

the TAPE RECORDER

PRICE 1/6

JANUARY 1961

Vol. 2 No. 12

INCORPORATING "SOUND AND CINE"



IN THIS NUMBER

- Build this Really Portable Recorder — Second in a Series Describing a Do-It-Yourself Clockwork-driven Machine
- Reader's Problems Answered
- News and Pictures from the World of Tape
- Equipment Reviewed
- Tape Recorder Workbench
- Sound and Ciné — Preparing a Holiday Film



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Recently the British Ornithologists' Union was given permission to make an expedition to Bulgaria—the first allowed behind the 'Iron Curtain'. Led by Guy Mountfort, the party took over 4,000 photographs (Eric Hosking was chief photographer) and made a large collection of recordings of rare bird-songs, using Emitape exclusively.

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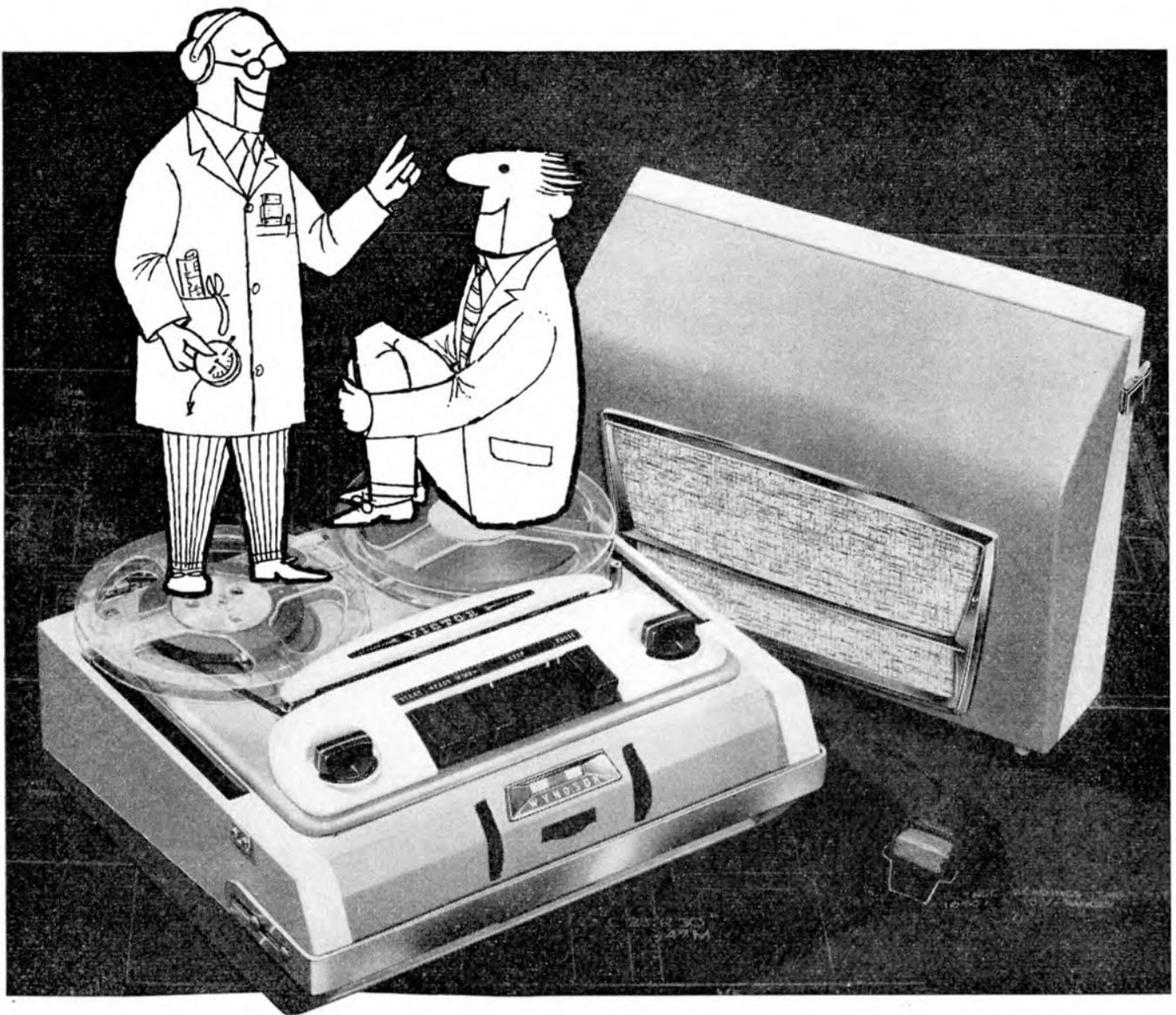
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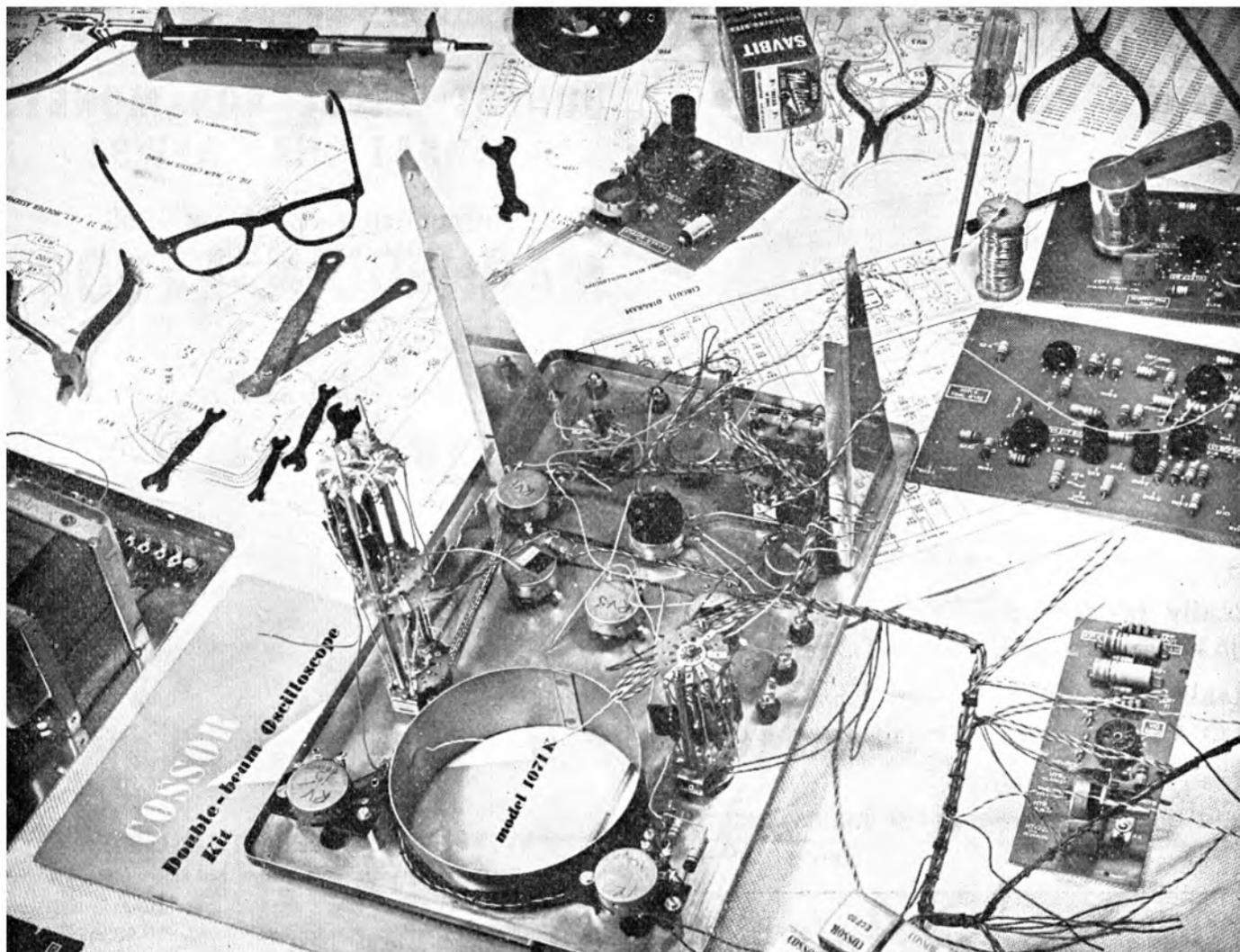
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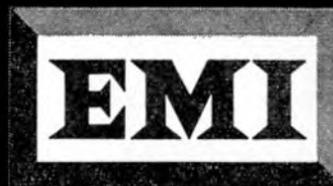
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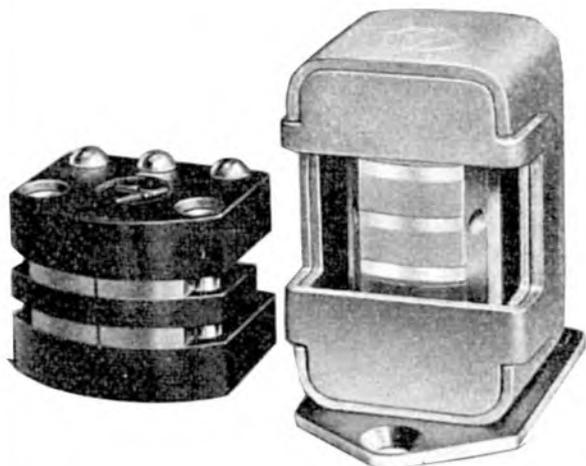
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EDITORIAL

IT used to be a catch to ask a person if he had suddenly noticed how young the policeman looked; and, when the answer was "Yes", to say... "a sure sign that you are getting old!" There is possibly the same observation to be made about the ever-increasing speed at which the years seem to fly. In youth, the speed of rotation of our planet is of little consequence and purely coincidental with the fact that there is an over-long period of waiting between the school holidays and (later) paydays. As the years pass, however, events like annual Audio Fairs and indexes for new volumes of *The Tape Recorder* begin to close up like the collapsing sections of a telescope—and, here we are again at the end of a volume, saying to ourselves: "It seems only yesterday that we were preparing our first issue!"

In a matter of a few short months more, the sixth London Audio Fair should be upon us; and we, in common with many of our readers, are wondering what place "tape" will take in the scheme of things. Some two years ago we raised the possibility of a separate annual "Tape Show," and a great deal of thought was given to it by people more capable than us in such matters. In the interim two things have happened. First, and most natural, tape has established itself as one of the important features of the Audio Fair. Second, because of the rapid expansion of interest in tape recording, it is establishing it as a domestic utility. There is thus a growing feeling that a large-scale "Tape Show" might no longer be a worthwhile venture; and there is good sense behind this line of thought.

Many of the manufacturers whose interests are in tape have firm and established interests in the broader territory of "Audio" and, in not a few cases, of "Hi-Fi"; and though a separate "Tape Show" would undoubtedly please a great number of enthusiasts, it would cost manufacturers a great deal of extra work, time and expense. The answer certainly seems to be a show-within-a-show, so far as tape is concerned; and it is probable that the organisers of the Audio Fair may be thinking along those lines. Even here there are difficulties, because of the interwoven interests mentioned above; but there is a strong case for a Tape Section as such, and more clearly defined, within the Audio Fair—possibly in an annexe to the main exhibition.

With a growing and expanding Hi-Fi industry there has always been a question of space and its allocation; but the location of the show has always made it possible for independent exhibitions to acquire accommodation in nearby buildings. We think it might be well worth exploring the possibilities of acquiring one such extra and convenient building for exhibitors—and perhaps not only manufacturers—to concentrate upon tape. Whatever form such an exhibition were to take, however, it would be most desirable to make provision for a section in which tape users, enthusiasts, and even competitions could be staged. With that thought we leave you, at the end of Volume 2, and we wish you all a very happy and prosperous 1961.

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COVER PICTURE

A BRIEF report on the Industrial Photographic and Television Exhibition will be found on Page 596, and our Cover Picture this month was taken at this important Show. It illustrates the Gaumont-Kalee portable magnetic sound recording equipment on the Rank Precision Industries' stand being inspected by the Directors of Ardee Film Studios, Elstree. This equipment, designed for use with the Arriflex 16mm. camera, enables synchronised picture and sound to be obtained simultaneously on magnetic striped film. Particularly suitable for low-budget film production, either on location or indoors, it is proving valuable in commercial, industrial and newsreel work.

NEXT MONTH

A. TUTCHINGS takes the construction of his *Clockwork-driven Portable Tape Recorder* a stage further next month, when he discusses switching and equalisation circuits for recording and playback. Included amongst the equipment reviewed will be a machine for which we have had a number of enquiries, namely, the *Philips EL3536* 4-track stereo machine. There will be another sound and ciné feature to which a great many readers will be looking forward with interest, since summer photography is very often followed by winter time editing and synchronising with sound on tape. A full line-up of our other regular features is scheduled, including *Tape Recorder Workbench*, *News from the Clubs*, and *Readers' Problems*, so why not place a regular order with your supplier now.

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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WORLD'S LARGEST SALES OF MAGNETIC TAPE

By I. W. Jarman

TEACHING TAPE

A SPECIAL SERIES FOR BEGINNERS

PART 7—SUPERIMPOSITION



The Spectone 161 is an example of a popular machine incorporating superimposing.

IN the previous article I dealt with the simultaneous recording of two or more sources, describing in some detail the various types of mixer units available and how to use them. This article dealt with the “mixing” of sources, not by recording them simultaneously, but by recording first one and then superimposing another on top of it.

How it's done

This superimposition is achieved by re-recording over the original—in fact by making two recordings on the same length of tape. There are two main points which must be considered if superimposition is to be used. The first is that, in normal circumstances when a recording is made, any signal already on

it your foreground material (e.g. your voice). Then play the tape and check whether or not the balance of the two sounds is correct. In all probability, you will find that the background tends to drown your voice. If this is the case then obviously the original sound should have been recorded at a lower volume. The experiment should be repeated until the correct balance of sound is obtained.

It is possible, by adjusting the bias, to vary the amount by which the volume of the original sound is reduced when superimposing. This, however, is a bad practice, since any great reduction in the bias will lead to an increase in distortion and to a poor signal to noise ratio.

High frequencies

Finally, you will notice that when superimposing, the higher frequencies of the original sound seem to be reduced considerably more than the lower frequencies. This is due to the fact that when partial erasure takes place due to bias erase effect, the higher frequencies are affected more than the low.

This, I think, will show that if two sounds are to be mixed, then, generally speaking, better quality will be obtained by recording both simultaneously using a mixer unit. In the next article in this series I shall be dealing with editing, including using the off-set marking method, on the various types of domestic recorders.

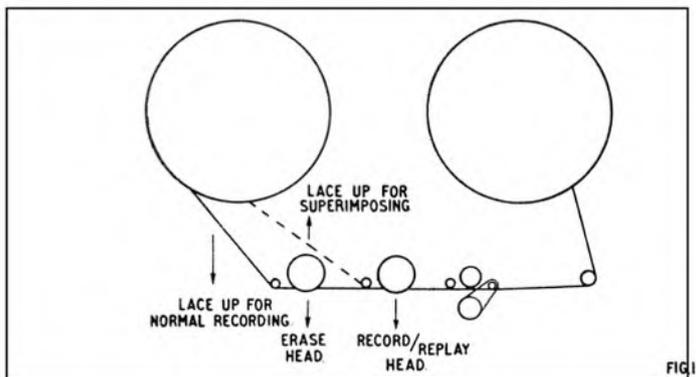


FIG. 1

the tape will be completely erased. It is obvious, therefore, that if one sound is going to be recorded on another then the erase head must, in some way or other, be made inoperative. On some domestic recorders this is done by switching the current from the erase head to a load resistance; on others, the erase head itself is by-passed. The methods employed on the different makes of machines are fully described by the manufacturers in instruction booklets supplied with their products.

On at least one make of recorder, when superimposition is used, the tape is taken from the feed spool, behind the erase head (this, of course, means that the head cover must be removed), then around the extra guide just to the left of the record/replay head. From then on the lacing of the tape is as for a normal recording (see fig. 1).

The second point which must be considered is the bias erase effect. In the first article in this series I pointed out that the sound to be recorded is mixed, in the recording head, with a high frequency signal known as bias; the purpose of this being to reduce distortion and to increase the signal to noise ratio.

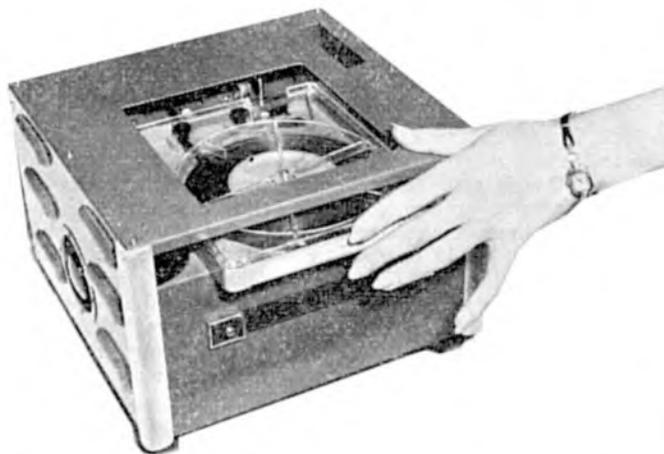
The oscillator which feeds this bias signal also feeds the erase current and, although the bias is very, very small compared with the erase current, nevertheless it does have the effect of reducing the volume of the original sound when you record over it.

To find out just how much the reduction in volume will be, you will have to do a number of experiments. The easiest way of doing this is to record your original sound (i.e. the one which will form the background) at normal level and note the setting of the volume control. Next, using superimposition, record over



"I hereby resolve to stop selling paper streamers to people for tapesponding on . . ."

HERE AND THERE AND EVERYWHERE



Continuous Music on Tape

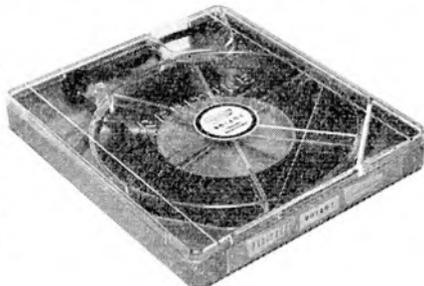
BACKGROUND music although relatively new to Britain, is definitely on the increase. Waterloo Station has it, Cunard's Queen Mary and Queen Elizabeth have it; it is in many factories, offices, hotels and shops throughout the country. Doctors and dentists are even installing it in their waiting-rooms to soothe nervous patients.

