

the TAPE RECORDER

PRICE 1/6

FEBRUARY 1961
Vol. 3 No. 1

INCORPORATING "SOUND AND CINE"



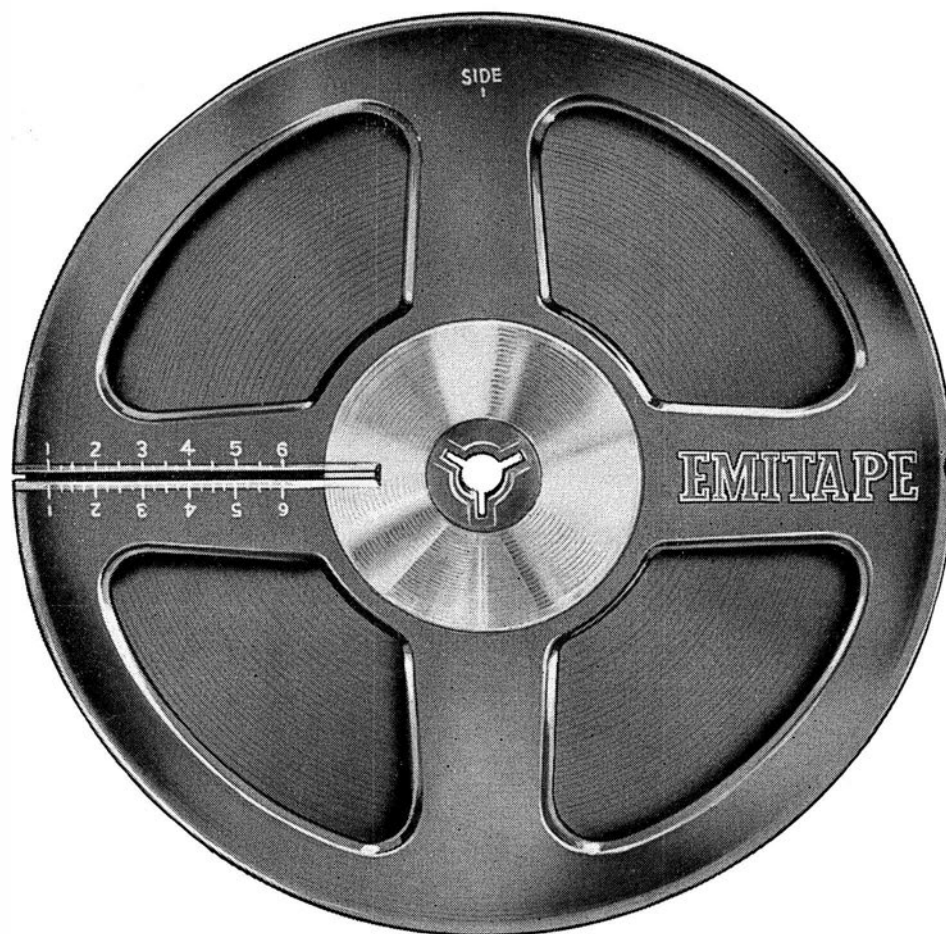
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- Field Trial of the Grampian Parabolic Reflector
- Making your Tape Recording Pay
- Building a Clockwork-driven Portable Recorder—Part 3
- Putting the West End on Tape
- Sound and Ciné—the Use of Jazz Sound Tracks
- Tape Recorder Workbench
- Reviews of Two Stereo Recorders

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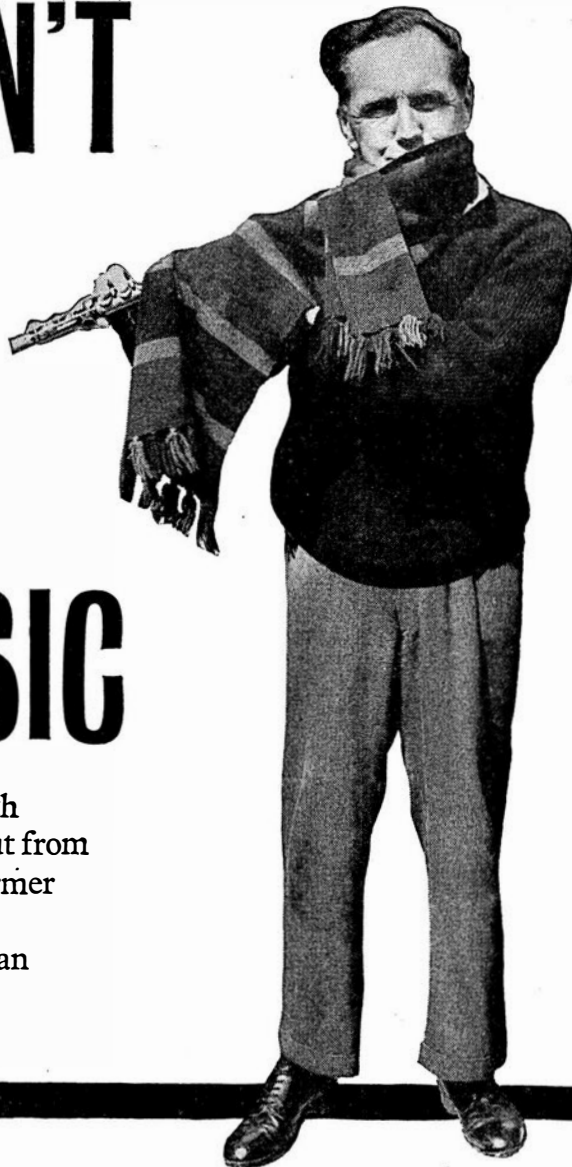


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sales have never formed part of the Ferrograph policy. How little the Ferrograph has changed in external appearance can be seen from the photographs above. Obviously its basic design is as sound today as when introduced 12 years ago. At the moment 4-track heads, slower tape speeds, cassettes and the like are in the news. We are, of course, fully aware of these developments and their possible advantages. We are also aware of their disadvantages. But Recording is our business and the unceasing efforts of our engineers will continue to be focused upon perfection in recording rather than attempting to develop a Tape Recorder as a competitor to the gramophone.

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R30 66 GNS. with meter record level indicator

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EDITORIAL

IT is probable that a number of our readers subscribe to a magazine called *Which?*: indeed, we hope that the number is considerable and that it will increase still further as a result of this gratuitous publicity, for the idea behind the magazine is a fine one. It is published by the Consumers' Association, which is a non-profit-making body and completely independent financially. Its monthly reports are liable to cover almost any type of product that the average shopper might buy, and have so far ranged from Aired Driers, Anti-freeze and Aspirin, at one end of the published cumulative index, to Travel sickness pills, Wool-washing and Zip fasteners at the other. The method is to buy a representative range of products in each category "over the counter", to have them appraised, and to publish the findings. In view of the fact that the public are far too often taken for costly financial "rides", through over-stated claims, inferior workmanship and materials, and misleading announcements, any organisation which is conscientious enough to tackle these surveys boldly, factually and without bias, deserves all the support it can get; and it is gratifying to learn that the Consumers' Association is well on the way towards a membership of a quarter of a million, in slightly over three years of activity. However, all that said in its favour, we now feel obliged to devote the remainder of this monthly editorial column to a criticism of its main topic in the January number of *Which?*, for that topic happens to be **Tape Recorders!**

Our news item on page 12 outlines the survey which *Which?* undertook. Its own introductory paragraph states that some 180 models are made by 85 manufacturers, ranging in price from under £20 to over £250. Our first comment is that, in these circumstances, a selection of a mere 16 must make a fair assessment virtually impossible. Next, selection was based upon price—a reasonable enough basis at first thought, for many people may be expected to buy with a price bracket in mind; but to have selected a price bracket of from £30 to £85, thus including the fringe of the semi-professional at one level, and the half-way point between "domestic utility" and "serious user" at the other level, made the assessment even more complicated. As a result, in our opinion, the published deductions from the appraisals have provided anything but the useful "purchasers' guide" that they might have yielded; and in some respects they have even made certain recorders look a better buy than others which, beside them, look sadly deflated.

It is easy to pick other peoples' work to pieces, so let us instead suggest how *Which?* might have more usefully planned their initial selection. This cannot undo what has been published, but it may perhaps make the still undecided purchaser read the report again, with reservations. First, by the question, "what do you want a recorder for?—(a) amusement (b) quality recordings for one purpose or another, as

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specified (c) serious work". Second, by coupling these requirements with a further breakdown, plus explanations, into groups—e.g. those built around different standard deck types. Third, by linking these two breakdowns with price brackets. Then—on with the Motley!

