

the TAPE RECORDER

PRICE 1/6

October 1959

Vol. 1 No. 9



IN THIS NUMBER

- Six pages of lively Pictures, Notes and News
- Readers' Problems
- How to Build Your Own Simple Tape Recorder, Part 2
- Details of New Products
- Readers' Postbag
- Reviews of Equipment
- How to Design Your Own Mixer
- Eric Simms on recording Nature's Sounds
- Hints for the Workbench
- Club news



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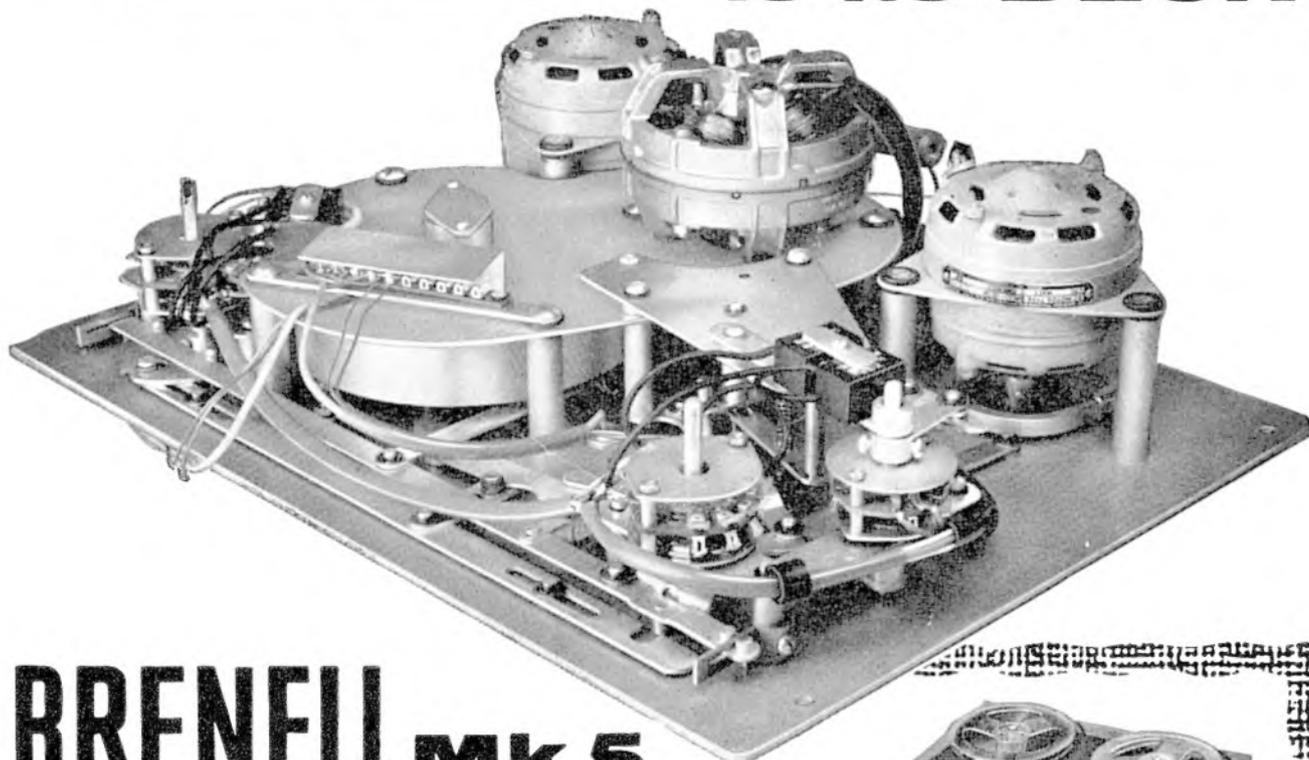
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Angus McKenzie in TAPE RECORDING AND HI-FI MAGAZINE



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MODEL R30/R40



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.

HOW MANY CYCLES?

From the correspondence we receive it appears that a great deal of importance is attached to the frequency response in its relation to reproduction, generally to the exclusion of the other inter-relating factors—i.e., background noise, harmonic distortion, transient response, etc.

In tape recording a balance must be sought between these factors in order to approach as near as possible to the original sound. The designer must decide at any given speed whether wide frequency response, low distortion or negligible background noise should be given precedence for one can be improved at the expense of the other.

It is generally known that to obtain the best results the bias is adjusted individually on each machine to an optimum level. This implies that a series of recordings are made at some middle frequency, generally 1,000 c/s and the bias current adjusted until maximum output is obtained on playback. The bias is then increased until the output drops by approximately 10 per cent. This is the optimum point at which distortion and background noise from the tape is at minimum. However, the high frequency output from the Playback Head is attenuated as the bias increases towards optimum; the higher this frequency the greater this effect. It is not known for certain the reason for this attenuation; one theory suggests the bias causes partial erasure, which is accentuated as the bias current increases.

A more plausible answer takes into account that at 7½ in. per second at 7,500c/s a distance of 0.0001 in. between tape and Playback Head results

in a loss of 6dbs or half the output; this loss is nearly proportional to frequency. Now below optimum bias the surface of the oxide coating on the recording tape is the most sensitive part and no distance loss can occur, subject to the tape making intimate contact with the Head. However, at optimum bias the point of maximum sensitivity or remanence is below the surface of the oxide giving a distance loss. This is borne out by the fact that a thinner oxide coating improves the treble response but with reduced overall sensitivity.

You are by now probably asking what all this boils down to—briefly then, a Playback Head with a very fine gap will not by itself improve the treble range unless:—

1. It is under-biased, which means higher background noise and greater harmonic distortion.
2. Receives large amount of treble boost during record which leads to increased distortion in the treble region, and excessive ringing on the transients.

Finally to see if you really need all those practically inaudible cycles try recording on a really good machine* at 7½ in. per sec. and then at 15 in. per sec. to compare the difference.

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

Mr.....

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Phone: ACOrn 4141

the TAPE RECORDER

Editor - - - - - MILES HENSLOW
 Technical Editor - - - - - John Borwick
 Assistant Editor - - - - - Julian Berrisford
 Editorial Offices - - - - 99 Mortimer Street, London, W.1
 Telephone - - - - - MUSEum 3967 to 3969

★
EDITORIAL

WHEN we first published *The Tape Recorder* in the early part of this year, we announced its policy of catering for the average tape enthusiast, and we laid particular emphasis on our determination to make it a paper that would be of special appeal to the non-technical user. In the main, we think that we have followed this course with reasonable fidelity; and judging by the barometer of our readers' letters, this magazine has at least succeeded in pleasing a large section of our readership. However, we have not been without some pretty sharp criticism, and this has come chiefly from the non-technical readers who are not in the least interested in home construction, home repairs and what-have-you. On the other hand, from the camp of "do-it-yourself" enthusiasts, and from the readers who rely upon constructive reviews, we have been similarly criticised for a lack of technicalities.

As a result of these prods and deliberations, we offer you this October Number in what we hope you will find to be a somewhat livelier style. We do not in any way intend to curtail the features which find such favour with readers of a technical and exploratory turn of mind: nor do we intend to soft pedal on our reviews and new products sections: these, we consider, should be of extreme importance to manufacturers, distributors and users alike. We are nonetheless conscious of the fact that a good seventy-five per cent. of each month's total of new tape recorder owners are people who want to know what others are doing—and, through this, to discover new uses and possibilities for their own instruments. Without in any way altering the "fair balance" of this paper, it is our aim to cater for this vast and growing army of enthusiasts in the brightest and most useful way possible.

This October Number is, therefore only the beginning of a new line of approach towards a better and more comprehensive coverage of the whole subject. As new features are introduced and as other changes are made, we shall rely upon our postbag more than ever before, for the criticisms and the guidance that are essential for any magazine which genuinely wishes to produce what its readers want.

We believe in the future of "tape" as *Item Number One* for home entertainment in the years that lie immediately ahead. We are convinced that the future of "tape" holds far more surprises and exciting developments, for the average user, than are apparent today. We are equally certain that the advances in techniques during the next two or three years will far outweigh all that has so far been achieved in the twelve years that tape has been with us. With confidence in our beliefs, and with a determination to press the cause of tape in every way possible, we intend to see to it that our reporting of all that transpires—our news and feature coverage—shall be second to none, anywhere. And, through this determination, our readers may depend upon us to implement our original statement, on page 7 of Vol. 1 No. 1. . . . "to maintain this magazine as the finest monthly publication in the world to cover this important field".

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COVER PICTURE

OF all the places one would *not* expect to find a tape recorder, the bathroom nearly tops the list. Mind you, there is just the *slightest* bit of suspicion in our trusting editorial mind that this picture may have something to do with publicity—that Miss Shane Cordell, up and coming TV starlet, does not normally rehearse her lines this way! But who are we to spoil the fun with such cynical observation? Let us rather conclude this short note with an angle of safety, and remind readers that one of the easiest ways of taking a lethal dose of electricity is to bring the mains supply, via *any* appliance, into the bathroom! So, Miss Cordell, for all our sakes, we hope the plug is pulled out—the electric plug, we mean!

NEWS and pictures of what other people are doing in the varied world of tape will again be given pride of place in next month's issue. A. Tutchings' *Beginner's Recorder* is taken a stage further, with instructions for first trial recordings. The *Readers' Problems* feature will go thoroughly into the questions of long and short microphone leads, and how to match all types of microphone into your recorder. *Tape Recorder Workbench* investigates mains hum, and together with details of *New Products* there will be *Equipment Reviews* including the Veritone Venus recorder. Why not make sure of your copy in advance by placing a regular order with your newsagent, or taking out a subscription from this office.

SUBSCRIPTION RATES

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

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TRR

BLOCK LETTERS PLEASE

Elizabethan

our readers write

★ We award a prize of one 7-inch spool of Tape each month for the best letter printed either on this page or amongst "Readers' Problems." This month the prize goes to J. Hone, London, W.12. Letters not intended for publication should be clearly marked NOT FOR PUBLICATION.

. . . about the man in the street

From:—J. Hone, 10 Aldbourne Road, London, W.12.

Dear Sir:—We are hearing a lot about tape cassettes and how much easier they will make it for the "average man-in-the-street" who finds operating a tape recorder "a bit tricky" (?)

But, what the average man may forget is that if the machine is used mostly for reproducing and the controls left in the "play-back" position, the record/playback head will become magnetized, thus putting a "hiss" on the pre-recorded tape which, of course, cannot be removed without spoiling the recorded material!

The solution? Making use of a de-fluxer—but . . . if the "average man" cannot operate a tape deck *without* a cassette, how would he understand how to use a de-fluxer! Yours truly

* * *

. . . more about morons

From:—Peter D. Turner, Cave Cottage, Oakridge Lynch, Stroud, Glos.

Sir:—On a technical matter I would not dare to differ from Stanley Kelly; but is he not exaggerating the difficulty of threading the tape on to the recorder? This may, indeed, not be "an operation recommended for morons"; but a blind friend of mine does it as quickly as I can. Spools with a single slot running the whole length of the flange are now usual: it only remains to slide the tape down this slot, and hold it in position with one finger while a couple of turns are given to the spool: a simple operation, not much beyond the reach of a moron; and one which renders quite unnecessary the chewing-up of the end of the leader-tape which so many of my correspondents seem to find necessary!

In my view, what we need is cheaper tape, *not* gadgets to render even easier an operation which is exceeded in complication by every man and woman in the world every day in the course of his or her own work. Cheaper tape would enable us all to do more experimenting—which means more editing and more wasted tape—and to retain a greater volume of recorded material. I believe that the cost of tape is the greatest single handicap on the future of recording: for the buyer of an expensive piece of equipment soon finds that the expense of pursuing the hobby is not inconsiderable. As for pre-recorded tapes, their cost is astronomical and makes lp discs seem relatively cheap. Yours, etc.

* * *

. . . about a specification

From:—P. N. Browne, The Manse, Morlais Street, Dowlais.

Dear Sir:—I eagerly await the appearance from a British factory of the following recorder, which I am sure would find a ready sale among those who possess good mains equipment.

A transistorised battery, half-track, single speed recorder, without erase, rewind, or playback facilities, and no internal loudspeaker, and instead of a Recording Level Meter, a separate Monitor Head to power ear-phones. The total weight not to exceed five pounds, and capable of being operated in either a vertical or horizontal position. A clockwork motor to drive spools and capstan. The reproduction from microphone should not be inferior to semi-professional machines on which the resulting tapes would be played. Yours truly

* * *

. . . useful switch for Wearite decks

From:—A. C. Griffith, Trevorrow, Hill Road, Haslemere, Surrey.

Dear Sir:—I think that readers of *The Tape Recorder* may be interested in a small modification I have made to my Wearite tape deck: this applies to all models. For convenience I shall

refer to Fig. 4 on page 255 of the July issue which shows the underside of one of these decks.

With the deck as supplied, on putting the main function switch in the record position, HT is applied to the Erase and Bias oscillator. If this is done accidentally whilst a recorded tape is



in front of the heads, a precious recording is likely to be seriously affected, even though the motors are not running.

To overcome this I have mounted an extra micro-switch (which can be obtained from Wearite or some shops) and mounted it on top of the motor switch (14 on Fig. 4). Two longer screws and a gentle easing of existing wire and condenser are all that is necessary. The plastic spigots on the motor slide (11) are long enough to operate this extra switch. It is now only necessary to wire this switch in series with the wire that goes from Tag G on the deck to the main function switch. The result of this is that the oscillator will not function in the Record position until the motor start lever has been pulled. This gives one an extra safety measure which I find most useful. Yours faithfully

Space prevents us re-printing the large photograph, but we show the function switch above with its identifying window.—(Editor).