Reditune Limited, of Croydon, a member of the Rediffusion Group, introduced background music to this country in 1958, and its subscriber list has grown rapidly. Waterloo and the Cunarders are numbered on it, and approximately 750 licensed premises now provide Reditune for their customers. Today, the company has more than 7,000 specially-recorded titles available in tempos ranging from marches and waltzes to mambos and beguines. It also operates overseas in South Africa, Japan, Australia, the Rhodesias, the Caribbean, and in Switzerland.

The service employs a compact 11½ in. × 8½ in. × 11 in. self-contained player machine which is installed on the subscriber's premises and will play a 90-minute tape over and over again until it is removed from the machine.

The tapes are easily and rapidly loaded and unloaded by means of a transparent plastic cassette which, to load, is gently pushed by one hand into a slot in the front of the player. This sets the

The plastic cassette is loaded in a single operation, and it is never necessary to handle the tape itself. The method of loading is illustrated in the photograph at the top of the page.



tape in motion automatically. From this point on, except for adjustments to volume as desired, the operator may forget about the machine until a change of tape is required. To unload the used tape, a finger control lever at the rear of the player is moved and the tape ejected. It is not necessary to switch off the machine while changing tapes.

The player is capable of driving 100 loudspeakers up to a total

power of 10 watts, or, alternatively, the output of the machine may be fed into a power amplifier for distributing signals over a network. Speakers can be supplied with or without on/off and volume controls at point of location, and in colours to match any decor.

Subscribers receive an initial supply of six tapes and these are changed every three months at no extra cost. Extra tapes may be supplied at a moderate charge. The tape player, wiring and speakers are installed by Reditune engineers after a thorough survey of the subscriber's premises to decide the number of speakers required and their location to give the best possible service.

The tape service may be hired at a basic rental of £56 a year. Music is grouped under headings such as Cocktail Time, Salon Music, Piano Playtime, Latin American and Bright Background. The Reditune library of more than 7,000 specially-chosen titles is added to each month as new tunes become established favourites. Perhaps one of the most distinctive features of disseminating music *at low sound volume* over a large number of strategically placed loudspeakers is that it is no longer necessary to ask for a seat "near the orchestra".

* * *



Famous Fi-Cord Broadcaster

NATALIE Core, roving correspondent for the National Broadcasting Corporation of America, and a BBC contributor, records a farewell conversation with Ralph Gough, Fi-Cord's General Manager, prior to returning to America. Miss Core's Fi-Cord is probably one of the most travelled in the world, and has been used to record conversations with most of the world's personalities. (Mystified on-looker is Natalie Core's husband, playwright John O'Hare).

* * *

Audiocraft Help Polio Campaign

The National Polio Vaccination Committee launched a nationwide campaign on Wednesday, November 16th, when Mrs. Nancy Hall, wife of John Hall, O.B.E., M.P., who is a member of the committee phoned five Lord Mayors throughout the country to ask them to help. The main theme of the campaign is an appeal to the public to "Make a call and save a life." The committee wants people to make at least three telephone calls to their friends reminding them that Polio kills, that it can strike even in winter and that the National Health

HERE AND THERE AND EVERYWHERE

cont.

Definitely the top story this month is the presentation by Grundig (Great Britain) Ltd., of a TK20 Tape Recorder to a representative of the Royal National Institute for the Blind. This was no ordinary occasion since this was in fact the 100,000th TK20 to be delivered. The photograph shows Mr. T. H. Tylor, Vice-Chairman of the R.N.I.B., receiving the Grundig TK20 from Mr. Eric Robinson, the famous Television Conductor. The ceremony took place at a Cocktail Party given by Grundig at their London showrooms. The Tape Recorder is earmarked for the Chorleywood Grammar School for Blind Girls, and it would be difficult to think of a more suitable recipient. Mr. Tylor, who is blind himself, is Teacher in Jurisprudence and Estates Bursar at Balliol College, Oxford, of which he is also a Fellow. He is an international bridge player and President of the Midland Counties Chess Union.



Service offers free vaccine for everyone under the age of 40. Each call ends with an appeal for the listener to at once phone three of his friends. Audiocraft, Ltd., have loaned sound broadcasting and record equipment to the committee and many other offers of help are reaching the committee daily—this campaign is the result of a letter from Mrs. D. Hall, widow of Jeff Hall the footballer who died from polio last year.

Grundig Price Reductions

GRUNDIG (Great Britain) Limited have just celebrated the sale of their 100,000th TK 20 tape recorder in Great Britain—a unique event in the tape recorder industry (see story above). To mark the occasion they are offering the consumer a share in this enormous success by drastically cutting the price of the following current models:—

The TK20—10 guineas off. This popular model can now be had for 42 guineas, including the famous Grundig Condenser microphone, which if bought separately costs 6 guineas.

The TK 24—price reduced by 7 guineas to 55 guineas, this includes the special high impedance microphone which is available on its own at 7 guineas.

The TK 30—can now be bought for 65 guineas, a saving of 7 guineas, and the TK 35, the three speed version of the TK 30, also reduced by 7 guineas to 75 guineas.

Specifications of these machines can be obtained from Grundig (Great Britain), Ltd., 39/41, New Oxford Street, London, W.C.1.

British Tapes Beat The World

"THE Rest is Silence", the story of a young man in a condemned cell, produced by Norman Paul, which was named as the *Tape of the Year* in the recent British Amateur Tape Recording Contest, won first prize in the Composition Section in the International Amateur Recording Contest held in Amsterdam during the week-end of October 29-31. To this competitor also went the *Grand Prix* of the Contest. Extracts from this dramatised feature, with Norman Paul's own story as to how he made it almost entirely in his room at Muswell Hill, London, were broadcast in "Sound" (Network Three) on October 2. Douglas Brown was one of the judges at this International Contest, and reported on the entries in "Sound" on Sunday, November 13 (repeat on Monday, 21st).

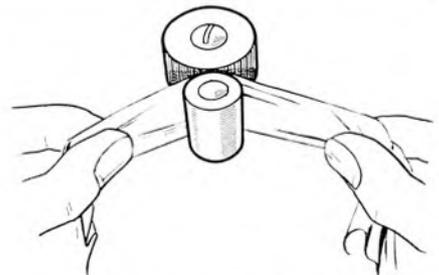
Mr. Paul received yet another award, in the shape of a Philips EL3536 4-track stereo recorder, at an informal dinner held by Philips Electrical Ltd., in Kettners Restaurant on Wednesday, 30th November.

Two others of the six British entries, "Beat'n Heart", by Ronald Guttridge, of Uppminster, Essex, and "Our School", by Stanground V.C. Primary School, near Peterborough, won first prizes in their respective categories—those for Music and Speech, and the Schools Section. The former was composed by B. Summerfield and performed by E. Locke, B. Summerfield, J. Aitken, and M. Eagles in Hornchurch, Essex. The latter was a school magazine in sound composed by P. J. Kingston, one of the staff, and the top form—mostly eleven-year-olds.

TAPE TIPS — by Guy

— No. 3 —

Keep the capstan and pressure roller clean



A DIRTY or oily capstan or an accumulation of tape deposit on the capstan or pressure roller can cause uneven tape speed and in severe cases will prevent the tape moving at all. The capstan should be cleaned periodically with methylated spirits (unless it is rubber covered). Rubber-covered rollers should be cleaned with C.T.C. (carbon tetra-chloride) but be careful to use very little and to polish off with a clean dry cloth because C.T.C. is a solvent for rubber and will do more harm than good if used to excess and if left to dry on the rubber.

These tips are abstracted by permission from "How to get the Best out of your Tape Recorder" by Percival J. Guy. Norman Price (Publishers) Ltd. 1958. 18s. 6d. net.

NEWS FROM THE WORLD OF TAPE



Exhibition of Interest

VISITING the second Industrial Photographic and Television Exhibition at the Royal Albert Hall, we were pleasantly surprised at the relatively large extent to which magnetic recording items were being demonstrated alongside every sort of photographic apparatus. A list of some of the exhibitors, whose names are familiar to readers of *The Tape Recorder*, is given below, and space has allowed us to single out only a few of the most noteworthy exhibits.

First of all we must mention the new **Fairchild Cinephonic Camera** which shoots 8mm film and simultaneously records a sound track on a magnetic strip on the film. Of course, this completely eliminates bothers with synchronisation and for many types of Home Movies it must, after a bit of practice in using the microphone, produce highly acceptable "Talkies" in a single operation. We were allowed to try out this new camera, and found, with head-phones plugged into the monitoring socket, it was possible to find a microphone position which picked up conversation and general sounds without it accidentally appearing "in shot".

The price of this new camera is expected to be around the £190 mark, and the special projector which gives immediate playback of sound and pictures from the processed film is expected to cost

The Gaumont-Kalee Type 1830 portable magnetic recording unit is designed for use with the highest quality 16mm film equipment and was demonstrated at the Exhibition in conjunction with the Arriflex Camera. The photograph at the top of the page shows the Marconi Vidicon TV Camera with versatile lens turret.



£153—definitely an importation from the United States which will receive a great deal of attention.

Still on the theme of making picture and sound an easier joint operation is the **Dominus 8 mm projector**. This is basically two machines in one. A single motor is used to drive both the 8 mm film and the tape—the spool-carrying spindles and the necessary drive capstans and gates are mounted respectively on the front and back of the unit. It is possible to use the units independently, so that we have a normal $3\frac{1}{2}$ and $7\frac{1}{2}$ i/s Tape Recorder and a 16 frames per second 8 mm silent projector contained in a single portable unit weighing only 33 lbs. and costing £120.

A number of interesting items were shown on the **Rank Precision Industries Limited** stand including the GK1500 series cabinet, magnetic sound recorder and the Type 1830 16 mm portable magnetic recording unit. Once again it is the synchronising of sound with picture which makes these new units of special interest, although in this case since 16 mm film is incorporated, it is the professional user who is aimed at.

Many interesting slide projectors—generally with sound coupling—were being demonstrated, including the Rollei, and a new-comer from America known as the Revere 503. The latter selects a slide from a 36-unit magazine and automatically projects these in sequence as rapidly as twice in every three seconds. Altogether this was a most interesting Exhibition which gave ample evidence of the lively state of the sound/photographic market.

Amongst the exhibitors featuring sound were:—Ampex Great Britain Ltd., Beulah Electronics, Neville Brown and Co. Ltd., Dominus (England) Ltd., E.M.I. Electronics Ltd., Gevaert Ltd., Ilford Ltd., Kelvin and Hughes Ltd., Kodak Ltd., Marconi's Wireless Telegraph Co. Ltd., Minnesota Mining and Manufacturing Co. Ltd., Polarizers (United Kingdom) Ltd. (Fairchild Camera), Pullin Optical Co. Ltd., Rank Precision Industries Ltd., RCA Great Britain Ltd.

B.B.C. "Sound" Programme

OUR Technical Editor tells us, just as we are going to Press, that he has prepared two talks on using gramophone records and tapes to check the correct working of equipment. His first talk is non-technical and uses ordinary music recordings, while the second talk refers to special test records and stereo. The transmission time of these editions of "Sound" is 2.40 p.m. on the 11th and 25th December, and each programme is repeated eight days later.

R.G.D. Recorders Stolen

Twenty three R.G.D. Mk. 104 Tape Recorders were stolen recently from the Company's Warehouse. Radio Gramophone Development Co. Ltd., Eastern Avenue West, Romford, Essex, will be grateful to receive any information regarding these Recorders. All the Models are covered in Red Leatherette with a Grey polka dot design and the serial numbers are given below. 0471833, 0470941, 0456621, 0471746, 0471836, 0457490, 0456415, 0456444, 0456655, 0456450, 0456576, 0456634, 0456649, 0471788, 0470883, 0471107, 0471067, 0457476, 0456412, 0471707, 0471060, 0456438, 0471758.

Lustraphone Patent Granted

WE have been advised that the Lustraphone "Stereomic" Microphone has now been granted a full Patent under the number 858031.

The Lustraphone Stereo Microphone has been reviewed by well-known specialists in the various Trade Journals with every success. Details can be obtained from Lustraphone Ltd., St. Georges Works, Regents Park Road, London, N.W.1.



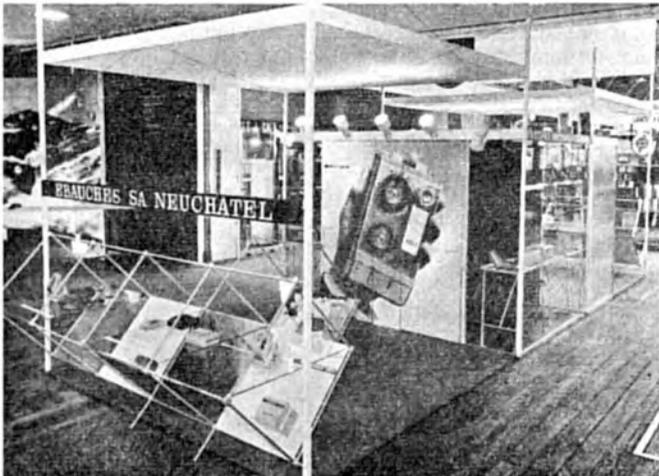
A conversation piece snapped at the Industrial Photographic and Television Exhibition (See story on facing page). The camera is the new Fairchild Cinephonic 8mm which simultaneously records a sound track, using the microphone as shown, on pre-stripped film.

Club news

We have recently received the latest newsletter from the secretary of the **Rugby Amateur Tape Recording Society** and from this we quote "One of the greatest difficulties facing a committee of any club and in particular one of this kind, is how to keep members happy. It is impossible to keep everyone happy all the time and we must aim at keeping the majority happy most of the time, but everyone happy some of the time. This is difficult and, in the absence of other ideas, the committee and programme committee and officers are left to put forth their ideas." This, surely, is the cry of all recording clubs throughout the country and, as stated in last month's issue of *The Tape*

Recorder, we are searching for ideas that will be of interest to all. The ciné article that was published in the last issue appears to be the answer. It is almost certain that one member in each club at least has a ciné or slide projector, and producing a sound track for a film can take a long time, but the result is amazing. Films or slides may be good, but the result will be far better if the appropriate sounds accompany the film. Many years ago ciné clubs were formed and now they have added tape recorders to produce sound tracks. It works perfectly well the other way round, so why not add ciné?

Rhona and John James have been appointed United Kingdom Representatives of the **World Tape Pals** after Mr. Len Watkins had to resign because of pressure of work. A circular letter has been sent to all members giving details of this change and requesting members to advise if they are still interested in W.T.P. A complete new roster is to be published in the new year, and if any person is contemplating tape exchanges they should contact R. & J. James, 45, Boundary Road, Colliers Wood, London, S.W.19.



Fi-Cord International were awarded the first prize for the best-designed plan at the 1960 Comptor Suisse Exhibition held recently in Lausanne.

We have just received the following letter:—"Thanks to the publication in your recent edition of *The Tape Recorder* of my intention of forming a club, I have had a marvellous response and through this the **Newcastle and District Tape Recording Club** has been formed. The attendance for the first two meetings was encouraging and nineteen, including two women, enrolled as members of the club. At the second meeting they were honoured by having the famous recording and television artistes, Mr. and Mrs. Mate, alias Tiger woman and her mate, who told them about their travels throughout the world and gave an introduction to South African Folk Music. Club meetings are to be held fortnightly on Mondays commencing at 7.30 p.m. Details can be obtained from Mr. M. J. Bonner, 28, Rushie Avenue, Benwell, Newcastle-on-Tyne."

TAPE CLUBS — NEWS AND PICTURES



Seen chatting with Miss Molly Greenhalgh, B.B.C. Drama Assistant, are three members of the **Phoenix Drama and Tape Recording Society**. Left to right they are Mr. P. R. Streamer (Treasurer), Mr. W. A. C. C. Smith (Secretary) and Mr. J. D. Rae (Chairman). Miss Greenhalgh had been talking to the Society on the essentials of radio drama production. Needless to say Miss Greenhalgh's talk was recorded on tape for a second hearing.

Mr. J. O. Bannister opened the meeting of the **Rugby Amateur Tape Recording Society** on 3rd November, and the forthcoming Christmas draw was discussed. After this Mr. W. Tilcock played part of a short recording made when the "Merrymakers" Concert Party was touring the district for the annual "rag". Members then listened to a tape which had been compiled by members to be sent to Bournemouth, after which a general discussion arose. Mr. R. Goodman provided the Quiz Tape for the evening and this was won by Mr. R. Pick. The President welcomed the *new electric Vice-presidents who attended this meeting.

Editor. They must really be bright sparks!
*P.S. We believe this should read newly elected.

The inaugural meeting of the **Walsall and District Tape Recording Club** was held at premises at the rear of No. 113, Lichfield Street, Walsall, on Wednesday October 19th. With 12 members attending and several prospective members, the club has great hopes of success in the future. A committee was elected and many ideas were put forward for future meetings. Club nights will be held weekly on Wednesdays at 8 p.m. at the above address and further details may be obtained from the secretary Mrs. J. Walford, 41, Mill Road, Pelsall.

On Monday, October 10th, Mr. B. Elliott and Mr. P. Upcher gave a talk and demonstration to the **Southall Sound Club** on the history of recording. Before dealing with recording Mr. Elliott mentioned the very early mechanical musical instruments, and played a recording of a mechanical spinet of the type used in Henry VIII reign. Turning to sound recording and reproduction he described Edison's first experiments in 1877, and outlined the developments leading to the first wax cylinder machines. The earliest machine demonstrated was made in

1897 and the earliest disc was by Berliner in 1896 on a hard rubber base. Mr. Upcher then took up the story. He has been associated with recording from the performers angle since the early 1900's and illustrated his experiences with recordings made at the time. The evening concluded with Mr. Upcher recording with a piano accompaniment on Mr. Elliott's 1903 cylinder machine and the result being replayed. Further details from Mr. K. W. Stanley. Community Centre, Bridge, Road, Southall, Middlesex.

