

the TAPE RECORDER

PRICE 1/6

OCTOBER 1961
Vol. 3 No. 9

INCORPORATING "SOUND AND CINE"



IN THIS NUMBER

- Inside the Outside-Pointers to Design
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- Tape Recorder Workbench
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- Equipment Reviewed
- Home Recording
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COTSWOLD



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S-88



UXR-1



RSW-1



FM-4 TUNER

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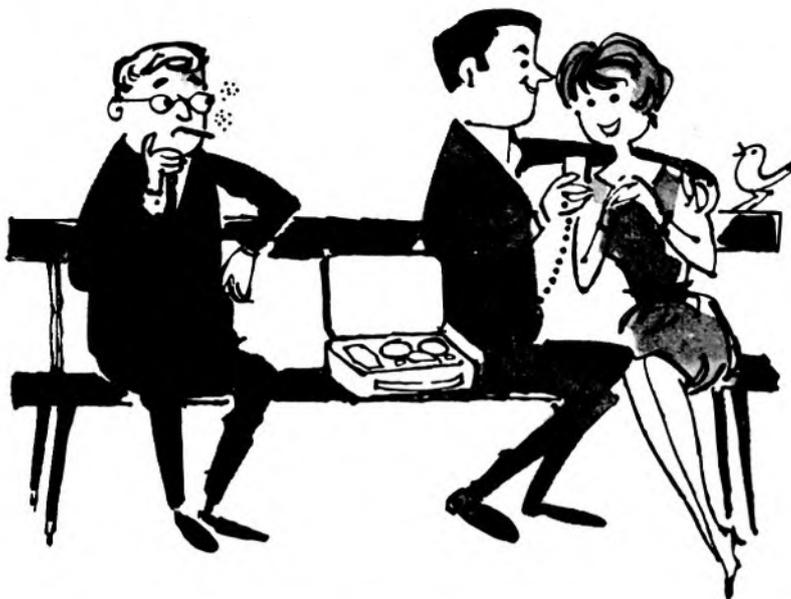
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* **ANYTHING ELSE? Yes.** The TK 1 has a **Magic Eye** which immediately registers peaks in recording level. This is not universal on battery machines, but we think it essential for good recording.

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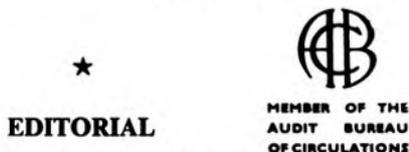
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EDITORIAL

LAST month in this column we wrote at some length, and with considerable enthusiasm, about the "arrival" of tape records for the domestic market. Since then, and in their own dramatic and bold fashion, World Record Club have seen to it that virtually everyone in the country should know their plans. To all this we can only say, "full marks!" If the proverbial job is worth doing, it is worth doing thoroughly and well. The advertising campaign is still in full swing as we write, and we learn from W.R.C. that the response to it has been (their word) "Fabulous". Many thousands of the new tape records were despatched to all parts of the country during the first two weeks, and the orders still pour in. And so, almost overnight, the domestic tape recorder became the new "magic box"—the new-style musical instrument of the home.

We do not know—and nobody knows exactly—how many tape recorders are in use, or disuse, in the homes of the British Isles. Estimates vary from 1,750,000 to over 2,000,000. But whatever the total, it is a formidable one; and the wonder of it is that such a potential market has for so long been neglected. Every tape recorder owner is a potential buyer of tape records. Ever since the first domestic recorder was offered for sale in Britain, more than twelve years ago, it was obvious to all who gave it thought that, sooner or later, tape would become a competitor for disc. For more than sixty years people have bought disc players, in every shape and form, from hand-wound portables to elaborate radiograms. If any proof were needed, after such a history, the tens of millions of disc players that must have been sold, and the seemingly ever-increasing demand for more, establish the fact that people demand "music boxes" as a part of everyday life. The fact that, say, two million "voice-recording boxes" have also been sold here, surely establishes the further fact that this newer modern domestic instrument has an assured place of its own. Couple the two—make it possible for the recorder to replay the records, and the potential must increase not twice, but several times.

This is what we have hoped for, and urged, for so long. Now that it has at last come about, we can all be very thankful—repeat, "all". For let us look further ahead, and deeper than the surface ripples. First, the advent of these tape records will demand, and result in, a better standard of quality of reproduced

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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sound from all domestic recorders. Second, medium-priced recorders will find a bigger market, which will enable wise manufacturers to plan in terms of quality and quantity. Third, the increased use of tape, through tape records, will stimulate the sales of unrecorded tape, and this should result in lower prices for the domestic user. And these main facts are the pointers to much more than that can lie in store.

W.R.C. have set the ball rolling. Given the success they deserve, they will not be alone in the field for long. Other holders of big music catalogues will not be able to remain disinterested. Other producers of tape records, too, will benefit from the impetus of the rolling ball. All will benefit who produce good products at a fair price—and this is as it should be.

Big and important as the W.R.C. plan is, it is but the first step in the direction towards the proper establishment of Tape in the overall domestic scene. We now wait with the greatest interest to see what will come next. It should be exciting—and it cannot be very long.

NEXT MONTH

IN our next number (November) we begin a new series of articles by Graham Balmain. The first of these deals with the facts of quarter-track recording. In this same issue, too, we propose to publish an analysis of the data supplied to us by readers in response to our editorial request of March (Vol. 3, No. 2). The Equipment reviews will bring reports by A. Tutchings on the E.M.I. transistorised battery portable RE 321, and the Reslo PRL microphone. Other features will deal with *Tape and Libraries*, and the combination of transparencies and sound for the holidaymaker. Workbench, Readers' letters and problems, details of new products, plus the usual pages of news and pictures promise to make the November number of exceptional interest.

COVER PICTURE

'SMILES for Three and Tears for One' could very well be the caption for this month's cover photograph. It was taken when Armand and Michaela Denis, the famous husband and wife explorer team, were travelling in the Suk country. The equipment seen in the photograph consists of a Fi-Cord Mark IA recorder and Grampian DP4 microphone, and although the recorder generally fascinates most of the natives, baby appears to be unimpressed. Readers will recall the previous front cover photograph of Armand and Michaela (March 1961) taken earlier on the tour.



**John Borwick presents
EMIGUIDES
6 demonstration tapes that pave
the way to better recording**

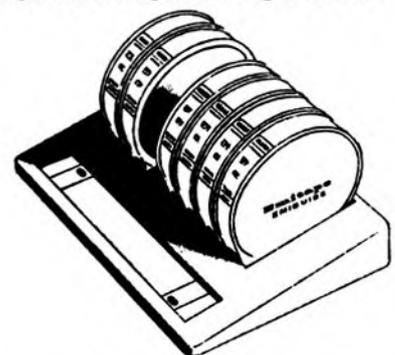
John Borwick, the well-known writer and broadcaster on all aspects of tape recording, has devised, written and recorded six EMIGUIDES. With these, you can *make your tape recordings as good as his.*

How are you on microphone technique? Ever tried trick recording? Whatever you want to know is almost certainly on EMIGUIDES, brought to you by the makers of EMITAPE. On them, John Borwick illustrates the answer to every problem with examples: you hear the sounds you should be getting and those you shouldn't, learning as you listen, how to achieve the first and how to avoid the second.

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NEWS FROM THE WORLD OF TAPE

Tape Position Indicators for B.S.R. Deck

Tape Recorders incorporating the B.S.R. TD.2 Decks will shortly be available with Tape Position Indicating Counters fitted as original equipment. The necessary arrangements will be made by Birmingham Sound Reproducers Ltd. upon request. English Numbering Machines Ltd. can supply a complete pack comprising the counter with fixing screws, driving pulleys and belt, as well as a clip-in window. This accessory was originally intended for supply only to manufacturers of tape recorders. Bearing in mind the simplicity of the fitting, it was felt that users of tape recorders incorporating TD.2 Decks may wish to benefit from an accurate and easily read Tape Position Indicator. The complete pack will, therefore, be generally available from English Numbering Machines Ltd., 25 Queensway, Enfield, Middlesex, at a retail price of £1 16s.

Colorsound comes to Britain

Colorsound—a revolutionary idea in home entertainment—will soon be introduced into this country by Bonochord Ltd., the electronic and acoustic engineers. Colorsound is an interpretation of music or speech in the form of light patterns and is the invention of Mr. R. O'Reilly, an American electronic expert.

For some years now, equipment has been available to produce visual images of music through colour patterns, but, it has consisted of complex consoles and computers. This has restricted performances to large scale public exhibitions. However, this problem has now been overcome with the Colour Translator—a box of electronic equipment only a few inches in diameter. It can be adapted for use with radios, televisions, record players, and tape recorders.

Mr. J. Traill-Hill, Market Director of Bonochord, claims that the equipment makes possible, the immediate mood-interpretation of music and speech in gradations of coloured light. The American patentees of the Translator—Colorsound Manufacturing Co. Inc. of California—have modified the equipment for use in the fields of mental therapy and drugless tranquillisation. These applications will now be available in this country.

A permanent display of the equipment and application is being prepared at Bonochord's showroom at 48, Welbeck Street, London, W.1. Details will be available shortly.

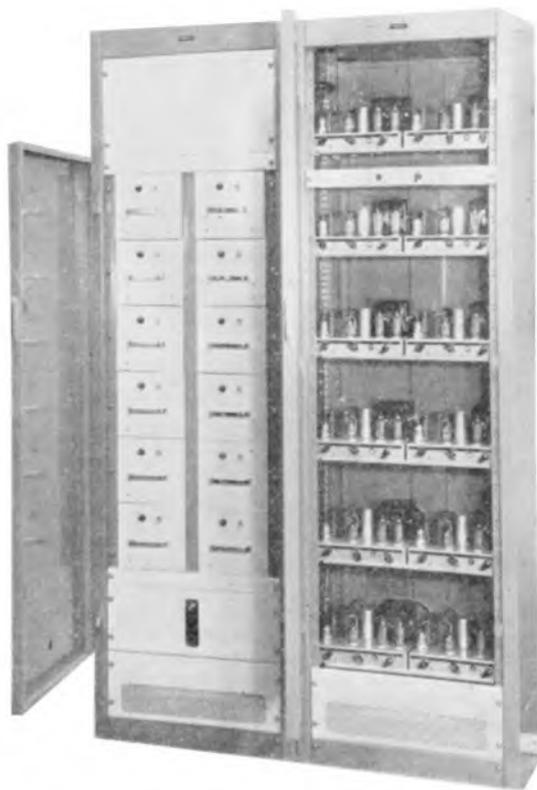
Recorder Manufacturer Finds U.S. "Very Promising"

MR. JACK DICKMAN, managing director of Fidelity Radio Ltd., returned just before the Radio Show from a tour of the United States heartened at the possibilities of breaking into the transistor radio and tape recorder market in that country. "There is room in that market for our 'Argyll' range", says Mr. Dickman, "but they require some extra features which I shall incorporate for them."

"Certainly, there is a lot of groundwork to be done, both from administrative and technical aspects, but there is great scope and opportunity. When recessionary dips hit the radio industry in the States, they go out and sell all the harder. The result is that there is a constant expansion rate."

EMI's New Mono-Stereo Audio Mixer

MONO and stereo recordings of the same performance can be made simultaneously on a special type 17-channel audio mixing control console now being manufactured by EMI Electronics Ltd., for Levy's Sound Studios of New Bond Street, London. Cost of supplying and installing this latest development in mixing equipment will be around £9,000, including console, rack-mounted units and special features designed by EMI to meet Levy's particular requirements. It will be used for making the highest quality master recordings on magnetic tape, for the production of gramophone records and feature programmes.



The new sound effects equipment just installed by Westrex Company Limited, London, for the Ghost Train Blackpool Pleasure Beach was especially designed and built for this particular situation and consists of a 12-way multi-tape sound reproduction system comprising twelve tape reproducing units with associated pre-amplifiers, amplifiers, control switching and loudspeakers each with car operation switches and time delay circuit. The entire unit is operated automatically with appropriate sound coming in at the designated stages.

Truvox Presentation

IN the National Press recently, there appeared a report concerning Robert James Armour, a schoolboy who acted, in the words of the Chairman of London Sessions, with great responsibility and citizenship in helping in the arrest of criminals.

As a result of this, Robert was awarded £5 and Truvox, Ltd., saw this report and noted Robert's desire to obtain a tape recorder, they decided that since civic zeal of this kind is not always rewarded sufficiently, they would present him with the tape recorder which he has wanted for so long. The presentation took place in their office on September 5th.

Kidderminster Club Organise Competition

A tape competition has been organised by the newly-formed Kidderminster and District Amateur Tape Recording Society which is open to all members and honorary members of the Society. A person may enrol as an honorary member for the sum of two shillings for the purpose of entering the competition. Prizes include a Silver Cup plus £10 in cash, and a tape recorder. Closing date for the competition is 25th October 1961. It is open to all amateur performers and the tapes must not contain any copyright material. Further details and entry forms can be obtained from J. S. Griffiths, "Hillcroft", 29 Sion Hill, Kidderminster.

. . . mind the doors, please

ALTHOUGH train-spotting is (apparently!) left to small boys with notebooks, the fascination of engines, signal boxes and everything connected with railways affects boys of all sizes and age groups, from 70 to 80 and downwards. We are therefore quite certain that this behind-the-scenes description of a unique semi-automatic train-announcement system will be of considerable interest—particularly since it is based on "Tape".

The location is Stratford (not upon-Avon), and the system has been in operation since 1954. There is, so we are told, nothing else like it in this country. Having seen it working, we can only wonder why. The General Electric Co. Ltd., who designed and built it, have certainly done a fine job. Anyway . . . "Stand back; mind the doors; the 3.30 stopping train to Gidea Park is now standing at platform 3". So let's see how it works.

First, the appropriate announcement is selected by an operator in the signal box and this selection is stored electrically until the train arrives at a predetermined distance from the station, when a "train approaching" announcement is automatically broadcast. On arrival at the platform and after a suitable time lapse to allow for the doors opening, a "train standing" announcement is given in a similar manner. During peak or abnormal periods when the headway does not allow time for "approaching" message to be broadcast, this portion is automatically omitted.

The equipment associated with the electric lines is independent of that for the main lines; announcements on both groups can be made simultaneously, as the platforms are sufficiently far apart to prevent any confusion.

The recorded announcements are numbered and are pre-selected by momentarily depressing the appropriate button, mounted on the control panel beside the telephone keyboard positioned in the signal box. Up to four pre-selections can be made and



Mrs. Thackery, Chief Train Announcer, seen operating the tape recording equipment used for training station announcers.

electronically stored in each platform group, with an illuminated lamp indicating the announcement number of each stored selection. When the announcement for the train is started, a red lamp is illuminated next to the respective storage indication, and both lamps are extinguished when the train leaves the platform.

Selection of Announcements

With certain exceptions, a selection is made for every train that enters, or will enter, the controlling section of the line. Selections are made in the order that trains will arrive at the platform, irrespective of the order of entering the controlling track circuit sections or routing to the platform. Non-stopping trains, light engines, and so on, for which no announcement is necessary, but which will occupy the platform track circuits are included in the selection by operating the "No announcement" key.

The exceptions mentioned are in respect of (a) the frequent goods trains that approach on a branch line and pass through the platform, and (b) trains that enter the controlling section but are diverted to the Woolwich branch before reaching the platform. To avoid undue attention by the operator no selections are necessary for the trains in respect of (a). In the case of (b) "No announcement" selections are necessary, as the route is occasionally set up after the train has entered the controlling section. In the event of an alteration or incorrect selection, the stored selections can be cancelled and fresh selections made.

Monitoring

An audible and visual warning is given if a train enters the controlling section for which no selection has been made. A selection can then be made at any time before the train arrives at the platform, but if no time is available for the broadcasting of the "train approaching" message, this is automatically omitted. For example, announcements for Hertford-line trains which start from Stratford Station consist of a "train standing" message only, and are broadcast either immediately the selection is made or immediately after any previously stored selection for arriving trains are cleared by those trains.

The announcements may be checked by means of a monitor loudspeaker, and special or emergency announcements may be made by microphone to any or all platforms including those of the up lines.