* * *

. . . about swapping tapes with Germany

From:—G. Loraine, 14 Vega Road, Bushey Heath, Herts.

Dear Sir:—In November last year I purchased a Grundig TK20. I still don't know what a signal to noise ratio is and I wouldn't recognise wow and flutter if I heard them, but nevertheless I have had a wonderful time using my recorder to correspond with people in other countries. Having a natural horror of belonging to an organisation, I find my correspondents the hard way. For example, last March I wrote to the then newly formed West German magazine "Das Ton Magazin" and asked for their help in obtaining correspondents from the Rhineland. My letter was published in their April issue and during that month and May, the postman brought a constant stream of tapes, letters and postcards. I now have four German correspondents, three in the Rhineland and the fourth from West Berlin but I still receive the occasional tape from someone in Germany wishing to correspond.

It seems to me that owners of recorders have a wonderful opportunity of getting to know people from other countries and that such contacts can only produce goodwill between people living in our country and people abroad. I hope that your magazine will help to encourage such contacts between your readers and enthusiasts in other lands—perhaps, for example, you could arrange an article or articles on tape corresponding. Could you also continue to print articles like Daphne Oram's "How to

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Jason FM	22	15	8	Garrard 301	22	7	3
Jason JTV	25	18	10	Pamphonic 3000	31	10	0
Pye FM	20	0	7	Leak Stereo 20	30	9	0
Trix FM	26	5	0	Loudspeakers by—			
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OUR READERS WRITE—(continued)

make this *New Music*" and Maurice Brown's series "*The Art of Tape Editing*", which deal more with the aesthetic side of our hobby than with the technical aspect. These articles must have a great appeal to any reader who, like myself, was not born with a screwdriver in his mouth.

Finally, I have received requests from three people in Stuttgart, Frankfurt and West Berlin to help them to find correspondents in England. If any of your readers who would like to correspond will write to me with brief details of their ages, hobbies, interests, etc., I will be glad to pass them on. So far as I know, only the West Berliner can speak English.

Yours faithfully

* * *

... about salesmen

From:—R. J. Deacon, 101 Knaresborough Road, Harrogate, Yorkshire.

Dear Sir:—I was greatly interested to read the letters by Messrs. D. L. Gardner and K. Short in the June issue, and would like to say how much I agree with their comments.

Mr. Gardner's remarks about the lack of specialist advice when purchasing a tape recorder touched a very sore spot. Before purchasing my present Grundig (my fourth recorder) I had a cheaper machine of continental manufacture, working at the single speed of $3\frac{3}{4}$ inches per second. Having read all the articles on music recording I could lay my hands on, I had become obsessed with the idea that nothing less than $7\frac{1}{2}$ inches per second would possibly do. I therefore investigated possibilities of a well-known British made three-speed machine in the medium price range and arranged for a demonstration in my own home. The salesman brought with him what he was pleased to call some specimen recordings of "pop" music, made by holding the microphone in front of a radiogram. Needless to add, they were not very good.

To give the machine a fair test I suggested that we should make some recordings from the built-in diode connection of my FM radio. We made the usual connections with the screened lead and jack plug supplied with the recorder and recorded some light classical music at the three speeds provided. Result, at $3\frac{3}{4}$ inches it was impossible to tell whether the orchestra was playing in the key of B flat, B major or C major, such was the wow. At the speeds of $7\frac{1}{2}$ and 15 (the latter "really hi-fi" according to the salesman) there was no detectable wow, but the orchestra sounded as if were composed of tubas and bass trombones muted with about two pounds of cotton wool each. What the recordings lacked in treble they made up for in mains hum and motor rumble. I said I was very dissatisfied with the performance, only to be told that I was "much too fussy" and this particular make of recorder sold like hot cakes. When I had recovered from feeling like a school-boy who has been sent for by the Head, I made a recording on my own machine for comparison purposes and played this back. To say that the salesman's mouth dropped a couple of inches is no exaggeration of the facts. He admitted, quite frankly, that my recorder was considerably better at $3\frac{3}{4}$ inches than his was at 15 inches per second. He then packed his gear and departed.

What is the point of this you may well ask? Firstly that the salesman had no right to be demonstrating tape recorders to members of the lay public, and secondly, that two recorders of about the same price, but different manufacture will produce wildly differing results. The moral—consult an expert who knows his subject and knows intimately all the better products on the market.

Yours faithfully

* * *

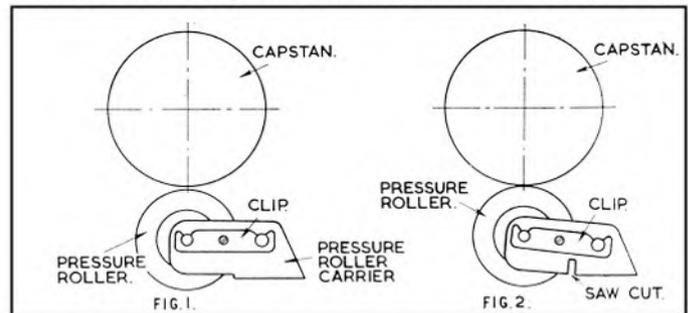
... more about modifications

From:—J. L. Smith, 21 Nutholt Lane, Ely, Cambs.

Dear Sir:—I own a Magnafon tape recorder fitted with the popular Collaro deck which recently developed severe "wow" on replay. I decided to attempt to locate the fault for myself and after several incorrect assumptions found that the cause of the trouble was insufficient pressure between the pressure roller and the capstan when the replay buttons were depressed as indicated in Fig. 1.

According to instructions in Collaro's handbook, adjustment to the pressure roller could be made by a cam situated under a hole to the left of the pressure roller, but upon inspection no cam was provided.

The solution which I eventually thought of was to remove the pressure roller carrier from its pivot and make a hacksaw cut in both the upper and lower surfaces of the carrier to a depth of $\frac{3}{32}$ in., and then by means of a vice, slightly bend the carrier as shown in Fig. 2. The carrier and pressure roller was then re-fitted, the spindle clip still located in the correct position as the



bending was only very slight, and upon starting the machine the trouble was found to be completely cured. I hope the above idea will prove to be of interest to any of your readers who may have a similar experience.

Yours faithfully

* * *

... about "Trusound" recorders

From:—D. C. Prior, 15 Olive Lane, Wavertree, Liverpool 15.

Dear Sir:—I have recently acquired a secondhand "Trusound" tape recorder. This machine is, I believe, five or six years old. As I am anxious to restore the model, I am seeking information as to whether circuit diagrams and spare parts are still available.

I am writing to ask if you could possibly put me in contact with anyone who could supply the circuit or keeps spares for old recorders.

Yours faithfully

* * *

... about self-demagnetisation

From:—H. F. Worth, 81 Sidney Road, Rugby.

Dear Sir:—It seems that some makers—mainly Continental—are claiming performance at low speeds as good as or even better than that obtainable at higher speeds, presumably by introducing smaller gap widths. The transport mechanism must also be very well designed and made if wow and flutter are to be comparable with higher speed results. This is all very fine for the user if it gives the whole story, but does it? My earliest essays showed how easy it was for the recording to deteriorate due to insufficient care in storage, the top frequencies disappearing rapidly, probably due to the proximity of A.C. mains. Even now, with the greatest care, my recordings (nearly all at $7\frac{1}{2}$ i/s) do not seem as good after a few weeks as when first recorded.

I would expect the self-demagnetisation of the high frequencies to occur more rapidly with the lower recording speeds. I should be interested to know what the experts say about this.

Yours faithfully

While the published frequency response at $3\frac{3}{4}$ i/s of many Continental machines to which you refer sounds most attractive, it would be as well to remember, perhaps, that the Continentals have rather landed themselves in a "Specification War". As a result, it might be said that the attainable frequency range has been extended at the expense of other parameters, equally important to good quality. To this end, a head gap of six micron, about $\frac{1}{2}$ thou, has been in use for some time, compared with the $\frac{3}{8}$ thou popular over here until quite recently. One of the drawbacks of a very narrow gap is that it shortens the life of the head. Your suggestion that demagnetisation is worse for very short recorded wavelengths is, indeed, another important argument for the higher tape speeds.

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HERE and THERE and EVERYWHERE

Tape Notebook

THE Midlothian County Council Assessor's department have found a novel use for a tape recorder. It is being used to report surveys in factories and other large buildings; the departments surveyors using it as a "notebook". The details are then transcribed and typed direct, eliminating all need for written notes. It has been found particularly useful for taping meetings etc., held on the site. The recorder employed is the Fi-Cord battery portable...

Nottingham Tape Show

Nottingham Tape Recorders Ltd., are organising a Tape Recorder Fair at the Albert Hotel, Derby Road, Nottingham on the 12th to the 15th November, inclusive. The Fair will be open to the public 2.30 p.m. to 9.30 p.m. on the 12th, 11 a.m. to 9.30 p.m. on the 13th and 2.30 to 9.30 on Sunday the 15th. Many leading manufacturers have agreed to attend. The hotel ballroom will hold a static exhibition for manufacturers' products and there will be a number of individual rooms for live demonstration...

Telefunken Celebration

On October 1st Dr. Hans Heyne, Chairman of the Board of Telefunken G.m.b.H., celebrates 25 years service with the company. He has been largely responsible for Telefunken's recovery and remarkable progress since the war...

E.M.I. Produce Videotape

E.M.I. Recording Material Division announce that they are now in production with Emitape for Video recording, developed and produced at Hayes. First supplies have already been delivered to the television industry. Emitape for Video recordings was used by Tyne Tees Television on their mobile Ampex unit at the Radio Show...

Winston Price Reduction

The manufacturers announce that because of the continually increasing demand for the Winston "Thoroughbred" tape Recorder, they are reducing the price of this recorder from £72 9s. to £61 19s. The price of the de luxe model is also being reduced from £82 19s. to £72 9s. These prices include the microphone and 1,800 ft. of tape...

Emisonic-Orthotone

An agreement was reached last March for E.M.I. Sales & Service Ltd., to undertake world distribution outside the United Kingdom of the "Orthotone" range of high fidelity units manufactured by Scientific and Technical Developments Ltd., of Wallington. This agreement has now been extended to cover the United Kingdom and all the products concerned will, as in the case of export, be marketed as part of the 'Emisonic/Orthotone' range...

New Tape Marking Method

Metro-Tabs are a new and colourful system for giving identity to recorded passages on tape both positively and instantly. A kit comprises two sets each of 20 coloured acetate

tabs enclosed in a storage wallet together with a comprehensive index. The first set of tabs is of solid colours for marking the upper track and the second of dual colours for the lower track. The manufacturers claim that they cause absolutely no interference with the running or erasing of the tape, the tabs being of less than 0.0002 in., and are visible on a wound spool. The manufacturers, from whom descriptive leaflets are available are Metro-sound Manufacturing Co. Ltd., 19a Buckingham Road, London, N.1. The price per set is 3s. 11d.

B.S.R.A. Stereo Symposium

The British Sound Recording Association have arranged a whole day Stereo Symposium, to take place on Saturday 31st October. The venue is the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1. Three aspects of stereophonic sound will be discussed—Hearing, Equipment, and Room Acoustics. These sessions are to commence at 10.30, 2.30, and 5.30., there being two papers, demonstrations and discussions in each.

The experts who are expected to speak include G. A. Briggs (Wharfedale), P. F. Walker (Acoustical), A. Livingstone (Tannoy), J. Moir (Goodmans), H. Brittain (G. E. C.).



Mr. G. Tughan gives the first demonstration of the new Veritone Venus Stereo Recorder at this year's Radio Show. The machine uses the Collaro Studio deck, and was used for live recorded comparisons with a five piece dance band.

"Sound" Answers Listeners' Questions

The B.B.C.'s Network 3 programme for recording and audio enthusiasts, entitled "Sound", is devoting a complete half-hour edition to answering questions sent in by listeners. This session will be broadcast on Sunday 25th October, at 3 p.m., and will be repeated at 6.40 p.m. on Monday 2nd November. The programme is introduced by John Kirby, and the panel of experts consists of Ralph West, I. W. Jarman, and John Borwick. We understand that the questions will cover a wide range of topics to interest readers of this magazine.

HERE and THERE and EVERYWHERE

continued . . .

● Readers of "Hi-Fi News" will have already seen this parrot on the October front cover, and will no doubt have read his remarks in the cover note. The interview over, however, he turned his attention to our equipment, and subjected the microphone to a most rigorous if somewhat unorthodox test. As a result, we are pleased to advise "Lustraphone" that they may now add the claim "Parrot Proof" to the specification of their LFV/H59—though this does not necessarily apply to the cable.

NOTES FROM CLUBS

THE Bournemouth & Poole Amateur Tape Recording Club (the Poole area being a recent addition) has elected Mr. V. Rawlins as the new chairman. They have two interesting visits lined up during the next few weeks—to the BBC studio at Southampton and the Black Museum at Bournemouth Police Station.

A new club room is to be established in the near future which will be more central to the Bournemouth and Poole area; until then the club will meet at St. Oldhelms Hall, Poole Rd., Branksome, Poole on alternate Tuesdays at 7.30 p.m. New members and visitors are welcomed.