The next meeting of the **Leicester Tape Recording and Hi-Fi Club** will be held at the Newark Girls School, Imperial Avenue, Leicester on the first and third Friday of each month. The date of the Annual General meeting has been fixed for 13th January 1961.

Mr. J. K. Gapper, has for a long while been considering inaugurating a Tape Recording Club in **Exeter** in conjunction with a number of other enthusiasts. It is proposed to hold a meeting for all those interested at Fildews (Engineers) Ltd. 99, Fore Street, Exeter on January 27th at 7.30. Mr. Parry of Denmark Court Hotel, Exeter who recently appealed to readers interested in forming a club, has agreed to join forces with Mr. Gapper. Anyone interested should call or write to:— Mr. J. K. Gapper, 108, Leypark Road, Exeter.

The **Harrow Tape Recording Club** at their meeting on the 25th November 1960 had a demonstration of Specto Tape Recorders given by Mr. De'ath. The attendance broke all records, 25 members and friends heard an excellent description of the capabilities of the Specto 161, and later the machine was put through its paces. The secretary of the **Ware and District Tape Recording Club** has contacted the Harrow club with a request to replay a tape from a patient in a Ware Hospital to the relatives in Golders Green. This is the first time this has been done by the club, and it is hoped that it is the first of many person-to-person messages. Further details of all meetings can be obtained from Mrs. T. Fisher, 5 Gloucester Road, North Harrow, Middlesex.

The **Stevenage Tape and Audio Club** have already in their short existence had demonstrations by Messrs. Veritone, Walter Instruments, Challen, B.A.S.F., and visits have been arranged for Lustraphone and Gramdeck. Meetings are held twice a month at the Tenants' Meeting Room, Marymead, Stevenage. Anyone interested in joining the other thirty members should contact Mr. K. N. Crawford, 17 Long Hyde, Stevenage.



Hi-Fi News

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TAPE CLUBS — NEWS AND PICTURES cont.

Sound with Slides

A NOVEL demonstration encouraging the amateur to brighten the presentation of his colour transparencies with actuality sound and commentary was given by the Bill Hartley Production Team of Bill Hartley, Bernard Coaling and Gordon Millar Thomson at a meeting of the Solihull, Warwickshire, Photographic Society on November 8th.

After projection by Maurice White, a keen local photographer, of a series of 67 colour transparencies showing a trip down the Rhine, past the legendary Lorelei rocks and rapids to the accompaniment of barge sounds, the legend of Lorelei in speech and song and other associated noises with commentary spoken over by Bill Hartley, each member of the team described his contribution to the sound picture.

Bill Hartley told his audience of some of the difficulties experienced in recorded interviewing. "Use plenty of tape," he said, "it's cheap enough and you can always use it again. Record anything and everything—this way you will find you will have enough material to do justice to the pictorial content of your show. Edit harshly—cut and splice as you would use a paint brush to high-light the visual colour with sound colour." His audience laughed when he described hiding the microphone of his recorder in a glove puppet in order to overcome shyness and capture young comments at a children's party.

Gordon Millar Thomson, sound recordist and industrial film maker, another director of the Bill Hartley Productions team described some of the problems arising during the editing and dubbing of some 3,000 feet of tape collected over a whole day's recording, to provide the short 23 minute sound accompaniment to the colour transparencies. There was no doubt in anyone's mind that use of recorded sound in association with the presentation of colour transparencies was a logical advance.

* * *

During the past year the members of the **Stoke Newington Amateur Tape Recording Club** have produced a tape containing recorded material obtained by members whilst on their holiday, together with a club visit to Woolwich ferry obtaining sound effects of ships and pleasure craft. Visits to the **Walthamstow and Catford Recording Clubs** has resulted in a closer tie between the clubs, and tapes have been exchanged. The winter season will be used as a time for discussing future programmes, preparing tapes for future competitions and assisting the blind. New members will be welcomed. Dates of meetings may be obtained from the secretary, Mr. E. Horne, 53 Londesborough Road, London, N.16.

* * *

There has recently been a change of Secretary of the **Long Distance Area Social & Sports Association Tape Recording Club**. Any correspondence should now be sent to:—P. Fallowfield-Cooper, LD/EF.2, Faraday Building, Queen Victoria Street, London, E.C.4.

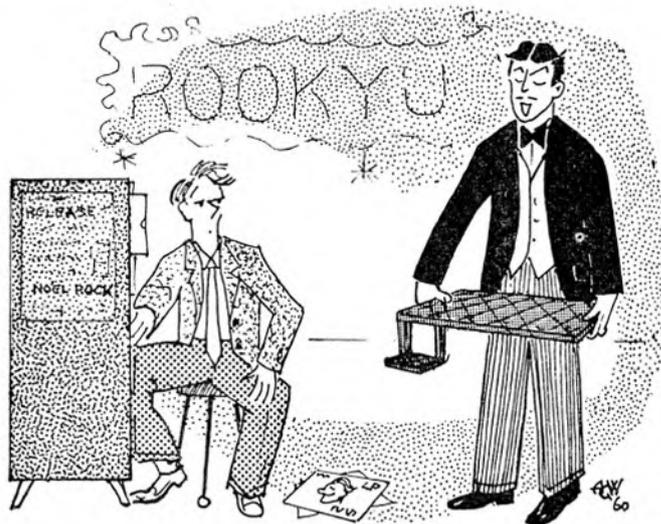
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The Field Section of the **Hull and District Tape Recording Club** have embarked upon a long-term project of compiling a "Sound Picture" of Hull. One feature tape on the "Mine Watching Service" is complete, and interviews have already been recorded with Anna Neagle, Bill Owen, Emile Ford and Mr. Acker Bilk. A feature tape on the British Legion is well under way, and on Remembrance Day an outdoor recording



of the Service held at Hull Cenotaph together with a recording of the Festival in the Hall gave members the opportunity of producing a programme with no rehearsals. Many months of editing will be required before the finished programme is ready for playback. Future meetings have been arranged including demonstrations by Walter Instruments, Ltd., Grundig (Great Britain) Ltd., Lustraphone and B.A.S.F. Consultations are taking place between the club and the local Amateur Cine Society to provide a demonstration of "Sound in the Cinema". Although Hull Tape Recording Club have a busy programme, the secretary will welcome tapes from other clubs. These should be sent to: F. K. Fulstow, 17, Lowfield Road, Anlaby, Hull, Yorks.

Mr. R. Penfold, Chairman of the **Coventry Tape Recording Club**, presided at the meeting on October 27th at the Rotherham Social Club together with thirty-one other members. Two new members enrolled during the evening bringing the total membership to sixty-two. The meeting commenced with a demonstration of the Corsor 4-track tape recorder and this was followed by a programme compiled by Mr. C. Briggs. Any readers in this area who would like to assist in raising the membership to 100 should contact the secretary: Mr. R. V. Reynolds, 1, Thurlstone Road, Radford, Coventry.



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By F. K. Rawson

A COLLARO "STUDIO" DECK MODIFICATION



WE receive many suggested modifications from readers, and are pleased to publish these when they are likely to be of general interest. However, we would point out that the manufacturers may or may not approve of the changes described.

MANY readers possessing the Collaro Studio tape deck, either as part of a home constructed tape recorder or included in a commercial tape recorder, will be only too aware of the lack of an interlock device to prevent the accidental erasure of a tape should the record/playback switch be inadvertently left in the record position. Recorded tapes can also be ruined by erase flux during fast winding, if the bias oscillator is left running.

The Circuit

The circuit to be described provides a simple method of achieving an efficient interlock by using a push-button operated relay to replace the record/playback switch. Reference to the circuit diagram (fig. 1) shows the coil of the relay in series with the high tension feed to the bias oscillator coil. The coil is energised by way of the contacts provided on the deck "start" switch and a "record" push-button. The push-button occupies the position to the left of the deck normally used for the record/playback switch, and is convenient to the "start" switch for one hand operation. On the relay becoming

tact on to the output of the recording amplifier. If the deck is fitted with a monitor head, the relay need only be provided with one hold-in contact.

Head Demagnetisation

The bias oscillator shown is typical of the type using an EL84 valve, but of course the interlock feature described is applicable to any type of bias oscillator provided it is connected in the high tension feed and provided the relay has

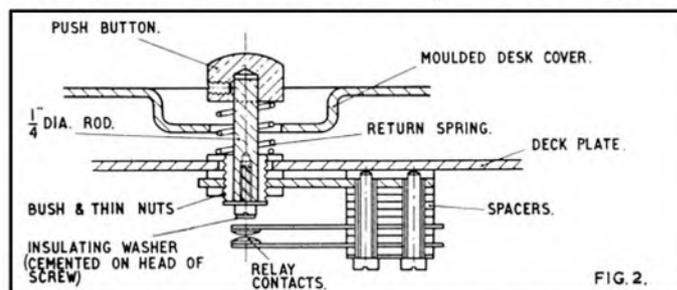
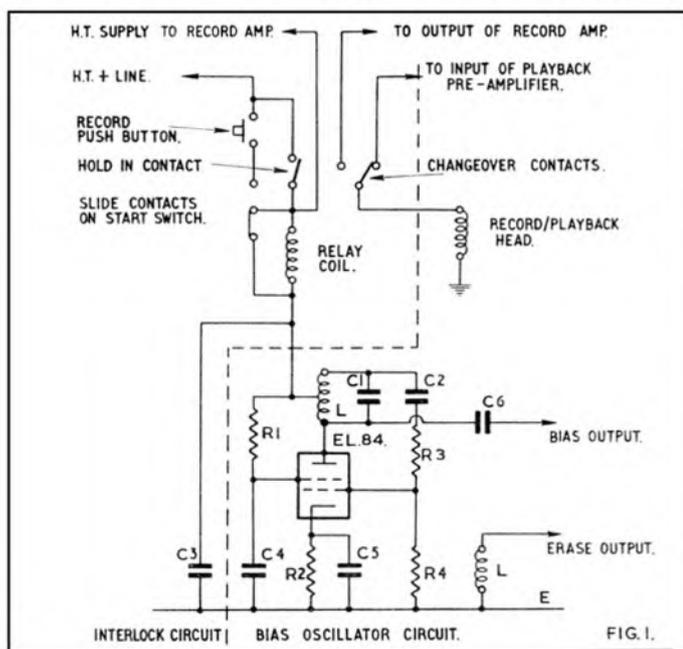


Fig. 2 showing a suitable arrangement of the push button, if this is to be home-made this may be purchased alternatively.



a suitable winding for the high tension current drawn from the supply line. It was found necessary to connect a by-pass condenser between the junction of the bias current high tension feed point and the relay coil, as shown in the diagram. Without the by-pass condenser, the oscillator may fail to operate due to the relay coil acting as a very effective decoupling element. The high value of by-pass condenser used ($8 \mu\text{F}$) serves to decrease the oscillator output slowly to zero on switching off, thereby avoiding the possibility of magnetising the head by switching transients.

The Button

The "record" push-button can conveniently be made up from salvaged relay contacts and insulating spacers as shown in fig. 2, or alternatively a suitable push-button can be purchased. A fairly strong return spring is advisable otherwise recording may be started during playback, by casually touching the push-button.

Components

Resistors		Condensers	
R1.	10K $\frac{1}{2}$ W	C1.	4000 pF MICA
R2.	330 Ω $\frac{1}{2}$ W	C2.	1000 pF MICA
R3.	47K $\frac{1}{2}$ W	C3.	8 μF 350 volt. Electrolytic
R4.	47K $\frac{1}{2}$ W	C4.	0.01 μF
		C5.	0.1 μF
		C6.	Approx. 100 pF depending on head and stray capacities

energised, the hold-in contact by-passes the "start" switch and record push-button and maintains the circuit in operation. Upon pressing the deck stop switch, the circuit is returned to the playback condition by means of a contact on the start switch returning to the closed position and shorting out the relay coil.

The record/replay head is normally connected to the input of the replay pre-amplifier until the "record" push-button and "start" switch are simultaneously depressed, whereupon, the head output lead is switched by the relay changeover con-

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Electron	47½
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Spectone Ex Tape	49
H.M.V.	£50
Grundig TK20	52
Telefunken 75 with Mic	56
Perth Saja Deluxe	56
Brenell 3 Star	58
Veritone	58
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Grundig TK25*	62
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Telefunken 85KL*	79
Sabafon Automatic*	79
Harting Stereo*	86
Timbra*	89
Simon SP4*	95

*Machines Marked * are excluding Microphone.*

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Readers' Problems

4- and 2-Track Exchanges

Dear Sir:—I would like to know how an owner of a four-track tape recorder can correspond with an owner of a two-track machine.

Yours faithfully, G.K., Sheffield.

Recordings made on the two-track machine can be replayed perfectly satisfactorily on the four-track recorder. The fact that only a quarter of the tape width is being "scanned", instead of the half which was recorded, means nothing more serious than a slight loss in volume.

Sending tapes in the reverse direction is a little more difficult, however, since the two-track machine reproduces two of the four tracks at any one time, and while this is unimportant if fully-erased or "virgin" tape was used for the recording, and only tracks 1 and 4 recorded, it means that two programmes will be heard together otherwise. The solution is for the four-track owner to bulk erase the tapes before recording.

Dodging Microphony

Dear Sir:—I have a tape recorder which gives quite good reproduction from its own loudspeaker, except that the quality is marred by slight rattles and glassy tinkles which seem to come from the valves. In order to overcome this, I made an extension loudspeaker by constructing a new lid for the recorder, incorporating a large (10-inch) high quality 3 ohm loudspeaker. I expected very much better quality from this, but I am very disappointed with the results. As you might expect, I have got rid of the glassy tinkles, etc., but the reproduction from the extension loudspeaker is rather harsh, with far too much "top". The fault is not in the recorder, which gives well balanced reproduction from its own loudspeaker and through an external amplifier.

The only cure as far as I can see, is to cut the extreme top of the extension loudspeaker. The tone controls on the recorder are hardly adequate for this purpose, so would it be possible to connect a filter circuit to the extension loudspeaker itself which would reduce the "top"?

If so, I would be glad if you would give me details. Incidentally, I would appreciate it if you could suggest some cure for the "glassy tinkles" as well, apart from wrapping the valves in cotton wool!

Yours faithfully, D.C., Leeds.

It would be a fairly simple matter to wire a "top cut" circuit into the leads of the external loudspeaker, but a better approach would probably be to refer your problem to the manufacturers of your machine. It may be that they have adjusted the frequency response of the playback amplifier to suit the special characteristics of the built-in speaker, and they could advise on how to modify it.

The "tinkling" you refer to are known as microphony, and are due to the tiny electrodes inside the valves being set into mechanical vibration. The cure is one of the following:—(a) a replacement valve, (b) anti-vibration valve mounting, (c) anti-vibration mounting of the built-in loudspeaker, or (d) use of an external loudspeaker, as you suggest.

Tape Records

Dear Sirs: As a reader of *The Tape Recorder* since its No. 1 issue, may I congratulate you on the fine job of work done in setting forth such an excellent journal.

I myself have been playing around with magnetic recording since as long ago as 1926, when I actually made up and operated a crude and wonderful contraption using fine gauge piano wire and no bias! During those far off days, what a help it would have been to be able to write for help and co-operation from a paper such as yours is today.

At the moment, I am very interested to read in your "Editorial" for this month, your comments on $\frac{1}{4}$ -track stereo tapes with recorded material on them. I am preparing to evaluate these myself, and I am fitting a $\frac{1}{4}$ -track head on to

my Bradmatic 5D deck for this purpose, being chiefly interested in those of $7\frac{1}{2}$ -i/s speed.

As my play-back equipment for tape, disc, FM, TV-Sound and mike is of the very first-class kind, with 3-way speaker set-ups in each channel, and 30 watts output available, I should be enabled to form a fairly accurate judgment on what the best in $\frac{1}{4}$ -track Play-back can give me.

With Bradmatic's highest grade stacked Stereo head for existing Stereo tapes, I do get very impressive results from the EMI range of pre-recorded Stereo Tapes, but often wish for a more extended high frequency response. This is because my speaker system is fairly flat from about 30 c/s to not far from 20Kc/s

Please let us have a list of where I can apply for immediate purchase of $\frac{1}{4}$ -track, $7\frac{1}{2}$ i/s Pre-recorded Stereo Tapes so that I may begin my tests. Additionally, any sources or normal $\frac{1}{2}$ -track Stereo recorded material carrying a better high frequency response than the EMI range will very much oblige.

Yours faithfully, C.T., Bridgend, Glam.

Playing around with magnetic recording since 1926 must make you one of our oldest tape enthusiasts and we congratulate you on continuing to be interested in this latest development.

Messrs. Tele-Tape of 59a, Edgware Road, London, W.2. now issue a catalogue of pre-recorded tapes which they can supply, and this includes EMI, Saga, Bi-tapes, Music on Tape, Tutor, Visophon and Fairy Tapes. The catalogue is available at 2/6d., this amount being refundable on the purchasing of tapes.

Variable Speed Replay

Dear Sirs: Could you put me in touch with a lightweight, variable speed, simple playback tape machine. I make my recordings on a Vortexion, which I wish to playback on a small lightweight machine which could easily be carried, and, sometimes fed into another amplifier.

The playback machine must, however, be capable of slight variable speed, controlled at say from 3 to 5 i/s, or something similar, for the purposes I have in mind. I doubt very much whether there is a commercial machine that will serve my purposes, so do you think perhaps any reader could advise me how to make such a piece of equipment? The old type of Reflectograph, though ideal, is, unfortunately far too heavy.—

Yours faithfully, W.B., Lewisham, S.E.13.

We do not know of a tape machine that meets your specification exactly, but it may be that readers will come to the rescue. We would, however, draw your attention to the series of articles, which have just commenced, by Mr. A. Tutchings, in which he describes a most versatile clock-work driven machine. Although the machine, as described, is primarily for the collecting of sounds in the field, no doubt it would be a fairly simple matter to base a variable speed playback unit on it.

Loudspeaker Flex

Dear Sirs: I have seen nothing in print to indicate the correct cable to use to connect loudspeakers to amplifiers. The only clue I have is the extension speaker socket of my Brenell Mk V recorder which indicates the use of coaxial cable. I am therefore using coaxial cable of the type used for television aerials.