Recording

The announcements for each group are recorded on a continuous loop of magnetic paper tape (to reduce static) 3 inches wide, with a capacity for recording 25 side-by-side tracks. The "train approaching" and "train standing" messages are each recorded on separate tracks. The reproducing head is attached by a gear wheel fitted to the shaft of a modified two-way uniselector mechanism. On receipt of a "start" signal, the uniselector wipers move over the normal type of bank contact and search for the position marking the required announcement; this rotation positions the reproducing head on the appropriate recorded track. The tape is driven at a constant speed of $7\frac{1}{2}$ i/s by rollers and gearing, from a 1/20 h.p. motor, and after passing through the reproducing head and main system capstan rollers is allowed to fall freely into one end of a box, so dimensioned that the tape is guided to form folds that are gently removed as it is extracted from the other end of the container, where it is again drawn to the reproducing head.

Endless Loop

Thus, about 30 ft. of tape is accommodated in a container 17 in. long by $7\frac{1}{2}$ in. The box, with tape, can be removed in a few seconds without dismantling the reproducing head. Two spare boxes, containing tapes with pre-recorded announcements are supplied with other spare components.

Two complete reproducers, with their associated relays, are mounted on a standard-type rack 6 ft. high and 21 in. wide, with a power supply control panel. A lamp indicator shows the



The above photograph shows the train control operator at the control panel at Stratford Station. The position of this desk in the signal box allows the operator to check with the train signalling system and so determine which announcement has to be relayed.

recording track in use, and also facilities for local operation for maintenance purposes.

Amplifier Equipment

Three racks of amplifier equipment are provided, two for the recorded announcements and one for the microphone announcements on the up platforms. Each rack is fitted with identical equipment consisting of a monitor loudspeaker and output level meter panel, switching panel, tape playback, pre-amplifier, power amplifier, relay panel and power supply.

The switching panel provides a ready means for connecting the rack equipment to either reproducer and to any loudspeaker group. During maintenance operations, or in the event of a failure, service can be maintained to a busy platform by switching the reproducer and loudspeaker group to the infrequently used amplifier normally associated with the up platform.

Each amplifier is self-contained with a power unit and rectifier circuit and a rotary switch is used in conjunction with a meter for checking the conditions of all valves. The mains supply is connected by a relay, with mercurial contacts fitted on each rack and is operated from the signal box control panel.

Operation

On receipt of the "start" signal from the control apparatus, a uniselector rotates and is stopped on the marked bank contact, thus positioning the replay head on the required track. The replay motor is then started and, simultaneously, all high-tension circuits are completed, via relays, on the amplifier rack associated with the particular reproducer, and the announcement is broadcast. The joining of the end of the paper tape to form the endless loop is made by a metal foil strip. This strip completes the circuit for the stop relay at the end of the operation, and the reproducer's amplifiers returned to the condition of awaiting for the next "start" signal.

Control Apparatus

The control apparatus referred to consists of British Post Office-type telephone relays and uniselectors. This equipment performs the following functions: (a) detection, discrimination, and storage of conditions given by trains approaching the station through the medium of the existing track circuits and train-describer equipment; (b) storage of announcement selections made by the operator; (c) connection of appropriate "start" signals to the

reproducer equipment; (d) omission of a "start" signal for the "train approaching" portion, when necessary; (e) facilities for cancelling, by the operator, of stored selections; (f) connection of a second "start" signal for a "train standing" portion, when a repetition of this portion, or alternative portion is required by the operator; and (g) provision of lamp and buzzer signals on the panels, such as "storage full" and "fuse alarm".

Each announcement selection is stored by positioning a uniselector on the appropriate bank contact; after which the conditions mentioned in (a) are connected in turn to these selection storage switches by a further uniselector known as the sequence switch and the "start" signals transmitted to the reproducer equipment.

Delay Relay

An adjustment delay relay allows for a suitable lapse of time between the train occupying the platform track and the doors opening before the "start" signal for the "train standing" message is transmitted. If a train is held at the platform unusually long, or if the "train standing" announcement needs correcting, this portion may be repeated, or an alternative given.

The microphone, mounted on an extending arm attached to the left of the control panel is connected to a pre-amplifier on the top of the reproducer rack. The output of this pre-amplifier is connected, when required, to any or all the platform amplifiers by the operation of relays controlled from the keyboards.

Built to Specification

The amplifier equipment and the tape reproducers and adoption of a uniselector switch mechanism for positioning the reproducer head on any required track was designed, developed, supplied and installed by the General Electric Co., Ltd., to meet the specification and requirements of Mr. A. Moss, Signal and Telecommunications Engineer, British Railways, Eastern Region. The keyboards, control apparatus rack and equipment was designed, manufactured, and installed and the whole work finally put into commission by the staff of the Eastern Region.

Installations of this type can only be used on special stations, this is due to the fact that personal announcements have to be relayed quite often on larger stations which would possibly interrupt an automatic system. However due to the success of this equipment it has been decided to duplicate this installation at Barking in the near future.

NEWS AND PICTURES FROM THE CLUBS



The secretary of World Wide Tape Talk, Mr. C. L. Towers, seen recording a tape to America.

CONSIDERABLE interest has been aroused by the formation of a new British tape exchange club **World Wide Tape Talk**. Although only founded as recently as last June, the club is already represented by members in the U.S.A., South Africa, New Zealand, Arabia, Malta and of course, Europe.

It would appear that the club is being run on well-organised lines. Besides the clearly printed "Contacts Lists" in which full, and precise data and interests are given, all members are introduced to each other by means of "Round Robin" Tapes. Thus a person has the opportunity of hearing the voice of any other member before deciding on the exchange of tapes.

Perhaps what is also a great appeal of the club is the low member's subscription fee of 7s. 6d. per annum. Readers interested in "World Wide Tape Talk" are invited to send a stamped, addressed envelope for full details, to the Secretary: **Mr. C. L. Towers, 35 The Gardens, West Harrow, Middlesex.**

THE Brixton Tape Recording Club was formed in August 1960. Meetings, first held in the organiser's small flat, are now held every Tuesday evening in a pleasant room over the saloon bar of the White Horse at 94 Brixton Hill.

At one time the membership of the club rose to 21, but there are now only 10 fully active members. After many setbacks, the club is now thriving and is inundated with requests for recording sessions by local associations and clubs. One of the club's main interests is producing tapes for the "Tapes For The Blind" Magazine, which includes tapes contributed individually or by the efforts of the members generally. Every two months a competition is held by club members, with a silver cup in view for the eventual winner. A great deal is being learned from the tapes submitted, and the subjects dealt with are very varied. During 1961 the club recorded many tapes. These included the 1961 Audio Fair (heard in many places of the World by subscribers to the "Tapes for the Blind" Magazine) and also the local "Lambeth Festival", which took place in June. Among the interesting personalities interviewed on this tape were the Mayor of Lambeth Mr. A. C. Dennis, the "Festival Queen" for 1961, Miss Vicky Borg, and Mr. Alan Freeman the well-known disc jockey who helped to judge the "Festival Queen" contest. Tapes of a recital by the Fortune Singers (members of the St. Margaret's, Westminster, Choir), and a short concert given by a

local girls Club—the Trinity Congregational were also made. It is hoped that many more tape recorder owners, both male and female, will join the Brixton Tape Club and so be able to take part in the interesting and full programme for the coming year. *Mr. R. G. Garrett* is the club secretary and all enquiries should be addressed to him at 56 Rattray Road, Brixton, London, S.W.2.

THE Walsall & District Tape Recording Club is fortunate in having a talented tenor as a member, and having brought his accompanist along with him one evening a recording session of operatic arias took place with members using their own equipment. A set of play books was acquired from the local library and an enjoyable comical meeting was held "play ghosts" with varying "boos" from folk taking part whilst others did the recording and sound effects. At the present time members of the club are having a summer rest period, but in the early days of September work will begin again. During this time a Round Robin tape is circulating round the members in order to keep everyone in touch. Further details from *Mrs. J. Walford, 41 Mill Road, Pelsall, Walsall.*

AT a recent meeting of the **York Tape Recording Society**, a vice-chairman and a publicity officer was elected. Guest for the evening was Mr. Donaldson who brought a tape of Christmas Greetings made in 1960 from the people of Munster, Germany. It was agreed that similar greetings should be sent to them this Christmas and arrangements are in hand. New members are welcome at any club meeting. Further details can be obtained from *G. Machen, 37 Chatsworth Terrace, Poppleton Road, York.*

A TAPE Clinic has been formed by members of the **South Birmingham Tape Club**. The title speaks for itself—tape recorders are brought along checked and cleaned, heads are demagnetised and checked for azimuth. A nominal charge of one shilling is made which is put into club funds. Negotiations are progressing with the formation of a team for a Hospital Service, arrangements are in hand for a visit to the studio of the Birmingham Hospital Broadcasting Association during an actual Broadcast.

The club meets fortnightly on Mondays at the Stirchley Institute, details of membership may be obtained from the Secretary *W. A. Judd, 1 Jeremy Grove, Sheldon, Birmingham.*

THE Southall Tape Recording Club has commenced a series of monthly newstapes. The tapes will be recorded at 3½ i/s, loaned and sent to clubs, post free from the address given below. Individuals are welcome to participate, but postage will be charged. The first issue available contains news of exhibitions in London connected with recording, a series of first-hand experiences with various types of recorders, and an information exchange bureau. Tapes may be erased and replies given. In later issues it is hoped to cover a wide range of topics. Meetings are held at the Community Centre, Southall, and further information is available from *N. Robinson, 14, Hayes End Close, Hayes End, Middlesex.*

THE Stereo International Magnetic Tape Club would like to hear from any stereo tape enthusiasts who are bi-lingual or tri-lingual. The main activity of the club is the interchange of tapes, made on stereo machines of music and conversation. One of the methods used between different language countries, is to record only on the top half of the tape. This is then sent to this

country, interpreted and recorded in English on the bottom track. Any reader interested in assisting this club should contact the secretary, R. V. Huddleston, 9 College Avenue, Melton Mowbray, Leicester, stating which languages are spoken.

SERGEANT Tony Clarke, stationed in Germany has helped the **Walthamstow and District Tape Recording Society** form a tape exchange programme. Since he was posted to this country he has received, regularly, copies of the local paper, and read of the activities of the society. He promptly applied for membership. Offering him honorary membership, the society also asked if they could perform any local services for him, his family and colleagues. Back came a prompt reply asking for the sounds of Walthamstow's High Street market on a Saturday afternoon for himself and other London servicemen. A member of the society offered to obtain these recordings, and equipped with a portable recorder managed to collect stallholders crying their wares, a butcher's auction and many amusing selections of sales talk so typical of the market. An edited version of the tape has been sent to the sergeant together with a promise that another will follow of a ride from the Baker's Arms, Walthamstow to Chingford Mount. This will be a real reminder of "civvy street", for Sergeant Clarke was a trolleybus driver on this route before enlisting. Further details of the club can be obtained from K. Perks, 9 Third Avenue, Walthamstow, London, E.17.

A RECENT meeting of the **Rugby Amateur Tape Recording Society** was presided over by John Bannister, who introduced blind member Jack Willis who spoke on the subject "How tape recording has assisted me." He had prepared some illustrations to help explain his talk. American member Nelson Woerner followed this lecture with advice on mailing tapes to other countries together with airmail and seairmail postage rates. Future details from M. E. Brown, 219 Clifton Road, Rugby.

ESTRA regrets to announce the death of Mr. Eric Channon, president and co-founder of the association. Mr. Channon died on Monday, 28th August after a short illness.

ESTRA was founded as an international tape-sponding club in 1960 by two enthusiastic British tape recordists—Eric Channon of Lewes, Sussex and Robert Ellis of Berwickshire, Scotland. (Incidentally, during the last five years these two men have been exchanging tapes at the rate of at least one per fortnight.)

In a little over 12 months the association has recruited 270 members from all parts of the world. Much of the success of the association was due to the great enthusiasm of Eric Channon. His love for tape recording was second to none and he had tape friends in almost every country in the world. One of his great aims in life was to make some contribution, however small, to world peace and understanding. It was with this object in view that he co-operated with his Scottish friend in the formation of ESTRA.



Don Fisher and his wife Toni, were awarded a certificate and a golden microphone as first prize in a competition organised by the Voicerespondence Club of America. Their winning tape was of their holiday on the Norfolk Broads and was recorded on a Fi-Cord 1A tape recorder.

THE meeting at Watford of the **West Herts Tape Recording Society** began with a demonstration of the Telefunken 85KL recorder given by the owner George Richardson. Having pre-recorded a description of the machine, it also included a short history of the Telefunken organisation besides some excellent examples of the machines capabilities. Mr. Richardson also gave members an example of how the effects of a crowded dance hall could be obtained by the use of just two persons and a record player. This was followed by a practical demonstration of head alignment given by the secretary. He played tapes, recorded on a machine with heads in line, on a machine with heads out of line and explained how the high audio frequencies were lost. With the use of a BASF Head Alignment Tape adjustment could be made to get the correct position. Members had been invited to bring their machines along if they wished to have them checked, but obviously they were all satisfied as no members took up the offer. However, the test tape is available should they wish to check at home. Further details of the society can be obtained from P. Holloway, 29 Fishery Road, Boxmoor, Hemel Hempstead, Herts.

THE outstanding entry in this year's British Amateur Tape Recording Contest was made by Mr. T. J. Devereaux of London with other members of the London Tape Recording Club. It is an eight-minute composition entitled "Just by Accident" which dramatises the hospital experiences of an accident victim. This tape wins the Emitape Challenge Cup, the Amphlett Challenge Shield, and a cash prize, and will be entered for the tenth International Amateur Recording Contest to be judged in West Berlin in October. Other winning tapes were: "Life in 1801" (Schools Section) Pennington Junior Mixed School, Lymington, Hants., "The Battle of the Brook" (Documentary) R. A. Margoschis., "Pum 31" (Compositions) D. J. Garrett, Tonbridge, Kent, "Final Curtain" (Music and Speech) A. Pengelly, Plymouth, "Experiments in Reversed Speech" (Technical Experiment) D. B. Aff'eck, Peterborough, "Bird Song" (Outdoor Recording) Miss A. N. Goodwin, Buckland St. Mary, Chard. The contest—which is the fifth in the series—was organised and sponsored by the magazine, Tape Recording Fortnightly.

MORE NEWS FROM THE CLUBS



The secretary of the Southall Tape Recording Club explaining the activities of the club to a prospective member.

HAS your Club or Society ever been invited to take part in an Exhibition in your locality? Have your members sat round a table trying to think of ideas that will interest the general public? To try and find out what really happens at such an exhibition, we recently visited a stand organised by members of the Southall Tape Recording Society during the August Bank Holiday. The section containing the recording exhibition was grouped together with a Cine Club and various other organisations in a fenced off portion of the grounds. A small admission charge was made and it was found that during the three days of the show 1,400 people visited the stand.

Much careful planning had gone on long before August. Questions were asked by members as to the type of stand they should have. Manufacturers were contacted for literature on the machines they produce. A stand had to be built, posters had to be printed and many other jobs had to be done. It was decided by the committee of the club to stage continuous demonstrations designed to make the general public stop and ask questions. After talking to Mr. K. Stanley, the club's chairman, we were surprised to hear of the poor co-operation given by many manufacturers. A few had been most helpful and supplied plenty of equipment and leaflets, but others didn't answer any of the letters sent to them. However, when the time came for the show to open, that stand was filled with leaflets on tape, recorders, and magazines.

Featured prominently was an oscilloscope which showed the visitors the signal being recorded on tape. This seemed to attract the largest amount of attention and a Philips tape recorder was used for the public to record their voices. Also on show was a Reflectograph coupled to a Mullard 5-10 amplifier which as well as providing continuous music on the stand was also used for supplying the sound for the Colour Theatre organised by the Cine Club. Other equipment on view was a Cinecorder, a home-made recorder using the Wearite Deck and a Sound 444 playing an endless loop giving details of club activities and inviting anyone to attend. This, was coupled to headsets for personal listening.

During our visit to the show we were pleasantly surprised at the interest shown in recording, many people being amazed to find that there were things such as tape recording clubs, and we feel certain that the Southall Club's membership will rise rapidly in the coming months.

Summing up the show Mr. Stanley stated that the public must have demonstrations and gimmicks. A static display arouses no interest whatsoever. Already many new members have enrolled and this alone made the exhibition worthwhile. It now remains for members to start preparing for next year.