One example from this would tell Mr. A that, for amusement in the home, choice embraced 20 types built around standard deck X, from which samples 1, 2 and 3, at prices so-and-so, should show up individual workmanship accordingly. Tests showed so-and-so. Undeniably, *Which?* chose a tricky subject and (we think) they came unstuck. Better, maybe, to have taken three bites at the cherry. Knowledgeable readers will have seen the oddities. Unfortunately, many of the puzzled ones will not.

COVER PICTURE

MUSIC for the television feature programme on the Boer War recently screened by Granada was conducted by composer, Wilfred Josephs. With the aid of a Venner Transistorised Digital Clock he was able to keep an eye on the read-out times to ensure that the musical theme fitted exactly the split second timing of the film sequences.

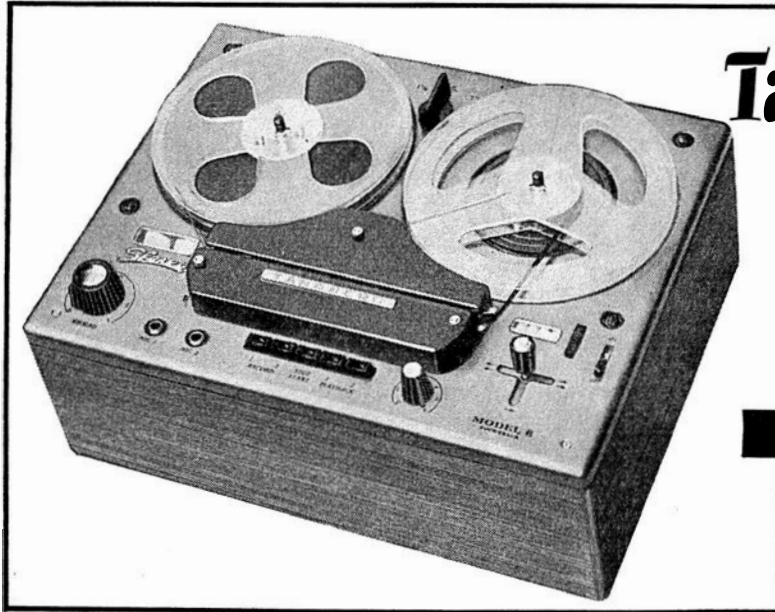
NEXT MONTH

AN exciting story of a school tape recording and film-making adventure is featured next month, and there will be in addition another article on *Sound and Ciné* by Richard Golding. A particularly interesting set of equipment reviews is scheduled and there will be a field trial of the A.K.G. D88 moving coil stereo microphone. Followers of the battery driven portable recorder series by Mr. A. Tutchings will be looking forward to his next instalment which covers the question of microphones and matching. In addition there will be all our usual features including a full coverage of news and details of Tape Club activities.

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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HOW WE PUT THE WEST END ON TAPE (I)

THE West End is one of my usual and favourite haunts, and queuing for the gallery of one or other of London's theatres is quite a routine Saturday evening occupation. Hence over the years I have had good opportunity to observe the London buskers of all types. And so I thought it might make an interesting feature if we took the battery portable out one Saturday, got some on-the-spot interviews and recordings, and put them together in the best way we could.

The day we had arranged to go out rained all the morning, but luckily cleared up about sixish, so we packed our bits and pieces together, put the new batteries in the portable—something always to remember—put some film in the camera, and we were away.

Looking for "characters"

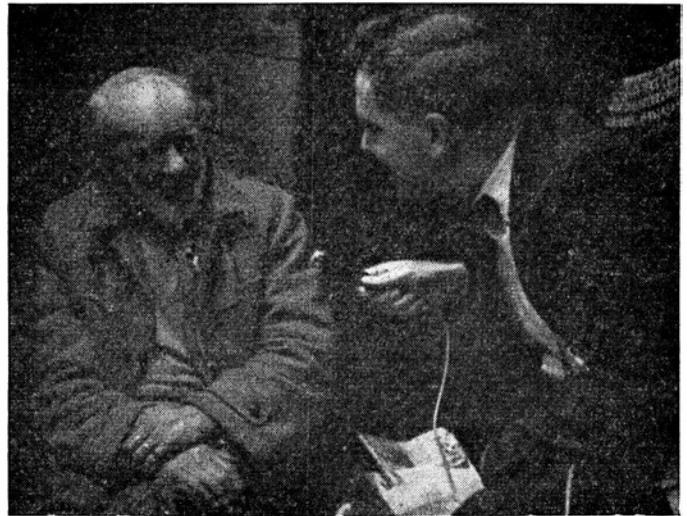
I thought I knew most of the places where we could find such entertainers as we wanted, but—just our luck—that particular evening they weren't there. It may well have been because of the threatening rain, but certainly we had to stroll round quite a bit before we found anyone. At last we came round to the gallery queue for the Garrick Theatre, where Harry spotted a chap going round with a hat. So we waited a bit to see whether he would start again doing whatever it was he had been doing before, but no luck. So Harry took the microphone, and we went down to him for a chat—and came up against our first refusal. We did manage to get one or two words from him, but as soon as he realised we were not professionals and were not prepared to pay, he would say no more.

But nothing daunted, we thanked him, and strolled on our way into Leicester Square. Here we spotted a woman singing to a queue outside the Leicester Square Theatre, so we advanced "at the ready". But no sooner had our microphone hove in sight than she deliberately stopped, came over to us, and told us she would not carry on unless we went away "with that thing"—failure number two.

The match-seller

By this time we were turning into Lower Regent Street from Charles II Street, and coming up towards Piccadilly Circus, we came across an old chap sitting on the pavement under one of the lighted shop windows, selling matches. Once again, out came the microphone, and we went up to him. Harry knelt down and asked him why he found it necessary to sell these matches and other such oddments, and we gathered that he found it very difficult to live on his pension, hence his necessity to do this. It was, in fact, this aspect of the conversation which directed the course of our final tape, as will be seen later.

Before we started the interview there were very few people around, few of which stopped, but as soon as the recorder and camera appeared, and we started, an enormous crowd collected, as if from nowhere. I have never seen a crowd collect so quickly before, and this is rather an important point to remember. Passers-by who see such goings-on will always stop out of interest—we were hearing comments such as "You from



Persuading a nocturnal match-seller to "say a few words".

T.V.?" and "What's this? The Candid Mike?"—and they can very quickly form a crowd which is obstructing.

In order to interview this chap, who as you can see in the photo was practically lying down, Harry had to hold the mike pretty low. When we replayed this recording at home, we were puzzled at first by a hum which was very apparent and annoying. Finally we had to conclude that the mike was picking up the sound of the passing traffic transmitted through the pavement, as such noises didn't appear on any other of our recordings.

From Piccadilly we pushed our way through the theatre crowds up Shaftesbury Avenue, where we hoped there might be one or two entertainers. But once again we were out of luck—surprisingly so, considering that the second house was queuing to go in. Going through these crowds, Harry still had hold of the mike, and there were plenty more comments about "Candid Mike" again, but no-one worth recording, when outside the Columbia Cinema we chanced across a very odd type. He had two carnations in each buttonhole, and was waving about a large bunch of the same flowers. The first thought that crossed our mind was that we'd run across Candid Camera ourselves. "Maybe", said Harry "It's a disguised Bob Monkhouse trying to see what people's reactions are." So hiding the recorder and camera as best we could, up we went.

Lessons learnt

So up to this point we had discovered quite a lot. Firstly, be careful in your approach to a potential interviewee, he might be microphone-shy; so don't go rushing up and point it at his head like a revolver. Secondly, look for a location which will contain a crowd if one gathers, without holding up traffic and passers-by. Thirdly, if you are photographing as well, watch carefully your lighting conditions.

At last we managed to part company with this chap, and walked a bit further up the road to make our notes. Such notes, of course, were all made on tape. These consisted of information gained on location, and our own impressions of the interview while it was still fresh in our minds. In point of fact, we had such little material in the end that we could more or less remember everything, but I would suggest that if you are having a long session of such recording, you make this verbal note-taking a standard procedure. It eliminates the need to wander around with a notebook as well as everything else, and trying to write on your knee or lean on someone's back. Also you have your notes together with their appropriate recordings. I recall another time I was out with the portable when I took written notes—and left them on the train coming home!

We had not gone twenty yards after this when a fire-engine came rushing up; Ahah! A Scoop! A Scoop!—Huh! Some scoop it was, too. We rushed up to the engine, only to watch it pull slowly into the fire station!—We plodded on. . . .

In the second part, I shall describe the remainder of our evening, and deal with the putting together of the material.