Will you please advise me whether I am using the correct type and also tell me the effects of using an unsuitable cable. Your advice will be greatly appreciated.

Yours faithfully, C.L.D., Chatham, Kent.

It is not necessary—indeed it is not recommended—to employ expensive coaxial cable to connect amplifiers to loudspeakers. Up to distances in the region of 20 ft. light gauge twin flex is ideal, while for greater distances it would be better to use thicker cable, e.g. 23/0076.

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Practical suggestions for the tape handyman_____ by A. Bartlett Still

No. 19 - MEASURING THE BIAS

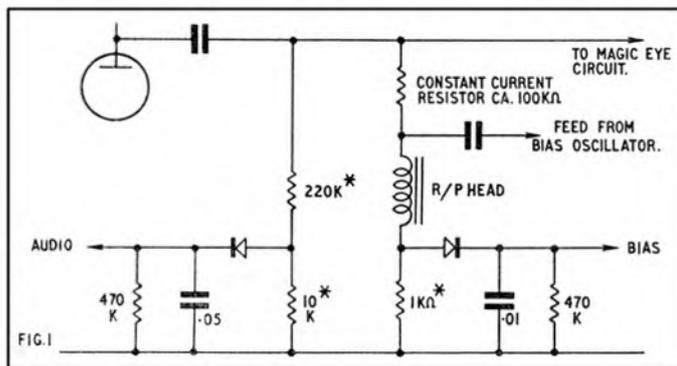
THE beginning of a New Year, apart from providing an opportunity for sending Good Wishes to all my readers, is traditionally a time for good resolutions. As I invariably find it impossible to keep any I may make, I shall take the easy way out and confine myself to a reassessment of the purpose of this column and outlining my plan for the coming year.

When this column started it was my intention to use it as a clearing house for practical hints and tips on the use of tape recorders. The idea was to help the amateur owner with a typical commercial machine to get the best out of it. In consequence I dealt with such factors as correct head alignment, using the magic eye properly, care and maintenance, and so on. It soon became apparent though, from the letters received by the Editor, that a lot of you were not, as I had supposed, content with leaving the "insides" strictly alone. If modification would result in improved performance, you were keen to try, indeed, in one or two instances we were expected to tell you how to make a silk purse out of the proverbial sow's ear!

Modifying existing recorders

If one considers the vast number of tape recorder models on the market, with a wide range of performance capabilities, and remember how many of them use the same tape deck, this is perhaps not as impossible as it would seem at first sight. The thing to remember is that a 30-guinea machine cannot be modified to give the performance of one twice the price. The deck may be the same, but the amplifier would have to be virtually rebuilt from scratch, which is, surely, the other end of the scale.

Somewhere between must be your particular interest, dictated largely by the facilities you have for practical work, and the knowledge and experience you already possess. But it will obviously not be possible to give specific help on the more ambitious ideas. I shall have to content myself with pointing to the broader issue, dealing rather more with what should be done than exactly how to do it. In this way I hope to be

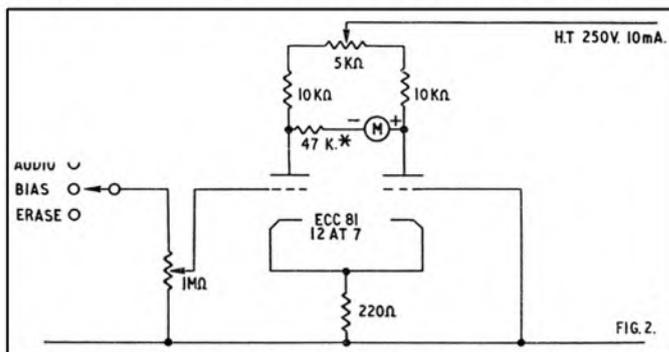


able to cover a wider range of the problems you put to us and still deal with the simpler, yet equally important, hints and tips.

One or two readers have realised that, without extensive modification to amplifiers, improvement in performance may be obtained by giving attention to the recording bias, and they have asked how they can go about measuring the bias current and the audio current through the record head. In fact, with the head feed arrangement used on nearly all domestic tape recorders, it is not possible to isolate the two currents. This can be got over by measuring, in effect, the audio voltage applied to the head network and assuming that this is the constant current device that it is supposed to be. The meter can then be read as current. In the case of bias, the only

measurement that can be made will include any audio current that may be present, but if note is taken of readings only when no audio signal is present, this need not be a problem. If desired, erase current can be metered in a similar manner, and as the major part of the output of the bias oscillator is used for erasing, it is worth while including the additional circuitry since this reading will, at least, give a good idea of the state of health of the oscillator.

It should be understood that, although we are metering the audio current in the record head, this circuitry cannot be considered as replacing the normal modulation indicator, usually a magic eye. This will be found to be a better device for



keeping a check on the rapidly fluctuating level of a normal recording signals.

Fig. 1 shows the sort of additional circuitry to be added to the T.R. using wiring as short as is reasonably possible. The signal obtained is rectified and smoothed immediately and can then be safely taken any distance for indication. The idea is to obtain about 1 VDC for full scale on the indicator and so the resistors shown starred, which do the actual measuring, will depend upon the current to be measured. It should not be forgotten that the DC voltage will equal the peak AC (i.e. 1.414 X R.M.S.). The values given on the diagram should be suitable for scalings of approximately 150 microamps audio and 1.5 milliamps bias. Erase current metering would mean a similar network in the earthy side of the erase head, and in this instance the resistor would probably be about 50 ohms for F.S.D. of 30 milliamps.

D.C. valve voltmeter

So far we have produced three DC voltages, each of about 1 V maximum, which represent the three quantities we wish to measure, and which can be passed as required to a meter through a simple switch. The circuit for the DC Valve Voltmeter required is given in fig. 2. With this type of circuit the calibration of the meter should be reasonably linear, thus avoiding the drawing of a special scale. The circuit should be fairly easy to understand, the 1 Megohm potentiometer is used to adjust the calibration, while the 5 Kilohm is for setting zero with no input. Any meter, from 1/2 to 5 mA full scale, can be used with adjustment of the value of the Starred resistor as found necessary. I suggest that you calibrate with a dry battery, using a simple potential divider of two resistors to produce a voltage of the right order.

With the more sensitive values of meter it would be possible to work at lower than 1V full scale, with corresponding reduction of the metering resistor in fig. 1. This should not be taken too far, however, since at very low levels the rectifiers, which should be of the germanium or silicone type, are no longer linear, but follow a square law.

Later in the series I shall return to this question of bias measurement, and examine the sort of changes in performance that should accompany a change of bias.

BUILD THIS REALLY PORTABLE RECORDER

PART TWO—ASSEMBLING THE AMPLIFIER AND OSCILLATOR

FIG. 1. shows the circuit of the transistor amplifier to be used with the tape transport mechanism described in Part 1 of this series. It will be seen that a straightforward two stage transistor audio amplifier is used to raise the output from the microphone to a level suitable for feeding the record head, and that a further transistor is used as a Hartley type oscillator to feed the necessary HF bias to the head.

Amplifier

The voltage available from a good quality moving coil microphone of 600 ohms impedance is about 0.25 millivolts for a sound pressure of one bar. One bar corresponds to normal conversational voice level at a distance of about six inches. Loud sounds quite close to the microphone may produce peak input levels up to one millivolt.

The gain of T1 unloaded would be better than one hundred times, but the 2K input impedance of T2 drops the gain to about

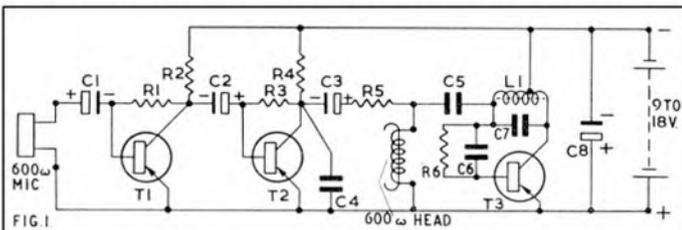
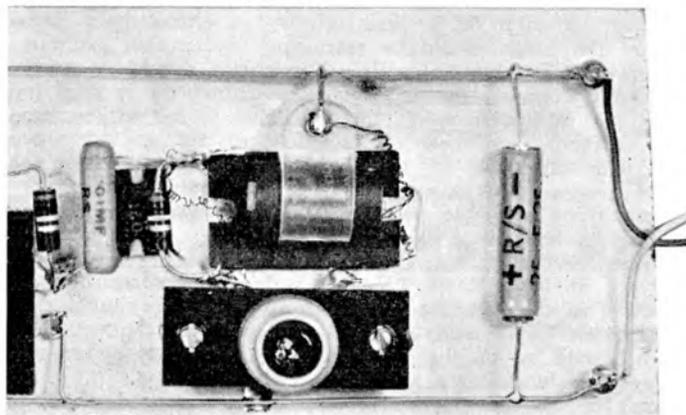


FIG. 1
Circuit of the two stage amplifier, and the oscillator.

thirty times, giving a mean signal to the input of T2 of about 7.5 millivolts. T2 is also loaded by R5 and the head so that its gain is also reduced to about seventy times, and the overall gain is 2,000. Therefore normal speech at the microphone produces an output signal of 500 millivolts or 0.5 volt.

Sensitivity

A peak input of 1 millivolt delivers an output of 2 volts R.M.S. and with an HT voltage of 18 volts the overload of T2 occurs for an output of 3 volts R.M.S. R5 has a much higher impedance than the head, so that a constant current is passed through the head windings for a constant input voltage regardless of any change



Close-up of the oscillator stage showing coiling of wire ends.

of head impedance with frequency. The signal current through the head is 0.05 mA for 0.25 mV microphone input, and 0.2 mA for 1 mV input. Pre-emphasis of the high audio frequencies is obtained by resonating the head inductance with the bias feed condenser C5 which is returned to the earthy end of the head via part of L1 and the decoupling condenser C8; this gives a 6dB rise in head current at 7.5 Kc/s relative to the low frequency current.

Oscillator

The oscillator uses a low loss ferrite pot core (winding details will be given later) which is tuned by C7 to a frequency of approximately 40 Kc/s. The HF voltage across the tuned circuit is 25 volts, but, as the coil tap is one third from the emitter end, a voltage of 15 volts R.M.S. is available at the base end of the winding, and this is fed via C5 to bias the head. The HF voltage across the head is 15 volts and the bias current 1 mA. The 10K constant current resistor R5 prevents this voltage from being shunted away by the relatively low impedance of the amplifier output transistor. A bypass condenser C4 drops the bias voltage at the output of the amplifier to a safe level without cutting the high note response of the recording amplifier to any appreciable extent.

Construction

As the transistor circuits are all low impedance, an open breadboard construction may be used with little risk of hum pick up, and, with the physical layout of the components matching the circuit diagram, there is less chance of wiring mistakes. Plug-in transistors are used to avoid possible damage due to soldering directly to the sensitive transistor leads; the transistors should be removed from their sockets while the breadboard is being wired. $\frac{1}{2}$ in. no. 4 wood screws are used to secure all components to the board and to act as anchorage points for the earth and HT busbars. The polarity of the 25 mfd coupling condensers is very important and is plainly marked on the circuit diagram; the photograph also indicates the positive and negative ends. The transistors are all of the same type and should be interchangeable, but there are inevitably small differences in gain and noise, and T1 should be chosen for the lowest noise on playback, and T3 for the highest bias voltage and lowest recorded noise. FIG. 2 shows the transistor connections at the three pin sockets.

The Oscillator Coil

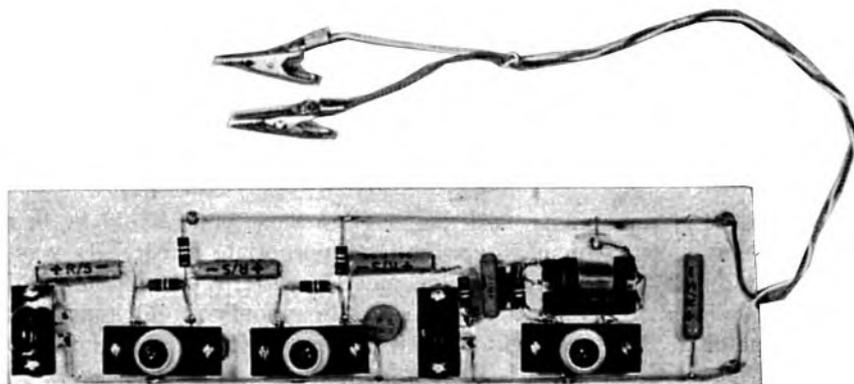
The oscillator coil kit consists of six parts: a length of 36 S.W.G. wire, a tubular plastic coil former threaded on the inside, two threaded ferrite plug cores, and two ferrite cup cores. The plug cores are screwed into the former so that they just touch at the centre. One hundred turns are next wound on the centre half inch of the former in a fairly even layer and a loop brought out adjacent to the starting point to act as the tap on the coil. A further 200 turns are now wound on the former in the same direction as the first 100 turns. The winding should be piled slightly near the centre so that it is self supporting, but the overall diameter of the winding should not exceed the inside diameter of the cup cores. The end of the winding should be brought out at the opposite end of the former to the start and tap leads.

Finally, the cup cores are slid over the wire ends and the ends of the former so that the lips of the cups touch at the centre. Pressure should be applied to the ends to maintain good contact whilst the junction is bound with Sellotape to secure. Note that

A REALLY PORTABLE RECORDER

Continued

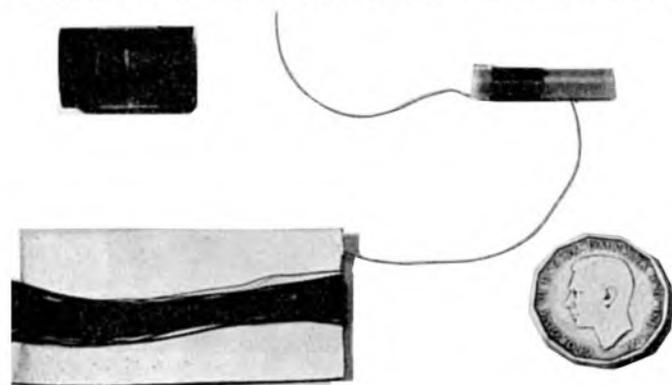
Using a bread board construction—at least in the experimental stages—helps to avoid wiring mistakes, since the layout follows the circuit diagram so closely.



the wire ends are brought out through the end holes in the cups which are large enough to accommodate both the former and the wire. Any effort to bring out the wires at the centre will prevent the cores making intimate contact, and the inductance of the coil will be low so that the bias frequency is raised above 40 Kc/s. The plastic strap is used to secure the oscillator coil to the breadboard; the start and tap loop should be on the right, near the end of the breadboard, and the end lead to the left, as shown in the close up photograph of the oscillator layout. It will be seen that the tuning condenser C7 is secured by being placed under the coil as it is screwed down. The wire ends and the tap should be coiled slightly so that they are not under tension and will not be broken by any small movement of the components.

Testing

The two-stage amplifier can be checked by connecting the head to the input socket and playing a recorded tape; it should be possible to vary the speed of the motor so that any part of a reel of either 7½ i/s or 3½ i/s recording can be heard at nearly proper speed. The output socket should be connected to the P.U. socket of any



Winding the coil is not difficult and involves a pair of cup cores (top left), a plastic former containing ferrite plugs (top right) and a length of 36 s.w.g. wire.

radio set or amplifier, or to the Radio socket of a recorder which allows monitoring whilst recording. Playback quality will be lacking in bass response and extreme top response, as it is at present unequalled; in addition there may be some azimuth misalignment between the original recording head and the new kit head. It is not worth making any azimuth adjustment at this stage, as later recordings will be done on the new head. For all playback tests the oscillator transistor T3 should be removed from its socket. The amplifier should work satisfactorily with battery voltages ranging from 4.5 to 18 volts. The gain should be roughly proportional to the HT voltage.

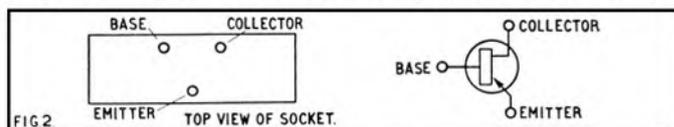
The Bias Oscillator

The bias oscillator can best be tested by a recording test. The microphone-headphone unit should be plugged into the input socket, and the record-play head into the output socket. The

oscillator transistor T3 should be reinserted into its socket after carefully checking the polarity of the HT battery. Reversed HT will not harm the amplifier transistors unless left on for a long time, as they are protected by the 10K emitter load resistors, but the reaction of T3 will be immediate and spectacular; it will die instantly, probably with a loud bang! Recording level and quality should improve as the HT voltage is raised. Optimum bias should be obtained with a battery voltage of 18 volts, but with some heads or tapes 12 to 15 volts will suffice. If the quality and level is still improving at 18 volts, and removing T3 makes a big difference in quality and recorded level, then low bias is indicated and T3 should be interchanged with one of the other transistors to see if it is responsible. If there is still no improvement, the bias resistor of the oscillator R6 should be shunted with another 100K resistor, alternatively C5 may be shunted with a larger condenser up to 500 pf. If these remedies fail, or if removing T3 makes no difference in level or quality, the oscillator coil connections should be carefully checked and the coil rewound if necessary as the fault may be a single shorted turn. For test purposes DC bias may be applied by connecting a 50 to 100K resistor from the junction point of R5 and C5 to HT negative, i.e. to the top busbar. With bulk erased, or HF erased tape, the quality and level will be inferior to full HF bias, but it will check that all is well up to this point.

Checking the Record Amplifier

If the two-stage record amplifier is suspect, then a signal from the low impedance Ext. LS. terminals of any radio set may be connected across C3, with T2 removed, and a further recording test made. If this recording is O.K. it indicates that the bias oscillator is functioning, and that the fault must be in the amplifier stages. Check emitter and base resistances carefully and see that the polarity of the coupling condensers is correct. C8 may be removed from across the HT supply, and used to replace each condenser in turn. When the amplifier and oscillator is working properly it may be found that connecting C8 has no audible effect.