An Interesting Hobby: Sound Hunting in Germany

ABOUT twenty thousand people of all age-groups in Germany spend their spare-time with a most satisfying hobby. They are hunting sounds—picking them up with the microphone and recording them on a magnetic tape. Doing so means pleasure to them and a lot of fun to other people. Sounds captured in nature as well as music and speech added to the narrow film shot during their holiday result in a sound film, i.e. a combination of synchronised sound and cinematography, as the experts define it. Thousands of sound amateurs organised in the two clubs existing in Germany exchange their experience and maintain a world-wide exchange of tapes. The sound amateur in Berlin or Nuremberg sends his tapes with personal regards, with little radio plays featuring his daily life in a nice setting of music, to friends in New Zealand, South America, and East Asia, and as a return gift he receives recordings from his partners overseas.

The national Clubs of Sound Hunters united in the Fédération Internationale des Chasseurs de Son (International Association of Sound Hunters) meet annually for a big competition. After each country has already run internal, eliminating competitions, the best tape recordings are presented to an international jury. In the years past, besides splendid technical performance and imaginative combinations there were real pieces of art of the smaller variety among the prize-winning tape recordings submitted: radio plays, documentaries, amateur compositions, sound documents, playful electronic experiments, and school recordings. In this year this international competition (the 10th) is held in West Berlin under the patronage of Sender Freies Berlin, and, as already happened in previous years, the best recordings are likely to be combined on a long-play record.

For a good and imaginative amateur recording besides ability, fantasy, and experience just a little good luck is required, and above all a good tape recorder. The sound hunters' activities came into full swing with the appearance of battery-powered, fully transistorised sound recording machines which can easily be carried into the open air and which allow recordings to be made in motor vehicles, railway wagons, and other places without a mains source being required. The German tape recorder manufacturers show on the German Radio, Television, and Phono Exhibition 1961 in Berlin a series of such self-contained sets.

For working in the home sound laboratory, mains-operated sound recording sets of every kind are available. Full satisfaction will be derived by the stereo amateur as well as by the amateur whose expectations are so high that they almost approach studio quality. The technically perfect tape recorder should be used with the appropriate accessories: microphones with omnidirectional or directional characteristics, remote-control components, high-grade transformers, trick mixing desks, cables and all implements and tools for tape cutting and pasting. The Radio Exhibition in this respect will comply with every desire; the range of tape recorders offered will cover all price categories from about DM 150—up to studio machines costing several thousands of German Marks.



OCTOBER NUMBER

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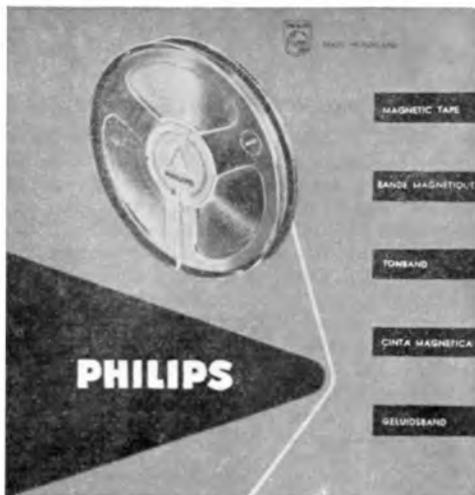
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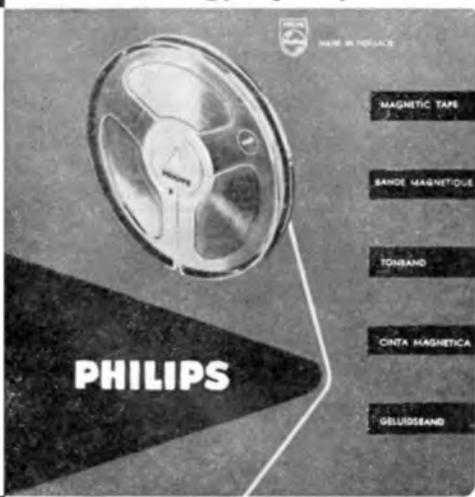
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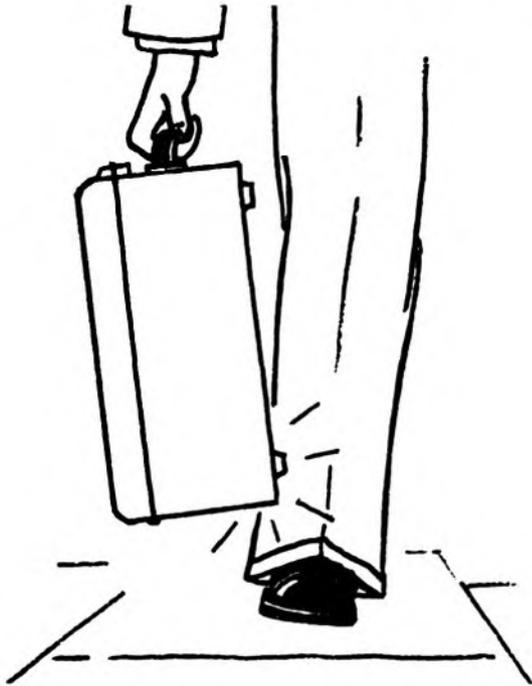
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... INSIDE THE OUTSIDE

SOME OBSERVATIONS AND SUGGESTIONS ON THE SUBJECT OF DESIGN



DESIGN is a fashionable word. Like other fashionable words it sometimes tends to be taken at less than its face value, and the need for it underestimated. For the purpose of this brief look at the subject, I want you to imagine you are a manufacturer and that you have a tape deck mechanism and electronic "black box" which meet the specification expected by the Hi-Fi fanatic. That is; unlimited frequency response, negligible distortion or wow at 17 i.p.s., and facilities equivalent to the Radiophonic Workshop. How can you fail? Anyone will buy this little wonder at £50! You are faced with the task of turning it into a finished tape recorder that will grace the most contemporary home, work like a charm with its lid on under the table and respond equally to dainty fingers or the expert's masterly swipe at the pause button. What are your problems? What should the customer look for in a well-designed recorder?

If you are lucky you may be able to afford the services of a professional to design the exterior. He will advise on its proportions, colour and surface texture. He knows what the fashion is, or will be by the time you sell it. The task of making the thing look efficient and yet live cheek-by-jowl with an Impressionist print or a Beatnik is worthy of a real Designer. Ideally, this man must know some of the production problems and tooling involved, and be able to see the bones under the plastic skin. An obvious need for this kind of approach is in ventilation. It often seems that the deck has been lifted up at the last minute to prevent complete incineration! If the mechanical design provides a fan, then the functional design should provide an air inlet and ensure it cannot be accidentally blocked.

A portable recorder may be carried about . . . Although an obvious statement, it assumes a handle that will take the weight without biting into the hand, will not mark white gloves and is above the centre of gravity (Fig. 1). It also means that if you want to stand it down in the Tube, the loudspeaker grille will not cave in, and the mains plug must not fall out as you

jump off the bus. Good looks should combine with an exterior life at least as long as the "works". If our designer is not disheartened by this time, he will give more than a little thought to the problem of soundproofing. Structural resonances that pass unnoticed in a busy showroom create havoc on the sideboard.

Opening the lid (which has pads to stop the spools falling off and a place for spare tape), you remove it and face your biggest problem—the deck. The size of spools it must take is easy enough to decide—the 7 in., 5 in. and 3 in. classes of recorder define themselves quite clearly. But the shape and position of the head cover, guides and operating controls can make you friends or enemies for life.

Editing of tapes should be encouraged, since it is a creative art which helps to get the best out of any recorder. Therefore the working faces of the heads should be easy to get at for accurate marking, and there should be enough space to mount a splicer or editing block. Even if editing is not a requirement, as in a really portable machine, the head cover should be hinged or removable to facilitate cleaning and defluxing. The position of the tape "run" on the deck must be clear of controls, speed change knobs and indicators—however much tape is on each reel—and the tape guides should be unavoidable. On some decks it is possible to have bad alignment, and consequently bad performance, by "short-circuiting" the guides.

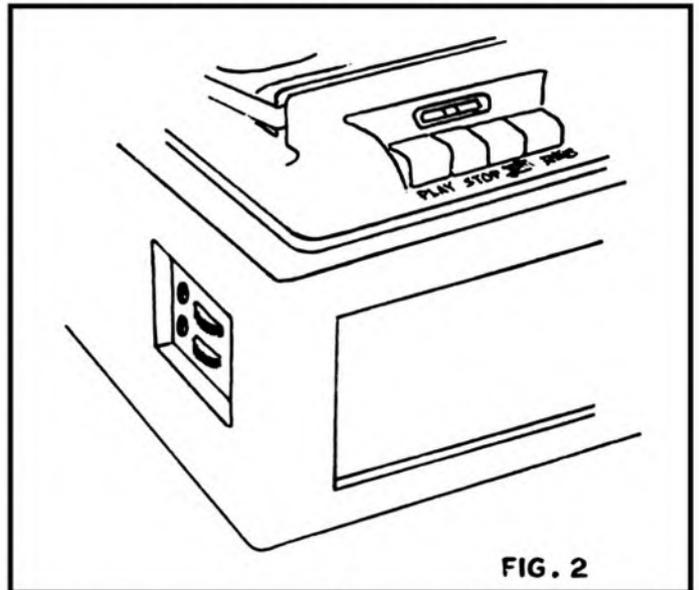


FIG. 2

Operating controls are indeed a formidable problem. On their shape, position and marking, depends the character and "feel" of the recorder. An otherwise perfect machine can get a bad name with reviewers and enthusiasts (and this *does* carry some weight!) by the almost cursed way it objects to being used intelligently. Fig. 2, a mythical model, boasts four robust push-buttons which control the functions of the mechanism. The playback and record gain controls are sleek little discs neatly recessed into the side of the case with their associated jacks, all completely invisible to the operator, well-nigh inaccessible when the recorder is standing next to other equipment, and with no indication at all of their working positions. You've got one nearly like it? Well I never . . .

Incidentally, you will notice that when your finger is on the stop button your hand will hide the level indicator. A more

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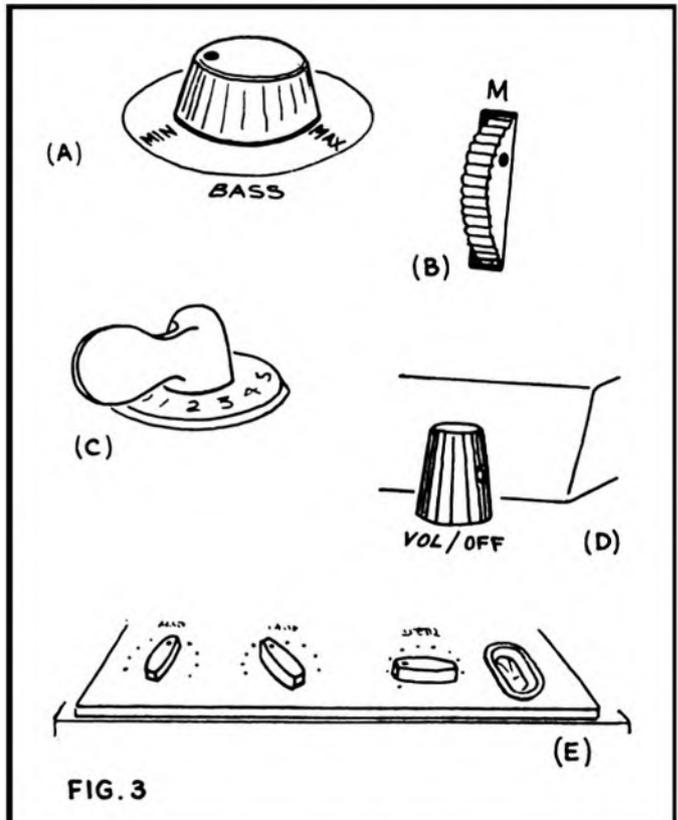
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Microphones from Vienna

advanced model of the edge control is shown in fig. 3b. Going to this one in a hurry, which way would you turn it for off? And is "M" for Mike, Monitor or Muffle? That inspiring little red dot does nothing to help, either. So perhaps we had better return to the good old knob . . . fig. 3a . . . set firmly at minimum Bass. Or nearly at minimum, probably. Does that mean the halfway point is level bass response? Well, it depends if the control is a cut, a lift or both, and the booklet is up in the spare room.

There is often a little argument whether a knob should look like a knob, or be designed purely as a shape on its own, to blend with the overall design. The most satisfactory answer to me is that the knob shall declare by its shape what is expected of it; a strong lever shape for changing function or speed, a prominent precise round shape for the most used gain control,



a smaller but equally precise shape for tone controls. All clearly marked, with no parallax problems and no ambiguity, for in the middle of a complex recording operation a glance should suffice to inform you of the positions of the major controls. Their relationship to each other and to the recorder in pure shape is an artist's problem, and should be dealt with by one. Fig. 3c is an example of a lever knob which demands operation in steps, yet it is, in fact, a smoothly operating volume control (and most awkward to operate toward the top of its travel, too). Fig. 3d is an all too common example of a squeezed-in control which tells you *what* it is but not *where* it is, and when you do turn it you rub a bit more surface off the head cover just behind it. Far too small for a knob which is used every time the recorder is used. As for the point of glancing at the panel to see where you are in a flash, how about fig. 3e?

Fashionable or not, the idea behind good design is not just to be arty-crafty or eye-catching. The development of the modern tape recorder has been strongly influenced by public acceptance of the new ideas that really work, like interlocked push-buttons, "pause" controls, accurate position indicators and durable plastic case coverings. A discriminating user can spot the well-designed product in advance and, by choosing it rather than the shoddy one, help the conscientious manufacturer to keep prices down and standards up.

By John Borwick

HOME RECORDING

PART 6 Programme Compiling

READERS who have been following this series so far—and I must thank all those who have written to me about their home recording exploits—have discovered how to perform most of the tape operations. Now I want to show you that programme building is the most creative way to use your tape recorder and is great fun at the same time.

I feel that recordings become *programmes* when they make a shape, when the beginning and end are just right and the whole thing belongs together with nothing left out and nothing there that shouldn't be.

In a BBC programme team you find a script-writer, producer and technician plus perhaps an interviewer or a few actors and actresses. You will probably have to be all these people rolled into one during the assembling of your tape programmes, but that's half the fun of it.

Naturally we have concentrated so far on the technical/operational side of recording, but let's have a look at the producer's job this month, using two very elementary scripts as a guide. I have directed groups of people on a number of scripts of this kind, and make no apology for their extreme simplicity. To begin with at least, it isn't what you do but how well you do it.

Making a Start

Let's look first at the simplest thing of all—speech linking sound effects. To make it something that everyone can lay hands on, I have based this script on woodworkers' tools, and you will be able to adapt this to nearly any noisy activity.

"OTHER PEOPLE'S JOBS—THE WOODWORKER"

Announcer: We present "Other People's Jobs", Part Two—"The Woodworker" (*music, establish, then fade down and fade up mixture of woodworking noises*).

Woodworker: I have always liked working in wood, and these are the sounds that I can hear any day of the week. Whatever I am making, one of my first jobs is to saw the timber to correct size (*sawing*).

Woodworker: Then I assemble the parts, and fit them together. This might involve glueing, followed by fastening with wood screws (*ratchet screwdriver*). . . .

Woodworker: . . . or on a rough job, I could simply nail the various pieces (*hammering*).

Woodworker: Sometimes a number of holes will be needed, accurately drilled and positioned (*drilling*).

Woodworker: A final, and very important operation which makes the surfaces ready to take a really professional polish, is sandpapering (*sandpaper*).

Announcer: This programme in the series "Other People's Jobs" was devoted to working in wood, as our closing sounds will remind you (*mixture of sounds, cross-fading into music*).

Method One—"Live" Recording

There are two ways of tackling a recording of this kind. In the first method you run the whole thing through "live" from start to finish with someone standing by to make each of the noises at the right moment. This is the most obvious approach and has the advantage that everybody knows what's happening *when it's happening*. And if everything goes right first time, your programme is on tape with no editing required.

The big disadvantage of this method, however, is that you have to get every detail right before you start recording. The sounds must be right, each one must be at the right distance from the microphone, and come in exactly on cue. Your



speakers must be word perfect, and there must be no "technical hitches." Of course, this used to be how all broadcasting was done, and even a 2-hour-long play would be acted out "live" with everyone remembering his positions and cues.