HERE AND THERE AND

Which? Reviews Tape Recorders

THE January 1961 edition of *WHICH?*, the magazine devoted to comparative analyses of various domestic products carried out by the Consumers' Association Limited, includes test reports on 16 Tape Recorders in the middle price group of £30 to £85, and also two other machines, the Gramdeck and the Sagatone. Notes are included on the workings of a Tape Recorder and what a prospective buyer should bear in mind when making his choice.

CA's tests were designed to find out the recorders' quality of recording and replay, whether the models were likely to be troublefree in use, how easy they were to operate and maintain, whether they were safe in use and whether they could do more than straight recording and replaying. Each recorder tested by the Consumers' Association was "aged" for the equivalent of 100 hours' use: in most cases this meant 77 ageing "cycles" each consisting of record-rewind-replay-rewind sequences.

In each of the four Tables that accompany and illustrate the *Which?* report on tape recorders, a comparative ranking is given for the machines tested. This ranking sums up and compares the results under the four specific headings (Quality of Sound, Reliability, Versatility, Ease of Operation and Maintenance) and their various sub-headings. It is not possible for us to reproduce all the findings here, but we note with interest that the Cossor CR1602, The Philips EL3542 and the Simon Ministrelle were all given very good assessments.

Which? is published every month, and is posted direct to all members of the Consumers' Association. Any member of the public or any organisation may become an associate member and so receive *Which?* The associate membership fee of £1 covers the subscription to twelve consecutive issues of *Which?*, starting with the current one.

* * *



This photograph shows how a British tourist brought back—on his Grundig Cub recorder—some of the sounds of Tangier.

New Tape Competition

"HEAR yourself on Radio Luxembourg" is the theme of a brand new idea in sound radio shows by Currys, the Television and Radio dealers. They are inviting the public to send them tapes made at home on the entrants' own tape recorders. Any type of recording will do—from baby's first word to a full symphony orchestra. The accent is on making a recording good enough and entertaining enough to be played over the air. Every Sunday, from January 8th, eight selected tapes will go out on one of Luxembourg's top winter shows to over three million people. Over one hundred tapes will be broadcast and Currys are offering both a seven-day free trial of any tape recorder for potential buyers during the period of the competition and free spools of tape to all entrants, giving advice on recording by Norman Paul, the winner of the 1960 Amateur International Tape Recording Contest, introduced by Mr. R. D. Brown, Editor of "Tape Recording Fortnightly". Macdonald Hobley will be in charge of the show and judging will be by leading experts in the talent-spotting and tape recording industry.

E.M.I. and Philips, two leading tape and tape recorder Companies, are giving their full co-operation. Prizes will include auditions with major recording companies, T.V. Sets, Radiograms, Premium Bonds and Butlins Holidays. The grand final will be at Butlins newest venture, the Winter Social Club at Bognor Regis, which has a membership of over 12,000. Entry forms available at any one of Currys 325 branches, or direct from: "Make a Tape" Currys Limited, 77 Uxbridge Road, Ealing, W.5.

* * *

BASF to have new distributors

THE formation of a new trading company to handle the distribution in the United Kingdom from January 1, 1961, of BASF Magnetic Recording Tape has just been announced. The new company, called BASF Chemicals Limited, will have its offices and warehouse at 5a Gillespie Road, London, N.5. (Telephone. CANonbury 2011) where suitable premises have been acquired.

Commenting on the new arrangement, Mr. B. Wilson, the Company's General Manager, said "The company's aim will be to give the best possible service and maintain the closest contact with both wholesalers and retailers, and a strengthening of our field representation will be the first step to achieving this."

* * *

A Telefunken 85KL Stolen

A Telefunken Model 85KL tape recorder, serial no. 824443 was recently stolen from one of the representative's car. Any reader receiving information regarding this machine should contact **Welmec Corporation Ltd., 147/8, Strand, London, W.C.2.**

* * *

Tape Record Catalogue

SAID to be Britain's first comprehensive catalogue of pre-recorded tapes, the new 42 page catalogue of **Messrs. Teletape, 32, Edgware Road, Marble Arch, London, W.2** lists no less than 800 titles.

The Recording Companies represented include: His Master's Voice, Columbia, Saga, Music on Tape, Bi-Tapes, Audio Fidelity, Covertapes, Everest Tapes, Omegatape, Vox, Westminster, Tutor, and the catalogue is divided into two main sections monaural and stereophonic. As noted in these columns recently, Teletape have now opened a tape bar where shoppers listen to tapes by means of listening booths, prior to purchase.

EVERYWHERE

We understand that an unprecedented interest is being taken in this new catalogue, which costs 2s. 6d. This amount is refundable on the purchase of tapes.

* * *

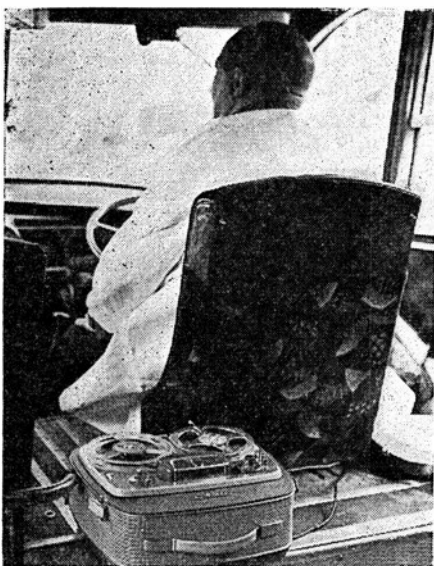
Non-Copyright Music

OUR use of the above term to describe the very useful atmosphere and general music recordings available from a number of music publishers has unfortunately lead to a certain amount of confusion amongst readers.

It would have been more correct if we had referred to this music differently, although the term "non-copyright" is used colloquially by film and broadcast producers alike. The true position is that the publishers, such as Messrs. Boosey & Hawkes, etc., control the copyright, both with regard to the music and the recordings of the music. They are therefore in a position to sanction the use of these recordings for film and tape production of all kinds, and are ready and willing to do so. Naturally enough, however, they depreciate the use of this term non-copyright, and we ourselves have promised to drop the term from now on.

* * *

Tape in a Bus



When Mr. William Harris, a self employed coach driver of Sevenoaks, Kent, read that the American Greyhound Coachline had installed tape recorders in their fleet of coaches to keep the customers happy on long journeys, he decided this was just the thing for him.

The experiment proved a great success, both from Mr. Harris's point of view and his passengers. He runs his Grundig TK20 with the aid of a convertor from the coach battery.

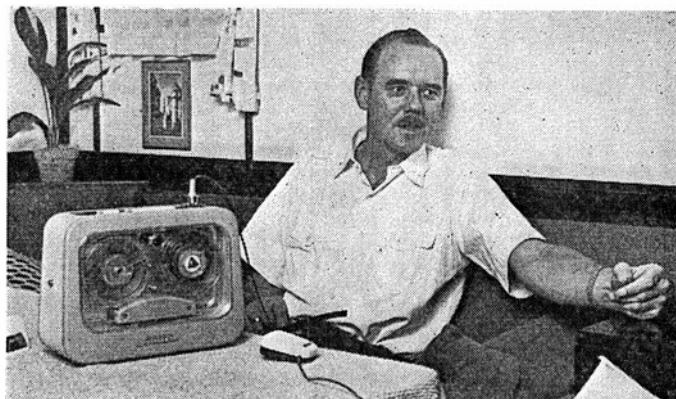
* * *

A Stuzzi "Nets" the News

THIS is a picture of a newspaper scoop. A scoop made with the aid of a Stuzzi Magnette. The relaxed man talking into the tape recorder is Captain Rutkowsky; his ship, the *Weissese*, had been fired on by the French near Mers El Kabir, severely damaged and forced into port. After being searched from bow to stern, she was allowed to continue on her way to Liverpool.

The attack had made the world's headlines, and journalists waited at Liverpool to interview the Captain. But dense fog and heavy seas kept captain and journalists apart—except for the two men with the Stuzzi. They hired a tug, went out to sea, and interviewed the Captain on board. For the German paper *Bunte Illustriete*, they had a world scoop.

Why had the French fired on a German ship 15 years after the end of the war? Captain Rutkowsky explained that the



Relaxing after an international "incident", Captain Rutowsky is interviewed by reporters on board his ship. (See Stuzzi story below.)

French authorities had suspected his ship of carrying arms for the Algerian Rebels, and had ordered him into port at Mers El Kabir. He was more than 50 kilometers out to sea at the time, and, being well outside territorial waters, he refused. Two cruisers were sent to fetch him, and, after firing on his ship, forced him into port. The extensive search that was then made revealed that the *Weissese* was carrying Russian grain for Britain.