This is quite in order as it only decouples the battery and prevents the internal resistance of the battery from affecting the bias and amplifier gain as the batteries run down.

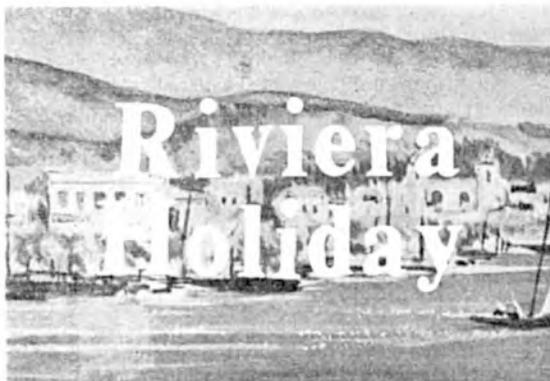
In Part 3 we shall discuss switching for record, play, and playback equalisation circuits.

List of Components (see fig. 1)

C ₁ , C ₂ , C ₃ + C ₅	25 MFD	25v WKG
C ₄	0.003 MFD	Ceramic
C ₅	0.01 MFD	Ceramic
C ₆	150 PF	Silvered Mica
C ₇	5000 PF	Silvered Mica
R ₁ , R ₅ + R ₆	100 K	¼ Watt
R ₂ , R ₄ + R ₅	10 K	¼ Watt
L1	5 Mh	

MUSIC FOR FILMS

After a preliminary "sorting out" session, you should be in a position to decide the moods of the various filmed sequences, and choose appropriate music. By way of example, we show six stills which would call for (1) gay "on the move" music, (2) continental "vista", (3) scenic or seaside atmosphere, (4) eerie or mysterious effect, (5) romantic moonlight, (6) happy signature music such as was used at the beginning. Non-copyright discs which convey these changing moods very well are listed in the table on the opposite page.



Sound and Cine

by Richard Golding

The well-equipped Mixing Room in the technical services section of the G.B. Film Library has a pair of Garrard 301 3-speed transcription turn tables, a 4-channel mixer, and an intercom system into the studio.



I WOULD say that the major part of the many thousands of amateur films shot in each year are holiday films, and that of these only a very small percentage ever reach the outside public, or are entered for competitions.

This is mainly because the authors of most holiday films regard movie-making as a part of the holiday itself, and the product rather as a handy set of transparencies joined together in one long convenient piece. These authors, who would scream at the thought of sitting through a commercial production, with no sound track, rarely turn a hair when presenting their own film for which the only accompaniment is the whirr of the projector.

With a little effort, the film, which after all was quite expensive to roll off in the first place, could become a small work of art, and indeed more of a pleasure for its audiences, by the addition of a music track; and if well done—a potential competition winner.

The easiest way out, and this is better than nothing at all for home viewing, is to choose music from your own collection that suits the mood of the film, but it will hardly do for a film with changing atmospheres and carries with it, also, the danger that the audience may be distracted because it contains a strong meaning of its own.

It is also an infringement of copyright to dub or re-record ordinary commercial discs on to tape or to play them in public.

The answer is to use the special mood music and sound effects discs issued by the various libraries of the music publishing houses. Most publishers catalogue their music under differing moods, and, at the same time, give the duration of the piece in minutes and seconds. It is therefore quite easy to select some suitable background music for each visual sequence. Here are a few headings taken from various catalogues:—Comedy, Drama, Fantasy, Love, Mystery, Night, Period, Sacred, Regional, and Travelogue.

The discs are normal 78 r.p.m. and are available for amateur use providing that the copyright is observed when they are re-recorded for public presentation, and are sold for this express purpose on extra payment of a copyright fee. Special concession rates at a nominal figure are available to amateurs on application to the Institute of Amateur Cinematographers, 8 West Street, Epsom, Surrey. The reason for 78 r.p.m.'s is that it is more convenient to select a groove on this type of disc than on the EP or LP which has perhaps three times more grooves to the inch.

Riviera Holiday

Let us now consider that you have spent your holiday on the French Riviera and that you have filmed various amusing and pleasing incidents that you have placed in logical sequence.

The film gives an account of the journey down by car, the arrival at the hotel and a tour of the town, the beach and water ski-ing, some underwater scenes perhaps, a battle of flowers, the night life, and then the departure.

Having timed the sequences, studied the catalogues, and decided on the right atmosphere you need for each scene, your final choice of background mood music may be something like the table at the foot of this column (pictures on page 608).

All discs in the above list from Boosey and Hawkes, 295 Regent Street, W.1. The cost for each disc is 7s. 6d. for 10 in. and 9s. 9d. for 12 in. (inc. P.T.).

Now, having chosen your discs, transfer them to tape in their correct order and timing via your own particular apparatus for synchronisation, making sure that each one is faded out or mixed on to the next one so that there is no unpleasant jar or interruption. For playing back against the film remember to place your extension speaker either above the screen or below it but never behind. The sides of the screen can be used providing you have two speakers, one on each side.

Other mood music publishers are: E.M.I. Ltd., 363 Oxford Street, W.1, Francis Day and Hunter, 138 Charing Cross Road, W.C.2, Paxton and Co., 36 Dean Street, W.1. Each of these libraries carries a full range of sound effects and special title music.

Music Plus Commentary

A film is primarily a visual medium, and the pictures should to a large extent explain themselves, but there are times when a commentary is necessary to bring out hidden points not evident in the picture, to form some continuity between scenes, or to add a new dimension of its own as in "Only a Mirage", a national competition winner four years ago.

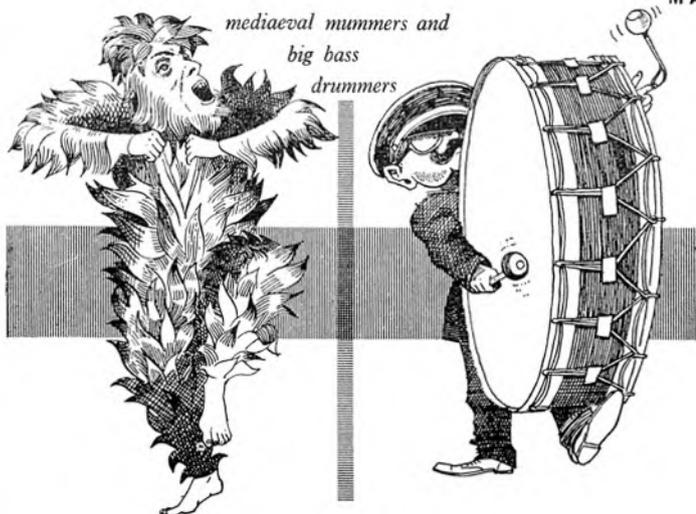
In "Only a Mirage", made by Jim Haynes of Cork, Ireland,

Sequence	Mood	Disc Title	No.	Timing
Titles and the trip down.	Novelty, gay and happy car sequence.	"Tour de France"	O 2349	2:22 min.
Arrival and glimpse of town.	Descriptive Continental background.	"Cafe Bon Accueil"	O 2303	2:22 min.
The Beach & Water-ski-ing.	Scenic waters ...	"Mediterranean Breeze"	O 2299	2:55 min.
Underwater ...	Drama—eerie—suspense—relief.	"Below Sea Level"	O 2354	3:52 min.
Night Life ...	Romance and Moonlit waters.	"Bright Lights" changing to—"Love and Moonbeams"	OT 2212	0:32 min.
Departure & End title.	Repeat or part of	"Tour de France"	OT 2312	4:11 min.

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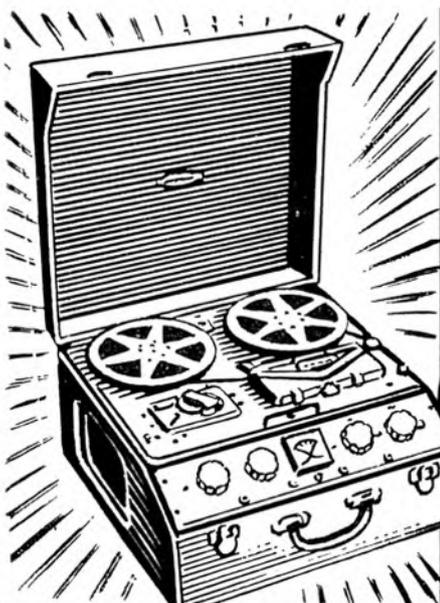


SIZES	STANDARD			LONG PLAY			SIZES	DOUBLE PLAY		
	FEET	TOTAL RUNNING TIME (L.P.S.)	PRICE £ S. D.	FEET	TOTAL RUNNING TIME (L.P.S.)	PRICE £ S. D.		FEET	TOTAL RUNNING TIME (L.P.S.)	PRICE £ S. D.
3"	150	16 min	5 6	225	24 min	8 6	3"	300	32 min	10 6
3½"	250	26 ..	9 0	350	37 ..	11 0	5"	1200	2.. 8 ..	2 5 0
4"	300	32 ..	10 0	450	48 ..	14 6	5½"	1700	3.. 0 ..	2 17 6
5"	600	1.. 4 min	1 0 0	850	1.. 30 min	1 8 0	7"	2400	4.. 16 ..	4 0 0
5½"	850	1.. 30 ..	1 7 6	1200	2.. 8 ..	1 15 0	SUPERGRADE			
7"	1200	2.. 8 ..	1 15 0	1800	3.. 12 ..	2 10 0				
8½"	1750	3.. 6 ..	2 10 0	2400	4.. 16 ..	3 10 0	7"	1200	2.. 8 min	2 18 6

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85, THE BROADWAY, WIMBLEDON, S.W.19. *CHerrywood 4393*

45, HARE STREET, WOOLWICH, S.E.18. *WOOLwich 1955.*

43, MITCHAM ROAD, TOOTING, S.W.17.

37, BEDFORD STREET, STRAND, W.C.2. *TEMple Bar 8858.*

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SOUND AND CINE—(continued)

the various sights of the countryside in Autumn, music background, and carefully chosen verses from some of the English romantic poets, are designed to conjure up an impression of the prevailing mood of the season, a solitary communing with nature and a philosophic reflection on the departure of summer.

The sound track of this film is extremely well organised. The title music fades out when a girl's voice begins reciting verses from Chatterton—"When Autumn, serene and sunburnt, doth appear; with his gold hand gilding the falling leaf . . .". Her short sequence ends with the reflection: "Methinks my heart's delight is mingled with some care", and new music is introduced to set the mood for all that follows—a parade of October; yellow, brown and russet leaves, the berries and the nuts, the fruits, the mushrooms and toadstools, the flowers, the birds, the insects. Interruption of this music is provided by some further lines of poetry appropriate to the woods and streams by which we linger awhile.

Adding the Commentary

The addition of a commentary, as described above, is not difficult. The first step is to run the film at normal projection speed and time each sequence with a stop watch. From this list draft your commentary by writing down all relevant facts and information that you think is necessary, bearing in mind that spoken word speed is about three words to the second.

Try to keep an ideal proportion of two thirds talking to one third music, so time your music in as you go.

Having roughly drafted the commentary, you must now re-run the film and speak your commentary aloud against the visuals. You may find from this that you will have had to speed up now and again to get all your words in, so parts of your commentary will have to be redrafted. It is always best, if you can, to listen closely to your own voice on tape going through the script, so that you can change or eliminate all awkward sounds that you may have trouble with. Some people cannot manage sibilants very well or d and t or ing endings. It is useful, too, to mark all pauses and stops for breath on the script so that you attain a level delivery.

Final Recording

Now, having carefully timed your music into the script and decided on the best method in the scope of your apparatus of mixing the two (whether superimposing or mixing both at the same time), you are ready for the final recording.

For this you will want to cut out all extraneous noise, especially that from the projector, so try to fix up some sort of sound booth. A serving hatch into the dining room is very handy, more so if you can blank off with a piece of glass and project from the other side.

A final word before you start—if you write your commentary on stiff paper or card and slide each sheet across instead of turning over you will eliminate all rustle—and if you are running commentary without music be careful that the re-appearance of your voice after a silence is not harsh or abrupt, for anything in the nature of a surprise, if not deliberate, is bad technique. Having settled all these points, switch on your apparatus, take a deep breath, and go man go.

Optical Recording

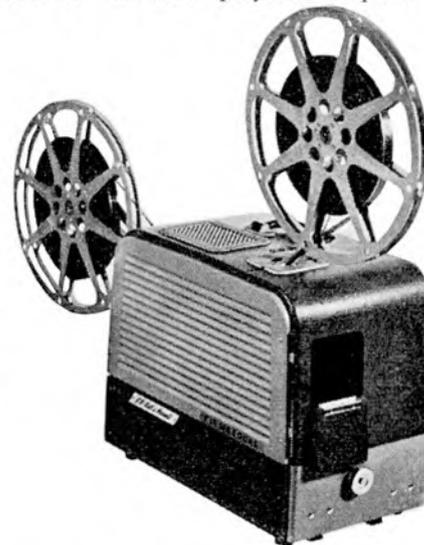
Obviously, the advanced Sound and Cine man with the mag stripe projector will have the edge when it comes to recording sessions but, although it is now usual to use magnetic stripe in the preparation of sound films, most 16 mm projectors are still only designed for the reproduction of photographic soundtracks. Therefore, in terms of wide distribution, a final optical track is desirable, although it is in many cases inferior to stripe for music reproduction. Optical is also cheaper when several copies are required. The chosen procedure is to make all initial recordings on tape or coated film by projecting the film from a soundbooth while mixing music, commentary and effects in synch on to a master tape. The tape is then transferred to an optical track by one of the recording studios.

There are quite a number of transfer studios to choose from, but the facilities offered by the G.B. Film Library at Perivale make optical tracks more attractive cost-wise to the amateur than any time in the past. A master reversal positive optical track with high quality from your original tape will cost only 4½d. per foot.

Facilities Provided

For £7 10s. an hour, and this is about the cheapest there is in London today, G.B. provide commentary and post synch recording facilities using sprocketed tape run in locked synch with a projector. The studio can also be used for mixing separate tapes on to a final master magnetic track for transfer to optical. Double heading can be arranged—i.e. running both visual and sound together on the same projector in perfect

The Bell and Howell Filmosound range of 16mm. projectors, including the model 640 illustrated, are completely self-contained, having built-in quality sound amplifiers for coupling to single loudspeakers or large Public Address systems.



synch. G.B. have their own library of music and effects to choose from, they will edit your track to picture for £2 10s. an hour, and transfer from tape to 16 mm mag stripe for 2d. per foot. Note—they are only equipped to handle tape speeds 7½ and 15 i/s.

A New Lip Synch Recorder for 16 mm

Great claims are being made for the "Nomad" (Magnasynch Corp of America) which is now available in this country. Weighing only seven pounds, it is fitted under the camera to which it is locked by a flexible cable. The camera drives the recorder at the same speed and for short sequences the spring wound motor is said to be sufficient. For long sequences, both may be driven by a small standard battery operated camera motor.

Split 16 mm sprocketed magnetic film in lengths exactly matching the picture film is normally 100 feet, but adapters permit use of 400 and 1,200 foot reels.

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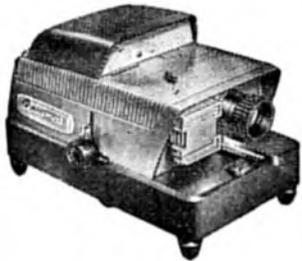


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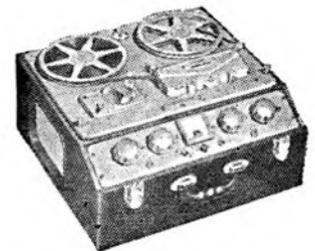
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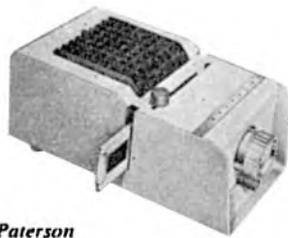
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Paterson



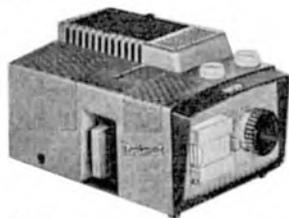
Rollei Automatic

THE main things to consider, when buying a still projector, are indicated in the accompanying Table. Firstly, if you propose to show 35 mm slides, or the 1½ in. × 1½ in. size which also fits the 2 in. × 2 in. mounts, then the popular 2 in. square type is right. For 2¼ in. square camera owners, e.g. Rollei—there is a narrower choice of projectors, but they can be obtained from most photographic/tape dealers, and of course the Rollei projector, for example, copes with either size of slide mount and will mix or “permutate” at will.