Method Two—Film Technique

But this method of recording everything straight through non-stop has now been superseded in most professional programmes by what we might call the "film technique". Most people know that films are shot in dozens of very short sequences or "takes", sometimes only a few seconds in duration. This is necessary because of the complexity of filming. Once the lighting, setting, actors and costumes have been collected and rehearsed for a particular scene, it is obviously commonsense to shoot all the parts of the film that use these, whether or not they follow the actual page-by-page order of the script.

In "The Woodworker" then, you could get all the tools ready and record each sound separately after rehearsing it for balance and volume. The opening and closing sequences, in which all the tools take part plus a gradual fading in or out of music, are the trickiest. You could perhaps leave these till last, enlist the help of the whole family, and set them all sawing and hammering together at the positions you have already found which give the best balance for each sound individually.

Once you have recorded each of the sound illustrations there comes the business of combining this with the speech. You rehearse the speakers first—in peace and quiet because all the noises are already safely on tape. There are then two ways of making the recording. Firstly, you can record all the speech lines "cold", that is without the other sounds. The readers can stop after each speech or simply leave a pause between each one and carry on recording. You then get the scissors or razor blade out and cut all the sound inserts into their appropriate places to give the finished recording. This splicing method will be your only choice, of course, if you are using a single tape machine.

If a second recorder can be got hold of, however, you can replay the sound effects in sequence from one machine and cue the readers so as to record the mixture on the second machine in its final form, and so avoid splicing the tape. It would be good practice to record some simple script such as the one above using all the methods, for each method has its advantages for one situation or another.

A More Ambitious Script

The next script I am reproducing here will show you how radio programmes are built up. It is still elementary, but needs a good brisk production pace. There are more noises needed,

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HOME RECORDING — (continued)

about three actors, and a distorted effect to imitate the sound of the far end of the telephone conversations.

The traditional ways of getting this effect are to speak into a tumbler, make a small paper dunce's cap to fit over the microphone, or tap a condenser across the microphone leads to cut out the bass tones. But owners of a telephone adaptor might like to do the thing properly and actually record these conversations from a telephone with the "lineman" ringing up from outside.

This script can easily be put together on a single recorder, and you can either try to run it straight through from start to finish, or divide it into about three sections.

"OTHER PEOPLE'S JOBS"—THE TELEPHONE OPERATOR

Announcer: We present "Other People's Jobs", Part 4—"The Telephone Operator" (*music fades into telephone dialling*).

Operator: Is that the Engineer's Department?

Voice: (distorted) Yes. What can I do for you?

Operator: We're still having trouble with line 203. Are you going to be able to clear it soon?

Voice: (distorted) Well, there's a linesman working on it now. You should be hearing from him soon (*buzzer*).

Operator: Thank you. I think this may be him now (*plug changed over. Buzzer stops*).

Operator: Hello, Exchange here.

Linesman: (distorted) Can we test line 203 with you? Apparently it's been giving trouble.

Operator: Yes, certainly.

Linesman: (distorted) To begin with, will you dial me on 203?

Operator: O.K. I'll use a separate instrument to check properly (*plug changed over. Receiver lifted. Dialling*).

Linesman: (distorted) That's fine. Now, hang up and I'll ring you (*Receiver replaced, pause. Telephone rings. Receiver lifted*).

Operator: Hello again. Well, that seems to be working O.K.

Linesman: Yes. Thanks for helping with the test.

Operator: That's all right. All in the day's work, you know . . . (*buzzer*).

Operator: There goes an incoming call. Goodbye.

Linesman: (distorted) Goodbye (*receiver replaced. Plug changed over. Buzzer stops*).

Operator: Exchange here. What number did you want, please? Oh, 203? Certainly, I'll get it for you right away . . . (*fade voice into music, then fade down*).

Announcer: That was "The Telephone Operator"—Number 4 in a series of programmes on "Other People's Jobs".

To Sum Up

Whether you are assembling programmes on tape for competitions, or simply to provide home entertainment, make it a basic rule that it is better to record a simple script well than to over-complicate things. The two scripts discussed here are intended simply as a guide and you will be able to think of numerous themes by studying them and listening to the radio. Although these articles have put the emphasis on technique, you should aim at becoming so adept at recording that the technique can take its proper place as a servant to the production itself.

This concludes the present series of articles by John Borwick, preparations are being made for a further series which will be published at a later date. (Editor).

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... and it comes out here ▶

(But it will sound better if it comes out somewhere else)



THE Music goes round and round . . . and, on even the best portable tape recorders, it is restricted in quality to the limits set by the inbuilt, monitor loudspeaker. Such speakers were primarily built in to portable instruments for the purpose of enabling the operator to play back what he had recorded—so that he could, in fact make an on-the-spot check-up that all was in order. Later, when the recorded tape was “in the can”, edited, or put to whatever use it was ultimately aimed for, it would be listened to through a properly designed speaker of sufficient size and quality to do justice to it.

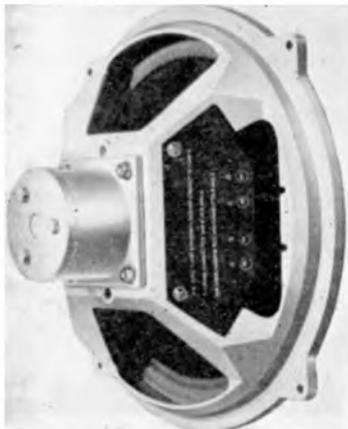
All that, however, was quite a few years ago; and in the intervening years “domestic” tape recorders have appeared and been bought by the public in their hundreds of thousands—all, of course, with “inbuilt speakers”—and the original purpose of that small but vital unit has been quite overlooked until, today, it is regarded by millions of owners the world over as “part of the machine”—an absolutely necessary part, without which the recorder would be useless!

Improving the Result

This is indeed a strange mix-up of thinking, for on the one hand it is very logical and correct, but on the other hand it is a complete misuse of the original idea. Any domestic tape recorder would, of course, be useless without a speaker to play back, or monitor, what was recorded: but, generally speaking, there is no tape recorder worthy of the name that will not give better results, when coupled to a good external speaker, than when used with its own inbuilt “monitor” unit.

Carrying this forward another stage, it can be said that (in nearly every case) the owner of a tape recorder who has never played back a tape through any speaker but the inbuilt one, has never heard his recorder to anything like its best advantage. The exceptional cases are those when the recorder is in such bad shape—so debased by hum and noise and distortion—that a good loudspeaker will make the reproduced sound more horrible and distorted than before, because of the larger scale of the overall reproduced sound.

This short article is not designed to go into detail concerning good and bad speaker systems: it is written, briefly, to state a basic fact, and to point the way to better tape reproduction. Nevertheless, having said that the inbuilt speaker of a recorder is inadequate for general listening, reasons should be given.



This photograph shows the Whiteley HF 1012, 10 in. drive unit, which can be adjusted to take inputs of 3, 7.5 and 15 ohms. This is one of the lower priced speakers, but fitted into a suitable enclosure this will provide better results than the internal speaker of most recorders.

The technically near-perfect speaker is one which will faithfully reproduce the complete range of sounds of the useful audio spectrum—i.e. sounds with a frequency of not less than 32 c/s in the bass to at least 15 c/s in the treble. Most modern speaker systems employ at least two speaker drive units to accomplish this, because (broadly speaking) the bass notes are better handled by a big diaphragm, and those of the upper register are more easily reproduced by a small diaphragm—and neither will do its own job, plus the other, satisfactorily. Also, it must be remembered, any speaker drive unit has to be properly “housed” in order to begin to do its job efficiently—as witness the “infinite baffle” type of mounting, or a speaker unit so mounted that the sound waves from one side of its diaphragm cannot reach, interfere with, or even cancel out, the sound waves from the other side.

Now let us look at a typical “inbuilt” monitor speaker of a tape recorder. Here we have a unit with a diaphragm measuring perhaps 5 inches. It is screwed on to a part of the chassis or casework. The rear part of the diaphragm is “boxed in” by the casework itself, which ensures that the overall sound must have a “boxy” character, depending upon the size of the box, the material it is made of, and the amount of free air in the box. No provision is made for coupling the unit efficiently to the air. The bass content of the sound is thus hopelessly inadequate.

None of this is written as a slam at tape recorder manufacturers. These speakers were, as stated originally designed as monitors. Nearly all recorders are provided with a socket for plugging in an extension speaker. Those who use their recorders for casual entertainment, or for business, where only intelligent reproduction of speech is required, have no need to attempt to extend the range of the reproduced sound. For them, the monitor speaker is quite adequate. For those who are using recorders for the reproduction of music, however, the external speaker is a “must”, if anything approaching good quality is required.

Varying Prices

The increase of recorded tapes, carrying musical programmes of really good quality, is the signal for many hundreds of tape recorder owners to consider this subject very earnestly. They have in their hands a musical instrument of very good potential—but will never have a chance of doing its best unless it is provided with a properly designed speaker. In a nutshell, listening to a tape record via the average, inbuilt, monitor speaker would be equivalent to listening to good l.p. discs by means of a turntable and gramophone pickup, coupled with a baby portable radio set.

Extension speakers vary in price from about five guineas to about £165. Quite obviously, it would be a waste of money to buy the latter for use with a cheap portable tape recorder! Similarly, it would be foolish policy to spend five guineas if the potential quality of a 100-guinea recorder deserved something much better.

Hi-Fi Year Book lists many dozens of alternatives over a wide price range; but before attempting to choose anything, the reader would do well to listen to his recorder playing back through any extension speaker of reasonable quality. From such an experience he will find the answer to the main question—“is it worth it for me?” That question answered, he can then make up his mind what to spend, whether to make up a “Do-it-yourself” kit, or whether to invest in a ready-built unit for possible future Hi-Fi use.

By Richard Golding

THE CINECORDER TESTED

"LIP-SYNC" SHOTS ON 8 mm MADE BY "THE GRASSHOPP REGROUP"



Richard Golding scribbling a few notes as a framework for a satire on one of the popular television programmes prior to putting his victims on the hotpot.



Stuart Wynn Jones suitably attired to cut down shine.

THE Cinecorder is a tape recorder designed to aid the compilation of sound tracks for films or for making up programme-type tapes. Perforated tape and special sprocket attachments enable advanced techniques to be used when making sound films, and lip synchronised inserts are easier to handle by the possibility of visible matching of tape against film when cutting.

It is a single speed machine, running at $3\frac{1}{2}$ i/s. The perforated tape type A, carries 16 sprocket holes for every second of run and can be used in conjunction with a number of 8 mm separate-type synchronised projectors and, for shooting lip sync inserts, with many 8 mm cameras.

The Preliminaries

To test the *Cinecorder* for lip sync shooting and projection I decided to enlist the Grasshopper Group and so I took it along to their Endell Street Studio during an ordinary production night. The sound boffins from University College, Keith Raven and Robert Higham, expressed especial interest when they saw me bring it in. "Amazing", said Raven, "for years I have been reading Desmond Roe's articles on what could be done for the cine-amateur, and here we have almost all his ideas altogether in one unit."

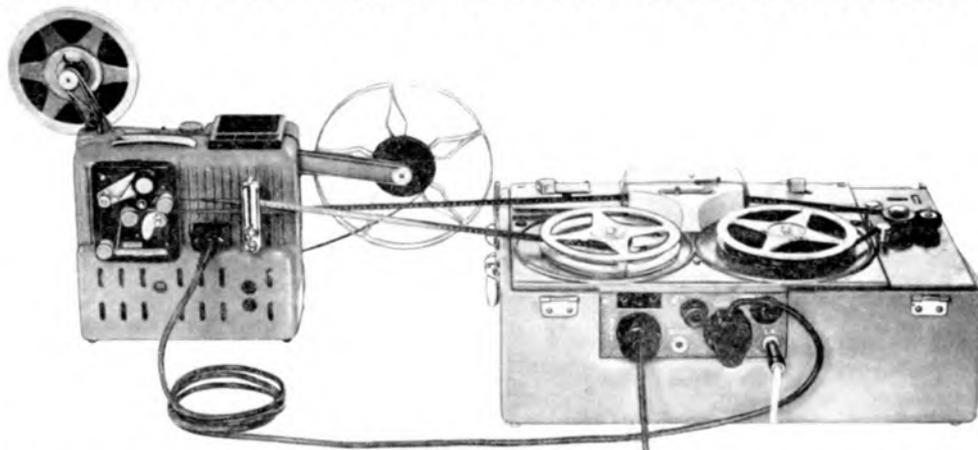
Although the *Cinecorder* is recommended mainly for lip sync inserts, I planned to shoot the whole of my short film as lip sync dialogue as I thought that this may give more indication of its capabilities. Normally, dialogue films take considerable planning and rehearsing, and the actors have to be word perfect as well as being sure of what action there is to carry out. Lighting the set, make-up, and the choosing of camera positions take a great deal of time and thought. For us, however, all the prepara-



Robert Higham, University College boffin, on the Cinecorder.

THE CINECODER TESTED

"LIP-SYNC" SHOTS ON 8 mm MADE BY "THE GRASSHOPP REGROUP"



tions, lining up, lighting and the rest of it would have to take place in one short evening, and so I decided to use a makeshift version of television technique by having a strong camera angle change after every shot.

I had intended to use three cameras, one in link with the Cinecorder and the other two for re-action shots, but only one camera arrived. This, however, was a Beaulieu Reflex 8 mm with three lenses and turret. With this model we could swing quickly from one focal length to another, and the lightness of the camera would enable rapid angle changing.

To make the test as interesting for everyone concerned, I scribbled a few notes as a framework for a satire on a well-known Television interview series and instituted myself as interviewer while taking stock of several prospective victims from among the Grasshopper onlookers. While this was going on the boffins were setting up the Cinecorder and testing microphone positions and various Grasshoppers were busy lighting the set for a low contrast effect.

"We're ready to calibrate the camera", called Leslie Morris, secretary of the Group and owner of the Beaulieu.

Calibrating the camera

On this particular model the old speed of 16 fps has now been replaced by 18 fps but it is possible to find an intermediate speed by slightly moving the speed indicator. After a series of tests we found that the Beaulieu would maintain a constant speed for at least 20 seconds of its 30-second wind, and these tests were carried out in conjunction with the Tape Time Indicator on the Cinecorder.

First, we loaded the camera with the provided double 8 film timing loop and which gave a complete running time of 60 seconds. This was placed with a punched hole just above the gate. The Cinecorder was laced with perforated tape, and the sprocketed disc (which controls the Indicator and which bears 16 numbered segments) was turned so that Zero was to the front. The Indicator was set to 0000.

The remote control lead was attached to the camera cable release at the one end, and to the Cinecorder at the other, so that the camera operator worked both units at one press of the button.

The actual calibration took rather longer than expected, but in the end we were completely satisfied that the number of feet of film passing through the gate at a given time bore an exact frame to sprocket hole relationship to the tape passing around the Cinecorder's sprocketed disc. The calibration is one of the most important points in this form of lip sync shooting, for while camera and tape recorder have a true synchronised start, they function quite independently of each other until the end of the take.

The camera was now loaded with film and the Cinecorder laced up with the Indicator set to 0000. The remote control and camera coupling mechanism was plugged in. The cover was removed

from the shiftrack mechanism, and the special tape marker was screwed up so that the point protruded from the front of the remote control arm toward the rubber pinch roller. The function of this tape marker was to prick a tiny hole in the tape at the end of every shot. Its position being exactly 5 perforations in advance of the actual sound on the tape.

The lip sync session

The victims were briefed and the set was ready. "There's too much shine on Stuart's head", said the cameraman. "Alright", called Len Skipper on lights. "Don't worry", said Stuart Wynn Jones. "I'll put my hat on." And he did so, introducing the programme in a horrific big close-up.

"Tonight, *Face to Face* brings you to Endell Street, in the heart of London's West End, where a strange collection of sub-humans are gathered for the purpose of telling us how they make their strange sub-human films . . . etc."

"Cut! Check the camera frame counter against the Cinecorder Indicator." It tallied exactly, and we all breathed again.

Raven, holding the microphone out of camera range, was briefed to tap me at 15 and 20 seconds so that I could time the ending of each take. The first fake interview was conducted rather seriously with Alan Cohen, author of "Lithomantic Vision", giving plausible reasons why everyone should believe in magic of all colours, especially shell-pink. During this interview and the following ones Leslie Morris moved in very tight on occasion for the most immense close-ups of a wide open mouth or the end of a quivering nose. "To give the dialogue more emphasis!" he said.