* * *

More News from Wyndsor

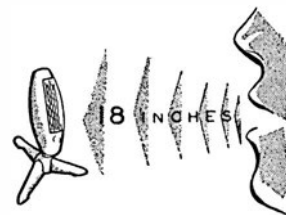
AS well as being shipped all over the world, Wyndsor tape recorders are now becoming well known on the high seas. The Wyndsor Recording Company have just been informed by one of their main distributors, Messrs. Winter Trading Co., Ltd., that Wyndsor tape recorders are serving on three famous luxury liners. One is installed for the pleasure of the passengers of the "Queen of Bermuda." Another is connected up in the radio room of the "Andes" (at present on a Mediterranean cruise) where it is used for relaying news and entertainment throughout the ship. The third one is in the "Pig and Whistle" Bar of the "Mauretania." All these tape recorders were supplied by Messrs. W. S. Downer of 111, Bernard Street, Southampton.

* * *

TAPE TIPS — by Guy

— No. 4 —

Keep well
back from the
microphone



THE best results are obtained if the microphone is placed about 18 in. to 2 ft. from the mouth of the speaker and further still away from a singer (not crooner—the latter purposely makes use of a close technique). The microphone should be hung over a table or mounted on a stand supported by a piece of thick felt or sponge rubber. Professional microphone tables have cellular tops that cause little sound reflection or absorption. You will find by experiment that the sort of surface covering the table top makes quite a difference to the quality of the recorded sound.

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. 8s. 6d. net.

NEWS FROM THE WORLD



Scoop on a Tape Recorder

FAME overnight came to boffin Mr. L. J. Hills of Belvedere, Kent. It happened on December 14th. Tuning in his communications receiver over the short-wave amateur bands, he picked up by chance an S.O.S. message from the Amateur Radio Club in Addis Ababa announcing the attempted *coup d'état*. The message was repeated several times and Mr. Hills was able to record it on his Grundig TK 9 tape recorder. Although quite unaware of its significance, he telephoned the Ethiopian Embassy and daily press, and thus became the first man to break the news to Great Britain.

Mr. Hills, who has always been keenly interested in radio and electronics, was one of the pioneers engaged in research in the high tension section of cathode ray tubes and since the war has carried out research on electronic music, as well as patenting a number of inventions. Needless to say his tape recorder plays a useful part in much of his work.

* * *



Mr. P. J. Kingston, headmaster of the Stanground V.C. Primary School, Peterborough, who submitted the winning tape in the Schools Section of the British Amateur Tape Recording Contest, receives the Grundig Shield from Mr. Alan Stableford, Secretary of the Federation of British Tape Recording Clubs.

Norman lends a hand

THE children of the A.B.C. Minor's Club at the Regal Cinema, Staines, are the biggest-hearted bunch of kids you could wish to meet. They heard about the Rushton Home for blind children with additional handicaps and immediately decided to organise an appeal, amongst themselves, to send the children at Rushton a Christmas present. A tape recorder, they thought, would make a marvellous gift and they decided that they would try to raise the money to buy the Stuzzi Junior 4M.

To give the appeal a really flying start, 13-year old Paul Dysart, the Appeal's Secretary, asked Norman Wisdom to lend a hand. He wrote to Norman and asked him if he would record an appeal that Paul could play to the Minors Club. Norman agreed, and so Paul and one of his young helpers, 8-year old Janice Stradling, came to London with the machine they hope to present to Rushton and in between rehearsals for his Palladium pantomime "Turn Again Whittington", Norman recorded a message to the children of the Regal Cinema, Staines. Said Paul afterwards "It was wonderful. I am now sure that we'll manage to send Rushton the Christmas present we want to."

TAPE CLUBS

Notes and News

A recording of Christmas carols made at Christ Church, Dover by six members of the **Dover and District Tape Recording Club** was replayed at Buckland Hospital and St. Margaret Bay Old Peoples' Home. Church Bells recorded at Lympne introduced the programme which lasted for twenty minutes. The patients requested that further visits should be arranged for future months and this is now being organised. Further information of the Dover Club will be sent on request from Mr. G. Newey, 2 Westcliff Cottages, Westcliff, Nr. Dover.

* * *

At the meeting of the **Chesterfield Tape Recording Society** held on the 21st November, a play was produced which had been adapted by three members of the society. Three other members had previously recorded sound effects for the production and these were synchronised on to the mastertape. At the meeting to be held on the 12th December, a guitar instrumentalist is to be recorded and it is hoped to use a great variety of recorders. Mr. Parrington will also attend this meeting to demonstrate the range of Walter tape recorders. Details may be obtained from R. J. Darby, 191, Highfield Lane, Newbold, Chesterfield.

* * *

After the first meeting of the **Northampton Tape and Ciné Club** last February, it was decided to try and find a regular meeting place and the secretary managed to rent a disused stable loft. The place turned out to be in a very poor state of repair with holes in the roof and walls thick with dust. However, members volunteered to assist in the rebuilding and, after six weeks of hard work, a projection room had been built and the complete building decorated. Since then a film set has been built, and two films are already being produced. Already thirty members have enrolled, which again proves that sound and cine combined, greatly assists the membership of clubs.

OF TAPE

Norman Wisdom (see story opposite) cheerfully lent a hand to help a neighbourly project thought up by the children of the ABC Minor's Club at the Regal Cinema, Staines. The photograph shows him recording an "appeal" message on the Stuzzi Junior 4m.



The Club is very proud of the work done during the past year, and the secretary, Mr. J. Harrison of 36 Spring Gardens, Northampton, would be pleased to supply any information to other clubs.

* * *

An open meeting was held at the **Bournemouth & Poole Tape Recording Club**, and forty-five people attended, some owning tape recorders and others contemplating purchasing a recorder. There were several members' machines on show, and during the evening a few new members were enrolled, and since then many enquiries have been received from other people interested in joining the club. A demonstration was given of the new Uher Stereo tape recorder by Mr. J. Finlayson, and all members were impressed with the quality of reproduction. The price of the machine including the two speakers, which are separate from the machine but fitted in the carrying case, is £150. A party from the Bournemouth club visited Mr. A. Tutchings, the inventor of the Gramdeck. They were able to see the prototype of the tape recorder which is being described in a series of articles in *The Tape Recorder*. This recorder proved to be an excellent machine, and at least as good as any portable recorder on the market today. The price when fully constructed will be in the region of five to six pounds. The secretary, Mr. H. R. Jones, 442 Poole Road, Branksome, Poole, will forward details of the club to any reader interested in joining the club.

* * *



Amateur photographers are quick to see the advantages of coupling appropriate sound recordings to their colour slide shows. The group in the picture are using a Liesgang projector and Telefunken recorder.

The Club room of the **Walsall & District Tape Recording Club** has been changed, which has necessitated altering the weekly meetings. These are now being held each Thursday commencing 8 p.m. in the Town Mission, Stafford Street. During the Festive Season, members were asked to produce "Live" Carol tapes—a small fine being enforced for no tape. The previous one of this nature was on "Bonfire Night," and members had an enjoyable time listening to the bangs, etc. Past meetings have included talks and demonstrations on Microphones, Tape Editing, Stereo, Recording from Radio and Disc Recording, these being given by various members. Details of future meetings can be obtained from the Secretary, Mrs. Joan Walford, 41 Mill Road, Pelsall.

* * *

Mr. L. W. Saunders of E.M.I. Ltd. and Mr. Parrington of Walter Instruments Ltd. have visited the **Bristol Tape Recording Club** giving talks on Emitape and Walter recorders respectively. Two documentary programmes are being prepared entitled "The Bells of Bristol" and "Christmas Steps", the latter being one of the oldest parts of Bristol with steps from top to bottom, and quaint shops on either side. Both of these recordings have to be completed by February 15th when it is hoped to replay them at a club meeting. Meetings are held at the Ship Inn, Redcliffe Hill, Bristol, 1. Details of times etc., can be obtained from Mr. M. E. Hollier, 27 Dean Lane, Southville, Bristol, 3.

* * *

After her success of interviewing Anna Neagle recently, Miss D. Harris, chairman of **Eastbourne Tape Recording Club**, went to Worthing a few weeks ago to record a similar interview with the star of "The Warm Peninsular", Andree Melly. She appeared very interested in the tape club's monthly visits to the old people's home, and recorded a special message for them. Mr. Knight of Cosmocord visited the club to give a lecture and demonstration of microphones, and replayed a tape which contained recordings made with the new stereophonic microphone. On the previous weekend, members visited Dr. Barnardo's Home.