The Rugby Amateur Tape Recording Society have started work on a tape documentary of the city. The plans were formulated at a special meeting in the Percival Guildhouse, and the details are not being made public as yet. However, we gather that there are to be five main divisions—school, market, industry, town and future. This documentary will, in fact, cover nearly every aspect of the town's history and activities and an invitation is extended to interested non-members to participate.

Nottingham Co-operative Amateur Tape Recording Society tell us that more than forty people were present at their first meeting which was held on September 3rd. After the business part of the meeting, Keith Fricker, one of the Society's organisers, presented a twenty-minute tape dealing with the history of the tape club movement. Included were greetings from the Leicester and Chesterfield Societies. The recordings for this magazine programme were collected over a period of about two months. In the week before the meeting, about twenty-five hours were spent in re-recording, adding narrative and linking music. N. D. Littlewood and K. Fricker are the Joint Secretaries.

Audio enthusiasts in this area will be interested to know that the Nottingham & District Technical College is organising a series of "Post Graduate" courses, one of which will be "Recording and Reproducing Techniques" (No. EX216), due to start on January 18th, 1960.

The Coventry Tape Club were given most impressive demonstrations of the entire range of Walters tape recorders at their meeting on the 17th September. The newly formed technical group were particularly interested and delved into the works whenever possible. This group plans to construct a number of useful items to be used by the club in general, and the first of these is a long mains lead with multi-plug adaptor board.

At a recent meeting of the Kettering & District Tape Recording Club, members contributed examples of their recordings for general entertainment and criticism. A highlight was Mr. Webb's



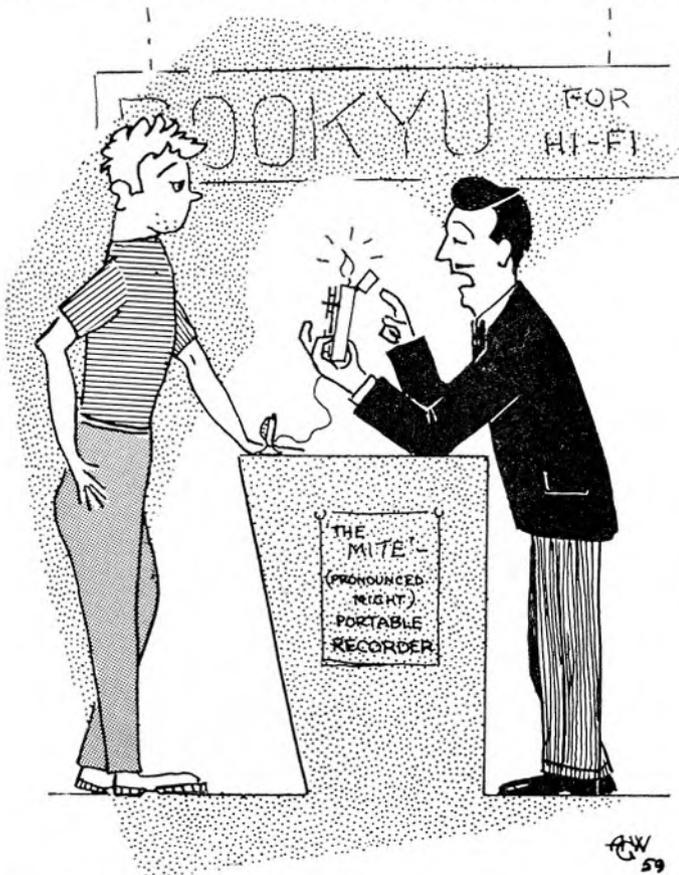
what others are doing

[AND WE WELCOME NEWS ITEMS AND ODD HAPPENINGS TO FILL THESE PAGES!]



Members and friends of the Edinburgh Tape Recording Club pose for a snapshot during their recent annual dinner.

The Leeds and District Tape Recorder Club propose sending a tape to Australia which they hope to get broadcast over the Australian Radio. The Editor of the Yorkshire Evening Post, and the Curator of Leeds City Museum are just two people who are helping, and it is hoped to get recordings of the Leeds Police Band and Choir, and the Leeds United players in their dressing room. The Leeds Rugby team are scheduled to appear on the tape; this was the first team to play the Australians this year.



"No erase head, sir. You just pass the tape smartly over the petrol lighter at the end..."

The Secretary of the **Edinburgh** Tape Recording Club, John Penman, has given us an account of how this club came to be formed. It claims to be the second club established in the British Isles, being beaten by Middlesbrough by only a few days. It all began when two characters, complete with tape recorders, showed up at a meeting advertised as a "Recorder Society". They were disappointed to find that the type of recorder intended was what the Oxford Dictionary describes as "an obsolete instrument of the flute kind". From this nucleus the club has now reached a membership of close on fifty, and shares a permanent home with the Edinburgh Cine Society. Meetings are held on the first Tuesday and the third Sunday of each month.

The activities of the Edinburgh Club are ambitious and varied. They are currently piecing together a feature tape for the Edinburgh Festival Society. This is for publicity purposes and copies are to be sent to a number of countries overseas.

* * *

At the Hampton Meeting on the 10th September of the **West Middlesex** Tape Recording Club, Freddie Westcott gave a very interesting demonstration of his new Mark 5 Brenell tape recorder which has four speeds— $1\frac{1}{2}$, $3\frac{1}{2}$, $7\frac{1}{2}$ and 15 i/s. Afterwards the Secretary gave a short demonstration on editing, splicing, dubbing and loop formation for playing repetitious sounds, e.g. as a basis for *musique concrète*. On the 24th September at Uxbridge, they were visited by Mr. Pontzen of Lustraphone, who demonstrated many of his company's microphones including the noise cancelling model which is intended for use at high ambient noise levels. It was amusing to see the otherwise sedate members yelling, whistling and clapping around Mr. Pontzen while he was talking into the microphone held close to his lips, but on the playback all that was heard was Mr. Pontzen's voice. Even more impressive was a repetition of this test using as background noise some jet and other aircraft sounds played on Mike Randall's Revox B36. It is noted that meetings are always held on the 2nd and 4th Thursdays of the month irrespective of the date, the first meeting being at Hampton and the second at Uxbridge.

* * *

Weymouth Hi-Fi and Tape Recording Club has now arranged a permanent headquarters and a full programme of events until Christmas. Anyone interested should please contact the Secretary—Gordon Butler, 53, Chapelhay Heights, Weymouth, Dorset.

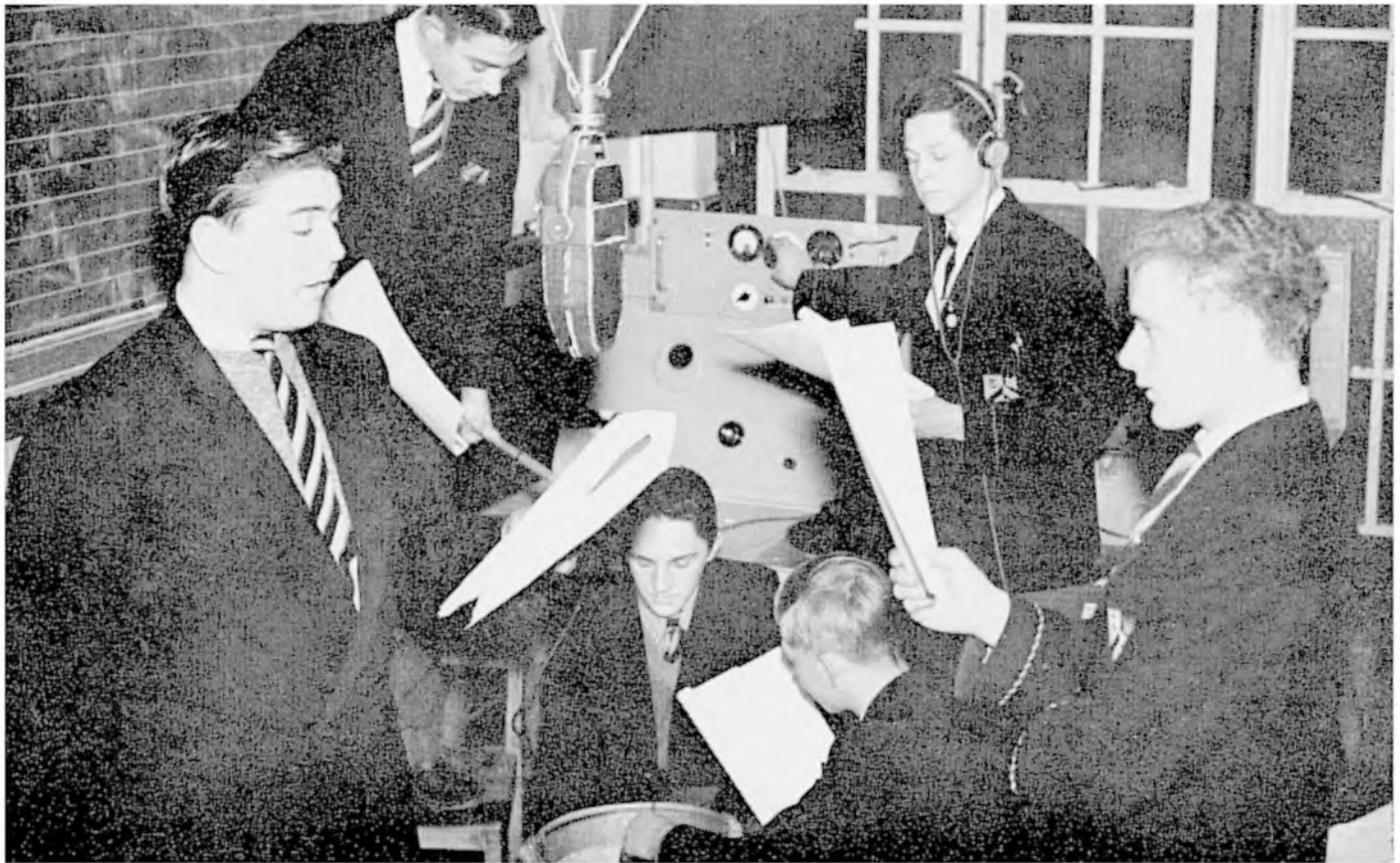
* * *

Is your club sending us news regularly? If you publish a newsletter or magazine, please let us have a copy. This is *your* page and only your news and pictures can fill it.

* * *

What Rochester can do...

AS an English, Speech and Drama teacher at a school of nearly 700 boys, it is my job to stimulate concise, clear and creative use of our language. We decided that we needed some medium through which the boys, working as a team, could create something essentially their own, and at the same time something which could excite an interest to extend beyond the



The boys of Rochester School are shown recording part of their programme, including sound effects (see bucket in centre).

classroom and school, into their free time, so as to make them aware of what was going on around them.

It seemed likely that the school's tape recorder could provide the answer.

However erringly they may do so, children love to build for themselves, to use their imaginations and to see the results of their work. Given the incentive, they are anxious to find out for themselves. A tape recorder offers scope in each of these directions.

So, with a group of boys, some of whom were enthusiastic and some merely curious, we turned our attention to the building of programmes in sound. A pilot scheme was started in a Radio Drama Club, which functioned out of school hours.

We formed a planning committee and decided to do a thirty minute programme called "*Rochester—Our Town*" (It is the boys' home town).

Ages and attainments varied considerably and the boys soon realised that jobs would have to be allocated to those best suited to them.

A small team undertook **Research**, so as to find out all they could about the City, its History, Industry and Government. Each boy worked alone until the team met to discuss their discoveries.

Script-writers and Editors

Meanwhile, another self-elected team labelled itself **Script-writers** and wrote descriptions of the City and its activities. A further team of **Editors** collected all the written material and selected what was to go into the script and what should be cut. Having started the ball rolling, I did no more than advise. The boys did all the work. They decided that the programme was to be a portrait of the City in sound, and suggested actuality sounds and interviews with prominent people. These included the Mayor, the Dean, the Secretary of St. Bartholomew's Hospital in Rochester, bargemen, the Curator of the Museum and the local stationmaster. We wrote to them and made appointments for recording interviews. This involved another team, and as

the group was not large, duplication was necessary. By the time the programme was finished, each boy had some experience of every team.

The shape of the programme soon became clear. We opened with a 'bang'—a train coming into the station. From there we viewed the City as it is today with its industry and modern bustle. We drew a contrast with the days of Dickens and went back to the founding of the City, and the building of the Cathedral and Castle in 1078. Modern ceremonies were linked with ancient tradition, and we gained permission to record the 'Mayor Making' of that year as an outside broadcast, complete with our own commentator. The Dean, recorded in the great choir of the Cathedral, ended our programme with a quotation from Edwin Drood, reminding us all that we had been 'looking down the throat of old time'.

Outside Recording in an Elderly Car

All these interviews and sounds needed a recording team which, centred on an elderly car, clattered about the streets from Hospital to Guildhall to Cathedral, setting up the equipment where they could.

Eventually, our research and writing complete, with the interviews taped and edited, the programme was recorded and played back to various forms for their criticism or approval. This amounted to three words "*Cor! Smashing, Sir!*"

Let's face it. The programme was *not* smashing. We had been too ambitious. The script was lumpy, the interviews too long and the interviewers hesitant—even off the point in some cases. The sounds were too loud and our equipment hummed to its wires' content—but it was the boys' own work; it was *their* programme, and it was they who learned about the City and its people. *And eventually it was the boys who sat down and pulled the programme apart, being almost brutal in their self-criticism.*

That was our beginning. With enthusiasm roused, we began immediately on a new venture. Of that, I hope to tell you more very soon.