After Cohen came Hettie Loman who gave a voluble account of her ballet filming activities which she described as "the registration of the poetry of motion in the air". Indeed, she was so expressive that several times I had to hold her down to prevent her taking off altogether. The last interview, however, was much easier to control. I introduced John Daborn, the chairman of the Group, as the G.O.M. of film making. "Just how long, Mr. Daborn, have you been making films?" I asked.

He swallowed. "Thirty-five years", he mumbled.

"To what particular thing do you owe your past spectacular successes?" I asked next.

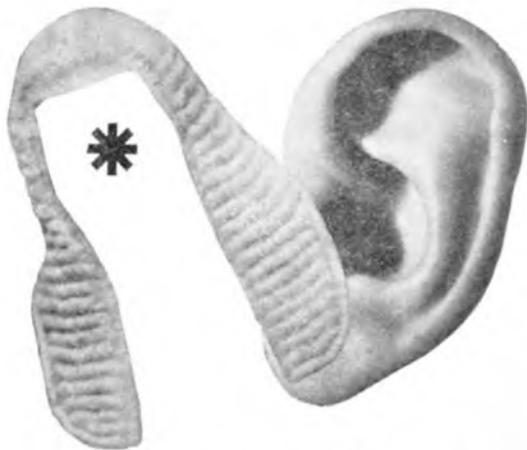
He swallowed again. "Film", he said, after a pause.

"And just how long will this cartoon 'Cupid and Psyche' take you to make?"

"Thirty-five years", he mumbled, and on this I was able to end the show.

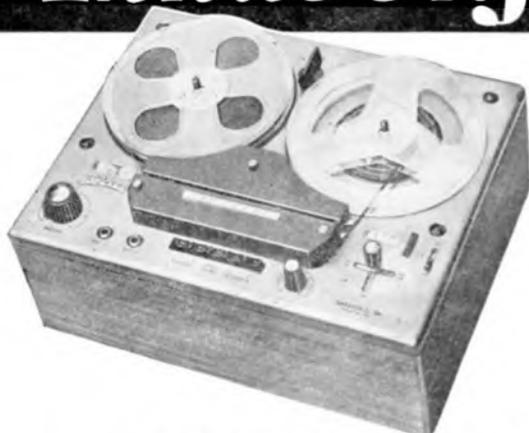
Editing session

On receiving the film from the Labs I first checked each shot against the Cinetape on an improved editing scale, to see if each tape marker point corresponded with the end of each film take. There were no discrepancies, but topping and tailing and the removal of some false starts were necessary and, in consequence,



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the tape had to be tailored to match. Edge fogging made editing critical at one point and meant that sound had to be carried over into the next shot. In some cases no cutting of film or tape was necessary, but where it was an extra frame was left on the film to allow for the one sprocket hole overlap required for splicing. The sound was checked for smoothness and we were ready.

Synchronised projection

This was done with the *Eumig Imperial*. The capstan was removed from the built-in loop coupler and the Cinetape sprocket unit was screwed easily into position. The projector was warmed up, then switched off from the mains and plugged into the projector socket at the rear of the Cinecorder. Film and tape were laced up in the normal manner, i.e. the tape passing from the recorder feed spool, around the Indicator sprocket, past the heads to the coupler and then to the Cinecorder take-up spool.

Both film and tape were provided with start sync marks and lined up, and the Eumig was switched on. The Cinecorder was switched on and the projector started in perfect synchronisation.

The result—a quite amusing little film with astonishing accuracy in its lip sync. "Do this again but with extra cameras for reaction shots such as a B.C.U. of someone's boot" said someone, "and we've got ourselves an Oscar!"

This is an exaggeration, of course, but in all respects our first encounter with shooting 8 mm lip sync turned out to be quite interesting.

Exact calibration of a spring drive camera for takes longer than about 15 seconds would seem to depend on a mixture of patience and luck. With the Beaulieu we were lucky, but it does seem unreasonable to expect such a camera to keep an exact speed for the major part of its run. With a camera such as the Bolex H8 with its longer run per wind, or where a motor can be added, the position may be different but, generally, the system of calibrating the camera by trial and error can result in some frustrating hold-ups before the actual shooting starts. With electric drive cameras, however, a rheostat speed controlling system on the camera might be worked in conjunction with a frame contact from the camera and the strobe on the Cinecorder Indicator capstan.

Apart from the facilities for sprocketed tape, the features on the Cinecorder which most appealed to me were: the Tape Timing Indicator, the Tape Lift Control which permits background sounds to be cross-faded and allows spot effects to be recorded on cue, and the Shiftrack Control which enables commentary to be recorded independently of a previous recorded background or vice versa.

The front control panel appealed also, with its compact layout and built-in mixer with independent volume controls, but I did feel that an output jack for monitoring should be included on this panel instead of being at the rear of the machine. Of the many accessories supplied, only one gave any trouble at all. This was the camera release coupler where the wires connecting the Bulgin remote control switch tended to foul the cable release at times. A slight modification can be made very simply to counteract this on existing models, although I understand from Desmond Roe that future models may have this modification themselves.

Manufacturer's Comment

A plastic editing scale is available from the manufacturers.

Non-copyright mood music

THE new Danceland record catalogue is extremely interesting. The sections include: Modern Dance, South American, Jazz, Light Orchestral and various International recordings. The discs are made in unbreakable vinyl plastic, are non-vocal for the most part and are free from Phonographic Licence Fees.

A glance through the lists shows a great diversity of title most of which I have never seen before. I would say that the greater part of these have been specially composed and recorded for the company while those I do recognise are out of copyright. This does, of course, represent one way out of the present copyright difficulty and might be worth investigation by a club wishing to build up a library for its members. Prices: 10 in. 5s. 3d. inc. of P.T., 12 in. 7s. 3d. inc. of P.T. From:— Danceland Records, 76 Southwark Street, S.E.1.

... tape recorder workbench

No. 27. BIAS FREQUENCY

by A. Bartlett Still

THE tape recorder enthusiasts that this column tries to serve seem to be generally divided into two camps. On the one hand are those, probably the majority, who have purchased a complete tape recorder, and whose concern is to get the most out of it and to keep it in good operational condition. Forming the second group are those, possibly more ambitious, who purchase the deck and build the electronics. It is often once this has been done that the real problems arise, carrying out the necessary adjustments, with a minimum of test gear, to produce the desired performance. I intend, in the near future, to devote some space to the general principles to be adopted when carrying out these adjustments so that the whole operation can be made as straightforward as possible. In the meantime, however, there is one query of a more specific nature that is outstanding.

Correct adjustment of the bias oscillator is probably one of the most critical factors affecting recording performance, and is often one of the least understood facets of the whole problem. In the past I have tried to offer some advice on the problem of arranging for correct magnitude of bias voltage, "optimum bias", as it is so often called, this being, perhaps, most important of all. This month I want to turn to the question of bias frequency.

The Selected Frequency

As one reader pointed out, there are several sources from which one can learn that the bias frequency should be "four or five times the highest audio frequency", but little has been said about how the frequency should be checked, or, for that matter, why it should be between those two limits.

One of the features that is always looked for in the specification of a tape recorder is a low distortion level, referring

of course, to distortion introduced in the recording/replaying process. This is obviously necessary if the reproduced programme material is to be the same as the original within reasonable limits. What is often forgotten, however, is that the distortion content of the original programme material may be quite high, except that the frequencies concerned are then referred to as harmonics or overtones. A given musical note is, fundamentally, a sine wave of a certain frequency. The fact that the ear can determine whether that note was played on a piano, violin, or trumpet is due to the distortion factor of the three instruments, the magnitude and relationship of the harmonics produced. This means that although the highest fundamental frequency involved in a piece of music may be no more than 3 or 4 kc/s, the response of a recorder needs to be flat to some 10 or 12 kc/s in order that sufficient harmonics can be correctly reproduced to ensure fidelity.

The Harmonics

This range will not encompass all overtones: a large number will be beyond the audible range. Let us consider, as an example, the eighth harmonic of a 4 kc/s fundamental (not at all unlikely in the complicated waveform of a full symphony orchestra) this would be a note of 32 kc/s. In the event of a 40 kc/s oscillator, a "beat" note of 8 kc/s would be produced and recorded, an unwanted or spurious signal well within the audible range. If the oscillator were at 43 kc/s the beat note (11 kc/s) would be outside the range of a 10 kc/s machine but would be recorded on a machine whose response extended to 12 kc/s. Some of the modern recorders whose frequency response is claimed to extend to the 16-18 kc/s region should have a correspondingly higher bias oscillator frequency. Unfortunately, many of them do not, and this often accounts for the rather shrill and tinny performance, though I remember being told by one eager salesman that for the first time I was hearing true recording fidelity—truer, apparently, than the original!

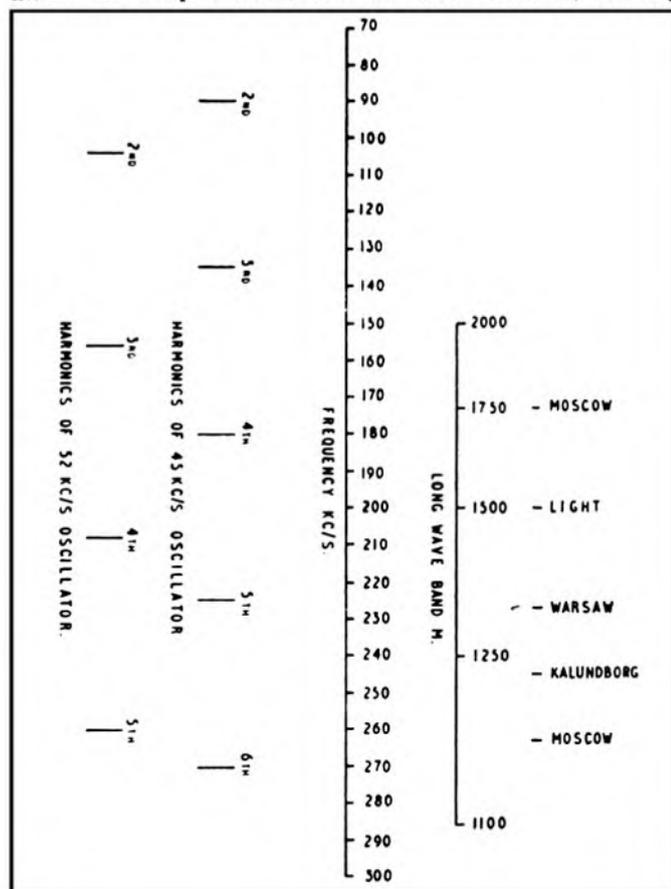
Upper and Lower Limits

In this way we can set a lower practical limit for the oscillator frequency. What about the upper limit? Here the answer is simple. What we are concerned with is bias current, but current depends on voltage and impedance, and the impedance of the record head rises steeply with any increase of frequency. If the current is to be kept constant the voltage must increase too, which means an increase of power.

Since conditions for the Erase head will be much the same, power requirements dictate that the frequency shall be as low as possible, hence the compromise as stated earlier. In practice, the desired frequency will probably lie between 45 and 55 kc/s, which leaves us with the problem of measurement. Although the harmonics produced by a well-designed oscillator will be small in magnitude they can be detected by a sufficiently sensitive wavemeter, and a radio is such a device. A transistor portable is particularly useful here, because it can be taken close up to the oscillator. My diagram shows the way in which harmonics of two oscillator frequencies are disposed in the Long wave band, any two are always separated by the fundamental frequency of the oscillator. Now there are two quite distinct ways in which these harmonics can be detected, and care should be taken not to arrive at any answer as a result of mixing the methods.

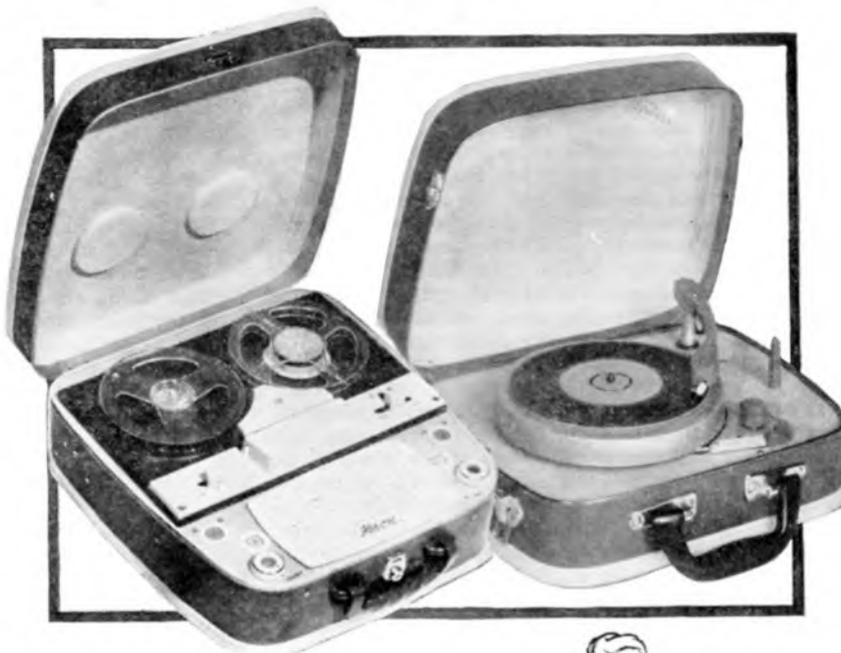
If a harmonic within the Long wave band is "tuned in" a whistle will be heard if the signal is near to a broadcasting station that can be received, otherwise there will be a quietening of the "off-station" background hiss, more difficult to detect. Such a whistle would be constant in frequency, varying in amplitude as it tuned in and out. This is the most likely, and probably most satisfactory, way in which the frequency

(Continued at foot of Page 437)



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By David Kinglake

ESSENTIAL POINTS FOR TAPE DRAMA

IN this article I intend to examine one or two of the essentials which should be considered in the writing and production of plays and scripts for the tape recorder. For the recorder does present its own particular problems, and if we are to produce recorded plays of a high standard, these problems must be resolved, so we must know just what the medium can do. Of course, there is no one-and-only right way to do things in creative work, and it may well be the case that the exception to the rule will often prove better.

Firstly, then, we must try and establish a convention and stick to it. This convention can be as usual or unusual as we like, for so long as it is maintained, it will be quite acceptable. For example, we are prepared to accept the theatrical convention, and ignore the fact that we know the set is only canvas and the characters only actors. We are, in fact, prepared to believe in the illusion so long as it is maintained. But once an event occurs not within that convention, the illusion is broken.

Using Sound Effects

Imagine a narrator appearing in the middle of a realistic play and continuing the story. On the other hand, such a narrator is acceptable in another convention. Bertolt Brecht uses not only narration in his plays, but documentary technique and the projection of slides. But as he does not claim that these plays are in the realistic convention, we will readily accept the convention he uses, and so it is with recorded plays.

To use a narrator where one is not acceptable will at once destroy the illusion of reality. It is a great temptation to pop in an announcement for continuity, or to set a scene which is difficult to show without visual means. It is much better, in most cases, to describe the scene with sound effects, or in the following dialogue.

This leads us on to sound effects and their use in plays. What is the best way to use effects to set scenes? To answer this we must consider not "What does the scene *actually* sound like?" but rather "What does the listener think *the* scene sounds like?"—for the two can be very different. Everyone has a mental idea of sounds, and it is this that must be presented if the actual location of a scene is to be understood at once. The same problem occurs in visual presentation where, for example, a mediaeval scene can be costumed in a way which, although not historically correct, is immediately acceptable to the audience as being in that particular period.

Two Forms of Presentation

On tape, the scene must be immediately understood and accepted. Imagine, perhaps, that a play had a scene set in a motor-car factory. The actual sounds of such a factory would be only confusing, and probably not specific. Hence the producer must build up a short montage which the listener will accept at once as a motor-car factory. I would suggest for this a combination of conveyor belt, heavy presses, and testing car engines. These would obviously have to be well balanced, but the final result would be a definite location, and not just a confused noise.