* * *

On December 15th, members of the **Leicester Tape Recording & Hi-Fi Club** visited the Rugby Tape Recording Club and helped to compile a tape to send to the Bournemouth Club. On the following evening Mr. J. Buckler and Mr. D. Derbyshire replayed a recording made at Rugby for members who were unable to make the trip. To end the evening's entertainment a carol service which had been recorded in the Town Hall Square was replayed, giving members a preview of what was to follow later in the month. Secretary, P. Starrie, 56 Minehead Street, Leicester.

* * *

As a result of a talk given by Mr. C. Hooker on producing a play on tape, the **Friern Barnet Tape Recording Society** set

TAPE CLUBS—NEWS AND

out to put this into practice. Having selected a suitable play, cast the actors, appointed the technicians, and with Mr. Buszard as producer, they prepared for the first recording. Several attempts were made to obtain the correct results, but very little was achieved during the evening except it was found that, for a project of this nature, every person operating equipment must be 100% familiar with the instrument whatever it may be. However, since this meeting, the recording procedure has been simplified which will enable members to obtain better results next time. Many other interesting items have been included in Club nights recently; these included a visit from Mr. Parrington of Walter Instruments Ltd., tape recordings from the Northallerton and Eastbourne Clubs and a visit to the London Palladium to record an interview with Russ Conway. Meetings are held on the second Friday and fourth Thursday of each month. Further details can be obtained from the secretary, Mr. A. S. Andrews, 13 Hartland Road, Friern Barnet, N.11. Telephone No.: ENTerprise 7972.

* * *

The 1960 Annual General Meeting of the **Crawley & Sussex Tape Recording Club** resulted in the present committee being re-elected for a further year. Requests for a full sound effects tape for their next production has been received from the Crawley Playhouse Company, together with help for the County Scouts Association with their Gang Show next March. Mr. Alan Stableford visited the club recently and gave an interesting account of the International Recording Contest held in Amsterdam. Selections were played of tapes entered by the French, and Chinese. Many interesting meetings have been arranged for the future months and details of these can be obtained from Mr. R. C. Watson, 32 Southgate Drive, Crawley.

* * *

The **South West London Tape Recording Society** at their mid-October meeting recorded a reply to a letter received from the Dannevirke Recording Club, in New Zealand. On the 2nd November the Chairman, Mr. D. Killick, gave a talk on splicing and editing and Mr. P. Lewis gave a demonstration of mixing and dubbing. After the demonstration members tried their hand at this with amusing results, not always intentionally. On the 16th November a Mystery meeting was held which turned out to be a carol practice. It was felt that members might be reluctant to attend if advised beforehand, however it was a great success. The local church organist played carols on the church organ which was recorded and the Society obtained permission

to collect when carol singing to the recorded tape, for donations to the Royal Putney Hospital for Incurables. Information of future meetings can be obtained from Mrs. V. Killick, 6, Disraeli Gardens, Fawe Park Road, London, S.W.15.

* * *

Two teams of 4 members, each armed with a Grundig "Cub" and a Minivox went out to record sound effects for use later in the evening at the **West Herts Tape Recording Society**. Cars, footsteps and other sounds were recorded, including a brick being thrown through a window of a disused car. A programme was made up on their return, telling of a milk float, which was stolen and ended up crashing through a shop window. Mr. Peter Rogers visited the club from the **R.A.F. Tape Recording Society**, and brought with him his Vortexion which he is taking with him to Aden. He requested members' views on four-track machines, the result being some for, and some against, but the members against seemed to have far more to say than the members for. Visitors will always be welcome at this club and details of future dates can be obtained from P. Holloway, 29 Fishery Road, Boxmoor, Hemel Hempstead, Herts.

* * *

Since the exhibition sponsored by the **Wakefield and District Tape Recording Club** earlier in the year, membership has reached a total of thirty-two. Mr. Pope, the owner of a recording studio, gave a lecture and demonstration of recording techniques in professional studios. At a later meeting, members visited the Wakefield City Fire Brigade to collect sound effects of alarms, sirens and water pumps. These will be stored in the club library for any future productions requiring such sound effects. Meetings are held weekly on Mondays at York Street Hotel from 7.30 to 10 p.m. Details can be obtained from Mr. G. Larder, Holmfirth House, Bradford Road, East Ardsley, Nr. Wakefield.

* * *

A tape slide show entitled "A Year in Leamington Spa" was presented by Miss Eileen Jones one of the founder members of the **Leamington Spa and Warwick Tape Recording Society** held at the Town Hall, Leamington Spa, on December 7th. One hundred and thirty full colour pictures were shown, accompanied by on-the-spot recordings. Among the general shots of Leamington were pictures of the town's well-known Riverside Youth Centre taken on the opening day, the Veteran Cycle Rally, and the parade on Remembrance Sunday at the War Memorial. The Society meets on the first and third Wednesday of every month; times and meeting venues can be obtained from the Secretary, Mr. C. Carter, 6 Central Avenue, Leamington Spa.

* * *

On Thursday evening December 22nd, the **Rugby Amateur Tape Recording Society** held their "Social Evening" at which the Christmas Draw winning tickets were drawn. A wonderful array of prizes for the lucky winners were on display for everyone to see. "Mine Hosts" Mr. and Mrs. S. Haskins had provided an excellent buffet which was consumed during the evening with much enjoyment and Mr. J. O. Bannister presented them with a plant on an ornamental stand, together with flowers, as a small token of appreciation from the club members. Two new members joined on this evening and were welcomed into the Society. They were Mr. and Mrs. Davis—parents of member Mr. Terry Davis. On Christmas Eve, Mrs. V. Tilcock and Mr. M. Brown went along to the Hospital of St. Cross with their



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PICTURES

portable recorders to record the Christmas Carols around the wards of the hospital. This was by kind invitation of the Matrons Miss J. L. Ryde. At the hospital they were met by Mr. G. Dawson and Mr. J. Campden and their American member Mr. N. Woerner. The service started in the chapel with Matron addressing everyone beforehand and wishing all a Happy Christmas. Afterwards Matron invited all to have coffee and mince-pies with them and to hear part of the recording. She then gave everyone a chocolate novelty from the large Christmas Tree before they returned home, very tired but very happy after an enjoyable evening well spent.

A tape received from the **Jersey Tape Recording Club** by the **Dartford and District Tape Recording Club** resulted in a visit to the Mayor of Dartford, Councillor F. L. Brown, J.P.,



who kindly gave permission to record a reply to the Jersey Club. Arrangements are in hand to record the opening of the Dartford to Purfleet Tunnel, due to be opened in 1962, a sound picture of Dartford, and the history of Dartford. Meetings are held every fourth Tuesday at the Dartford Public Library and new members are invited to attend. The secretary is Mr. E. H. Foreman, 117 Westgate Road, Dartford, Kent.

At a meeting of the **West Middlesex Tape Recording Club** at Southall on November 24th Mr. K. Phipps was elected Chairman to replace Mr. F. Wescott who has had to resign not only from the club, but also from the Federation and all activities regarding tape recording. After the election, members had an interesting film and talk by Mr. P. Merrick, Director of Wilmex Ltd., the Irish tape distributors in this country. Also on view was a variety of tapes and other accessories including the splicer. Two spools of double-play tape were presented to the club for use in their hospital and message service. Further details of the club can be obtained from Mr. H. E. Saunders, 20 Nightingale Road, Hampton, Middlesex.

Thirty-three members gathered at Rotherham's Social Club on Thursday November 24th for what proved an interesting evening for the **Coventry Tape Recording Club**. A comparative newcomer, Mr. Lucas, brought his Grundig T.K:35 demonstrating the quality obtainable when reproduced through an external speaker. After the interval Mr. Lucas removed the recorder from its case and continued to play tapes to demonstrate the interior workings. Finally two quiz tapes were played. No



The photograph shows Mr. A. Cartland, secretary of the **Derby Tape Recording Club** at the annual dinner and social evening sharing a joke with Mr. and Mrs. Hunt and Mr. Nichols (right).

all-correct papers were received but the winner was rewarded with a prize. Details of future meetings can be obtained from Mr. R. V. Reynolds, 1 Thurlstone Road, Radford, Coventry.

The **Tape Recording & Hi-Fi Society of South Africa** have decided to combine the Tape and Hi-Fi sections of the Society and hold one combined General Meeting a month. A live recording session at the last meeting was preceded by an interesting demonstration from Mr. D. Worman on the art of placing the microphone in relation to the artistes and so obtaining a perfect balance. After the interval, the enthusiasts who had brought their recorders were to be seen giving their machines last-minute adjustments and it could be seen that much had been gained from the previous lecture. The music was provided by Miss D. Allen, soprano and Mr. P. Brassens, horn player with Mrs. Worman accompanying on the piano. The whole programme was recorded and will be replayed at a later meeting to compare the results of different machines.