Graham Jones

MAINLY NEWS

TRAVELLING WITH TAPE

**Mr. and Mrs Richard Harrison (Nel and Peter Motte, the authors), who have just returned from a 7,000-mile tour of the Balkans and Middle East, "record" some of their experiences.*

OUR assignment involved the collection of material for three books and numerous articles, as well as piloting a bubble car across Europe's worst roads and round Asia Minor; So quite obviously we weren't going to have time to stop and write down everything we wanted to remember. The solution was a tape recorder and a portable at that. There just wasn't room for



The circle indicates what you can't see—the Minivox tape recorder. The bubble car (inset) is bumping along a typical stretch of road.

equipment to step up the output from the car battery. Also, there would be times when we wanted the recorder away from the car.

Our final choice was the *Minivox*, which offered all that we needed, and which would give 100 minutes' play on the smallest reel of thin tape. The makers offered to produce a fully tropical model for us, and we gratefully accepted. We were going to meet some pretty high temperatures before we got home.

As a note-book, the recorder was a complete success. Our technique was to make notes of everything important—at the time and on the spot when possible—and to type these out at our leisure (not that we got much!). We had devised a headphone attachment for play-back. We also used the recorder for verbatim work, taking it with us to interviews when absolute accuracy was essential. These occasions included a visit to Sofia University and a meeting with the Bulgarian Union of Authors.

But we found the recorder had another use, and that was to make friends. We needed to establish intimate contact with all sorts and conditions of people in ten different countries. Our approach was for one of us to get into casual conversation with

our victim, while the other made an unnoticed recording. This was played back. The victim was intrigued and wanted to know more about the tape. Soon we were firm friends, and able to get the information we wanted. Since we taped this also, we could transcribe at our leisure any phrases that had been difficult to translate at the time.

While tape recorders are on sale in the larger towns in the Balkans (at a cost of round £120), they were a complete novelty in most of the villages. When requests to play our "radio" resulted in the audience hearing their own voices, their astonishment was quite ludicrous.

Once we were stuck in a tiny Macedonian village, owing to mechanical trouble with the car. Our first audience consisted of children who sat round our tent in a semi-circle and stared. We recorded their conversation and played it back. Within half-an-hour we had them singing their national songs (and a pretty ghastly row it was!). That evening the whole village turned out to hear the magic box. Finally they all insisted on singing. The scene round our tent was like a revival meeting. As a result we made contacts that might otherwise have been lost—one of them with a man who had been a Partisan under Tito during the war.

* * *

BURGLARS—PLEASE NOTE

THIEVES who recently blew open a safe at the G Club in Soho used a Grundig TK5 to press cloths against the safe and muffle the sound of the explosion. Although the machine was badly scorched, it was found to work perfectly, and the two delectables in the photograph are inspecting the damage prior to rehearsals.



When not helping burglars, the TK5 is normally used for recording band music for the cabaret, thus enabling the girls to rehearse their routines at any time. It also assists the band in working out new musical arrangements.

good recordings deserve good Scripts!



Sparkie Williams, champion talking budgerigar of Great Britain, criticises the script for his next recording. With his fantastic memory—he has a vocabulary of 400 words and can recite 200 complete sentences—it is no wonder he thinks scripts are ‘for the birds’.

... at last — more tapes!

AFTER a gap of nearly twelve months, EMI have recently made two new releases of recorded tapes. The first (List No. 11) was dated September 4th, and the second bears the date of October 4th. This seems to point to a regular monthly supplement to the catalogue; and if so it will be a most welcome decision. There is only one thing wrong with these tapes. Their extravagantly high price. In all other respects they are truly first-class products, and they deserve the attention of every owner of a good quality tape player.

In quibbling about the price, one must remember that EMI invaded completely virgin territory when they launched Tape Records in the United Kingdom several years ago. It is probably true to say that there were not more than six stereo tape players in private use in the whole of Great Britain when the first release of stereo tapes was made. In other words, there was virtually no sale whatsoever for these products, and very little more for their mono counterparts. Whereas, on the other hand, the cost of producing them—even in reasonable quantities—was exorbitantly high. One of the main reasons for their high price was undoubtedly the small demand which, compared with the sales of disc-recorded music, was infinitesimal. However, circumstances have changed drastically during the past 12 months, and today it seems likely that a very big buying public exists for tape records of outstandingly high quality, such as these.

The recent releases for September and October are made up of two stereo tapes each, on both the *H.M.V.* and *Columbia* labels. They are all ‘Classics’, but of the decidedly popular brand which successfully fill the Albert and Royal Festival Halls. October’s release, which will be reviewed in our next number, is as follows: on *H.M.V.* ‘*Philharmonic Pops*’ (SCT 1525), played by the Sinfonia of London, under Robert Irving, price 55s., and Tchaikovsky’s ‘fifth’ (SAT 1023) played by the Philharmonia Orchestra, under Constantin

Silvestri, price 63s. On *Columbia*, Beethoven’s No. 8 Symphony, played by the Philharmonia under Otto Klemperer (BTB 308), price 47s. 6d., and Respighi’s ‘*Pines of Rome*’, Liszt’s ‘*Les Preludes*’, and Berlioz’s ‘*Le Carnaval Romain*’, all played by the Philharmonia under Herbert von Karajan (BTA 132), price 63s.

The September Releases

Beethoven. Symphony No. 6 (‘*Pastoral*’) played by the Philharmonia under Klemperer. *Columbia* stereo tape BTA 131. Price 63s. One of the most pleasantly spacious performances of this work yet recorded, and recorded superbly.

Offenbach. ‘*Gaieté Parisienne*’. Played by the Philharmonia Orchestra under von Karajan. *Columbia* stereo tape BTB 307. Price 47s. 6d. Gay, witty music played with delicious polish and charm. The recording is, again, superb.

Rimsky-Korsakov. ‘*Scheherazade*’. Played by the Royal Philharmonic Orchestra under Sir Thomas Beecham. *H.M.V.* stereo tape SAT 1021. Price 63s. This symphonic suite, as played by the greatest living master of such music, is sheer beauty from beginning to end. Its magnificence is well matched by its recording.

Nights in Vienna. Comprising Suppe’s ‘*Morning, Noon and Night in Vienna*’ overture; Heuberger’s ‘*Der Opernball*’ overture; Johan Strauss’s ‘*Die Fledermaus*’ overture; Lehar’s ‘*Gold and Silver*’ waltz; Reznicek’s ‘*Donna Diana*’ overture; Josef Strauss’s ‘*Sphärenklänge*’ waltz; Johan Strauss’s ‘*Radetzky*’ march. All played by the Philharmonia Orchestra under Rudolf Kempe. *H.M.V.* stereo tape SAT 1022, price 63s. This is an exceptional tape in terms of really enjoyable musical content. Its recorded quality will not disappoint owners of even the most advanced hi-fi tape installations.

J.S.



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Elizabethan Princess	39	4 19 0	3 0 0	0
Saja Standard	45	6 5 0	3 8 4	
Electron	47½	6 17 6	3 12 2	
Wyndor Viscount	49	6 19 0	3 14 2	
Spectone 161 ex Tape	49	6 19 0	3 14 2	
H.M.V.	50	7 0 0	3 15 10	
Telefunken 75 KB with mike	56	7 6 0	4 5 10	
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	
Elizabethan Major	59	7 19 0	4 10 0	
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	
Telefunken 85 6w.*	79	9 19 0	6 1 8	
Grundig TK35*	82	10 12 0	6 5 8	
Harting HM 8	86	12 6 0	6 10 0	
Sabafon Automatic*	89	13 19 0	6 13 4	
Simon SP4*	95	14 15 0	7 1 8	
Tandberg 4TR*	124	20 4 0	9 3 4	

All machines are complete with tape and microphone, except those marked * which are without microphone.

WHY not add a tape deck with pre amp to your present equipment. We highly recommend the Telefunken deck at 63 gns. Details on request.



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Readers' Problems

★ Do you have any questions on tape recording—technical or otherwise? If so, send them to our Editorial Office and we will find the answer or invite readers to help. But please limit each letter to a single query to help us in answering.

Erasing "Print-Through"

Dear Sir: Kindly let me know if there is any known method whereby tapes suffering from the above may have the original recording restored.

Yours faithfully, A. G. S. Plymouth.

We have heard of fairly mild cases of "print-through" being tidied up by the application of weak erase voltages. The theory is that a small degree of high frequency erasure may render the unwanted (and weaker) signal inaudible, while leaving the desired programme relatively intact. However, we have no first-hand experience of the operation, and suggest that you carry out a few experiments beforehand. Perhaps a reader can supply more information?

Recording from TV

Dear Sir: Regarding Mr. F. E. Woods article in the August Tape Recorder, headed "Living with Tape", he mentions that direct connections were arranged from the TV sound to the recorder input.

I have always thought that it was dangerous to fiddle with the back of a TV set as the voltage is too high. I would be very grateful indeed if you could tell me how one can record direct from the TV set. Thank you for producing two first rate magazines and I hope they will carry on being a great success.

Yours faithfully, J. E. P., Maidstone.

It certainly is dangerous to "fiddle with the back of a TV set" and in all cases of doubt you should leave it alone, or call in an expert. When the set is known to be of the AC/DC or "Universal" type, no connections to the chassis should be attempted at all.

A method of making a so-called "diode" connection from the volume control was described in our April issue. A simpler solution is to take a lead from the loudspeaker tags (or Ext. L/S terminals) with or without a step up transformer. To describe this we cannot do better than quote from another reader's letter:

Dear Sir: Having aquired a new tape recorder, I was eager to make some recordings from our TV-Radio set, but was disappointed to find no "Ext L/S" sockets on the set, nor on a record player, or even on the portable radio and after trying microphone recordings, the background noise of the kitchen sink, the clocks ticking and the "budgie" babble soon put that off.

However, I had seen it was "easy" to connect up to the

volume control, so carefully took off the back of the (rented) TV—Ugh!—I daren't, and even so—where was it?—but—and here is the point of my letter, I did see the two wires going to the PM Loudspeaker, from the output transformer, and after carefully connecting a length of flex to these and to a jack socket screwed under the set—I was enabled to make excellent recordings through this low-impedance socket on the tape recorder. I did the same on the record player and portable radio, suitably mounting a jack-socket for easy connections.

Later I included a further improvement by interposing an ordinary radio output transformer in the lead to the tape recorder, connecting the 3 ohm winding to the loudspeakers on the sets, and the high resistance winding of the transformer, to the tape recorder inputs. Such a transformer can be bought quite cheaply and, more important, completely isolates the set from the recorder and ensures safety in case of a "live chassis".

Yours faithfully, A. N. B., Warrington.

Battery-operated portables

Dear Sir:—I would be grateful if you would send me details of all portable tape recorders on the market (both British and Continental and, if possible, American) which fulfills the following spec: 1. Portable (less than 10 lbs or so), 2. Battery driven (not rechargeable batteries). 3. Using standard speed(s) and tapes.

The purpose of this enquiry is to find a recorder suitable for use by missionaries all over the world.

Yours sincerely, H. S. E., Bowden.

So many battery machines have appeared in the last few months and there are presumably more on the way, that our answer may not be completely up to date. However, to take your requirements in order:—

Weight: Machines weighing less than 10 lbs include the Challen Instrument Company's Minivox (9 lbs); Fi-Cord (4½ lbs); GBC Clarion (5 lbs); Stuzzi Magnette (8 lbs); Grundig Cub (5½ lbs).

Non-rechargeable batteries: From the above, all use non-rechargeable batteries except the Fi-Cord.

Speeds: The running speeds of the above machines are standard (as follows), except that the Grundig Cub speed (nominally 3½ i/s) increases as more tape is wound on to the take up spool: Minivox (1¾ i/s); Fi-Cord (1¾ and 7½ i/s); Clarion (3¼ i/s); Stuzzi Magnette (1¾ and 3½ i/s).

Tape in Australia

Dear Sir:—A friend in England sent me a copy of your magazine—*The Tape Recorder*. I was delighted with it, especially as we haven't such a mag in this country.

I have a one speed tape recorder, 3½ i/s which takes reels up to 5 in. and I'm writing in the hope that some of your readers would like to correspond with me via the tape recorder . . . I promise a speedy reply and interesting tapes. I would also welcome any literature, information etc., on the tape recorder.

Out here tape recorders are beginning to "take on" but unfortunately there are no magazines to educate or instruct owners of the full use of their machines so that the majority of owners fail to get full benefit from their recorders. As far as I can fathom out there are no, or very few, tape recording clubs in this country, simply because I suppose the recorder here at present is in its infancy—but I understand its popularity is growing rapidly.

I use mine mainly for corresponding with folk overseas and obtain quite a lot of fun and entertainment from it in this way. I find taping letters far more satisfying than setting down thoughts in cold print. Here's wishing your magazine long life and continued success and bumper circulation and may I win a lot of tape pals through its columns.

Yours sincerely, B. Beattie,
26 Moleworth Street, Coburg-Victoria, Australia.

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OUR BEGINNERS' RECORDER

second easy building stage

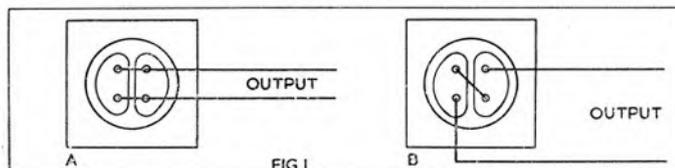
● Last month, in the first of these articles, we assembled a transistor amplifier and used it to boost the signal from the microphone/headphone unit. Now we add a tape head and experiment with simple playback.