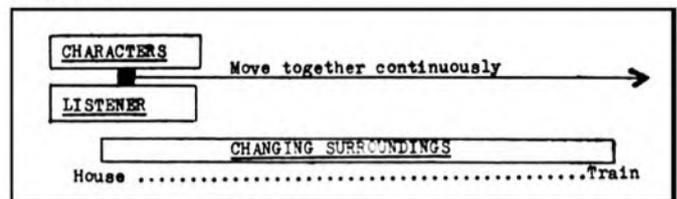
We must now consider production with regard to the relative apparent positions of listener and characters, and in doing so, I want to refer to what I call the "travelling listener" and the "fixed listener", in order to discriminate between two forms of presentation. These, in effect, mean that the listener either *travels* with the characters as they move in relationship to their surroundings, or the listener *'jumps'* from place to place, and the characters move in and out of range relative to the listener. I can illustrate this better with an example.

Let us assume we have a play in which some characters move from a house out into the street, hail a taxi, and drive to the



"The Happy Journey" by Thornton Wilder, showing the mimetic style of the play at a point where a "car" stops at a garage.

station, buy a ticket and get on a train. If, throughout all this journey, the dialogue was continuous, we should use the technique of the "travelling listener", and as our characters moved, so the listener would move with them. The surroundings, as presented in sound effect, would be continuous and changing. We should hear the front door opening, going on to the pavement, move with them into the taxi etc. I can illustrate this with the following diagram (1).



However, it may be the case that only parts of what in fact would be continuous dialogue are essential for the play. Perhaps it starts in the house, jumps to the taxi, then to the station, and concludes in the moving train. In this case, you would have to use the "fixed listener" method, and let the characters move relative to the listener. This is shown in the diagram (2).

In this form of presentation each location has to be set, and this must be done quickly and efficiently, and it may be necessary to put in one or two very short scenes without dialogue for better continuity. We should, in effect, fade out at the end of the scene in the house, move straight to the "pavement" and put in the sound of the characters coming out, hailing a taxi, and the taxi driving off. The cut to inside the taxi, and at the end of the dialogue cut to the station booking office. This is established before the characters arrive, we hear them buy tickets, and then add a short continuity scene to show that their train is setting off—a station announcement would serve for this. The play then continues in the train.

(Continued on Page 437)



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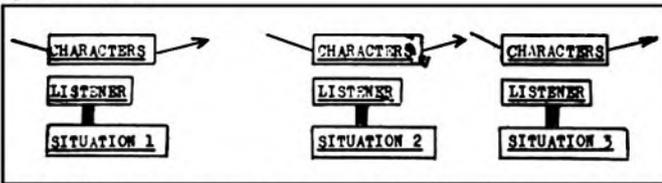
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These continuity scenes are important, not only to help establish the next main location, but they prevent the play falling into rather watertight compartments. The listener must not be jerked from one scene to the next too abruptly, or the illusion may be destroyed.

The question now is to what extent we can mix these two listener conventions. As I have said, there is no one answer in creative work, and the answer is very dependent on the play itself. However, it's not a good thing to allow too much intermixing. It may be that in the middle of a play some short documentary scenes are necessary—such as might occur in "flash-back" scenes which are often a montage of important points in a number of short incidents. In a case like this, intermixing is quite acceptable.



Finally, it is necessary to try and decide what sort of plays these forms can be used for. Mention has been made of the documentary play, a very extreme form of which is Brecht's "The Private Life of the Master Race". This is in short scenes unrelated to one another except in that they illustrate the playwright's theme. Continuity is achieved by songs and the sound of a Panzer truck. Other types of play which fall into this category can be many Victorian Melodramas, which provide good use for sound effect; the plays of Shakespeare and other Elizabethan playwrights.

On the other hand, there are not so many plays which have a continuous flow from location to location, but I would suggest that "The Happy Journey" by Thornton Wilder would be a very nice little play to tackle. It's very short, and concerns the journey of a family by car from their house to a neighbouring town. This play is usually performed entirely in mime, but could be made very effective at the hands of an imaginative producer (see Photograph).

With the drawing room comedy type of play, there are no problems with regard to the establishment of location, but these plays are not entirely suitable in most cases for the tape recorder. For they often depend, for their effect, on visual means, and even if there is nothing in the plot which necessitates visual explanation, they do tend to be boring with nothing to watch.

In conclusion, I would say that the medium of tape should be used to its greatest advantage. Although sometimes hampered by lack of visual means, it has an advantage over the theatre that it can convey the listener to any location at once—and often more effectively, for a great deal is left to the listener's imagination, which is often better than any painted scenery. So we must know all the advantages and possibilities, and use them to their greatest effect.

TAPE RECORDER WORKBENCH—continued

can be determined. It is possible, however, to pick up signals that produce beat notes with the radio oscillator. These are above the long wave frequencies and, in consequence, any dial reading will not be correct in relation to the fundamental, but two adjacent readings will still give the right answer. Such signals can be recognised by the variation of frequency of whistle as the tuning is altered, the lowest frequency being the correct tuning point, the bottom of the "dip" in the characteristic.

So much for checking the oscillator frequency, a process actually easier to carry out than to describe, but now comes the inevitable word of warning. Should you check the frequency on your present machine and decide it is too low, remember that a change in frequency will necessitate a re-adjustment of the bias level, a considerably more tedious process. Unless it is carried out, however, any advantage you might have hoped to gain would be lost in the deterioration in performance in other ways. Those building their own recorders, of course, will have to set the bias level anyway, so it will certainly pay them to get the frequency correct first.

TAPES REVIEWED

WITH the announcement last month of nine new tapes by Saga, all at 3½ i/s on 5-inch spools, and the promise (by this same company) of the complete "Messiah" by Handel on three tapes at 3½ i/s for this month, it certainly seems that the tape recorder enthusiast is at last beginning to receive due attention. Coupling this Saga announcement with the newly released W.R.C. catalogue of tapes at 3½ i/s, we see the list of available titles increased by nearly 50 in a matter of weeks—and we do not overlook or forget the good work of the other makers of tape records as we write, for though their output has been small, it has been steady and progressive; and without it the 3½ market would not previously have been served at all!

Unfortunately, Saga were unable to send us samples of their new tapes in time for review in this number, but we hope to receive them in time for next month, and we also remind other tape record producers that this column (or page, according to the available material) is their shop window!

Of the next batch of W.R.C. tapes to be played and tested, we have picked out five for special recommendation, in terms of quality, musical performance and interesting content. First, for lovers of piano music, TTP149 is a "must"—a Chopin recital by Jorge Bolet. The items are (Track 1) Polonaise in A Flat Major, Op. 53. Waltz in D Flat Major, Op. 64, No. 1 Fantaise—Impromptu Op. 66 (Posthumous). Nocturne in E. Flat Major, Op. 9, No. 2 Etude in C Minor, Op. 10, No. 12 (Revolutionary). (Track 2) Polonaise in A Major, Op. 40, No. 1 (Military). Etude in E Major, Op. 10, No. 3, Waltz in C Sharp Minor, Op. 64, No. 2. Prelude in D Flat Major, Op. 28, No. 15. Etude in G Flat Major, Op. 10, No. 5. The playing of all these pieces is really superb, and the recording is excellent. (Time, 41 minutes).

Next, for those who like the sound of Woody Herman, "The Herd Rides" (TTP 153) is quite terrific. (Track 1) Northwest Passage. Caldonia. Wild Root. The Good Earth. Blowin' Up A Storm. It's Coolin Time (Track 2) I Cover the Waterfront. Crazy Rhythm. Sinbad the Sailor. Fire Island. Black Orchid. Bijou. (Time, 41 minutes).

Show Boat. (TLMP 14) is another good one for collectors of show music, and the Linden Singers, plus a good cast and the New World Show Orchestra under Johnny Douglas provide the following numbers: Overture and Opening Chorus; Make-believe; Can't help lovin' dat man; Ol' Man river; You are love; Entr'acte—Till good luck comes my way; Bill; Life on the wicked stage; Why do I love you; I still suits me; I might fall back on you; Finale. (Time 41 minutes).

Readers who like the violin, and particularly violin concertos, there is a most thrilling performance (TTP 30) by Andre Wolf with the Sinfonia of London, playing the Brahms violin concerto in D major, Opus 77. The conductor is Anthony Collins. (Time, 41 minutes).

Finally, for this month, there is a double winner on TLMP 6, under the dual title of "Can Can" and "Paint Your Waggon". The first, with music and lyrics by Cole Porter, contains: Overture; We are maidens typical of France; C'est magnifique; Live and let live; I love Paris; It's all right by me; Allez-vous-en; Can Can. The second brings Overture; There's a coach comin in; I talk to the trees; The wind Maria; I still see Eliza; Another Autumn; Wandering Star. (Time 45 minutes).

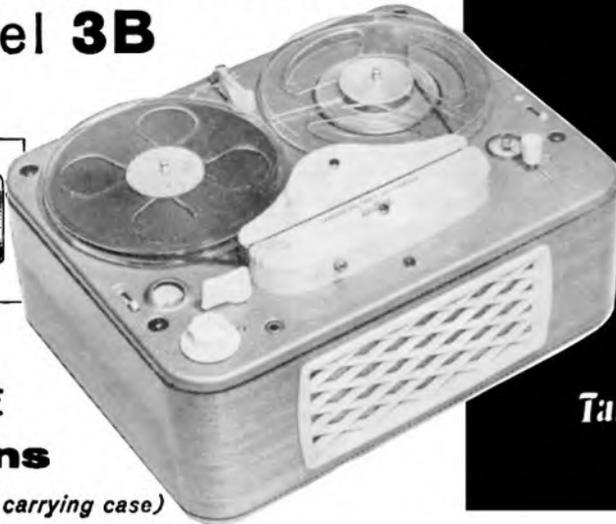
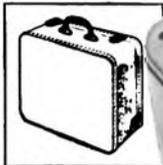
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Readers' Problems

Mains Convertors

Dear Sir:—I have an Elizabethan Major tape recorder set to work on 200 volts A.C. However, I frequently visit a friend whose house is still wired for 200 volts D.C. Would you please tell me whether it is possible to convert the D.C. to A.C. to enable me to use my recorder there, but a temporary modification only is necessary as I would like to make the equipment fit in a box into which I plug my recorder.

Yours faithfully, G.J.S.H., Warrington.

Mains-operated tape recorders can be used successfully from D.C. mains supplies provided a suitable converted unit is used.

These convertors are not items that can be made, they have to be obtained as a suitable unit for the particular requirement. The "Valradio" convertor, frequently advertised in *The Tape Recorder* is a most successful device and you would find the manufacturers most helpful in determining the correct type for your machine under the conditions you mention.

Overloading Recordings

Dear Sir:—I have a Telefunken 85 KL which is connected to my equipment which comprises a Dulci DPA 10 amplifier and pre-amplifier, Rogers switched FM unit, Goldring 580 pickup and Goodmans Axiom 300 speaker.

Recordings made at $3\frac{1}{2}$ i/s are excellent, with negligible distortion but most recordings made at $7\frac{1}{2}$ i/s from the radio tuner are ruined by a kind of overloading distortion. I have set the magic eye indicator at all different levels, but no change occurs. What must be mentioned, is that this generally occurs only from live performances, not gramophone records or pickup recordings. I have tried three brands of tape, but one make gives better results than the others. This seems to record all music except heavily modulated piano music.

Yours faithfully, D.G., Kingston-on-Thames.

It is a little difficult to offer you exact advice without having had the opportunity of hearing the distortion to which you refer. Noting, however, that this only occurs at the higher tape speed, receiving live performances that are being recorded via the tuner unit, I suspect that the fault does not lie in the tape recorder at all.

The B.B.C.'s F.M. transmission is designed to have a flat response up to some 15 Kc/s, except where affected by G.P.O. land lines, but gramophone records are invariably cut off earlier to avoid needle scratch. If the de-emphasis circuit of the tuner were not correct this would result, on live transmissions only, in a rising characteristic above 10 Kc/s. The harshness, particularly on sibilants, that this would produce would only be recorded at the higher tape speed, and might well be emphasised if the recorder itself had a rising characteristic in this region.

The fact that the effect is varied by the use of different brands of tape lends support to this theory in that only one brand will correctly bias on your machine. Over biasing of a tape causes a falling off of the treble response and may in this instance serve to balance out the overall result.

Selecting Microphones

Dear Sir:—I own a Regentone RT 50 tape recorder which is provided with the familiar microphone. I have tried rather unsuccessfully, to record piano music, but when I tried a borrowed microphone, (I don't know the make) I found that my microphone is seriously handicapping my recordings. I do a certain amount of recording small groups and choirs, as well as speech, and have decided to invest in a more expensive microphone (up to £10). Could you please advise me of a suitable type.

Yours faithfully, A.G.H. Rugby.

The microphone you have with your tape recorder will be the crystal type, normally provided because of their high sensitivity and low cost. These microphones are, however, deficient in bass

response, and a moving coil type would give you a better all-round performance with, perhaps, a slight loss of sensitivity. The "Grampian" DP/4H, advertised in *The Tape Recorder* is a popular choice, and the high impedance version would be directly suitable for your machine. This would be an omni-directional microphone and the lead could be extended over a distance of a few yards, provided very well-screened cable was used. This microphone is also available in a low impedance version which would require a matching transformer. However, the lead between the microphone and the transformer could be extended to many yards without hum pickup. Better frequency response still would be obtainable with a ribbon microphone, but, I think you would find that this type would be more limited in its use.

Monitoring on Headphones

Dear Sir:—I use an Armstrong ST3 Mk. 2 AM/FM tuner for making direct recordings into a tape recorder using the Collaro deck and Mullard Type A amplifier. As I wished to monitor the input signal, I plugged a pair of headphones into the output socket of the recorder, but found there was slight distortion. Could you please inform me if the trouble lies in the amplifier, or tuner.

Yours faithfully, E.H.E., Maesteg.

When listening to the signal being recorded through the output socket of a tape recorder a certain amount of apparent distortion is to be expected. This is due to the fact that the signal is affected by the recording characteristics of the machine, and it is something which need not cause any concern. The function of monitoring in this manner is to determine the content, not the quality of the signal being recorded. The quality of the recording will be determined by the recording level control which should be set according to the indication of the magic eye.

Add-on Units for Stereo

Dear Sir:—Shortly after the 1960 Radio Show I purchased an Elizabethan FT 3 tape recorder, with the intention of converting it to stereo recording and playback. I wrote to the manufacturers a short time ago asking for information on their additional amplifier unit. They informed me that the unit, an amplifier and speaker combined costs £26 5s. (In comparison with the price of the recorder). This seems expensive when the company concerned markets a complete recorder for £19 19s.

I would appreciate your advice on assembling my own unit, using a transistor pre-amplifier, alternatively could you recommend any kits for the machine I am using.

Yours faithfully, Miss J.H., Leighton Buzzard.

I regret that I am not going to be able to give you the answer that I suspect, from your letter, that you are hoping for.

The price of £26 5s. asked by the manufacturers for an add-on stereo unit is probably not excessive when you consider that far

announcing . . .