Next you should consider the lamp power. We would say that for family viewing 200 watts is adequate, though there is (continued overleaf)



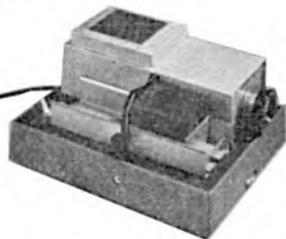
Voitländer Zettomat



Norimat



Ikomat Automatic



Johnson Wray Autolux 300



Kodaslide 40

TABLE OF PROJECTORS

Manufacturer	Projector	Slide Size	Watts	Price	Remarks
Agfa Ltd. 27 Regent Street, London, S.W.1	Agfa CP.35	2" sq.	150 w.	£ s. d. 13 15 6	2¼" sq. version £22 4s. 9d. 16 ft. remote control cable; 30-slide magazine, Sound attachment (Foil) £10 8s. 9d.
	Diamator S.	2" sq.	150 w. or 300 w.	44 5 0	
Gnome Photographic Products, Ltd. Caerphilly Road, Cardiff.	Alphax 1	2" sq.	150 w.	8 19 6	Filter for 500 w. Automatic Complete with screen in lid.
	Alphax 111	2" sq.	300 w. or 500 w.	16 19 6	
	Litemaster	2" sq.	300 w. or 500 w.	24 15 6	
	Gnome New Companion	2" sq.	150 w.	14 3 0	
Hanimes (U.K.) Ltd. 345 City Road, London, E.C.1.	Argus 200	2" sq.	200 w.	13 13 0	300 w. version available. Slide changer and 36-slide magazine.
	Argus 500	2" sq.	500 w.	19 19 0	
	Han-O-Matic 500	2" sq.	500 w.	25 10 0	
R. F. Hunter Ltd. Calfix House, 51-53 Grays Inn Road, London, W.C.1.	Paterson	2" sq.	150 w.	11 19 6	10 ft. remote control cable. 30-slide magazines for large and small slides.
	Rollei	2¼" sq.	300 w. or 500 w.	75 0 0 approx.	
Johnsons of Hendon Ltd. Hendon Way, Hendon, London, N.W.11.	Voitländer Perkeo	2" sq.	150 w.	19 0 0	36-slide magazine. Loads 20 slides. Two 36-slide magazines, 16 ft. remote control cable.
	Johnson Wray Autolux 300	2" sq.	300 w.	21 0 0	
	Voitländer Zettomat	2" sq.	300 w.	43 15 0	
Kodak Ltd. Kingsway, London.	Kodaslide 40	2" sq.	150 w.	12 17 6	
	Kodaslide 5	2" sq.	250 w.	26 9 0	
	Kodaslide Home Projector	2" sq.	150 w.	9 10 0	
Leitz (Instruments) Ltd. 30 Mortimer Street, London, W.1.	Prado 150	2" sq.	150 w.	19 7 6	250 w. and 500 w. version available. Remote control slide change and focus. 30 or 50 slide magazine. Ultrasonic tape coupling.
	Pradovit	2" sq.	150 w. to 500 w.	59 5 6	
Luminos Ltd. 1 Belsize Crescent, London, N.W.3.	Noris Companion	2" sq.	150 w.	10 10 0	36-slide magazine.
	Norimat	2" sq.	150 w.	17 17 0	
	Noris Airflow 66	2¼" sq.	300 w.	29 19 6	
Neville Brown & Co. Ltd. 77 Newman Street, London, W.1.	Aldis 303	2" sq.	300 w.	19 19 0	500 w. version available. 36-slide magazine. Remote control. Pre-set interval timer available.
	Aldis Automatic	2" sq.	500 w.	37 17 6	
Peeling & Komlosy Ltd. 181 Victoria Street, Dunstable, Beds.	Aldislite	2" sq.	100 w.	9 18 6	12 ft. remote control cable. Pre-set timer.
	Ikomat Automatic	2" sq.	300 w. or 500 w.	52 10 0	
Pullin Optical Co. Ltd. Electrin House, 93-97 New Cavendish Street, London, W.1	Paximat S Electric	2" sq.	300 w.	34 18 6	Remote control. 36-slide magazine. 36-slide magazine. Magazine version available.
	Paximat Portable	2" sq.	200 w.	19 19 0	
	Realist 400	2" sq.	150 w.	9 19 6	
Rank Precision Insts. Ltd. Mortimer Street, London, W.1.	Bell & Howell Hi-Lyte 707	2" sq.	300 w.	16 17 6	
J. J. Silber Ltd. 40-46 Lamb's Conduit Street, London, W.C.1.	Halina 150	2" sq.	150 w.	8 19 6	Automatic, pre-set interval timer. 30 or 50 slide magazine. 17 ft. remote control cable. Complete with 2 magazines.
	Liesegang Fantax Auto 500	2" sq.	500 w.	57 15 0	
	Liesegang Fanti Fanti-Automat	2" sq. 2" sq.	150 w. 150 w.	16 12 6 30 14 9	
Specto Ltd. Vale Road, Windsor, Berkshire.	Specto Colorslide 150	2" sq.	150 w.	9 19 6	
	Specto Colorslide 300	2" sq.	300 w.	16 19 6	

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HAM 9632

CHOOSING A PROJECTOR

(continued from previous page)

no doubt that the 300 watts rating is extremely popular.. At 500 watts a very brilliant picture can be got, but it is then essential to have a highly efficient cooling system, which adds to the cost. Naturally, the maximum dimensions of the projected picture are to some extent related to the lamp voltage, but more important is the lens which ultimately fixes the picture size for a given projector/screen distance. If you will require to depart very much from a roughly 40 in. X 40 in. picture at 8 feet—an average set up—then you should investigate this question of lenses more closely.

A major consideration, when it is planned to organise smooth running slide shows, perhaps with a sound commentary on tape as described last month, is the method of loading and unloading slides. In the simplest projectors the slides are inserted manually one at a time, either through a slot at the top, so that each slide ejects its predecessor, or in a to-and-fro sliding gate from which used slides must be removed by hand. Operating these projectors is easy enough, and provided a suitably numbered and indexed storage box is employed, a series of slides—in any pre-arranged or random order—can be shown as required.

The next type of projector still involves manual operation, but accepts a magazine of 20 or 36 slides at a time. The advantages of this magazine system is that the slides themselves need never be touched by hand or leave the magazine except for as long as the selector arm passes them in front of the lens and back again. For the user who carefully arranges his slides in some kind of order for viewing, magazines are clearly ideal, since absolutely no preparation is necessary before the performance. Magazines do have one disadvantage, however, that it is difficult to hop about from one slide to another out of sequence.

Automatic operation

The introduction of magazine loading made it possible for slide projectors to be fitted with automatic loading, since a fairly elementary motor and switch can move a given slide into position in front of the lens, shift it back again, and advance the magazine by one step. This automatic slide selection may be in the form of push buttons on the projector itself or on a remote control unit connected to the projector by a length of cable. On a number of projectors this remote control is carried a stage further, and a knob is also fitted to give remote control focusing. Coupling the projector to a tape recorder so that supersonic pulses or metal foil switching actuate the changing mechanism is a fairly expensive business, and many people will feel that it is strictly for professionals. However, when this facility is available, you will see it mentioned in the Table.

With such a wide range to choose from, it is clearly a good idea to visit an established photographic dealer who could demonstrate a number of projectors and give advice on the best for your purpose.



Voitlander Perkeo



Paximat Portable



Gnome Litemaster



Leitz Pradovit

A to Z

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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.



NEW BUTOBA MAINS/BATTERY PORTABLE

A NEW version of the Butoba portable tape recorder has just been announced called the M.T.5. Fully transistorised, the machine has two speeds of $1\frac{1}{2}$ and $3\frac{1}{2}$ i/s and a spool size of 5-in. enables up to four hours' recording to be obtained with double play tape. Separate volume and tone controls are provided, and the machine can be used as a straight through amplifier. Other features include push button controls. Separate microphone and radio inputs, and monitoring facilities. A mains converter is available as an extra which allows the machine to be used from 110 to 260 volts. The Butoba M.T.5—priced at 69 gns.—is distributed by **Denham and Morley Ltd., 173-175, Cleveland Street, London, W.1.** Plastic or pigskin carrying cases can be obtained, for £3 17s. 6d. or 7 gns. respectively.

The Incis mains-operated portable recorder was described last month. Our photograph shows the carrying case, which is included in the price of £30 19s. 6d. Enquiries to Denham and Morley Ltd.



Recorders from Belgium

AVAILABLE in this country for the first time are two new tape recorders manufactured in Belgium by Ateliers de Constructions Electriques de Charleroi. Known as the Lugavox, the Type 1160 has two speeds of $7\frac{1}{2}$ and $3\frac{1}{2}$ i/s and will accommodate a 7 in. reel with recording tracks of international standards. Other features include, mixer circuit, clock type indicator, monitoring switch, external speaker sockets, two speakers, and push button controls. The frequency range is claimed to be up to 15,000 c/s at $7\frac{1}{2}$ i/s and the machine has a power output of 2.5 watts.

The Type 1161, has four speeds, $7\frac{1}{2}$, $3\frac{1}{2}$, $1\frac{1}{2}$ and 15/16 i/s, and also accepts a 7 in. spool. Using printed circuits for the amplifier stages, the machine can be adapted for stereo if required. Direct mixing is possible on record or replay and superimposition of

a second recording is possible without erasing the previous recording. Facilities include two speakers mounted on an acoustical baffle, bass and treble controls, revolution counter, and magic eye recording level indicator. The two machines are priced £52 and £58 respectively, and can be obtained from: **Lonor Ltd., Maddox House, 1, Maddox Street, 215/221, Regent Street, London, W.1.**

Brand Five Tapes

FERRODYNAMIC Brand Five magnetic recording tapes, manufactured in the United States, are now available in this country from leading dealers. Tapes are in individual boxes and are identified by the colour of the box: Acetate standard, Blue; Acetate L.P., Red; Mylar Dupont L.P., Green; Mylar Dupont D.P., Yellow. These high fidelity tapes are priced as follows, acetate based, 5 in. 600 ft., 16s.; 5 in. 900 ft., 18s. 6d.; $5\frac{1}{2}$ in. 1,200 ft., £1 3s. 6d.; 7 in. 1,200 ft., £1 5s. Mylar Dupont tapes: 3 in. 300 ft., 13s.; 5 in. 1,200 ft., £1 17s. 6d.; 7 in. 1,800 ft., £2 4s.; and 7 in. 2,400 ft., £3. Wholesale distributors are **V. L. Dewitt Ltd., 24-26 Hampstead Road, London, N.W.1.** and the tapes are imported by **Electro-Techno-Dynamics Ltd., 101 Leadenhall Street, London, E.C.3.**

SIMON INTRODUCE FOUR TRACK MINSTRELLE



THE manufacturers of Simon tape recorders have announced a 4 track stereo version of the "Minstrelle", priced at 41 gns., with a matching unit (not illustrated) containing a second amplifier and speaker at 22 gns. With the add on unit it is possible to record on track 1 and listen to track 3 at the same time. The "Minstrelle 4S" can be obtained as a table model or as a portable with carrying handle, at no additional cost. Manufactured by **Simon Equipment Ltd., 48, George Street, Portman Square, London, W.1.**

Back-Spacing Now Available for Fi-Cord 101

A back-spacing system has been introduced by Fi-Cord International for their 101 portable dictating machine. The system, which takes the form of a small motor unit attached to the transcriber, is operated by the electronic foot-pedal which controls the transcriber's stop-start mechanism. Half-pressure on the pedal provides the normal stop-start process—full pressure gives back-space.

The new transcriber units will be available at the end of November, and will cost £21. Enquiries should be addressed to: **Fi-Cord International, 40a, Dover Street, London, W.1. (Tel: HYDe Park 3448).**



The right microphone makes a good recorder— better

The Grampian DP4 is a moderately priced sensitive reliable microphone developed to meet the requirements of the "Quality-minded" recordist seeking better performance from his equipment.

With a uniform frequency response from 50 c/s to 15,000 c/s the DP4 will satisfy the most exacting user. The DP4 is equally suitable for Public Address, Broadcasting, Call Systems etc.

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DP4/L low impedance—25 ohms 86 dB below 1 volt/dyne/CM². DP4/M medium impedance—600 ohms 70 dB below 1 volt/dyne CM². DP4/H high impedance—50,000 ohms 52 dB below 1 volt/dyne CM².

Grampian DP 4

Retail Price—DP4/L complete with connector and 18 ft. screened lead £7/11/-. (Medium or High Impedance models £1 extra).

A complete range of stands, swivel holders, etc. is available also. A matching unit (Type G7) can be supplied for adapting the microphone for a recorder having a different input impedance, or when a long lead is required. Retail Price £3/5/-. Write or telephone for illustrated literature.

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NAME _____
ADDRESS _____

NEW PRODUCTS—(continued)

★
"POPULAR"
RECORDER
FROM
ELIZABETHAN



★
ELIZABETHAN (TAPE RECORDERS) LTD. have produced a new machine to sell at the low price of 19½ gns., the lowest-priced tape recorder ever to come from a leading manufacturer. Known as the "Popular", the machine is supplied complete with crystal microphone, tape, spare spool and radio connecting leads. Fitted with 5½ in. spools the Popular operates at a tape speed of 3½ i/s with a frequency response of 60 to 8,000 c/s. It is a twin-track machine and incorporates a magic eye level indicator, 7 by 4 in. elliptical speaker, and volume and tone controls. The output power is 2½ watts. The cabinet, which includes storage space for spare spools, is finished in red leathercloth and grey and blue vynair. Manufactured by Elizabethan (Tape Recorders) Ltd., Bridge Close, Oldchurch Road, Romford, Essex.

★
STENOCORD
DICTATING
MACHINE



★
K.G.M. Electronics Ltd., of Richmond, Surrey, have announced that they are sole distributors in U.K. and N. Ireland for Stenocord dictating machines and central dictating equipment. Servicing arrangements are also provided on a national basis. The recording medium is a convenient re-usable plastic belt with a capacity of up to 2,000 words of dictation. The hand microphone is also worthy of note because it contains all operational controls, not only "start-stop" but also unlimited playback and control of volume for loud or soft playback as desired. Coloured cue lights in the microphone indicate "recording" or "reproducing". It is unnecessary to touch the machine at all, once the recording belt has been loaded.

Stuzzi go 4-track (see also Review on page 619)

THE new Stuzzi Junior 4M is the lowest priced 4-track recorder so far. Designed and made in this country by Stuzzi's British concessionaires, Recording Devices Limited, it embodies many of the features of the company's Mannequin recorder, including superimposition, and straight through facilities.

A BSR deck with a 4-track head using 5½ in. tape spools gives 6 hours playing time per reel of tape at 3½ i/s. Frequency response is 80-9,000 c/s. Changing from one track to another is simple; all that is required is the turn of switch. Other features of this new machine include; magic eye, input and output sockets, volume and tone controls, and a high quality 8 in. by 3 in. speaker. The Stuzzi Junior 4M is housed in an attractive two-tone plastic cloth-covered cabinet. Price 26 gns., including microphone and reel of tape. The manufacturers are Recording Devices Ltd., 44 Southern Row, Kensington, London, W.10.

EQUIPMENT REVIEWED

★
THE
TELEFUNKEN
MOVING-COIL
CARDIOID
MICROPHONE
TYPE D.11B
★



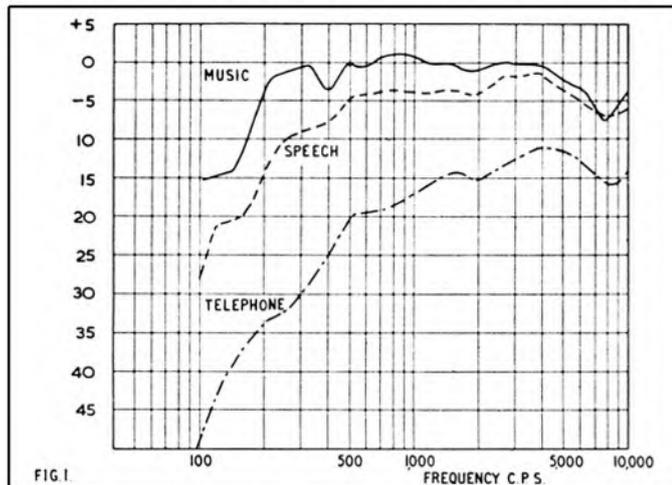
Manufacturer's Specification:

Moving Coil Unit. **Directivity Pattern:** cardioid. **Impedance:** high and low (according to how plug is inserted). **3-position "quality" switch:** speech, music, simulated telephone. **Price:** 8 gns.

Distributed by **Welmec Corporation, Ltd., 147, Strand, W.C.2.**

MOST of the cardioid microphones manufactured in this country are of the two element type, which combine a velocity element with a pressure element so that the outputs add for sounds reaching the front of the microphone, and cancel for sounds approaching the rear. In America and Germany, however, the single element cardioid has been developed, where sound reaching the back of the diaphragm is delayed by an acoustic phase-shifting network so that the pressure difference, and therefore the force available to move the diaphragm, is high for sounds reaching the front of the microphone and low for sounds from the rear.

In theory, a sound wave approaching the back of the unit is delayed by precisely the time it takes the same wave to reach the front face by diffraction around the microphone case, so that the pressure on either side of the diaphragm is identical and the output is zero. It will be appreciated that an acoustic network to delay all wavelengths by the same amount is necessarily rather complex, and studio microphones using this principle have a complicated system of tubes, slots and cavities to provide the mass, acoustic resistance, and compliance required. In addition, the diaphragm of such a microphone is neither mass



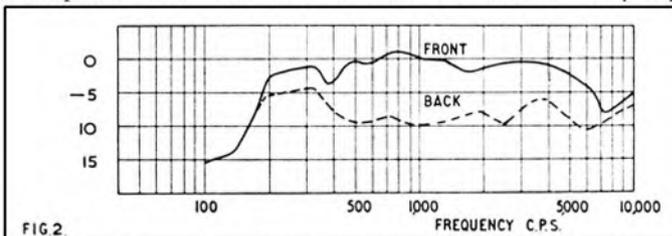
● Frequency response in each position of quality switch.

controlled, nor stiffness controlled, i.e. the resonance is not at either extreme of the sound spectrum, but is usually placed between 200 and 300 c/s. Extra acoustic elements to provide a large acoustic mass and compliance have to be coupled to the diaphragm to extend the response down to the lower frequencies.

In a relatively cheap microphone, designed for domestic recording, it is not possible, or necessary, to provide all these refinements, and the D11B has a frequency response which matches the acoustic performance of the average domestic tape recorder very closely. A switch at the rear of the microphone allows the response to be modified and is marked M, S, and T, Music, Speech, and Telephone quality. Two alternative output impedances are available by appropriate connection to the three pin plug; the high impedance output, of 25,000 ohms, suits most domestic recorders which use valve amplifiers, and the low impedance of approximately 250 ohms is suited to transistor input stages, which are common in battery-operated, portable tape recorders and certain Continental mains-operated machines.

Frequency Response

Fig. 1 shows the response for the three positions of the quality switch. It will be seen that the response is smooth and free of peaks, and that, even on the widest response or *Music* position of the switch, the response falls sharply below 200 c/s. Now, despite advertising claims, most domestic units: recorders, record players or radio sets show a falling response below 200 c/s due to lack of adequate baffle area, and the use of loudspeakers with relatively high cone resonances, so that any canned music available in the home can be recorded acoustically with this microphone with little loss. In fact the smooth non-peaky



● Front and back response in "Music position".

response, and the directional characteristic, which cuts down extraneous noise, makes this one of the best microphones for this type of home "music" recording. The *Speech* position cuts the bass response still further, and gives very clean crisp speech quality, even in bad acoustic surroundings. The *Telephone* response is in fact much better than that of a telephone receiver, and for close talking under very noisy conditions, or for distant pick up in bad acoustics, may give more intelligible speech than a wide range microphone which reproduces "the lot".