THE photograph shows the rubber heel mentioned in last month's article, it will be seen that it is used as a drive capstan to a loop of tape for the playback experiments. If any of you have anticipated this article and bought a normal D shaped heel you may be in some slight difficulty with "wow". The diameter should be $1\frac{1}{2}$ in. but 2 in. will do. The size of this type of heel is usually marked on the heel itself. Do not attempt to enlarge the centre hole but force it on the centre spindle of the turntable so that it grips firmly and runs concentrically. An eccentricity of a few thousandths of an inch will not matter for this experiment, and if one heel is untrue you always have a spare. At a turntable speed of 78 rpm the tape will be driven at approximately 7.5 i/s.

A loop of pre-recorder tape should be made by cutting a length of about three feet and sticking the ends together with splicing tape or sellotape. An empty reel may be used as a roller at the other end of the loop, and this should be placed on a $\frac{1}{4}$ in. spindle which is mounted on a heavy base. Do not be afraid to improvise in these experiments, a pencil forms a useful $\frac{1}{4}$ in. spindle and a block of wood tied onto a few books will provide a base of approximately the right height and adequate weight. A small washer of cardboard or felt should be placed under the reel so that it runs freely and does not foul the base as it rotates. Next the magnetic playback head must be mounted as near to the turntable as possible so that the pole pieces contact the bottom track on the tape. 4BA screws and nuts can be used for tape guides, and the second photograph shows one method of mounting the assembly in the right position.

First Experiment in Tape Replay

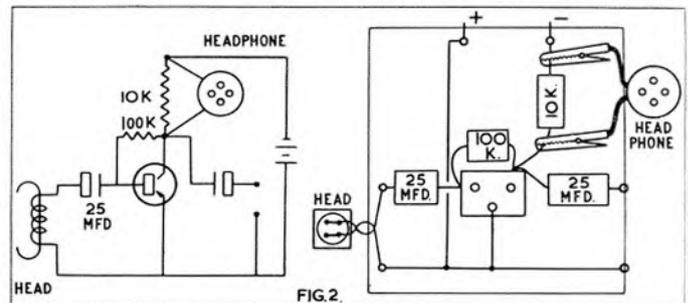
The terminals of the head should be wired as shown in fig 1a, and connected to the input terminals of the single stage transistor amplifier described last month. If all is well the brief recording will be reproduced on the loudspeaker of the radio set, and no



doubt this will thrill the experimenter more than somewhat, but he should be warned that his wife, family, or neighbours will take a dim view of the repeated reproduction of the same snatch of radio programme or news bulletin, and will be eligible for entrance to the nearest mental home if this treatment is prolonged.

If the loudspeaker of the radio set can be disconnected, the

transducer can be used as an earphone by connecting it in place of the speaker, so that further adjustments may be made without causing a family crisis. These adjustments are aimed at getting the loudest volume, and the best possible high note response from the loop recording. The guides or head should be moved so that the head poles coincide exactly with the recorded track. If the tape is recorded on both tracks and the head is moved up too far it will be found that both tracks will be heard together, one forwards and one backwards. When the maximum volume has been obtained, the head should be rocked slightly to



see if any improvement of the high note response is possible. Final adjustments may be made either by altering the number of washers under the two securing screws of the head or by altering the height of the tape guides on either side of the head.

In a tight loop system such as this the tape tension should be adequate to hold the tape in intimate contact with the head but if it is found that slight pressure on the face of the head improves volume and quality the following points should be checked:—

- See that the head face is perfectly clean, any oxide deposit should be removed with the finger, or a match stick—never with anything metallic—and the surface polished with a soft rag.
- See that the head is not tilted backwards or forwards relative to the tape guides or the natural run of the tape. Adjust if necessary.
- Increase the loop tension slightly by moving the pulley reel a little further away from the turntable.

The Amplifier can be used for Monitoring

If all these remedies fail it may be necessary to improvise a pressure pad from a bit of steel wire or flat spring and a scrap of felt. Some of the older acetate type tapes tend to "cup" slightly under conditions of high humidity and for these a pressure pad may be essential.

If the headphone is connected to the output of the preamplifier instead of the radio set it will be found that very weak

OUR BEGINNERS' RECORDER

second easy building stage *cont.*

signals are audible. The level may be increased by connecting the phone directly into the emitter circuit of the transistor. This may be done by bridging it across the 10K load resistance. The impedance of the transducer is low compared with the resistance so that most of the current passes through the phone winding. (See fig 2).

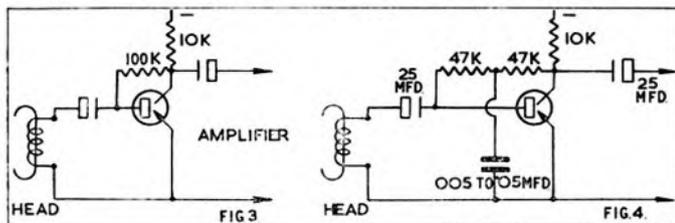
Modifications to the basic amplifier circuit

This experiment is instructive as it shows that a single transistor amplifier is adequate for headphone monitoring of tape recordings, and many readers may consider adding this facility to their normal tape recorder. It is only necessary to find a suitable mounting position for the monitoring head, somewhere in the tape path between the record head and the take up reel, to be able to check a recording a fraction of a second after it is recorded. The loop experiments described above provide useful experience in setting up such a system.

The basic transistor amplifier playback circuit is shown in fig 3. The 100K resistance couples the output electrode of the transistor back to the input electrode, and this gives rise to what is known as negative feedback which acts to reduce the gain of the amplifier as the input impedance rises. As the head impedance is mainly inductive the impedance rises with frequency, so that the effect of the feedback is progressively to reduce the gain at high frequencies.

High Frequency Compensation

Over the middle frequency range this effect tends to compensate the rising response of the head, but at very high frequencies we require all possible amplification to make good the magnetic losses in the tape, and for gap and scanning losses in the head. By using two 47K resistances in series to supply bias current to the base electrode of the transistor, and connecting a .02mfd condenser from the junction to earth, it is possible to remove almost completely the feedback at high frequencies, and

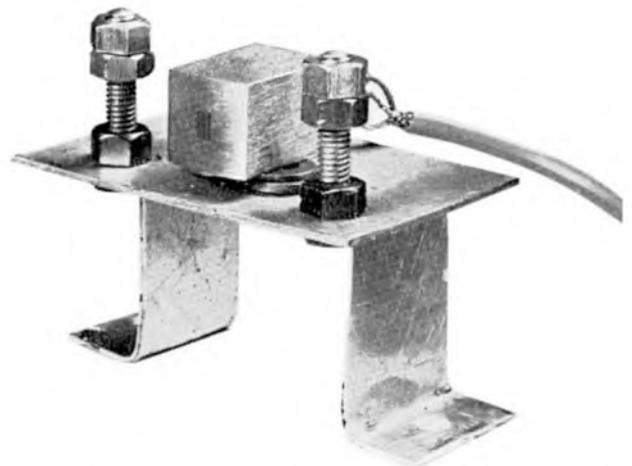


obtain the full gain of the transistor just where it is wanted. It should be pointed out that full gain is also available at very low frequencies where the impedance of the head has fallen to a low value so that the feedback is again very low. Fig. 4 shows the modified circuit.

Try various values of bypass condenser

If the playback head windings are connected in series to make the impedance higher (see fig. 1b), the feedback circuit has still more effect, and the playback response may be varied over quite a range

by altering the value of the bypass condenser. Try condensers in the range .005 to .05 mfd. A small condenser will cut the high note response to favour the bass frequencies, and a large one will increase the top response to tip the tonal balance in the opposite direction. It should be emphasised that this simple circuit by no means fully equalises the playback characteristic,



Showing one method of mounting the magnetic record/replay head for ease of positioning. The 4BA screws and nuts have been added to act as simple tape guides.

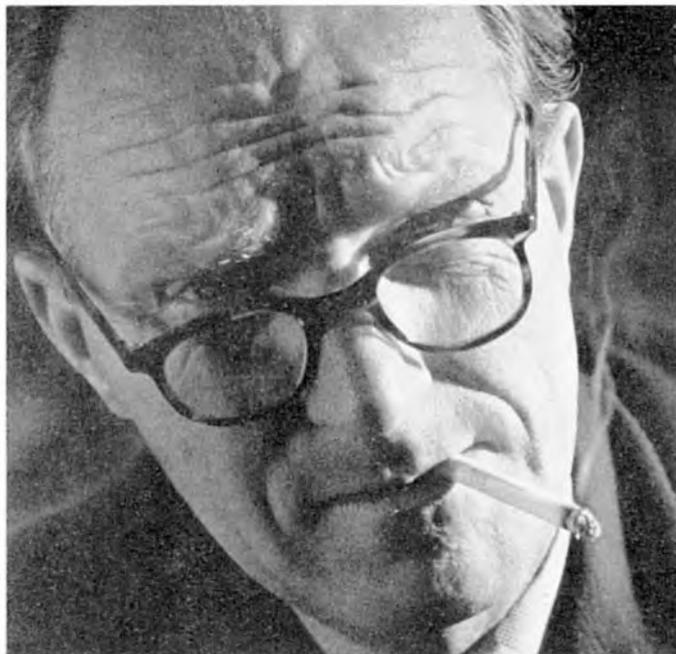
but it does enable some measure of correction to be achieved and it illustrates the principles which are used in more advanced circuits.

This experiment must be performed via the loudspeaker so that the small differences can be fully appreciated. The repeating loop is a help here as the effect of a circuit change can be tried on alternate repeats of the same programme material.

Next Month:—In the next article we start recording experiments, first via the microphone and the single stage transistor amplifier, just to show how very simple a magnetic recorder can be, and then from the loudspeaker terminals for radio recording. You will require a small horseshoe magnet in addition to the apparatus so far used in the playback tests.

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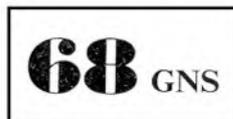
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... tape recorder workbench

Practical suggestions for the tape handyman _____ by A. Bartlett Still

No. 5 CURING CROSS-TRACKING

IN my notes this month I am going to begin by dealing yet again with an aspect of the record/replay head. If there is any reader wondering when we are going to get "into the works", bear with me, remembering that the whole performance of your machine ultimately depends on the relationship between Head and Tape.

It is fairly common practice to use pressure pads to keep the tape in intimate contact with the head, the tape rollers on earlier Grundigs fulfil the same purpose, but their task should be made as easy as possible. Try the effect of gently pulling the pressure pad away from the replay head while you are playing a familiar piece of music. You may find that the treble, or at worst, the whole signal, will disappear, indicating that the *natural* path of the tape is away from the head face. Should this occur, look carefully to find out why. It may be that the tape, no longer deflected by the pad, is assuming a direct path that is completely clear of the head, or perhaps the head is tilted, at right angles to the tape path, so that only the top or bottom is touching. In the latter case the head mounting arrangements will often allow the appropriate adjustment. Before touching any of the mounting screws, however, be sure in your own mind that the adjustment you propose to make will tilt the head, and in the right way. If the tape is completely clear of the head there may well be little you can do. It probably means lateral displacement of the tape guides or the head itself, not normally provided for on domestic machines. It is also an indication that the design of the deck leaves something to be desired.

Check the Pressure Pads

These adjustments have a two-fold object. Allowing the tape to follow its most natural path will minimise the effect of crinkles, folds, or other deformities, and will also mean that a lighter adjustment of the pressure pads will suffice. This is important in preventing excessive head wear. In checking the pressure pads it will be realised that the plane of the pad should be exactly parallel with the front face of the head so that the tape is truly ironed out between them.

Misalignment of the heads, and maladjustment of the pressure pads can increase wear and reduce frequency performance, as we have seen, but these effects are not always immediately apparent. Tracking errors (Cross-tracking is but one example) can immediately produce an annoying signal in the background of the recording, though the conditions under which it is noticed tend to vary depending on the particular tracking error. What is meant by a tracking error? The tape we use is $\frac{1}{4}$ in. wide, and this accommodates two tracks. Each track is therefore just under $\frac{1}{8}$ in. wide, allowing a central safety zone (rather like a dual

carriage way road). If the safety zone is not there, or if the tape is allowed to wander vertically across the head, cross-tracking occurs.

The first step towards correct adjustment is to ensure that we can see what we are doing! A few feet of spare tape are necessary, and a section in the middle should have all the oxide wiped off with the aid of a piece of rag and some tape cement. The clear section should be long enough that we can run the tape normally, operating the temporary stop (or holding the supply reel) so that clear tape is in front of the heads. By pulling the pressure pad clear we can see, through the tape itself, which part is scanned by the pole pieces of the record and erase heads. Note that whereas I have previously referred to alignment of the record/replay head, in this question of tracking the erase head is equally important.