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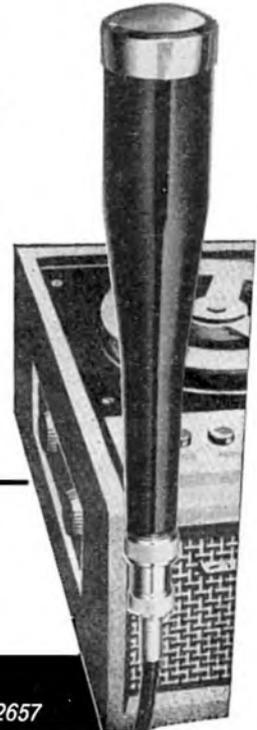
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Argyll Minor ...	2 6 3	2 6 3	22
Wyndor Heron ...	2 15 0	2 12 3	25
Grundig TK14 ...	3 13 6	3 13 6	35
Elizabethan TT3 ...	4 2 0	4 1 11	39
Reps R10 ...	6 3 11	6 3 11	59
Allegro ...	4 8 6	4 8 2	42
Spectone "161" ...	5 2 11	5 2 11	49
Telefunken 95 ...	6 3 11	6 3 11	59

4-TRACK			
Stuzzi ...	2 16 6	2 14 6	26
Argyll 4-T ...	3 4 0	3 4 0	29½
Elizabethan FT1 ...	3 11 5	3 11 5	34
Phillips EL3541 ...	3 11 5	3 11 5	34
Stella ST 454 ...	3 17 9	3 17 9	37
Sound ...	4 15 0	4 14 6	45
Elizabethan FT3 ...	4 15 0	4 14 6	45

BATTERY			
Clarion Mk. 1 ...	1 19 11	1 19 11	19
Minivox "C" ...	2 8 4	2 8 4	23
Phillips EL3585 ...	2 10 5	2 10 5	24
Clarion Mk. 2 ...	2 16 9	2 16 9	27
Grundig TK1 ...	3 1 0	3 0 11	29
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Butaba MT5 ...	6 18 8	6 18 8	66

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Elizabethan Major ...	14 5 0	3 0 0	65
Grundig TK35 ...	15 15 0	3 10 0	75
Truvox R7 ...	15 15 0	3 10 0	75
Telefunken 85KL ...	17 19 0	3 12 3	79
Ferrograph 4A/N ...	18 1 0	3 14 6	81
Brenell 5 Type "M" ...	18 10 0	4 2 2	88
Simon SP/4 ...	20 0 0	4 8 8	95
Reflectograph "A" ...	22 5 0	4 17 6	105

4-TRACK MONAURAL			
Reps R10 ...	14 10 0	3 4 5	69
Grundig TK24 ...	11 11 0	2 11 4	55
Telefunken 76 ...	12 7 0	2 12 10	57
Brenell 3 Star ...	12 4 0	2 14 2	58
Phillips EL3542 ...	12 8 0	2 15 1	59
Stella ST455 ...	12 8 0	2 15 1	59
Truvox R84 ...	12 8 0	2 15 1	59

4-TRACK STEREO/MONAURAL			
Korting MT 157 ...	17 17 0	3 19 4	85
Telefunken 77K ...	17 17 0	3 19 4	85
Harting H.M.8 ...	18 6 0	4 0 0	86
Phillips EL3536 ...	19 12 0	4 5 7	92

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READERS' PROBLEMS—(continued)

smaller numbers will be produced than of their tape recorders, and also that the unit has not only to provide correct recording and replay characteristics but, in addition, has to be sufficiently close in performance to the existing tape recorder to provide good stereo. If such were not the case you would have the protection of the manufacturer's responsibility since it was for this purpose that the unit was advertised and sold.

Should you purchase a unit from another manufacturer there would be no guarantee that the performance of the two channels would be sufficiently alike for stereo, indeed, the probability would be against this. The transistor pre-amplifiers that you mention are linear devices, not having the necessary record and replay frequency characteristics and would not therefore be suitable.

The short answer is that for £26 5s., you have some assurance that the manufacturer's aims are the same as your own, while separate purchases may in the end cost you far more.

Monitoring on Headphones

Dear Sir:—I write to ask whether you will advise me how to solve a problem with which I am faced. I own a Wyndsor "Victor" twin-track recorder and wish to fit earphones or a stethoset for monitoring or playback—without disturbing other members of my family who might be watching television or listening to the radio in the same room.

As you know the Victor has no muting switch on the fitted loudspeaker or a socket for external speaker. Would I cause any damage to the machine if I merely cut the lead to the loudspeaker and inserted a simple plug and socket connection, to be used with earphones in place of the speaker? If so, what impedance should the earphones be? The speaker I believe is 3 ohms. Also, would I need to fit any resistance to prevent any overloading or distortion in the earphones? I shall be grateful for any assistance you can give together with recommendation of any suitable phones or stethosets. Yours faithfully, W. D., London, S.E.27.

If you simply cut the lead to the loudspeaker in your tape recorder it will upset the conditions under which the output valve is operating. However if you connect in place of the loudspeaker a resistor of three ohms (1 watt rating) the correct conditions will be maintained. Any pair of high impedance earphones may now be connected across this resistor when they will receive an adequate signal which may be adjusted in the normal manner.

Fitting an Extra Head

Dear Sir:—I wonder if you would kindly give me some information on the following query.

As the record/play-back head is usually mounted between the supply spool and the capstan: would it be technically correct to fit an additional head for play-back only, between capstan and take-up spool?

My tape recorder is a Telefunken model 85T, and I am considering the practicability, or otherwise, of fitting a stereo head for playing 4-track tapes at 7½ i/s and feeding into a separate stereo amplifier (corrected to CCIR).

Yours faithfully, D.G., Brighton.

It would not be technically correct to fit a playback head between the capstan and the take-up spool on a recorder but this is not to say that it cannot be done on certain machines.

The basic requirement is that the tape take-up should be sufficiently positive to maintain a reasonable tape tension without any tendency towards "looping" or "snatching" since these would mean a variation in tape speed. You would also have to bear in mind that with four track heads the guiding of the tape becomes extremely critical and would almost certainly require the fitting of a guide pillar on either side of the new head. The whole assembly would have to be positioned so that the tape was effectively wrapped round the head to ensure intimate contact.

It must be said that such heads are normally fitted for monitoring purposes only and not for serious replay in this position.

Pure Bass

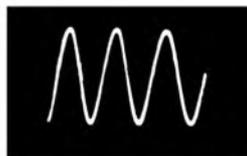
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442

our readers write

. . . about being creative again

From:—K. A. Paxton, 125 North Road, Withersea, Yorkshire.

*Dear Sir:—*A correspondent asks what the owner of a single machine, the average enthusiast, can do with his machine. Surely the possibilities are quite varied. I own a Stella ST 454, reviewed in the August *Tape Recorder*. With this, I have done both live and "canned" recording. On the lively side I include a concert given by my College Choral Society, recorded at the last minute with little thought or indeed scope for elaborate facilities, a family wedding, from which I shall in due course have a disc cut, the voices of college friends whom I shall not see for at least a few years now, and an impersonation of the college Principal which, played during the commission of a misdemeanour, made the culprit as nervous as a kitten, so true, did the recording sound.

Your correspondent seems to jib at "canned" recording, speaking of "disappointing copies" and of the recorder as an "expensive copying machine". My copying has in general been neither disappointing nor expensive. I manage as good a recording as my radio will give me, which is no more than I ask, as the radio would be for me as for many others the only means of access to much of what I record. So far as I know, copyright subsists only in gramophone records, and except when these are played on the radio, none of the BBC material presumes upon the laws of copyright. After all, it is for our edification that the corporation exists, and if to understand or appreciate something we need a second hearing, then surely we, whom the BBC serves, are entitled to this if we can provide it at no one else's expense, i.e. by recording it.

Other correspondents may suggest other uses, and indeed one could think of many more (I had even projected a short feature programme on a particular institution) but the use I have made of my machine has satisfied me perfectly that my money has been well spent. *Yours faithfully,*

. . . about a tape monitor

From:—The Rev. Yerburgh, Wells Cathedral School, Wells, Somerset.

*Dear Sir:—*Your recent articles by John Borwick prompts me to submit details of a gadget which I have constructed. This has been of use to me and may be of interest to others.

This unit was built into a Stentorian "Bedford" external speaker and used in conjunction with a Philips tape recorder, E.L.3542; but, doubtless, it could be used with other recorders which have high-impedance monitor sockets. It consists, essentially, of a level meter and an amplifier. The amplifier used was a one-watt transistor amplifier (G.S. 12005) manufactured by T.S.L. By means of switches the unit can be used

in a number of ways. These are listed below, but it has been chiefly used as a Tape level and monitor Unit.

By switching in a variable matching system the Tape Monitor amplifies the tape monitor signal (1000 ohms at 100 mV). The amplified signal activates both a 3 ohms speaker and also a level meter. The deflection of the level meter can be adjusted by means of a variable resistance. The desired amount of deflection is first decided upon. Now, by comparing the reading on the level meter with that of the tape recorder magic eye when the latter is fully closed, one can see by looking at the level meter of the Tape Monitor unit, when the recorder is being overloaded. If the Monitor is used in conjunction with a mixer unit, then the overloading can be reduced forthwith. Otherwise, either the volume of sound at source must be reduced or, the recorder's controls adjusted.

The variable resistor marked 25K ohms should be rewound to a value of 20 ohms. This is used as a volume control. The other variable resistor: 100K ohm, is used in conjunction with a 15K ohm resistor and fixed condensers to form part of a variable matching system. *Yours faithfully,*

. . . about a Reflectograph Manual

From:—G. B. Shaw, 2 Park Ravine, The Park Nottingham.

*Dear Sir:—*I am writing to ask if any of your readers can assist me in obtaining a copy of the instruction book for the Reflectograph Model 500. It has occurred to me that some reader may be willing to loan or sell me a copy. Any help in this direction would be appreciated. *Yours faithfully,*

. . . about early articles

From:—R. Brookes, 27 Greenway Drive, Staines, Middlesex.

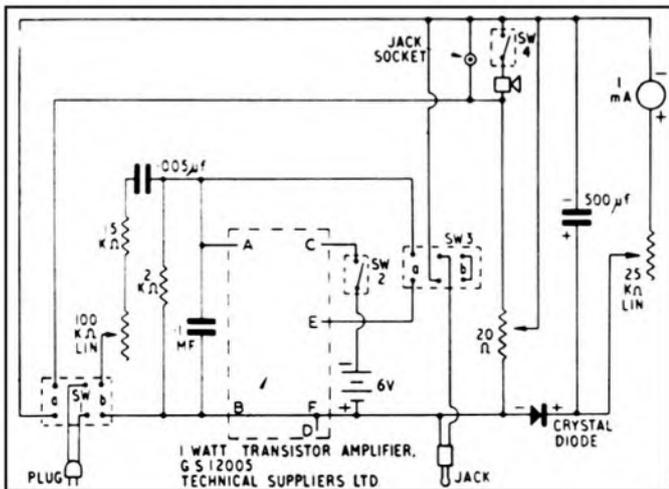
*Dear Sir:—*A friend of mine recently loaned me his bound volume 1 of *The Tape Recorder* and I am most envious of his possession. The many earlier articles aimed at helping the beginner are most interesting and valuable. I am sure there must be other readers who missed these initial articles who would purchase them if they were reprinted in a book form. "Taking up tape" and "What do these things mean to you" are excellent examples to start a series. *Yours faithfully,*

. . . about a tape exchange

From:—R. F. Kidd, 18 Milton Road, Buckland Estate, Dover, Kent.

*Dear Sir:—*I see from the letters printed in your magazine each month, that you have readers in most parts of the world. Therefore I wonder if you could put me in touch with someone of my own age with whom I can exchange tapes.

I am 17-year-old, my interests are tape recording, photography, cycling, radio and television. The equipment used is four track with speeds of 7½, 3½ and 1½ i/s: countries I am particularly interested in contacting are the U.S.A. and Australia.



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Prices: 2 Track 7" spools 59 gns.
4 Track 7" spools 69 gns.

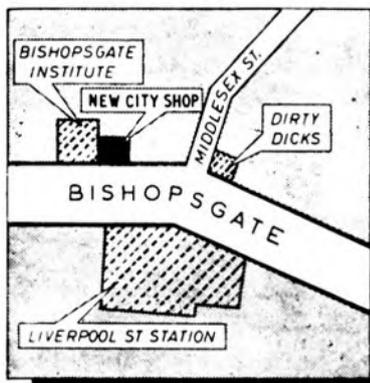


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TAPE, RECORDERS & ACCESSORIES

FIRST DETAILS OF NEW PRODUCTS

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

★
**TRUVOX
 INTRODUCE
 TWO NEW
 RECORDERS**



★
 TRUVOX Ltd. will shortly introduce additions to their range of tape recorders. The redesigned tape deck, whilst similar in appearance to the Mark 6 model, has numerous modifications resulting in improved mechanical performance. The method of operation has been simplified, frequency response improved and additional facilities provided. Both the two track and four track models will have cabinets of the latest design. The Model R82, the two track machine will have the following features:— Mechanical disc brakes; Separate drive wheels for each speed, automatically disengaged when the machine is switched off; Interlock which ensures that the record switch will revert to playback when the stop, forward, or rewind buttons are pressed; A pause control that can be left on indefinitely; Superimposition; Mixing facilities; 4 watts output; Auto-stop; Straight through amplifier; Storage space in the cabinet for tape.

The Model R84, a four track machine, has the same specification as above, but is fitted with a track selector switch with a stereo replay position. Sockets at the rear allow for a second tape amplifier. Frequency response on both machines is claimed to be 40 to 20,000 c/s \pm 3 dB at 7 1/2 i/s and 40 to 12,000 c/s \pm 3 dB at 3 1/2 i/s. Prices will be announced shortly, but further details may be obtained from the manufacturers. **Truvox Ltd., Neasden Lane, London, N.W.10.**

★
**BUSH
 ENTER THE
 TAPE
 RECORDER
 MARKET**



★
 BUSH Radio Ltd., demonstrated their first tape recorder at this year's Radio Show. Known as the TP50, it is a four track machine using the B.S.R. Monardeck with push-button controls. Frequency response claimed at the single speed of 3 1/2 i/s is 80-10,000 c/s, Wow and Flutter less than 0.2%. A revolution counter is fitted and magic eye recording level. The output of 2 watts is fed into a 7 x 4 in. speaker. Separate bass and treble controls are provided. The size of the TP50 is 14 x 7 1/2 x 13 1/2 in., weight 25 1/2 lb., price £42. The manufacturers are **Bush Radio Ltd., Power Road, Chiswick, London, W.4.**

★
Stuzzi Memo-Cord Recorder

THE smallest tape recorder to reach this country so far is the Stuzzi Memo-Cord which measures only 4 1/2 x 3 1/2 x 1 1/2 in. and weighs 11 oz. Although the machine is so small, one hour's playing time is possible with the use of special 1/4 in. recording tape. Power is provided by a PP3 transistor battery and a D15 penlight cell. The volume is controlled automatically and the loudspeaker and microphone is built-in. Rewind can be operated by power or manually. A hand or foot remote control is available for a secretary or shorthand typist, or alternatively an amplifier speaker unit can be supplied. The price of the Memo-Cord is £26 5s. complete in a book styled presentation case. The distributors are **Recording Devices Ltd., 44 Southern Row, Kensington, London, W.10.**

★
**THE
 TANDBERG
 SERIES 3B
 MONAURAL
 RECORDER**



★
 WE promised in last month's *Tape Recorder* that we would publish a photograph of the new Tandberg Series 3B. This has now reached the office, and as readers can see above, the basic design is similar to the previous models. This is a two-track three-speed, monaural recorder capable of taking 7 in. spools. The price is £79 16s. The machine is manufactured in Oslo and distributed in this country by **Elastone Electronics Ltd., Edwards Street, Templar Street, Leeds, 2.**

★
Wilmex Tape Accessories

A NEW SERIES of accessories for the tape recording enthusiast has just arrived in this country from America, and will be distributed by Wilmex Ltd.

The Gibson Girl tape splicer shown at this year's Audio Festival, cuts the tape diagonally and then trims the edges with a "bow wave" the same as the SP3 splicer. The cost of this is 18s. 3d. fitted with stainless steel blades, these are claimed to have a life of 2,500 splices. Other accessories include a tape cleaning kit type TK2 which contains a special cleaning fluid for recording and playback heads together with a tape cleaning cloth. This is priced at 12s. 6d. A tape threader for quick threading of a tape on to an empty spool. Self-adhesive spool labels, tape clips for securing the end of a full reel of tape and tape storage cans for 5 in. and 7 in. reels. Further details of all these accessories can be obtained from **Wilmex Ltd., Wilmex House, 151-3 Clapham High Street, London, S.W.4.**

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EQUIPMENT REVIEWED



★
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MT5
BATTERY
PORTABLE
★

Manufacturer's Specification: Double track international system. Tape speeds $3\frac{1}{2}$ i/s and $1\frac{1}{2}$ i/s. Playing time 2 hours with double play tape at $3\frac{1}{2}$ i/s and 4 hours with double play tape at $1\frac{1}{2}$ i/s. Push button operation. Tone and volume control. Microphone impedance 200 ohms. Microphone input 200 microvolts. Radio input impedance 100K. Low level output 100 millivolts at 200 ohms. Frequency range 50-13,000 c/s at $3\frac{1}{2}$ i/s, 60-5,000 c/s at $1\frac{1}{2}$ i/s. Noise level -40dB. Power output 1.2 watts. Magic line record level indicator. 7 transistors, 2 diodes and magic line indicator. Batteries 8 U2. Mains converter 110-260 volts at 50-60 c/s, or car battery. 2 Motors. Clock type tape indicator. 20-40 hours battery life. Weight, including batteries 12 lb. Price £72 9s. including connecting lead, moving coil microphone and empty spool. Sole importers **Denham & Morley Ltd., Denmore House, 173-175 Cleveland House, London, W.1.**

★ ★ ★
THE forerunner of this machine, the MT4 was enthusiastically reviewed in the Portable Recorder Field Trial No. 8 in August last year. Messrs. Denham & Morley were so confident of the performance of this new slightly modified version that they have submitted it for a full scale technical review with no concessions to the fact that it is a portable recorder and with the invitation to "give it the works". I have done so and I must say I am most impressed with the results of these tests.