It is proposed to form a Tape recording club to cover the **South Birmingham Area**, with its headquarters in the Selly Oak, Northfield districts. Any person interested in joining should contact Mr. D. Osbourne, 75 Millmead Road, California, Birmingham, 32.

The Annual General Meeting of the **Urmston & District Tape Recording Club** was held on December 5th. Four new members enrolled, bringing the total membership to fourteen. A permanent meeting place has been found, and from January 1961



"Cassettes take all the fun out of tape recording don't you think?"

A to Z in AUDIO

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by

G. A. Briggs



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CLUB NEWS (continued)

members will meet at the 1st Davyhulme Scout Group H.Q., dates to be announced later. The club recorded a complete carol service at St. Clements Church, Urmston to be replayed at the Ann Challis Old Folk's Home at Christmas. Any readers requiring further information are invited to write to Mr. W. Firth, 29 Kirkstall Road, Davyhulme, Urmston, Lancashire, who will forward all the necessary details and an invitation to attend the next meeting.

* * *
It was stated in the December issue of *The Tape Recorder* that the World Tape Pals Police Round Robin Tape Group, was no longer in existence. However we have just been informed by Rhona and John James, the newly appointed representatives of W.T.P. that this statement is incorrect, and this has been confirmed by Harry Matthews in Dallas, Texas. It has been announced that Mrs. Cloe Gilmore is now organising the section and is at present visiting this country. Mrs. Gilmore is an ex-Police Officer and the wife of a Police Officer. Mr. and Mrs. James have formed a small committee to run the organisation in this country, and already some new members have joined. Official Mailing Labels have been printed and these are available priced five shilling per hundred with a minimum order of fifty. It is hoped to circulate all members with a news letter in the New Year, but until this is printed details of the World Tape Pals can be obtained from:—R. & J. James, 45, Boundary Road, Colliers Wood, London, S.W.19.

* * *
In response to a request from the **Ellesmere Port T.R. Club**, Mr. K. Hartman of the **Ilford & District Tape Recording Society** recently visited Grays and recorded a personal message for a lady in an old people's home in Cheshire. The tape has been sent to the Ellesmere club, who will play it to the recipient. The Society will shortly own its first piece of equipment—a Stentorian ten-inch speaker and tweeter unit which will be built into a console cabinet by a member. Mr. J. Hunter was elected Chairman at the last meeting to replace Mr. P. Ager who has moved to another district. New members are invited to attend any club meeting which is held every Tuesday at the R.A.F.A. Rooms, Cranbrook Road, Ilford. The secretary, Mr. D. Bolton, will be pleased to supply any further information. Letters should be sent to 13 Gloucester Road, Manor Park, London, E.12.

* * *
Committee member Mr. M. Clarke devised and presented a very instructive and entertaining lecture called "Sound—Its properties and effects" to members of the **Leicester Tape Recording & Hi-Fi Club**. The audience were invited to determine the velocity of sound in air using relatively simple apparatus. Beat frequency and complex waveforms were also discussed and demonstrated. Mr. Clarke, with the aid of oscilloscopes and other instruments hopes to discuss some further aspects of sound in the New Year. As sound recordists, the members feel this talk together with the forthcoming one will provide a deeper insight into the subject of sound itself. Members recently had the pleasure of recording an interview to be played by the Aden Forces Broadcasting Association for a man stationed at the R.A.F. base at Khormaksar at Christmas. Further information regarding meeting dates can be obtained from the Secretary, Mr. P. Starrie, 56 Minehead Street, Leicester.

* * *
Since their formation, the **Singapore Naval Base Tape & Disc Club** have been quite busy collecting sound effects for a stage production of "The Yeomen of the Guard". A new feature, which will be a series of tape programmes for the patients of the British Military Hospital in Singapore is scheduled to begin early in 1961, and relatives of servicemen in this Hospital may send requests to the secretary who will see that the message is passed on. Clubs in this country can assist by recording messages to patients from relatives and friends and sending the tapes to the secretary, Mr. R. S. Hellyer, c/o S.A.S.O., R.N.A.D. H.M. Naval Base, Singapore 27. Airmail letters should be sent as correspondence by sea mail takes a considerable time.

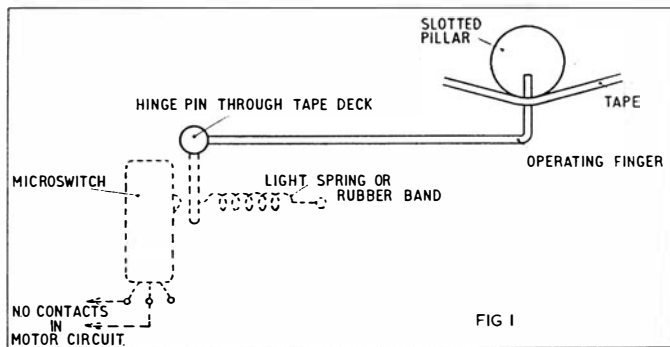
... tape recorder workbench

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

No. 20—USEFUL MODIFICATIONS

A NUMBER of readers have queried the possibility of using their tape recorders in a secondary capacity, as an amplifier for use with a radio feeder unit or record player without recording. In certain cases this is simple enough as an "amplify" condition is arranged for in the normal control switching. All that is then necessary is the connection to the correct input and selection of the correct tape recorder condition, all of which should be adequately explained in the instruction booklet.

On some of the continental style machines, having all push button control, the same result can sometimes be achieved by



a particular push button setting, though this is not always described in the instructions. The manufacturers, or their representatives in this country, are usually quite helpful in response to enquiries from owners of this type of equipment.

In both the foregoing examples the "amplify" condition of the tape recorder is specifically one in which there is something approaching a straight line response, as against the high degree of bass lift used for replay, or treble boost for recording. In a machine designed solely to perform its normal function, it is likely that the amplifier must be in one of these two conditions. Moreover, it is probable that connection can only be made to the amplifier via the input sockets when the machine is in the record condition, which, incidentally, means that the bias oscillator will be in use. If yours is a machine where one valve performs the function of output stage during replay and bias oscillator during recording, there is, quite frankly, nothing to be done. Where, however, the internal loudspeaker can be used for "monitoring" your recording, it is possible that the machine can be used in this way. If the amplifier controls are separate from the tape deck controls nothing further need be done, except decide whether the quality of reproduction is really good enough.

In some cases the motor runs as soon as the mains are switched on, or when the equipment is set to record. Here there would probably be no reason why a simple switch should not be fitted in the motor circuit, unless it were going to mean that the pressure roller and capstan are left under pressure without rotating. This would introduce the risk of pressure roller deformation and subsequent "Wow". By and large, unless you have the "amplify" condition referred to already available I believe it would be better to invest in a kit to build a small "Gramophone" amplifier as a separate unit.

Automatic Stops

The second subject that I would like to consider this month has also been raised on two or three occasions by readers. This concerns the fitting of an automatic stop device to stop the machine when it comes to the end of a reel of tape. The advan-

tage of such a device lies in the fact that the machine may be safely left, either recording or replaying, without the fear that the tape will whip itself to shreds, when it runs out.

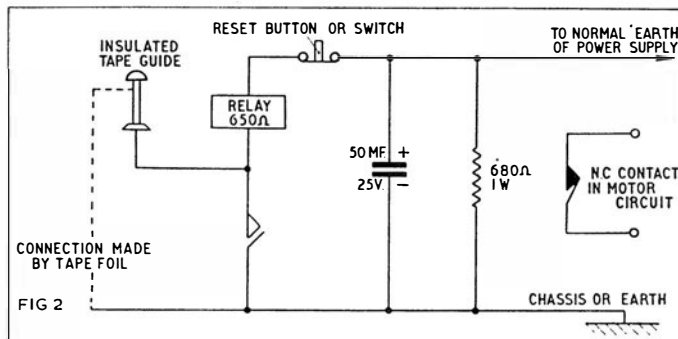
Two systems of auto stop are in fairly general use. One is more or less mechanical in operation, while the other utilises the metallic foil found on most reels of tape these days to complete an electrical circuit. There is little to choose between these systems in use. The mechanical system has the additional feature, rarely required these days, that it will stop the motor in the event of a tape breakage. The choice really lies in whether you are better at fitting or wiring!

Fig. 1, showing the mechanical arrangement, should be self explanatory. The finger is normally held out of the slot in the additional tape guide by the tape itself. When the tape has run out, the finger moves into the slot, under the action of the spring, and releases the microswitch, breaking the motor circuit. The whole assembly should be lightly constructed, and should move freely in the pivot bush through the tape deck. The end of the finger, where it bears on the tape, will need to be radiused off so that it will not "snag" on any splices in the tape. A suitable type of micro switch that is small and should be easy to accommodate is the Bulgin S520. The price should be under 10s.