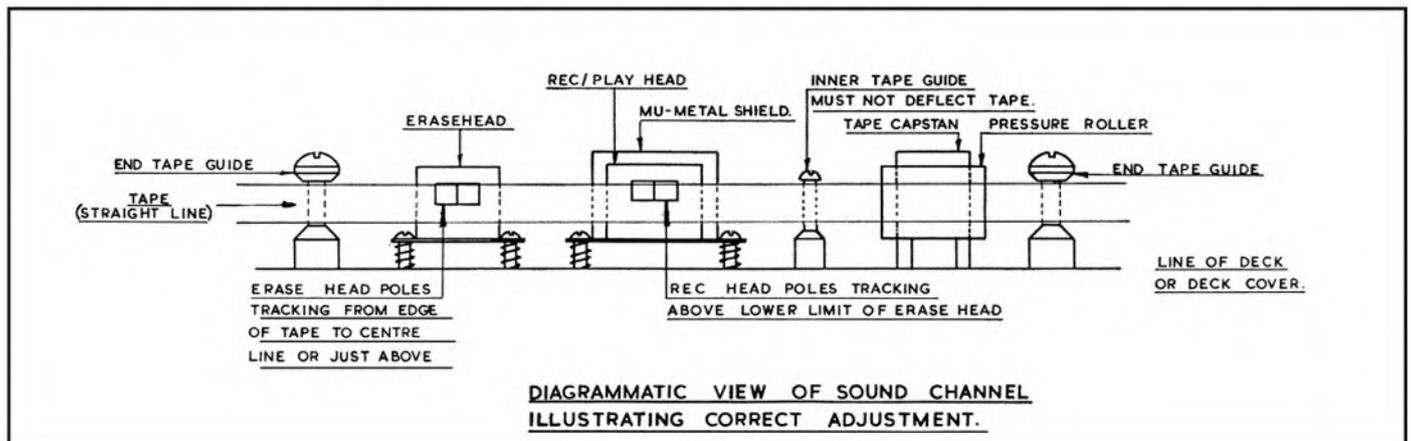
Line up the Erase Head

On a domestic machine probably the easiest tracking to determine is to arrange for the top (or bottom) edge of the erase head to be in line with the edge of the tape. The record head is then allowed to show a hair line outside the edge of the tape. This will ensure, first that the safety zone is present, and, second, that the erase head is fully wiping the track of the record head. A trace of a previous recording, due to inadequate coverage by the erase head, sounds similar to cross-tracking, but can appear when the other track is blank. Whether the head positioning appears to be correct or not, check the line of the tape through the length of the sound channel. There should be no tendency for the guiding arrangements to deflect the tape in the vertical plane between the two ends. Any inner tape guides should merely restrain the tape's movement away from the straight and narrow.

If the heads have vertical adjustment, they may be moved as necessary to align them with the edge of the tape. But if the only adjustment on the heads is for alignment, (tilting) then it may be necessary to bring the tape to the heads, i.e. raise or lower the whole line of the tape through the sound channel by making the right adjustment to all the tape guides. The illustration should give you a fair idea of the correct adjustment.

Finally a few words of warning to save any headaches. Never use a magnetised screwdriver to adjust a head mounting. Check the head mounting carefully, three-screw or collet mounting can be raised and lowered, one or two screws—look again. Run plenty of tape through while checking and take your time, use a good piece of tape *and* an old crumpled piece. A well designed and correctly adjusted machine should handle both, the latter will check correct pressure pad tension.

Next month we'll have a look to see what can be done to reduce playback hum.



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By Eric Simms

MORE SOUNDS FROM NATURE'S STOREHOUSE

PART 5——NIGHTS WITH BADGERS



“Slowly sniffing the night air, a black nose was pushed forward, followed by a long and low body. This was the boar—the male badger.”

DURING the last few days of July this year I took a tape recorder to the Field Study Centre at Juniper Hall, near Box Hill, in Surrey. Mr. John Sankey, the Warden of the Centre, keeps a number of tame badgers for research and study, and in the hope that it will be possible for these badgers to breed in captivity. Late one evening I was able to watch one of these badger pairs going through its pre-mating courtship. The sow, or female, lay on the ground in a submissive posture and made a soft, drawn-out moan—a kind of invitation note. This call I was able to record for the first time and so bring my total of different recorded badger sounds to thirteen. I had never seen this pre-mating behaviour before and had never previously heard the sow's invitation call—it was a great experience in my recording work.

A Difficult Animal to Study

The badger is my favourite British wild mammal with a distinctive independence of its own. It is a difficult animal to study in the wild and its native shyness makes this task much harder. Until recently very little was known about the language of the badger and I was most anxious to carry out a careful study and analysis of this interesting aspect of the badger's life. It is, of course, possible to place a microphone in such a position that a badger will approach it more closely than it would a human observer. With its highly developed sense of smell a badger can detect traces of human scent on the ground long after a person has passed by.

Badgers will move or stand by a microphone only six inches from their nose; a human observer would be fortunate indeed to remain undetected six feet away. It was clear that certain methods of field recording showed a great advantage in this respect. In May, 1951, Major Maxwell Knight invited me to visit a badger sett—the name for the badger's underground home—where the animals were apparently conditioned to the presence of man. This sett was in woodland and close to several large houses with gardens through which the badgers carried out their nightly foragings. These remarkable animals had accepted buns thrown to them and had even been known to climb dustbins in order to knock off the lids from others nearby.

Surveying the Sett

Before making a full-scale recording expedition, I went down on a lovely July afternoon in 1951 to make an examination of the sett. It was the biggest I had ever seen and covered an area some seventy-five yards long and forty-five yards wide. The holes into the sett were grouped around a big central mound, which was surrounded by pine, oak and ash trees, a couple of cedars and huge clumps of rhododendron. It was as attractive a site for a sett as I was ever likely to see. I found nearly forty entrances but of these only fourteen appeared to be in use. There were clear signs of badgers on the loose, sandy earth with imprints of the typically square pad-marks with five toes. There

were other clues as well; ground where the moss had been systematically turned over; a group of lavatory pits at the bottom of the mound; a little tuft of black and white hairs caught on a bramble and the stump of a pine-tree scratched from top to bottom by immensely strong claws. I spent that night from 8.30 p.m. until 1.30 a.m. in the fork of an old contorted cedar from which I could survey the whole central area of the sett.

“Pinpoints of Sound”

As the evening chorus of bird-song died away my attention became more and more concentrated on single pin-points of sound. A blackbird clacked from the depths of the rhododendrons. A mosquito buzzed and hummed about my face. A foraging field-mouse trod delicately on a dead leaf. The light was now failing fast. As I peered down, the gloom seemed to advance and recede in strange and rhythmic waves. Then a sharp thrill ran down the nape of my neck. Yes! I had really seen it. At a moment of receding darkness I spotted a striped head in an entrance just below me. I held my breath in silent anticipation. Then the face was withdrawn. Slowly sniffing the night air, a black nose was pushed forward followed by a long, low body. I glanced down at my watch; the time was twenty minutes past nine. This was the boar—the male badger. A couple of minutes went by and, while the boar sniffed and scratched himself, another face appeared at the same entrance. It was the sow and she took twice as long as her mate to come out fully into the open. Then both animals ran at speed to the foot of one of the rhododendron clumps.

The Badger's Scream

Half a minute went by and then the still, summer evening was ripped apart by a dreadful scream. For over four minutes it continued without interruption. Then it finally stopped and an oppressive silence rolled over me like a strange fog. I had never before heard the badger's scream at such close range. As I sat in my vantage point in the cedar I was brought back to the present by the crash of undergrowth as the two animals made off. That night's vigil taught me several things, including the timetable of the local railway station and the presence of jet aircraft in the neighbourhood.

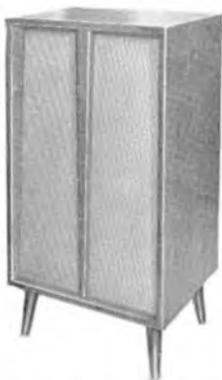
On the 13th of August, 1951, I returned with Bob Wade. I placed three microphones around the sett; one was eight feet from a tunnel mouth; the second was secured to the old scratching stump and the last was lashed to a pine-tree near the rhododendrons. We fortunately had a permanent supply of mains electricity and we placed the recorder in a small tent for protection; inside was a loudspeaker from which we could hear all the sounds coming from the three microphones. We began listening at 8 p.m. (B.S.T.) At first we heard nothing but the sound of an occasional distant train or car on the far-away main road. The first badger appeared at five minutes to

(Continued on page 393)

WAL DUO-REFLEX SPEAKER

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NIGHTS WITH BADGERS—(continued)

ten and for the next three-quarters of an hour there were continuous rustlings interspersed with short bursts of scratching. The badgers were pretty silent that first night but we knew that we might have to spend many nights hours before we got the recordings that we wanted.

Bringing in Fresh Supplies

The second night we managed to get a recording of a badger screaming some distance away; on the third night we heard nothing. The fourth was blank too so far as vocal sounds were concerned but the animals used the last hour of the night to bring in fresh supplies of bedding material. I had already seen several little round piles of bracken and oak-leaves collected together under some trees near the sett. During that night the badgers made several visits to bring in these bundles and we recorded the distinctive rustling made as they came back to their home. Each bundle of material was clamped firmly between the front paws and the lower jaw while the animal shuffled slowly backwards towards the sett. Our recording reveals quite distinctly the strange swishing sounds and also the periods of quiet when the badger stopped to listen, rest or adjust its load.

Badger cubs are born during the weeks from late January to March and this is a most interesting time in which to study wild badgers. Before the birth takes place new excavations are made underground and fresh bedding is carried in. The sow is very sensitive and most intolerant of the boar's presence at this time. It was to study this aspect of the badgers' behaviour which brought us back to the sett in February, 1952. The wood was waterlogged under driving snow and sleet and there was a great deal of evidence of new subterranean workings. Again I slung three microphones above the sett. That evening sunset was at five o'clock and just thirty minutes later the sow appeared. She sat for almost three hours at the entrance from which she had emerged. Three or four times a minute she uttered a sharp, high-pitched "wicking" call like that of a moorhen. I knew that this call was used by the sow to reassure her young.

The call suggested strongly that cubs had, in fact, been born and this was confirmed later in the night. From the loud-speaker we heard the faint sounds of whimpering coming up from one of the holes. It was a delicate whinnying sound which Maxwell Knight likened to the calls of very small goslings. It was possible that these cubs may have been as much as sixty feet from the sett entrance, but the microphone, slung only two feet from a hole, picked up these very gentle sounds. We made a series of continuous recordings of the sow and the cubs, for it was doubtful whether any naturalists before had heard the calls of such tiny badger cubs in a sett.

February nights are long and it was often necessary for me to spend as much as fifteen hours at a time listening to the badgers. For hours there might be no sounds except an occasional fox's bark or an owl's hoot but I could not relax for a moment. Always there was the possibility that badgers might return and it would be necessary to start the recorder turning. Sometimes in the middle of the night I would have to pass through a barrier of mental lethargy lasting for a quarter of an hour or so. If badgers suddenly appeared the tiredness went at once; otherwise coffee and sandwiches were brought in as allies in this short battle.

The Badger's Vocabulary

Shortly after the cubs were born we brought a parabolic reflector into use. This was useful in recording some of the low grunts of excitement and the purring call which the boar uses to call the sow up from below. The sow also has a purr but hers is rather higher pitched.

Between this visit and early 1955 I spent more than 800 hours at night working solely on the collection of the badger's vocabulary. In this time recordings were made of a strange encounter in the wild between a boar badger and a stray fox-hound which was living rough in the area and came to the food we put out for the badgers. We saw the hound come forward several paces and then the boar turned. The badger

grunted like a pig, but the hound stood his ground. This was too much for the boar who, swinging his head upwards, gave a savage threatening yell. The other animal wheeled smartly in his tracks and was gone like the wind. Our tape machine recorded the whole of this unlikely incident which three people watched only a few feet away.

We also recorded many conversational calls of very low level, of excited play, of warning notes and of the family together. In April, 1953, we captured the sounds of a running fight between our own sow and an intruder from another sett. By late 1954 I had recordings of twelve different sounds made by the badger—the first time that the language of badgers had been worked out in full. Some of our friends who had listened to the curious sounds which we had recorded had some difficulty in believing that such strange noises could emanate from animals. Some photographs of badgers feeding in front of the parabolic reflector would surely convince them! But badgers are nocturnal. To our rescue with camera, flash-gear and the rest came a friend, Peter Bayly. The equipment was fixed in one of the large cedar-trees on the sett one evening before dusk. In the space of fifty minutes four flashlight photographs were taken. Although it was necessary after each shot to change the flash-bulbs, the badgers returned within seven or eight minutes, so well conditioned were they.

The Long Night Watches

There is always a fascination about the dark and the animals which make it their domain. There were many sounds that kept me company during the long night watches—distant trains, church clocks, aircraft, barking dogs and sometimes distant guns. Nearer at hand were the hoots of owls, the yap of dog foxes, the scamperings of the wood-mice, and in the summer, odd snatches of bird-song in the depths of the night. The waits were sometimes long and tiring but I, for one, would not have changed a single moment of them. For the first time the language of the shy and nocturnal badger had been revealed.



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TWELVE NEW RECORDERS



● The L2/TA is the latest version of the famous E.M.I. L2 professional battery portable. It is fully transistorised, and operates at $7\frac{1}{2}$ i/s. Full details will be given next month.

WITH the advent of the B.S.R. Monardeck manufacturers have been quick to produce tape recorders at a very competitive price, and maintain most of the better features found on the more expensive models. It is also noteworthy that a number of large radio and television manufacturers entering the tape recorder field for the first time are using this deck. Of the twelve recorders illustrated here no fewer than eight employ the Monardeck. A number of makers are also building machines round the exciting new Garrard "Bichette" and Collaro "Studio" decks, full details of these will be published as soon as they go into large scale production.