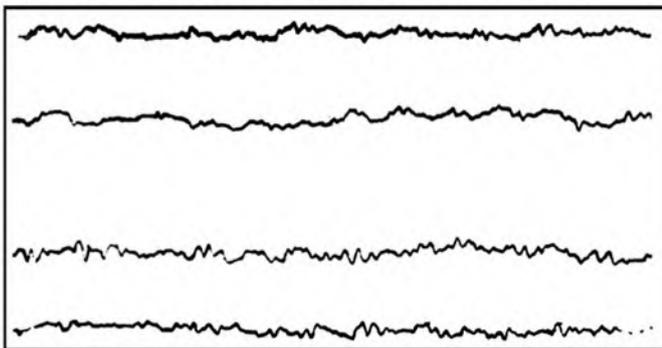
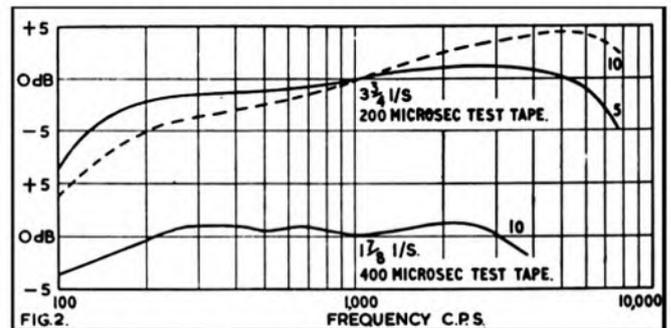


Fig. 1. Top two fluttergram readings at $3\frac{1}{2}$ i/s 0.11% R.M.S. Lower pair $1\frac{1}{2}$ i/s 0.16% R.M.S.

Wow and flutter: The combined wow and flutter at the highest speed of $3\frac{1}{2}$ i/s is .11% R.M.S., and at $1\frac{1}{2}$ i/s .16%. The "fluttergrams" of fig. 1 show that there is no recurrent cyclical component of wow and flutter and that the tape motion will stand comparison with the best mains driven machines. Music recordings at both speeds were smooth and sweet with only a slight curtailment of the upper frequencies to indicate that the lower speed was being used. The tape speed remained constant, even

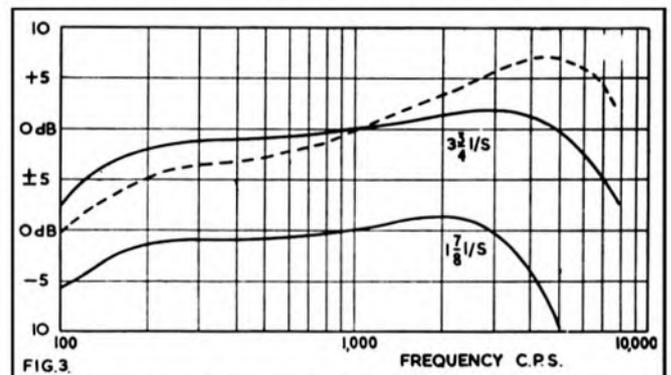
with fairly violent motion of the recorder such as would be encountered when carrying the machine by the shoulder strap.

Playback frequency response: Fig 2 shows the response at the low level output socket when playing a 200 microseconds test



tape at $3\frac{1}{2}$ i/s, and also the response from the same tape played at half speed at $1\frac{1}{2}$ i/s. This shows that the tone control should be set to 5 for $3\frac{1}{2}$ i/s replay and to 10 for $1\frac{1}{2}$ i/s replay to the Internationally accepted 200 and 400 microsecond characteristics.

Record replay responses: The tone control operates on both record and play, but on the maker's recommendation the tone control was set to 10 for all recording tests. Fig. 3 indicates the response obtained when oscillator tones were fed to the radio



input and replayed via the low level output socket. These responses are very close to those obtained from the test tapes and show that the recorded response on the tape conforms to the standard 200 and 400 microsecond recording characteristics. The dotted curve and the tone control settings marked on this figure refer to the tone control position on replay.

Acoustic responses: The overall acoustic response, including the loudspeaker and the effect of the case, is shown in fig. 4. This was obtained by feeding one-third octave bands of filtered white noise to the radio socket on record, with the tone control at 10, and then measuring the replay sound level at a distance of 1 ft. from the speaker fret with a calibrated microphone. This again shows that the most level acoustic response is obtained with the tone control at 5 for $3\frac{1}{2}$ i/s and at 10 for $1\frac{1}{2}$ i/s. At the higher speed the response is maintained level within plus or minus 4dB over the range 200 c/s to 6,500 c/s. This is appreciably better than most table model recorders and accounts for the extremely fine tone quality remarked upon in the field tests. The maximum undistorted acoustic output was 109 phons, which is slightly above the average for all recorders so far tested, mains or battery. The fact that the loudspeaker is mounted on what would normally be considered the bottom of the cabinet accounts for the open unobstructed and unboxed sound quality.

Continued on page 449

Ferrograph

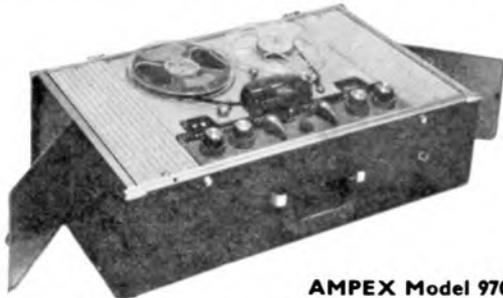
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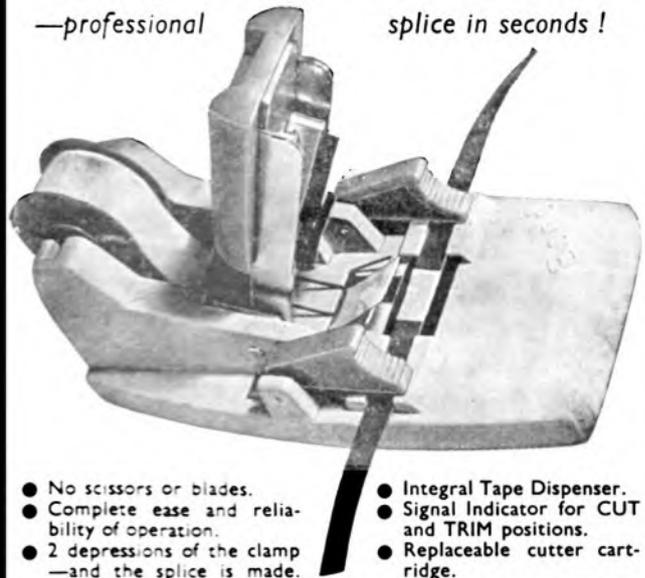
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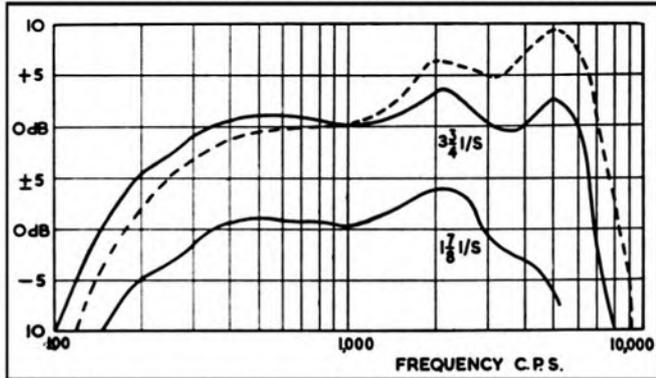
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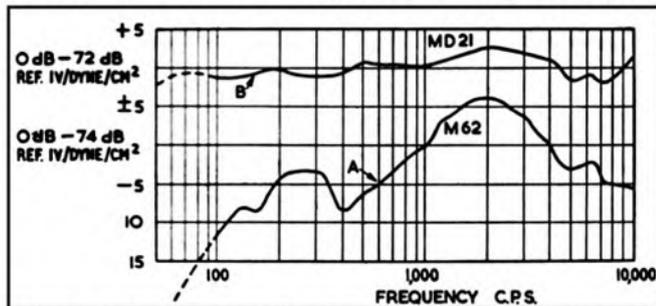
EQUIPMENT REVIEWED—(continued)

Microphone responses: Two microphones were sent for test with the MT5. The *Beyer M62* is supplied with the recorder, and the response is shown in Fig. 5A. The broad bump at 2Kc/s can be partly compensated by turning the tone control down to about 6 during $3\frac{1}{2}$ i/s recording. At the low speed the tone control is best left at 10 and the microphone peak used to give a bit of edge to the recorded quality. Fig. 5B shows the response of the more expensive microphone supplied, the *Sennheiser MD21*. This is a microphone of the highest quality with a very wide range frequency response. I encountered some hum on this microphone until I discovered that the screened mic lead was not earthed to the appropriate connector pin.



At this point I rediscovered a phenomenon often remarked upon by other workers in high quality sound reproduction. This was that the extended response of the better microphone could be appreciated even when listening through a system of limited bandwidth. The acoustic responses of fig. 4 seems to show that differences in extreme low note response would not be audible, but careful listening tests showed that they were. The usual explanation is that the ear, being a non linear device, can synthesise the missing low frequency fundamental from intermodulation between the harmonics, which may have been present in the original low frequency signal or may be produced by the loudspeaker itself. Whatever the reason, it shows that frequency responses of such complex units as loudspeakers or microphones do not always tell the full story, and that the ear is still the final judge.

Signal noise ratio: Perhaps the most impressive feature of this machine is the almost uncanny quietness in the absence of a recorded signal. Some of this quietness is due to the very low



Microphone responses (Fig. 5A) Top-Beyer M62 (Fig. 5B) bottom Sennheiser MD 21.

mechanical noise. I tried to emulate Mr. Moir's sound level measurements, but, at a foot away from the recorder the reading was below 30 phons, which is the prevailing noise level in one of my quietest rooms. Only when the test meter was brought within a few inches of the case was any reading obtainable. This bears out subjective tests; the ear has to be almost against the machine to tell if the motor is running. Electrical measurements were almost equally satisfactory. Transistor hiss and motor noise were 45dB below test tape level, or 57dB below peak recording level. Bulk erased tape gave a peak S/N ratio of 52dB, and tape erased and biased on the machine was 50dB below peak recorded level. The "exclamation mark" record

level indicator was biased so that it *extinguished* at peak recording level; this is much more satisfactory than brightening this type of indicator and is the first time I have felt really happy with this system. Perhaps all the other manufacturers have been using it the wrong way round! It just flickered out at a recorded level 11dB above test tape level, and further tests showed that 13dB above test tape level could be recorded before the onset of tape distortion. This shows that the designers have chosen to set the bias to optimum for minimum distortion, rather than try for an extension of frequency response with the risk of low recorded level and harmonic and intermodulation distortion.

Comment: It may not be immediately obvious from the responses of Figs. 2 and 3 that the fall off in bass response is a function of the geometry of the head and of the playback electronics. The recorded response on the tape goes down to about 40 c/s or less, so that recordings made on this machine may be played back on a semi-professional machine with full range response. The head was set exactly to the azimuth of my test tape and required no further adjustment. The radio input is at an impedance of 100K, but the required input level is only 3 millivolts for full recorded level. This means that an attenuator will be required if recording from a radio tuner or extension speaker outlet is to be attempted, otherwise the first transistor can be overloaded and operation of the volume control will reduce the recorded level, but the overload distortion will remain.

This radio input has enough sensitivity to work from most high impedance moving coil microphones. 100K is a bit low for a crystal microphone but the slight cut in bass response may be useful for speech recording.

The press button controls are fairly stiff and have to be operated firmly, as they have certain mechanical functions to perform as well as electrical switching. The clock type tape position indicator works very well, and a given item on a tape can be located within a few inches without fail. The mains unit slips easily into place (*instead of the batteries*) with no increase of noise or hum level, so that the battery pack may be conserved for those less frequent outside events.

The low mechanical and electrical noise level of this recorder makes it ideal for the recording of low level outdoor events, such as bird song or nature study work, and the high quality playback sound makes it an ideal choice for the enthusiast who only wants to buy one recorder, but may be called upon to do occasional recordings away from home and independently of the mains supply. An excellent job and warmly recommended.

A. Tutchings.

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MANY readers will recall an "odd-man-out" tape recorder which had its two spools stacked one above the other, and which was advertised about 12-18 months ago at a price of some £90. This same recorder, now re-named the "Countess", is currently on offer (advertised in this magazine) at a price of 30 guineas. And this advertisement has brought us a very large enquiry mail—the main theme of all letters being more or less the same: "(1) *Is it any good;* (2) *Would I find it useful as a second machine;* (3) *If I buy it, am I likely to find any service facilities for it, should it go wrong?*"

In order to answer the first two points, we obtained one of the instruments from the advertisers (Radio Clearance Ltd., 27 Tottenham Court Road, London, W.1.) and gave it a very thorough testing. So far as point (3) is concerned, we are informed by the advertisers that they are making very detailed arrangements for service facilities, and that they consider this necessary in view of

an absolute practical minimum



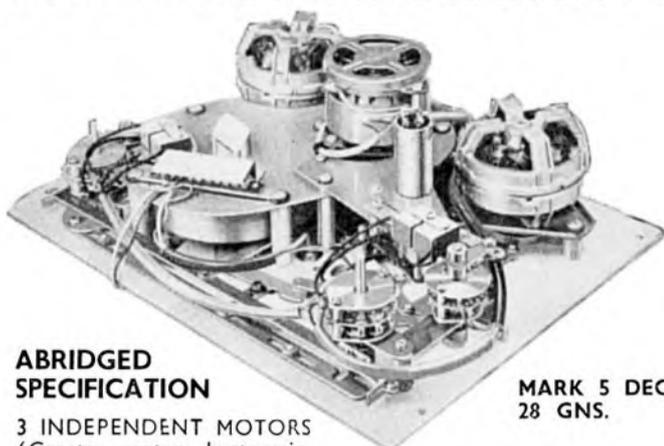
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EQUIPMENT REVIEWED—(continued)

the fairly large quantity of these recorders which they have sold, and are still selling.

When any product is first marketed at a price approaching £100, and is then marked down to about one-third of that figure, the public can be excused for being suspicious of it. The first question usually asked is "Why didn't it sell?" Well, in this case we believe the answer to that question is that the idea was too revolutionary in itself, and far too revolutionary in view of the price originally asked. So, having answered that unspoken one, let us answer the three main questions of our first paragraph.

Is it any good? Yes, without doubt it is very good indeed. It could not possibly be made and sold at the price to-day in this country.

Would I find it useful as a second machine? Again, without any doubt at all. Yes. It has all the normal facilities of a normal domestic recorder. In fact, the *only* difference between it and all other good quality machines is the somewhat strange tape spool and transport layout. This *looks* awkward to anyone who is accustomed to the normal, but in practice is not in the least awkward; and it only takes an hour or so to become completely at home with it.

The feed spool is placed over the spindle; a metal bush is then dropped over it, the take-up spool is dropped on top of that, in turn. Tape from the feed spool is pulled out (exactly as normal) dropped into the slot (as with every other model), and led to the take-up spool, in the same direction and manner as for other machines.

A function lever selects fast forward, replay, fast rewind, and record. One push-button selects 3½ or 7½ i/s. A second push-button starts the motor. A third push-button stops or starts the transport system.

This column must not be read as a full-scale review, but as a home test report. The recorder has not been subjected to our usual series of bench tests, but we have little doubt that it would score very high marks and much praise in such tests. It is well and very solidly built. Its controls function smoothly and positively. Recorded tapes from the catalogues of E.M.I. (7½ i/s) and W.R.C. (3½ i/s) were replayed on it with very pleasing results through its own in-built speaker, and with excellent results through an extension speaker. As a recorder, it works and behaves as well as any other domestic recorder we have tested, and better than several.

Summary. This is a genuine bargain, in our studied opinion. Anyone who has been dithering about the purchase of a second machine is recommended to make sure of one, before the opportunity passes. M.H.



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All advertisements for the November issue must arrive not later than October 3rd.

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