The Electrical System

The electrical system, the circuit of which is given in fig. 2, derives its power from the HT current of the tape recorder amplifier. Connection of the network should be made to the chassis on one side, and on the other to the earth connection of the power unit, which has first to be removed from the chassis. In the case of power units with valve rectifiers, this will come from the transformer. Where a metal rectifier is used, the lead in question will come from the rectifier.

The operation of the circuit is as follows:—under normal conditions, the return HT current of the amplifier, probably about 40 mA, will develop a voltage across the resistor and maintain



a charge in the condenser. As soon as the tape foil completes a circuit between the insulated tape guide and some metallic part of the tape deck, the charge is passed to the relay coil to provide a high initial energisation in order that it shall operate quickly. The relay coil is now in parallel with the resistor and shares the current which should be sufficient to maintain it, a normally open contact being used for this purpose to replace the tape foil.

This circuit has to be electrically reset as shown, though it may be possible to incorporate this with an existing switch or tape deck push button. Suitable relays would be Varley type VP or Magnetic Devices type 596, cost about 25s. In both instances, in the case of multimotor decks, it would probably be advisable to connect the motor contact in a common line so as to cut them all.

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WHY NOT MAKE YOUR TAPE RECORDING PAY?

By C. F. CARR _____ Part I

COMING developments, now being widely discussed, in the field of local broadcasting hold promise of new opportunities for those who prepare themselves to use the tape medium on serious creative lines. Recent exhibitions, intended primarily for the specialists, have focussed public interest on current achievement in the techniques of tape recording. It has now become clear that the time is ripe for the specialists, especially the enthusiastic amateurs who take tape recording seriously, to look carefully at the possibilities which lie immediately ahead. It is simply stating the obvious to say that we are still on the fringe of achievement in the creative and artistic uses of tape recording. Accepting that, the important thing is to get some sort of idea as to where we are going in this interesting field.

Recording progress

Some of the most likely and not the least significant developments will stem from progress in other spheres. The miniaturisation of tape recorders is one illustration of a process which has now become almost a universal law. I write from over 30 years' experience of recording, dating from the early wax cylinder days. Before and during the war it was possible to make some beginnings, crude and unsatisfactory though they were, in actuality recording, by putting on wax through the medium of domestic radio the broadcast speeches of great personalities like Winston Churchill. This was not at all easy and required a lot of patient experimenting in the positioning of loudspeakers and voice tubes. An early recording made in this way was the abdication speech to the nation by Edward VIII.

Wax recordings made at that time were quite audible on the head-phone play-back—but the more they were played back the less audible they became!

Apart from these primitive efforts at the permanent capture of topical events, I used the wax cylinder method for recording some millions of words in literary and journalistic work. It was a method then quite advanced in its field and was of incalculable value and help. For over five years I ran a monthly magazine largely by dictaphone. An editor much better known, Herbert Casson, had already set the example in this way and proudly announced the fact on the cover of his own famous magazine.

The scope of tape

It was amazing, even in those pioneer days, that so few busy business people were willing to accept the help of the early dictating machines. When, back in the late 20's, I was daily using a dictaphone in one of the largest towns in the south of England, it was the only one being serviced there! Looking, in recent trade displays, at what the latest machines can offer, the main cause for surprise is not the progress achieved in the past two or three years, but the limited use which industry and the British business man are still making of them. Few modern inventions have a greater market potential. In newspaper production, for instance, there is still a score of practical uses to which tape recorders could be put.

While there is a considerable emphasis to-day on tape recording as a medium for entertainment, especially in the home, it is now apparent that there will be great opportunities for its profitable use in new spheres of creative activity which must open up soon. Tape enthusiasts who prepare to take advantage of them could easily find a spare-time interest developing into a full-time occupation, or even something approaching a new profession.

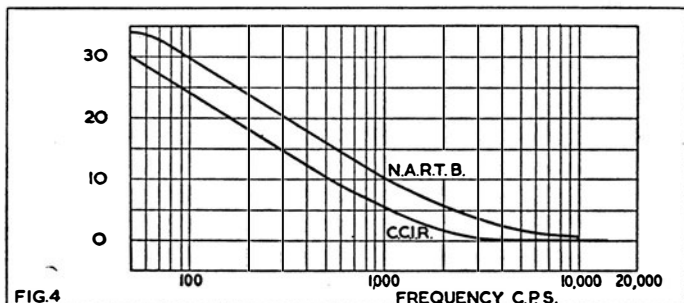
NEXT MONTH: The opportunities in local broadcasting.

Readers' Problems

C.C.I.R. versus N.A.R.T.B.

Dear Sir:—As there are various standards in general use, and in lieu of the relevant curves, I would like to have some indication as to the actual difference in sound if wrongly matched.

(1) I have ascertained that my tape recorder (Telefunken 85T)



Replay characteristics for the two standards now in use.

is equalised to N.A.R.T.B. standards at both $3\frac{1}{2}$ and $7\frac{1}{2}$ i/s. Are Columbia and H.M.V. tape recordings correctly reproduced? Or should use be made of the tone control (on Leak pre-amplifier RC/PA/U)?

(2) I am considering purchasing a tape reproducer for dubbing, etc., and it happens to be equalised to C.C.I.R. (or N.A.B. to order) at $7\frac{1}{2}$ i/s, and N.A.B. at $3\frac{1}{2}$ i/s. Will it be aurally unsatisfactory, or is N.A.B. an abbreviation for N.A.R.T.B. Thank you in advance for any information you may offer.

Yours faithfully, D. G., Brighton, Sussex.

It would be a mistake to over-emphasise the audible effect which will arise from playing tapes recorded to N.A.R.T.B. standards. However, there is in fact a slight difference, and you will be able to calculate this by referring to the re-play characteristics, as shown in the diagram, which we have taken from the article by James Moir on reviewing tape recorders in the February 1960 issue of The Tape Recorder.

In essence it is only necessary to introduce a very small amount of top lift on a N.A.R.T.B. machine to get fairly close to the C.C.I.R. standard. N.A.B. in this case can be read as N.A.R.T.B.

* * *

Abrupt Endings

Dear Sir:—I recorded a record from my radio set, but unfortunately stopped the tape a few seconds before the end of the record. When I played back the tape, this abrupt ending was immediately noticeable. I would therefore like to know whether there is any way I can slowly fade out the record to cure this abrupt finish.

I am sure there are many other readers who would like to do this.

Yours sincerely, R. H., Manchester.

There are at least two ways of successfully superimposing a fade on something which has already been recorded. Firstly, it is possible, by introducing a variable resistance in the erase head circuit, to produce the effect known as "fade erase". The way in which you would use this would be to switch the machine to the record position, with no inputs connected, and gradually increase the erase current so as to fade out the recording. Fade erase was the subject of A. Bartlett Still's TAPE RECORDER WORKBENCH feature in our June 1960 issue. Naturally, any modifications made to the erase circuit require to be done carefully and by a knowledgeable type.

The second method is to slice the tape over 6-12 inches, using a razor blade, and join this to a similarly tapering piece of blank tape, using a length of jointing tape. You ought to experiment on some waste tape before trying this rather difficult operation. Finally, and perhaps most simply, you should get in touch with another tape recorder owner and copy from one machine to the other, fading down at the appropriate point.

Tape Amplifiers

Dear Sirs: I am on the verge of building a tape recorder from separate units using a Wearite Tape Deck and utilising amplifiers and pre-amplifiers of proprietary make. I was thinking in terms of the Quad make of amplifier and pre-amplifier. I am a little uncertain, however, as to the exact requirements that are necessary for this job. I want to both record and re-play.

If I do buy a Quad amplifier and pre-amplifier, what other equipment is necessary and could you please list the makers of such equipment. I shall be pleased to hear from you at your convenience.

Yours faithfully, A.P., Paisley.

The Acoustic Quad amplifiers are justly popular in Hi-Fi circles and have given performances which place them in the highest class. However, to provide recording and re-play facilities with the Wearite Tape Deck it will be necessary to augment these amplifiers with a special tape amplifier unit. These must provide pre-amplification and equalisation for recording and reproduction, as well as the oscillator which supplies high frequency bias and erase currents. A number of suitable tape amplifiers exist, including those manufactured by Cape Electrophonics Ltd., Lowther Manufacturing Company, Heathkit, and Sound Sales Ltd.