Ferguson's first tape recorder

Ferguson's Model 441TR is a particularly neat model weighing only $15\frac{1}{2}$ lbs and measuring $14\frac{1}{4} \times 12\frac{1}{4} \times 6\frac{1}{4}$ ins. The case is robustly constructed of moulded wood fibre covered with plastic leather-cloth. Other features include inputs for microphones, radio and pickup; $2\frac{1}{2}$ watts output and 3 ohms extension speaker socket. Price with tape and mic. is £29 8s.

The Alba R59 represents good value at £27 6s. complete with microphone, spool of tape and lead with jack plug for connecting to external speaker or radio, etc. Mixing of a high and low input is provided for. Other features are monitor socket, which can also be used for connecting to external amplifier or radiogram; twin neon level indicator; "straight-through" amplifier facility for radio or discs; separate bass boost and treble cut controls; and extension speaker socket with cut-out switch the internal 7 inch elliptical speaker. The case is two tone blue-grey with leather carrying handle and nickel fittings. The size is $6\frac{1}{2} \times 14 \times 12$ ins, and the weight, 20 lbs.

At the Radio Show Saga introduced a range of equipment including four tape machines, two use the new Collaro deck and two the Monardeck. One of these is the "Tapelet". This is designed for re-playing of tapes re-recorded at $3\frac{1}{2}$ i/s, through a radio or disc equipment. It has an output of 1 volt. The price is £19 19s. The second, the model 3S 29, is a complete recorder which costs £30 9s.

The latest version of the popular Sound Belle, uses a deck of their own manufacture and operates at a single speed this gives over one hour's playing time with the l.p. tape supplied. This

Fergusons have entered the tape recorder field with the 441TR, this is a very neat recorder weighing $15\frac{1}{2}$ lbs. Full details can be obtained from your local dealer.

The Lee Products Elpico TR400 uses the B.S.R. Monardeck, and the price includes 600 feet of tape and crystal mic. For leaflet write to Elpico House, Longford Street, London, N.W.1.

● Left. H.M.V. have announced a domestic recorder, the DSRI, this will sell for £50. Full details will be given next month. Centre. The RGD Mark 104 recorder sells for £28 8s. complete. Right. The Alba R59, another newcomer to the tape market. This has built-in mixing and other useful features.



TWELVE NEW RECORDERS cont.



The latest Elpico Geloso, distributed by Lee Products, has many interesting features. The claimed frequency response at the speed of $1\frac{7}{8}$ i/s is 80-6,000 c/s. A wide range of accessories are available for this recorder.

is a very transportable recorder, weighing only 11 lbs. and measuring $10 \times 8 \times 5$ ins. The amplifier can be used "straight through", it gives a claimed 3 watts output. The price is £27 6s. with a microphone. The "Prince" also made by Sound, employs the Monardeck, it has mixing facilities on the two inputs, erase cut-out control, monitoring through the 8×5 elliptical loudspeaker, and outlet from pre-amp stage for connections to external amplifier. The size is $15\frac{3}{4} \times 14\frac{3}{4} \times 7\frac{1}{2}$ ins. and the weight 18 lbs. The price with microphone; spool of tape and connecting leads is £33 12s.

R.G.D. use the Monardeck on their MK104 recorder, this is claimed to have a scratch proof covering and is priced at £28 8s. The weight is 19 lbs. and the size $13 \times 14 \times 7$ ins. The two inputs can be mixed, monitoring is possible through headphones, or a microphone and the same socket can be used on replay for connecting to an external amplifier.

The Bantam, from E.A.R. is also a compact recorder, measuring only $10\frac{1}{2} \times 15\frac{1}{2} \times 6\frac{1}{2}$, and weighing 13 lbs. Separate bass and treble controls are fitted, radio and microphone input, extension speaker and separate monitor sockets are provided in accessible positions. There is also an erase cut-out for superimposing. The price, with spool of l.p. tape and microphone, is £29 8s.

The Mannequin from Recording Devices

Recording Devices, distributors in this country of the famous Stuzzi recorders, are producing an all British recorder the "Mannequin". Its features include built-in mixer, superimposition, and input and output connections, straight-through amplifier facilities and monitoring on record. The price of £27 6s. includes a microphone and spool of tape.

Lee Products have announced the latest version of the Italian miniature mains recorder, The Elpico Geloso. This machine has many interesting features. The recording speed is $1\frac{7}{8}$ i/s, which gives a total playing time of 1 hr. 25 mins. using both tracks. A clock type tape position indicator is fitted, and it is operated by push-buttons. The size is only $10 \times 5\frac{1}{2} \times 4$ ins. and the weight $6\frac{1}{2}$ lbs. The price is £27 16s. 6d. Lee Products are also producing a tape recorder with the B.S.R. deck, the TR400, this sells for £27 6s. complete, and has external speaker socket, two inputs, a monitor output and magic eye indicator.

The Mannequin is made by Recording Devices, who are also the distributors for Stuzzi battery and mains portable recorders. For full details write to 95 Villiers Road, London, N.W.2.



The E.A.R. Bantam model. Separate bass and treble controls are fitted, the price is £29 8s. Full details can be obtained from the manufacturers:— Electric Audio Reproducers Ltd., The Square, Isleworth, Middx.



● **Left.** The Sound Prince also has mixing facilities, an erase cut-out and connection for an external amplifier. **Centre.** The popular Sound Belle operates at a single speed and gives over an hour playing time. **Right.** One of the recorders from the range of Saga Sound System, the 3S 29.





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MORE ABOUT MIXERS

PART THREE

FIRST STEPS FOR ENTHUSIASTS

THIS is part III of a series of articles and by this time I have no doubt that a number of questions have come to mind about mixers. Many readers will be asking themselves whether they really need one, whether it is possible to achieve the same results by other methods. Those who have already made or purchased this useful item of equipment are asking how to get the best results from it. Still others are wondering why they're not getting the results they hoped for. I'm going to assume that having read this far you, as the reader, are interested in getting the most from your recorder. It would seem convenient then to examine these and other questions regarding mixers and also see if any of the practices of professionals are of any help to the amateur.

Let's start with the simplest set-up of all, namely just the recorder and the microphone which came with it. Most recording fans start this way and progress from here. An enthusiastic owner soon finds that he can do much more with his machine than record the voices of his friends at parties and send the occasional tape letter to a relative. Sooner or later he gets asked to bring his recorder along to someone else's party, or perhaps to record the choir at his local church. Maybe his local dramatic group wants a few sound effects added to their production, or a garden party may provide the reason for a recording session. In any event it isn't very long before the recordist finds himself wishing that he had another microphone, if only to save himself starting and stopping his recorder every time he wants to move his one mike to a better position.

Wiring Microphones in Parallel

So he goes out, buys another mike similar to the one that came with his recorder and then wires the two in parallel. This works fine for the first few efforts until the recordist finds that both mikes are not in use all the time, and the one that isn't is contributing a great deal of unwanted noise to the recording. So he adds a switch in the leads of both mikes so that he can select whichever one is in use at the time. This is fine until he hears the playback of his first recording with this arrangement. Then he rapidly removes the switches again when he finds out that they impart a nice loud crack to the recording every time they're switched on or off.

Mixers Practically Essential

After that he begins to look around for a way to select whichever mike he wants noiselessly. The only way to do this is by fading down the unwanted mike and this can only be done with a two-channel mixer. And so we see that we've only got to add one extra source to our recording set-up to make a mixer practically essential. You can, of course, use switches if you wish but only if you remember to set your recording level to zero every time you make a change. In any event your recording continuity is back to nil. The whole reason for adding a mixer is to impart a smoothness and flow to your recordings which you can get by no other method. Continually starting and stopping a machine is fatal to good recording unless you plan to spend five times as long afterward in editing, and anyway editing cannot replace what you weren't able to get in the first place.

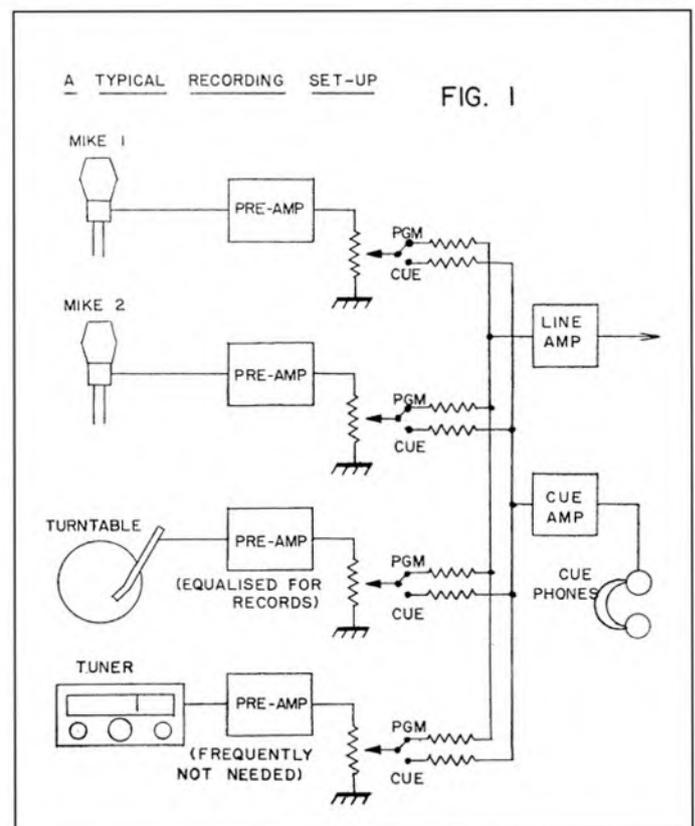
So the recordist either buys or builds a small two-channel mixer and right away finds himself with half-a-dozen unexpected benefits. Most domestic recorders are dual-track, which prac-

tically eliminates editing as a means of cleaning up a recording. The proud possessor of a recorder often has a number of records he would like to transfer to tape, and on the odd occasion he borrows a valuable and irreplaceable record from a friend. Then there are the occasional once-in-a-lifetime broadcasts of a jazz concert, a symphony or an opera which he wants to record. In the latter cases particularly it is important to have some sort of announcement on the tape to indicate what is there and also to add the personal touch to the recording. This is easy with a mixer since the wanted material is merely faded down to background when the announcement is made, then brought up to full level while the mike is faded right out. The transition is smooth and clean particularly if the fades are unhurried. I'll go into more detail about a few of these tricks later.

Smoothly and Professionally

Even with a two-channel mixer we can achieve a number of different recording effects smoothly and professionally. Most transitions from one sound source to another take place between two sources only without anything else added in. Only when we get into the big productions put on by TV and radio stations do we find several mikes being cross-faded at the same time. Thus we can cover practically any type of recording session with three or four sound sources at the most. These sources don't all have to

(Continued on page 399)



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MIXER DESIGN—(continued)

be microphones either. Let us suppose for instance that we have a recording set-up which includes two microphones, playback tape deck, turntable, broadcast tuner, FM (VHF) tuner and sound projector, a total of seven channels in all. With this arrangement we can cover almost any recording assignment and at no time will we be using all seven sources simultaneously. In actual fact we can put some of these items of equipment on a selector switch, thus reducing the number of channels needed for a mixer.

If we also design our mixer so that any one or all of the inputs can accept either a microphone or one of the other pieces of gear we can come up with most of the recording set-ups in present-day use, certainly far more variations than the average amateur is ever likely to use. Let us try a set-up which should give us all the versatility we're ever likely to need. First of all we have to figure out what kinds of recording we're likely to be doing in the future. Note that I say deliberately "in the future" since it would be silly to acquire a piece of equipment only to find in two months time that there are several things it won't do. So let us plan ahead, and since it's easier to use practical examples I'll describe the changes that took place in my own set-up.

Three Microphones Very Useful

The first thing that was added to my gear was another microphone, since I was asked several times to record church choirs. Under these circumstances I soon found that using three mikes was a good arrangement since they gave me enough flexibility to overcome the acoustic problems of most churches. Just to be on the safe side, I added a fourth channel to the mixer. I have only the two mikes but I've made arrangements to borrow a

couple more whenever I need them, and by offering to rent the extra mikes for a small charge and returning them promptly after I've finished with them, I've never been short of mikes yet. In the course of making tape letters to a number of friends across the world (through a tape club) I've also improved my tapes tremendously by adding in music.

Adding Music

The human voice, no matter how well presented, becomes monotonous after a while and it seemed a good idea to relieve it with a little music. With a turntable and a small pre-amplifier I can fade it in at any point I wish. Better still, the brief respite while the music is playing allows me time to collect my thoughts and my tapes flow a lot more smoothly than they did. Since I can fade in the music at any point, I don't have to worry about starting the record exactly at the beginning. I can just put the arm down anywhere on the record and bring the music in slowly under my voice (which masks the start of the music). I can do the same too when I'm recording from the radio. I'm using a radio tuner, covering both the normal broadcast and FM bands and feeding this through my recorder. A good quality speaker enclosure hooked into the back of the recorder means I get better listening quality even when I'm not recording.

And so my basic arrangement consists of a four-channel mixer with all four inputs sensitive enough for recording from a microphone. In addition, three of the inputs are arranged to accept the higher outputs of other equipment. At home, one input accepts a microphone permanently and that mike is usually directly in front of me. If I have several friends in when I'm doing a tape letter or my wife and I do a joint tape, I use a second mike on one of the other channels. One mike would be enough to pick up everyone but we can get closer to two and

(Continued on page 400)



Even with a 2-channel mixer (centre) quite professional results are possible. The disc is about to be played in on a pre-arranged cue.