Directivity

Fig. 2 shows the front and back response on the Music switch position. It will be seen that the front to back ratio is about 10 dB from 500 c/s to 6,000 c/s, but that it falls to 4 dB below 400 c/s. The broad low frequency peak in the rear response colours the reverberant noise somewhat, but this colouration disappears on the "S" or "T" position of the switch.

Sensitivity

The sensitivity on the high impedance output and the "Music" position of the switch was 52dB below 1 volt/dyne/cm², or 2.5 millivolts per bar sound pressure. The sensitivity falls on the other positions of the switch as shown in **fig. 1**. On the low impedance output, the sensitivity was 72dB below 1 volt/dyne/cm², or 0.25 millivolts per bar.

Impedance

Fig. 3 is an impedance plot at the two output pins. The natural diaphragm resonance at 250 c/s is shown as a slight impedance

DO YOU SPLICE TAPE?



HOW TO SPLICE TAPE

★ If you use tape, sooner or later you will need to know how to splice tape—how to repair simple or complicated breaks—how to edit your material—how to cut out words or syllables, etc. All this is described in this well-illustrated booklet, in which stage-by-stage photos and text provide the complete answer to professional tape splicing.

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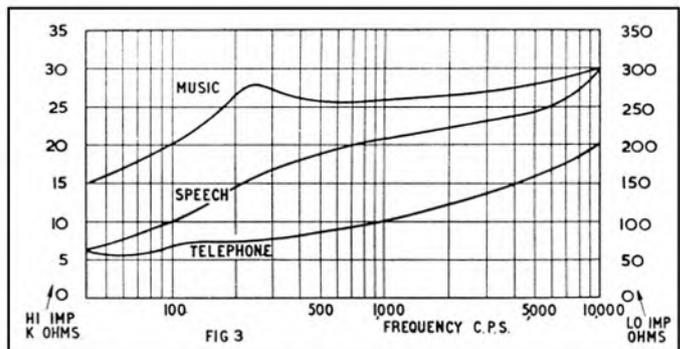
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TELEFUNKEN REVIEW—(continued)



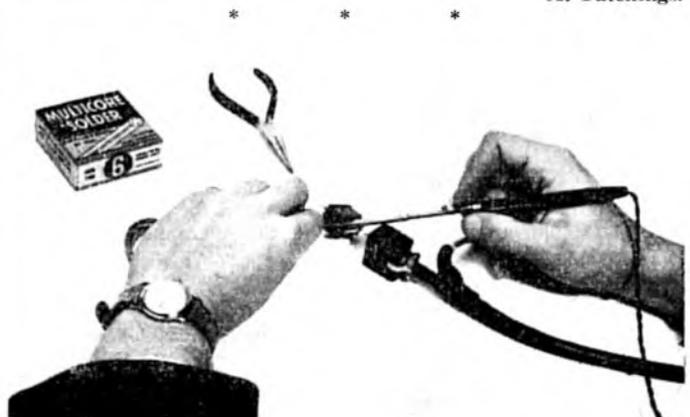
● Frequency/Impedance graphs at output pins.

rise, but it is well damped by the acoustic resistance in the phase changing network.

Comment

The big feature of this microphone is its versatility, and it can be recommended for domestic recording of speech and the limited range music available from radio sets, etc. The directional characteristic, and the wide variation in frequency response obtainable by use of the quality switch, allow recordings to be obtained in conditions which would be almost impossible with conventional microphones.

A. Tutchings.



12-VOLT SOLDERING IRON

Adamin Battery-Operated Soldering Iron 12 volt version with replaceable bit and 9/64 in. Diameter Shaft. Price £1 7s. 6d. Manufactured by **Lite Soldering Development Ltd., 28, Sydenham Road, Croydon, Surrey.**

THE user of battery-operated equipment often finds himself in a situation where a quick soldering job is required. It may not be generally known that soldering irons can be obtained which are designed to operate from low voltage supplies, and we have just been testing the 12 volt model shown in the photograph. This is one of the Adamin series of micro soldering instruments which are made in a wide range of voltages and sizes.

One advantage of this type of soldering iron was found to be the speed with which it reached a high working temperature, so that it was possible to wire microphone plugs and various other odd jobs within about a minute of connecting up to the car battery. The element is in a very thin gauge housing from which the heat is easily absorbed, and this has made possible the reduction of the distance from the handle to the bit. This iron, therefore, is able to be used in very confined spaces, such as we find in multi-way plugs and sockets.

Fixed and replaceable bit versions of this iron are available, and it is also possible to obtain isolating transformers which

allow this low voltage instrument (with its very useful safety factor) to be used from ordinary AC Mains when required. The group of irons to which this 12 volt model belongs have 9/64 in. diameter shafts and may be obtained for voltages from 6-50 volts.

Another series called the "A Group" employ 3/32 in. shafts and are for 6 volt elements only. Considering its low price, this iron should find itself a place in the tool kit of all battery recorder enthusiasts. **J.N.B.**

* * *

★
**THE STUZZI
 JUNIOR 4M
 PORTABLE
 4-TRACK
 RECORDER**



Manufacturer's Specification

Tape Speed: 3½ i/s. **Frequency Range:** 80-9000 c/s. **Fast winding or re-winding:** for 850 ft. of tape 3 minutes. **Built-in loudspeaker:** 8 in. x 3 in. Permanent magnet. Microphone and pickup input sockets and external loudspeaker socket. **Playing Time:** 6 hours per 5½ in. double play spool. Superimposition, straight through amplifier, and switched track change (1 and 4 or 2 and 3). Price 26 Gns., including microphone and reel of tape. Manufactured by **Recording Devices Ltd., 44 Southern Row, Kensington, London, W.10.**

* * *

THE preliminary announcement about this new 4-track Tape Recorder arrived only a few hours before the machine itself. We can therefore assume that the Recorder tested is one of the very first to leave the assembly line.

First impressions were extremely favourable, and these were enhanced through our remembering the excellent sound produced by the Mannequin (which is the 2-track predecessor of this machine) at this year's London Audio Fair. Reversing the usual procedure of trying out the microphone to begin with, we lost no time in fitting a pre-recorded tape on to the machine in order to satisfy ourselves about the quality of reproduction. We had the same pleasant surprise as we had experienced with the Mannequin. From a machine whose size— together with the slimming effect produced by the sloping panels— would scarcely lead one to expect full range Hi-Fi, we found a very pleasing balanced tone.

For listening in an average room the volume control only requires to be set at about a quarter of its range, so that there is ample gain in hand to fill a very large room indeed. The tone control was adjusted independently by a number of "guinea pigs" and in all cases a central position was preferred, which corresponded to a very small amount of top cut. Once again, for those who preferred a mellow sound, it was possible to obtain this by turning the tone control further in a clockwise direction.

It was then decided to try out the machine's most topical feature, namely, 4-track recording, and a number of recordings were made on tracks 1 and 2, using both the microphone and radio inputs. The effect was then tried of producing crosstalk between the tracks by heavily over-recording on one and playing the unmodulated neighbouring track at very high volume. In no case were we able to produce noticeable break-through of the unwanted track. The track change switch operates independently, so that immediate comparison of tracks 1 and 2 (or tracks 3 and

4 when the spools have been reversed) is possible while the machine is running.

The super-imposition slide key was very popular, and several friends tried their hands at producing Disc Jockey type recordings by super-imposing announcements over music. It was found that no experiments were necessary to establish the necessary volume setting to give a good balance between the music and speech, since if both were recorded with due reference to the Magic Eye recording level indicator it was found that operating the super-imposition key effectively reduced the level of the music to about half. This meant that the speech was highly intelligible, with the music at a reasonably faded down volume.

The actual mechanism specification of any machine is, of course, dictated by that of its deck, and much has been written in these columns about the ease of operation and highly useful performance of the B.S.R. Monardeck. The braking, winding and rewinding and the very handy edging facility, which the joystick operating lever provides, were all found to be well up to standard on the model tested. Used as a straight through amplifier, the Stuzzi Junior 4M gives very good reproduction from an ordinary record player with crystal pickup and from a radio tuner unit.

To sum up, therefore, this new machine, which the manufacturers claim to be the lowest-priced 4-track Recorder so far, can safely be recommended to anyone who is considering changing over to the 4-track system or who perhaps is venturing into the medium of tape recording for the first time. **J.N.B.**

* * *

★
**THE NEW
 "BIB"
 TAPE EDITING
 ACCESSORY
 KIT**



Manufactured by **Multicore Solders Ltd., Multicore Works, Hemel Hempstead, Herts.** Price 18s. 6d. complete.

FOR a number of years the Bib Tape Splicer has led the field in this country, as witness its forming the basis of such editing outfits as the Scotch Brand and the M.S.S. Now Multicore Solders Ltd. who make the Bib, have launched their own complete kit, and besides the Splicer itself, this includes a dispenser roll of ½ in. jointing tape, 6 extra hard-back razor blades, 24 Bib Tape Reel Labels, and a Data Card giving the playing times for Standard, Long Play and Double Play tapes on 12 sizes of spool, for 5 speeds, and 1, 2 and 4 tracks. The Card also lists the approximate durations of 48 popular music classics.

Although the reviewer was already familiar with the Bib Splicer, it was decided to examine how a newcomer to editing would get along using only the items supplied in this kit. There were plenty of splicing jobs on hand—topping and tailing leader tape on to some spools which had become a bit "tatty" in use; cutting out lengths of leader tape from unwanted items to salvage the recording tape; fitting metal foil track-change tape, etc., etc.

To perform these operations it is simply a matter of laying the required cutting position of each tape section in turn along the main channel of the splicer. The left and right clamps are then lowered to hold the ends of tape, and

(continued overleaf)

Chitnis AUDIOGRAPH

STEREO AND MONO RECORDERS



**New name . . .
New (lower) prices**

To Chitnis Recorders using Bogen heads, goes the credit of proving that high quality recordings can be made at $3\frac{3}{4}$ ips using quarter-track heads and that a stereo recorder can be contained within an unusually compact case without sacrificing efficiency in any way. The mechanical and electronic standards of the Chitnis range are things that users quickly learn to rely on and recordings taken with these machines are outstandingly good from whatever source they are made.

In future, Chitnis Recorders will be known as Chitnis AUDIOGRAPH Recorders, and with this change of name we announce attractive price reductions. Quality, workmanship and materials remain the same.

KM22 Two-track, two speed ($3\frac{3}{4}$ and $1\frac{1}{2}$ ips) mono with reel of Tape, now **48 gns.**

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4-TRACK STEREO (Illustrated above). With paired inputs (micro/radio/PU) and outputs (5 and 15 ohm and low level) throughout. Pause, s/impose, etc. With reel of Tape. WAS 62 gns., now **56 gns.**

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the cutter (razor blade) drawn across the 45° slit (a right angle slit is provided also, for split-second editing e.g. on $3\frac{3}{4}$ i/s or slower recordings, where fractions of an inch are critical). After making the two cuts, and pulling away the surplus tape, the ends to be jointed are pushed together—not overlapping—held by the clamps, and covered with a cross-wise piece of jointing tape well pressed down. The cutter is then drawn along the lateral slits along the sides of the tape to trim the jointing tape neatly at the edges, and the job is done. An advantage of this method is that the jointing tape remains on the dispenser roll—it is not necessary to cut off lengths before hand—and is therefore used very economically.

Add a chinagraph pencil

For trickier editing assignments, such as cutting out announcements or false starts, and assembling recordings made at different times, the only further accessory required is something to mark the tape accurately—a Chinagraph pencil is commonly used. The owner of this useful new kit is then able to undertake any tape splicing job going. This Accessory Kit can therefore be welcomed as combining the virtues of low cost and efficient operation. **J.N.B.**

* * *

★
THE
CALL-BOY
ADD-ON
POSITION
INDICATOR
FOR TAPE
MACHINES



SOME method of locating with reasonable accuracy the beginnings and ends of recordings on tape is a virtual necessity, and this has now been realised by most tape deck manufacturers. It is fairly usual practice to incorporate some type of position indicator, and we usually find clock-type indicators on the more expensive machines and 3-digit counters on domestic machines.

Machines without indicators

However, quite a number of tape recorders possess no reliable indicator of the tape position, and it is to satisfy this that the new Call-Boy indicator has been produced. It consists basically of a 3-digit counter, built on to a large rubber suction cap and connected by a driving shaft to a three-prong rubber clip. The indicator can be affixed to any convenient part of the tape recorder's surface, but it is recommended that this be between 9-10 in. from the spool spindle. The rubber clip is simply pushed down on to the spindle of the drive spool (the supply spool, that is the left-hand spool when recording in the usual left to right sense). There is a re-set wheel on the counter, so that the reading may be returned to 000 when required.

The Call-Boy was tested on three different tape recorders, and in no case did it interfere with the free running of the tape drive system during recording, re-play or fast winding. It was found that during fast winding it is very necessary to adhere to the 9-10 in. spacing between counter and drive spindle, otherwise the driving shaft is forced to take up weird and wonderful configura-

tions, which are likely to be harmful either to the tape recorder or the Call-Boy or both.

Experiments were carried out to establish the difference between the law of the Call-Boy and that of the machines' own indicators, and it was found that, naturally enough, the three figure numbers on the Call-Boy are traversed at a progressively rising speed as tape is taken from the supply spool (moving the Call-Boy indications by 1-digit corresponds to one complete revolution of the spool). This law naturally makes the actual location of tape excerpts very much more accurate towards the end of a reel than it does at the beginning, but the fact that absolutely no slip occurs between the drive and the counter made it possible to rely much more on these indications than those on many machines. The law of the built-in indicators was found to depend on the manner in which the rubber counter drive was derived, but some degree of slip was found in each case.

Watch the spools

One very important piece of information must not be forgotten, namely, that the Call-Boy clip will only fit tape reels which possess three equally spaced holes around the spindle. This is found, for example, on Emitape 7 in. spools and Scotch Brand 5½ in. and 7 in. spools. Here is a useful tape accessory which carries out to the letter what it is designed to do. It costs 42s. 6d. and is manufactured by **Colton & Co. (Lapidaries) Ltd., The Crescent, Wimbledon, S.W.19.** J.N.B.

TAPE REVIEW

Fairy Tales from all over the World. Told by Melanie Scott. Fairy Tapes of four 5 in. reels, price 29s. 6d. each.

Tape One: The Snake Charmer, The Giants Stairs, Sadko, Alenushka and Her Brother. *Tape Two:* Ali Baba, Snow White Red Rose, TheTinder Box, The Loving Dragon. *Tape Three:* The Fisherman Story, The Ugly Duckling, Hansel and Gretel, The Little Bears' Xmas. *Tape Four:* Lazy Molly, The Enchanted Horse, The Little Goose Girl, Bottle Hill.

Looked at from a wholly mercenary viewpoint, tape records make a worthwhile investment for tape recorder owners, particularly when they are as inexpensive as those considered here. For 29s. 6d. you get four well-told fairy tales, plus some introductory and linking chat, and should the children tire or grow out of the stories you can always erase them and you still have a reel of tape (value approximately 22s. 6d.) and the recordings have cost you only 7s.

We have said that these stories are well told, and they are indeed pleasantly presented in the cheerful tones we have become accustomed to hearing in Children's Hour and "Listen With Mother". Their reception depends very much on the children; some are enthralled, but it must be admitted that some are liable to fidget after five minutes or so. The present reviewer found that the introductory talk by Miss Scott, after a single hearing, had to be skipped if youngsters were to embark on the actual stories with unabated interest. In view of this, one wonders if long introductions—however successful in broadcasts—are altogether a good thing in recordings. In particular, was it really necessary for Miss Scott to tell us at the end of Tape Four that she was "going away for a while?"

You may come back with the suggestion that we can erase the introductions if they have become over-familiar, or fast wind through them, and I would agree. So also will most people skip the copyright announcement intoned at the beginning of each tape. Why, if it is necessary to remind us that the recordings are copyrights, is this not printed on a label or on the box? Come to think of it, why are there no labels on the reels at all, so that if two tapes are taken out of the boxes at the same time, we are in danger of returning them to the wrong box? It is true that different coloured leader tapes are used on the tapes, but these are not cued on the boxes. These criticisms about points of detail in the presentation do not detract from the value of the stories themselves to the young audiences at which they are aimed. J.N.B.

BOOKS RECEIVED

The Walter Tape Recording Book, by Joseph M. Lloyd. 160 pages, illustrated. Published by Focal Press, price 12s. 6d.

Tape recording attracts a very wide range of individuals including a host of people who neither have nor ever wish to have, any technical knowledge. They get plenty of fun out of recording—or plenty of utility if used as a business or teaching aid—and the best tape recording book for them will have the following specifications:

- (a) absolutely no obscure engineering jargon.
- (b) enough illustrations to make every operation crystal clear.
- (c) ideas for extending the comic and serious use of tape.
- (d) references only to *their* tape recorder (or its near relations), and details of all accessories available.

These requirements are all admirably met, for owners of the popular Walter range of tape recorders, in this new book. Some two-thirds of the space is given up to an elementary step-by-step coverage of the make-up and connecting up of Walter machines—perhaps a little *too* elementary for the initiated e.g. on page 43 we attain to a full-page drawing and the caption: "*Getting Ready:* Take off lid (1), load with full spool of tape (2), connect to power socket (3), plug in microphone (4), and turn on—off switch (5)". There follows some excellent suggestions on Editing, Trick Recordings, Tape at Work and Play, and how to use the Walter Cine Stroboscope for sound/film synchronising. Throughout, the author has been at pains to treat each new subject without pre-supposing any prior knowledge by the readers, who can therefore progress by easy stages to the more advanced aspects of recording. The final chapters cover connecting up, and care and maintenance, and there is a Data Section describing all the Walter range of machines and accessories. No Walter-owner will want to be without this book, but it is my guess that many of them will subsequently be aroused to do further reading. J.N.B.