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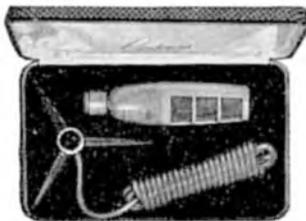
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TA 1994

this improves the sound quality since our apartment echoes rather badly at the moment. The third and fourth channels accept the turntable and the tuner or, if we don't want to record from the radio, I plug in a tape playback deck.

With the latter I can frequently re-record a question asked me on another tape by the person to whom I'm talking. I can then answer the question direct rather than having to explain it all over again. Also, because of this set-up I have several times recorded portions of programmes off-the-air for other people, allowing the recipient to add his own comments at the beginning and end of the recording. Several of us have also had a lot of fun lately by making tapes to be played over in conjunction with home movies. With my recorder hooked up through the sound-coupler section of an 8-mm Eumig projector, we've been able to make a nicely co-ordinated sound-track for the movies, including music and sound effects (recorded on the spot) along with the commentary. A couple of dances have also been organised (and recorded at the same time) by taking along the speaker, turntable, mixer and recorder. Records were changed while the announcements were being made and the whole thing was fast-paced and lively as a result.

The Mixer is the Focal Point

All of this shows what can be done with a mixer. I haven't exhausted the possibilities of my set-up by any means, and yet I've been able to build up my facilities a little at a time. The important thing is to start out with a clear idea of how much you want to do and how to do it. The mixer is the focal point of all these activities since everything goes through it. If it is inadequate to start with it will have to be changed later. Exactly how many channels will you need for your recording future? From personal experience, I'd recommend four. More than that is unnecessary and less drastically reduces the versatility of your set-up. Also if possible, try and go to the expense of building or buying one of the "active" variety of mixer rather than the so-called "passive" type. The latter sometimes imposes penalties in the form of insufficient recording level, particularly when used with more than one microphone.

A typical set-up of the type described is shown in Fig. 1 with one useful addition. A switch has been inserted in each input and a small pre-amplifier added. This extra circuitry can be eliminated without detriment if not needed but it does help once the recordist has got used to using a mixer with his more ambitious efforts. By throwing a switch to the "cue" position it is possible to monitor that particular sound source while recording is actually going on, without that sound being recorded. It is particularly useful when using a record, since the exact start of the music (or whatever is on the record) can be located and the record "cued in" at the appropriate moment. This imparts a slickness to the production which is definitely worth while. I hope to be able to describe this trick in greater detail at some later stage.

Next Month: Concluding notes on mixing technique.

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USING TAPE WITH SLIDES

THERE are many more amateur photographers than cinematographers and yet until recently the "still" photographer has been left in the lurch regarding the possibilities of combining the hobby with tape recording. Today, the picture is beginning to look better, and a fascinating new combination of talents is now possible with the provision on certain tape recorders for automatically operating a slide projector. As more and more photographers turn to colour photography, so they acquire a slide projector. The colour slide show is beginning to replace the ritual inspection of the family photograph album.

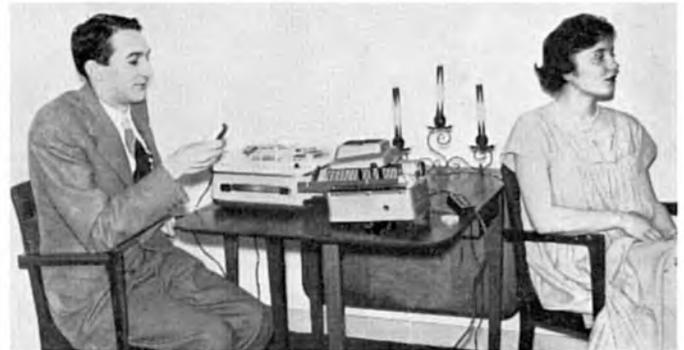
But operating a slide projector can often be a tiring and overheated occupation, with the result that the projector manufacturers are turning all their attention to the production of fully automatic, magazine fed, press button operated projectors. One distinct advantage of this system is that the colour slides can be permanently stored, the right way round, the right way up (upside down for projection!) and in the right order for projection. All the owner has to do is to switch the projector on, insert a magazine of slides, and then, as the advertisements say "lean back in your favourite easy chair" and press a button.

What happens when the button is pressed? An electrical signal closes a simple circuit, which starts the cycle of operations; i.e. move the magazine one notch forward, withdraw a slide, open the shutter, and project it. Open the circuit with another signal, and the shutter is closed, the slide replaced, and the operation is repeated. Simple enough, but if all that is required is an electrical signal, then could not this signal come from a tape recorder? It certainly can, and the London made REPS JC 30 and the West German Telefunken KL 75 models can be converted to this operation.

A look at the specification

Let us look a little more closely into the specifications of these two recorders. The REPS JC 30 is an excellent example of British quality workmanship, and it is very versatile. It has the well-known Collaro transcription deck, with three speeds, and push button track reversing. The amplifier specification is impressive. The sockets accept standard jack plugs, and the extension speaker socket has a resistance of 15 ohms. On the debit side it is relatively heavy. The device for operating a slide projector is built in to the back of the machine, and is a simple circuit which impresses an audible "pip" signal on the track which is being recorded. When the tape is played back, the "pip" operates the circuit, which is transmitted to the slide projector by a special lead.

The Telefunken KL 75 tape recorder is small, neat, and not too heavy. It will only accept spools up to 5 in. in diameter, and the tape speeds are restricted to $3\frac{3}{4}$ i/s and $1\frac{1}{2}$ i/s. However, the



Mrs. Bob Kerridge listens to her husband recording a commentary to accompany a series of slides. The recorder is a Telefunken KL 75 with built-in Telechron. This is coupled to a Leisgang Fantax automatic slide projector.

continental magnetic heads and superb amplifier design give it a performance equal to many machines running at twice these speeds. One interesting fact is that there are no pressure pads for the tape transport over the heads, and special attention has been given to the tensions on the feed and take-up spools to give the all-important contact between tape and head without excessive wear to the head. The input and output sockets are continental and require special plugs, and the extension speaker socket has a resistance of 5 ohms.

The Telechron unit which operates the slide projector has to be built-in by a qualified service agent, and includes an extra magnetic head which operates on the lower track. This means that although the signal recorded to change the slide does not reproduce through the system, the lower track (track 2 in normal use) cannot be used for any other recording. When a tape is recorded to accompany and operate an automatic slide projector, it can only be used one way. One small advantage is that it is possible to record a message over the slide changing operation.

Magnetic Relay Sometimes Needed

To illustrate this article, we visited Mr. and Mrs. Bob Kerridge from New Zealand, who are at present staying in London. They have a Telefunken KL 75 with built-in Telechron and Fantax Automatic slide projector. Note that there is a small box of tricks in the lead between the tape recorder and the slide projector. This is a magnetic relay, and is necessary with some machines of slightly earlier design.

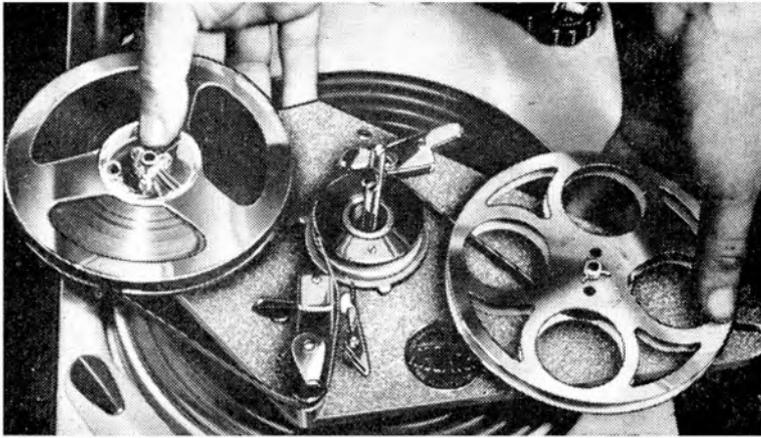
On the latest machines, such as the Braun Paximat and Leitz Pradovit automatic slide projectors, the magnetic relays are built in the machines. It may be some time before the design of slide projectors settles down to a regular style. At the moment new layouts, new improved lamps and optics and new gadgets are coming on the market thick and fast. The latest idea is to have a push button control on the focusing of the lens, to allow for slides of different thickness.

For the time being there are only two tape recorders available suitable for conversion to operating a slide projector. We will be interested to see whether the manufacturers take up this idea and incorporate it in more machines.

Close-up showing the magnetic relay in the recorder/projector lead, and the microphone which incorporates recorder remote control.



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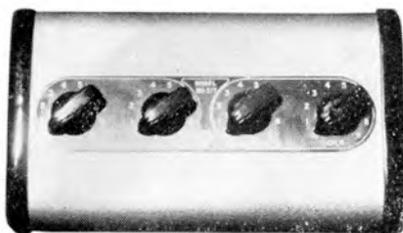
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EQUIPMENT REVIEW



★
Lustraphone
Transistorised
Mixer
Type MU577
★

Manufacturer's Specification

4 Channel transistorized unit complete with Mallory cell. Channels 1 and 2: Low impedance (20-50 ohms), microphone input with transistor pre-amplifier—linear gain controls. Channels 3 and 4: High impedance—incorporating attenuation and suitable for use with Tuner Units, Pickups, etc.—Logarithmic gain controls. Output: 50,000 ohms—suitable for connection to a high impedance microphone input socket. Estimated battery life: 1,000 hours. Width: 9 in. Height: 4½ in. Weight: 2¾ lb. Price: £22.

Manufactured by Lustraphone Ltd., St. George's Works, Regents Park Road, London, N.W.1.

THIS handy little mixer unit, supplied with a complete set of connecting plugs, is made the more convenient by not requiring any form of power lead. The size is a reasonable compromise between the miniaturisation possible through the adoption of transistors and the larger sized equipment that would allow the hand to go readily to the right control.

The low microphone impedance chosen is not normally found on domestic equipment, but is worthy of adoption in view of the ease with which long leads may be used. In order to obtain a practical assessment of the gain available (in view of the vast difference between the input and output impedances) the performance of a ribbon microphone was compared, through the unit, and directly via a suitable input transformer. This test showed a useful gain of some 7 dB. The frequency response of all four channels was found to be well within the quoted range of 50 c/s—14 Kc/s ± 3 dB.

If the writer has a criticism of this unit it is that the attenuation introduced on Channels 3 (5½ dB) and 4 (10 dB) is not sufficient, though logarithmic controls are a help here. In fact, radio tuners often have an output of 100 to 250 mV, and as this unit, to obtain best results from the microphone channels, should work into a sensitivity of about 2 millivolts, it is suggested that a loss of about 30 dB on one channel would be an advantage.

Being battery operated, hum is not present in the output, and the screening against external pickup hum seems to be adequate. A certain level of hiss was discernable, but this should not prove troublesome at normal programme levels.

A. Bartlett Still

BOOK REVIEW

Performing Times of Orchestral Works

The duration of a piece of music has to be known pretty accurately these days, by radio programme builders, conductors, and concert organisers. To help these various people, a mammoth catalogue has been compiled by S. Aronowsky, listing practically all the works of each composer whose works have entered the standard repertory. The trainings of individual movements, etc., are included, and there are three appendices devoted to Music Publishers' Organisations: Music Publishers, their Agents and Associates, and Performing Rights and Collecting Societies.

This question of how long a given piece of music runs interests the man with a tape recorder too, and although the bulk and the price of this new catalogue put it beyond the realms of domestic recording, its value as a reference book will be appreciated by everyone engaged in the drawing up of musical programmes. "Performing Times of Orchestral Works" by S. Aronowsky, is published by Ernest Benn Limited; Size 13in. x 8in., 836 pages, pre-publication price 15 guineas.

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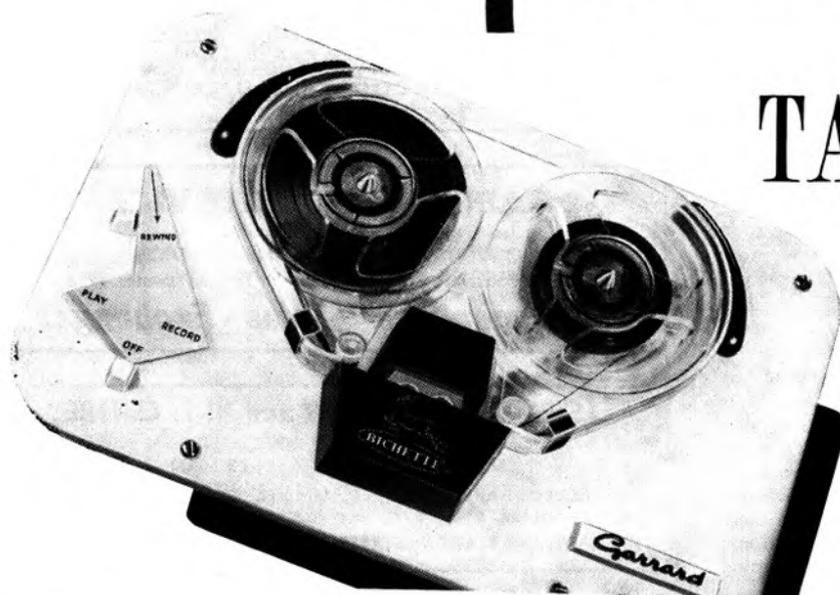
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