Tape Sound Effects Catalogue

WE have just received a copy of the catalogue of recorded sound effects and actualities for theatre and cine-film purposes issued by **Sound Recording Stratford-upon-Avon, 14 Hathaway Hamlet, Shotton, Stratford-upon-Avon, Tel. No. Stratford-upon-Avon 4144.** A very wide range of sounds is offered on these tapes, and each has an average playing time from 30 to 60 seconds, depending on the subject matter. All the usual effects needed for Plays and Documentaries are included, such as aeroplanes, helicopters, ambulances, bird song, cars, clocks, children playing, creaking doors, factory sounds, footsteps, gunfire, sea effects, thunder storms, trains and a useful selection of farmyard animals.

Each item is priced at 12s. 6d., and an additional charge is made according to the "dubbing" and editing time required to produce longer duration tapes should these be requested. The terms outlined in the catalogue call for receipt of remittances before despatch of the tapes, so that Producers of sound or film productions would be well advised to make early approaches to make sure that they have all tapes in time for rehearsals, etc.

Behind this new Tapesounds venture is Mr. Holmes Tolley, the well-known broadcaster, who has indeed used a large number of his own recordings on the air, and has supplied tapes to the Shakespeare Memorial Theatre, the B.B.C. Library, the Canadian Broadcasting Corporation, etc., etc. The catalogue is available free on application.

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Robuk RK3 ...	3 15 0	3 15 8	36
Minstrelle ...	4 2 0	4 1 11	39
Allegro ...	4 2 0	4 1 11	39
Spectone 171 ...	4 2 0	4 1 11	39
Victor ...	4 15 0	4 14 6	45
Spectone "161" ...	5 2 11	5 2 11	49
4-TRACK			
Argyll 4-T ...	3 5 1	3 5 1	31
Philips EL3541 ...	3 11 5	3 11 5	34
Elizabethan FT1 ...	4 2 0	4 1 11	39
Sound ...	4 15 0	4 14 6	45
BATTERY			
Clarion ...	2 15 0	2 12 3	25
Grundig "Cub" ...	2 16 0	2 14 6	26
Trav-ler ...	3 1 0	3 0 11	29
Clarion Mk. 2 ...	3 9 4	3 9 4	33
Minivox "B" ...	3 17 0	3 17 0	37
Walter (Battery/ Mains) ...	5 15 6	5 15 6	55
Ficord 1A ...	6 3 11	6 3 11	59
Stuzzi Magnetec ...	6 3 11	6 3 11	59

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MAINS 2-TRACK			
Grundig TK20 ...	10 19 0	2 8 6	52
Telefunken 75/15 ...	10 19 0	2 8 6	52
Truvox R6 ...	11 15 0	2 11 2	55
Brenell 3 Star ...	12 4 0	2 14 0	58
Grundig TK25 ...	13 2 0	2 17 10	62
Brenell Mk. 5 ...	14 4 0	2 18 11	64
Elizabethan Major ...	14 5 0	3 0 0	65
Grundig TK30 ...	17 12 0	3 4 6	72
Telefunken 85KL ...	17 19 0	3 12 3	79
Ferrograph 4A/N ...	18 1 0	3 14 6	81
Grundig TK35 ...	18 2 0	3 15 7	82
Reflectograph "A" ...	20 0 0	4 8 8	95
Simon SP/4 ...	20 0 0	4 8 8	95
4-TRACK MONAURAL			
Wyndors Victor ...	10 9 0	2 5 7	49
Elizabethan FT3 ...	11 11 0	2 11 4	55
Philips EL3542 ...	12 8 0	2 15 1	59
Grundig TK24 ...	13 2 0	2 17 10	62
Telefunken 76 ...	14 4 0	2 18 11	64
4-TRACK STEREO/MONAURAL			
Korting ...	14 8 0	3 3 4	68
Harting H.M.8 ...	18 6 0	4 0 0	86
Philips EL3536 ...	19 12 0	4 5 7	92

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our readers write

. . . about the Sound Mirror again

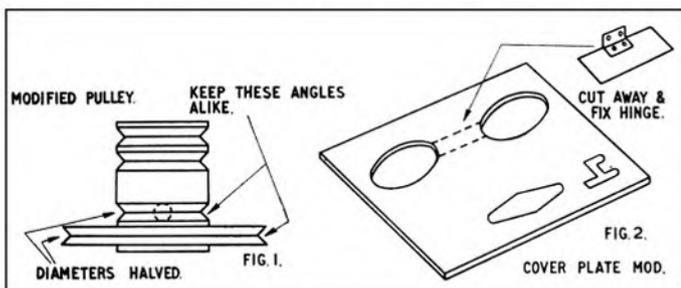
From:—C. F. Compton "Marill," Pilley Hill, Lymington, Hants.

Dear Sir:—I was very touched by the appeal in your November issue for modernising the Thermionic Products Ltd. "Sound Mirror".

I have no connection with this firm, but their engineers are my very good friends, and I am fortunate in possessing a "Sound Mirror", which with their help I have converted to double track recording and two-speeds. Thermionics, Ltd., have asked me however to state that they are not in a position to carry out these modifications.

In view of this I am preparing full details which with "gen" and drawings I hope to make available for about 2s. 6d. a time, and anyone who is interested and sends an S.A.E. I will contact when available. Meanwhile, Mr. Editor, if you can find room for the two-speed modification, that will help.

Remove the top cover of machine, and the driving pulley, which is mounted on the motor. First make sketch of way driving bands are fitted, then referring to fig. 1 you will see I have cut a second capstan driving groove just above the original one.



This groove should be half the diameter of the old one to obtain $3\frac{1}{2}$ i/s, and—most important—the groove cut with a lathe tool sharpened to the same angle as original groove. This new groove comes right over the grub-screw hole without any ill effects but will need cleaning up afterwards.

The pulley should be replaced slightly lower to prevent side thrust on flange formed by larger pulley. To avoid having to remove cover each time a change of speed is required, or worse still having to leave cover off, I have cut away centre of cover plate—see fig. 2—and hinged the cutaway piece to tidy it up.

I cannot detail the double track modification in a letter as will be realised when one considers,

- (1) Fitting of new half track head,
- (2) Removing erase magnet, filling hole and fitting half-track erase head,
- (3) Fitting erase oscillator and doing switch mods.

I am however in the fortunate position of being able to supply some of the required bits and pieces, a list of what is available will be included in "gen" envelopes. Hope this will help.

Yours sincerely,

Editorial Note: We have received a number of helpful replies on this subject, and would like to thank the senders for their enthusiastic assistance.

* * *

. . . about a bouquet

From:—F. J. Brundish, 150 Wednesbury Road, Walsall, Staffs.

Dear Sir:—I was interested in reading your Editorial in the November magazine, as the "after sales" service is often a subject of discussion among my friends. During the past year I have purchased the Elizabethan Essex and Princess from the Littleton Tele Service Ltd., at their branch at 113 Lichfield Street, Walsall, and I would like to state that they have there

a really interested and most considerate dealer who is only too willing to spend time in explaining the types of equipment and various recorders. Whether you can afford a first-class hi-fi system or the cheapest set on H.P. from that branch, I would say you would receive most earnest consideration.

Yours faithfully,

* * *

. . . about tape records

From:—M. Sherwood, 27 St. Georges Close, Windsor, Berks.

Dear Sir:—In the November issue of *The Tape Recorder*, Mr. W. Carter said that he thought the sizes of pre-recorded tape spools were misleading. He may be interested to know that Saga in their catalogue state the spool sizes and playing times.

Yours faithfully,

* * *

. . . about the Clarion

From:—D. Thorpe, 177 Fountain Bridge, Edinburgh, 3, Scotland.

Dear Sir:—In regard to the item published in the November issue, regarding the modification of the "Clarion", I wish you would publish and put your readers right on the subject that anyone with the "Clarion Twinset" will find it completely impossible to fit the plungers on the "Clarion", as the lid of the "Twinset" is obstructing the plungers.

Yours truly,

* * *

. . . about 4-track in Hongkong

From:—K. A. Watson, 42 Island Road, Repulse Bay, Hongkong.

Dear Sir:—I am delighted to see that 4-track tape-recorders are being introduced into Britain for I am convinced that the most satisfactory way of reproducing music in the home is by means of 4-track stereo tapes at $7\frac{1}{2}$ i/s.

As, however, I am still waiting for my ideal tape-recorder, it may interest readers (and perhaps manufacturers) if I listed my requirements, starting with a 4-track stereo one with the normal three speeds.

- (1) Designed to play at normal speeds in both directions.
- (2) Two sets of heads, so that tracks 1 and 3 record and play with the tape moving from left to right and tracks 4 and 2 with the tape moving from right to left. This avoids having to change the reel over from right to left after each track is ended.
- (3) A switching arrangement (using foil on tape) so that at the end of a track, the direction of travel changes and the next head comes into use automatically. This would be a great convenience, for it is a nuisance having to get up every half-hour to change reels. It would give 3 hours of oratorio or opera in stereo without going near the machine.
- (4) Mixing and superimposing facilities, and variable bias to reduce permanently a signal already recorded. Combined with

(continued on page 625)

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READERS' LETTERS—(continued)

the ability to record two tracks separately and then play them together (as for stereo) this would give a wide latitude for experiments in *musique concrète* and would be ideal for recording music and commentary for ciné films. While recording on the second track it should be possible to replay the signal recorded on the first track through the spare amplifier.

(5) Designed in separate packages (a) tape-deck only capable of best possible results with hi-fi amplifiers and speakers, (b) amplifiers (c) portable speakers.

(6) An arrangement for dubbing on the lines suggested by Mr. Squire (Oct., 1960). With two amplifiers, this would require an extra set of heads, some extra guides, and extendable spindles.

Except for the last, all these features are found in different tape-recorders, and there should be no great difficulty in combining them. I look forward to the day when such a machine appears on the market. *Yours faithfully.*

* * *

. . . about dubbing fees

From:—S/23617051 L/Cpl. Hall, R.N., 3 Higher Edn. Centre, B.F.P.O. 30

Dear Sir,—Mr. T. J. Masters of London (letter in November issue of your magazine) raised some interesting points regarding the dubbing of copyright material.

Like Mr. Masters, I am fully convinced that a very large percentage of tape recordists are criminals! Tapesponding, for instance, becomes rather dull if speech is used all the time, and it is inevitable that music will be introduced to relieve the monotony. Such music, need it be said, is rarely "self-made". I think that nearly every serious amateur would not mind paying a small annual nominal fee, for the privilege of being able to record what, when and how he or she likes without the fear of a Court Summons being instigated.

The various recording companies and members of the Musician's Union naturally have to protect their interests, but they cannot stop the advancement of tape recording and wealth of enjoyment it offers to the serious amateur and/or the man-in-the-street. Continued lack of a definite relaxation in restrictions, or means by which a recordist can legally, at a moderate cost, record what he sees fit to record, will only lead to abuse of the Copyright Act 1956 to such an extent that it will not be worth the paper it is written on. Surely it is far better that action be taken now, once and for all, to give the amateur recordist the freedom he deserves, to enable him to utilise his equipment, skill and ingenuity to the fullest.

I would be interested to learn of:—

(a) The approximate dubbing fees payable for recording from an ordinary commercial disc.

(b) Do such fees serve for only one disc, or any number of recordings of a particular make (or makes, where more than one company is owned by a Group, such as EMI)?

(c) What is the likely fee to be charged to permit the operation of a record request programme in such places as Blind Institutes and Hospitals.

Thanking you for the freedom of speech, if not the freedom of recording. *Yours faithfully.*

Editorial Note: *You will find the answers to some of your questions in this month's Sound and Cine feature. We are trying to find out the rest for you!*

* * *

. . . about poor salesmanship

From:—P. H. J. Pittam, 35 Kelso Road, Leeds, 2, Yorkshire.

Dear Sir:—With reference to your editorial in the November issue of "The Tape Recorder," I regret that I am unable to recommend a single dealer of tape recorders in this city.

I certainly would not advise anyone to purchase a recorder from the shop where I obtained my machine some two years ago, because of the poor service. I am at the present time searching for another recorder. I have visited three central retailers and am disgusted by the attitude of the salesmen. In the first shop I

asked to see a Philips EL 3541. I was shown one still in the packing case. No attempt was made to demonstrate the machine, and the salesman had no knowledge at all of the machine, and made no effort to sell it to me.

At two other shops I asked to see the new Elizabethan "Major." At the first shop after much a do the machine was taken out of the window and "demonstrated." No pre-recorded tape being available, I heard nothing. When I suggested that the brakes were poor I was told to "Give it a chance". The salesman just hadn't a clue, pressing any button in the hope that something would happen. At the next shop the "Major" was again taken out of the window and we went into a small room packed full of tape recorders, some of which to my knowledge have been in stock some 18 months. At this shop I finished up with the manager, a sales assistant, and a service engineer, none of whom appeared to have a clue about the machine, or recording, except the engineer. After listening to a tape made in the shop from a disc via a mic, I think, and with no attempt being made to find the instruction book, I asked if I could have the machine for an evening to test at home. This was refused, even though I have excellent references and know a little about tape recording. There was no effort to sell the machine to me.

One can understand why stocks of tape recorders remain unsold for months and even years while this appalling salesmanship exists. The above machine by the way was returned to the shop window to join six companions, all of which gather dust and still remain unsold since my visit a month ago. I am very sorry for the manufacturers, who always give every assistance when contacted, as they are let down all along the line by the retailers with their attitude of couldn't care less—take it or leave it salesmanship.

In conclusion may I finish with this latest little episode. I was asked to check on a Murphy record player by a friend of mine. I visited a Murphy dealer, the machine was produced, the usual excuse of no knowledge about the model was given, and a disc was found which was absolutely filthy and the machine was demonstrated. I am still speechless.

Please continue to supply full details and reviews of recorders etc., in your excellent magazines, *The Tape Recorder* and *Hi-Fi News*, for you are the only source of information which is reliable and sound. If any retailer is recommended to you in Leeds, I would be very pleased to learn of his name and address. *Yours faithfully.*

* * *

. . . about extension speakers

From:—Rev. Fr. E. P. Becher, 102 Sevenoaks Road, Orpington, Kent.

Dear Sir:—I was very interested to read W. T. R.'s comments in the current issue of *The Tape Recorder* regarding the use of extension loudspeakers. My recorder is a Telefunken 85 KL with 6 watts output at 4.5 ohms. This information is clearly stated in the instruction book. About nine months ago I bought a G.E.C. metal cone speaker and use this in an appropriate cabinet as an extension speaker. Without a transformer the metal cone speaker is rated at 4.5 ohms but a suitable transformer is sold by G.E.C. for use with outputs of 15 ohms.

To my mind the quality is as good as the ordinary non-technical user (such as W. T. R. and myself) would wish for, and many independent listeners are amazed at the good reproduction. The separate bass and treble controls on the Telefunken are a great advantage and I have certainly no intention of buying a "better" amplifier to use between my recorder and what is essentially a high-class speaker. *Yours faithfully.*

(continued on page 627)

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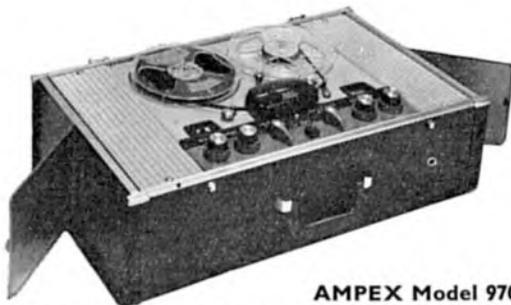
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READERS' LETTERS—(continued)

... about identifying friends

From:—L. G. Murray, "Cheverny", 12 Pavilion Road, Worthing, Sussex.

Dear Sir:—I have been a regular reader of your magazine since its first issue and can remember, with interest, what an exciting time that was when we all awaited the appearance of a tape recording magazine really to cater for amateurs.

I have been a user of magnetic wire, and later tape, since 1948, when in Malaya, I commenced exchanging talking letters with friends all over the world—many have become very close friends after so many years. One of these tape friends came to England last August to stay with me for a holiday. This Norwegian friend, Per Lundberg of Oslo and his fiancée, were to be met at London's Victoria Station one Sunday afternoon. As we had never met and only knew one another by our recorded voices, the problem of recognising one another on a busy railway station presented me with some concern. My friend did not appear to be worried—but then he could not possibly appreciate the large crowds that could be found on a British railway station during the holiday season.

However, I need not have been too worried, as I said that I would hold up at face level a copy of our magazine ("The Tape Recorder" of course!) and my friend being a reader (I send him my copies) instantly recognised me! It would be interesting to know if fellow readers have had similar difficulties in meeting friends, if so, then I can thoroughly recommend my method.

My latest recorder is a "Philips" stereo 4 track (EL 3536) and I cannot recollect there being a full report in "T. R." or "Hi-Fi News," at least not these last three months since I have had this "Philips." I would appreciate if you could tell me if this recorder will be the subject of an early report.

Yours faithfully,

The Philips EL 3536 is reviewed by James Moir in next month's issue. (Editor.)

* * *

... about a broadcast

From:—Alan R. Hunt, "Winton", Palmers Road, Wootton, Isle-of-Wight.

Dear Sir:—In the latest B.B.C. programme, "Sound," John Borwick gave a very interesting talk on my favourite topic, tape with slides, and I was very interested in his comments concerning the bugbear of copyright, and I heard mention of a non-copyright music catalogue. Please pardon my ignorance, but is this catalogue freely available to anyone? Or is it only for professional users? If this catalogue is available to all and sundry, would you please let me have details concerning price, and from whom it may be obtained.

Yours faithfully,

John Borwick replies as follows: The non-copyright music to which I referred in the Broadcast is listed in the "Catalogue of Recorded Music" of Boosey and Hawkes Ltd., (Recorded Music Department), 295 Regent Street, London, W.1. It costs 2s. 6d., and I should imagine they would appreciate 6d. extra to cover postage. I must point out, however, that other music publishers supply non-copyright recorded music too, notably Francis & Hunter Ltd., 16 Soho Square, London, W.1, and The Conroy Recorded Music Library, 10 Denmark Street, London, W.1. Finally, I recommend you to get in touch with the Institute of Amateur Cinematographers Ltd., 8 West Street, Epsom, Surrey, to which a subscription would soon repay itself in advice, "know-how" and other services. This subject is also discussed on page 609.

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All advertisements for the February issue must arrive not later than **January 6th.**

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