* * * Full Track Recordings

Dear Sir:—Could you please help me to solve something or tell me about this. A friend of mine in the Merchant Navy has just come home from sea. On the trip he called at New York and Panama. At these two ports of call he got hold of one or two tapes that had been recorded on.

When I played them over on my recorder, a Simon SP/4, the sound was backwards, that was running from left to right the normal way. I couldn't understand why, so I let it run on until the right hand spool was full and changed tracks and played it back—right to left. That was the right way and of very good quality, but it was only one track using the full depth of the tape.

Do they use that type of a head over in the States or are they special heads? I wonder if you could help me on this matter, as it was the first time I've heard anything about things like that.

Yours faithfully, J. R., Preston, Lancs.

There seems to be no doubt that the tapes to which you refer have been recorded on what is termed a full track machine, i.e., one in which the recording, playback and erase heads scan the full $\frac{1}{2}$ in. width of the tape. This system of recording is widely used in professional circles here and abroad, but is not found on domestic tape recorders, principally for reasons of tape economy.

As you will know, $\frac{1}{2}$ track recording is practically universal with $\frac{1}{4}$ track now becoming increasingly popular—again for reasons of economy in tape playing time. As you have discovered, of course, it is quite possible to replay full track recordings on a $\frac{1}{2}$ track machine, and of course this has been found to be the case also by many people purchasing $\frac{1}{4}$ track machines and replaying $\frac{1}{2}$ track recordings quite satisfactorily.

* * * Slower Rewind Wanted

From:—R. B. Coomber, 63 Woodland Road, Tunbridge Wells, Kent.

Dear Sir:—Could any of your readers help in the following problem. I have a recorder which has a very untidy rewind, which I have established is due to the speed at which this operation is carried out. If this speed is cut by about one-third, the tape winds on much more evenly. Is it possible to slow this rewind operation down, either by increasing the resistance of the opposing motor, or cutting the volts to the rewind motor. Has anyone tried this scheme? The tape guides have a considerable amount of play, as they have been machined a good 0.025 in. wider than the tape. This undoubtedly assists the untidy rewind, but must have been done for some reason by the manufacturers, so I have hesitated to modify these.

Yours faithfully,

Sorry, we can't help, but perhaps some kind reader will oblige, or issue an awful warning? (Ed.)

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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
Grundig TK20 ...	4	8 6	4	8 2	42
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					
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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
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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 ...	14	5 0	3	0 0	65
Telefunken 85KL ...	17	19 0	3	12 3	79
Ferrograph 4A/N... ..	18	1 0	3	14 6	81
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Wyndor 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 ...	11	11 0	2	11 4	55
Telefunken 76 ...	14	4 0	2	18 11	64
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By A. Tutchings

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PART 3 — SWITCHING AND EQUALISATION

BEFORE proceeding to equalising and switching circuits, I have to make good two omissions and two corrections in the last article. The first concerns the head connections; in the present recorder, or for general use with transistors, the head windings should be connected in parallel as shown in fig. 1a. The lead out wires should not be bent or strained in any way, as they connect to very fine wire windings within the head which may be broken if the connections are roughly handled. The ends of the lead out wires should be tinned, and the ends of the flexible wires which lead to the amplifier should be bared

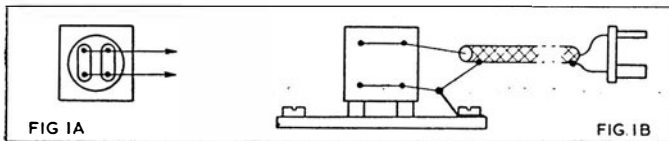


Fig. 1. Correct method of wiring the record/playback head.

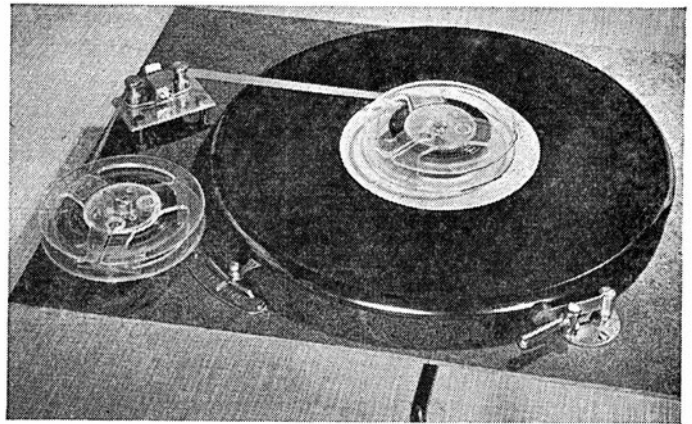
and tinned over a length of about one quarter of an inch; the head wires are then bridged and soldered as shown in fig. 1b. The bottom lead should also be grounded to the head mounting plate by means of a soldering tag under one of the securing screws. If a screened lead is used, the screening should be connected to the bottom head leads and to the plate.

A screened lead is not essential in these circuits and a tightly twisted pair of fairly fine wires will do equally well. It is also not very clear from the photographs that the two pin input and output plugs have one large diameter pin and one smaller diameter pin so that the plug is not reversible. The earth lead should be wired to the large diameter pin and, in the same way, the large diameter sockets of the two connectors on the breadboard should also be connected to the common earth line.

Battery Precautions

The other point I forgot to mention was that if transistors are interchanged for testing purposes, the battery circuit should first be broken before removing a transistor from its socket. Failure to do this can result in severe magnetisation of the head when T1 is removed, due to a heavy surge of charging current through C1. If a head does appear to have become magnetised, resulting in a heavy hiss on playback with partial erasure of the tape being played, then the head should first be plugged into the recording socket, with the bias oscillator in position, and the bias switched on once or twice. If this does not cure the trouble, connect the head directly to the Ext. LS terminals of any radio set, turn up the programme signal to a very high level and then reduce it gradually to zero by turning down the volume control. If you have access to a bulk eraser or a head defluxer, the head may be demagnetised by switching on the degausser, bringing it near to the head face, and then withdrawing it gradually to a distance of several feet before switching off.

Finally there were two condensers wrongly identified in last month's article. In testing the bias oscillator I said that C5 may be shunted by a larger condenser up to 500 pf; I should have



This photograph illustrates one of the drive arrangements which requires fewer modifications to the turn-table itself.

said C6. I also said that a LS signal could be injected across C3; this should have read "between the positive side of C3 and earth"—see paragraph headed **Output Jack** in this article.

Equalising

As mentioned in Part 2, the playback quality will be relatively poor with no equalisation, and in addition the bias feed condenser C5 is effectively shunted across the output socket which reduces the high note response still further. If the output is taken from the junction of R5 and C3, i.e. the other side of R5, the high note response will be improved but the bass response will still be poor due to the falling response of the tape and head output at low frequencies.

The equalisation circuit shown in fig. 2 introduces a loss of 15dB, or 5 to 1, at 1 Kc/s, but the full output is available at very low and very high frequencies. The combined head, amplifier, and equalisation circuit response is almost exactly to C.C.I.R. characteristic at $7\frac{1}{2}$ i/s, and a test tape moved across the head at this speed gives an equalised output of 0.1 volt R.M.S. which is level within plus or minus 2dB from 60 c/s to 10,000c/s. If the insertion loss of this equaliser is too high, and enough output to feed the recorder or amplifier is not available, the alternative circuit of fig. 2b may be used with

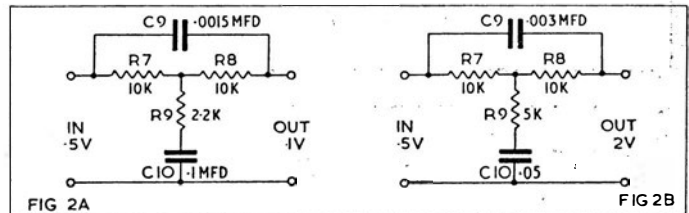


Fig. 2. Two versions of the equalisation circuit, giving approximately the C.C.I.R. $7\frac{1}{2}$ i/s response. The right hand circuit introduces less loss.

a 6dB improvement in gain, but with a slight restriction of range at either extreme of the sound spectrum.

As recording is done at a variable tape speed, with a fixed amount of recording pre-emphasis, the playback equalisation should theoretically be changed as the tape speed increases towards the end of a reel. In practice, the change in quality is barely noticeable even with a wide range microphone. In fact a small change in the angle of the microphone will often result in a bigger quality change than that due to the fixed equalisation. However, for the purists, and those who want to experiment in playback equalisation, R8 may be made variable with a maximum value of 20K. With the full resistance in circuit the high note response is at a maximum, and this setting should be used near the start of a reel. Halfway through the reel, where the speed is approximately $7\frac{1}{2}$ i/s, the resistance should be set to 10K, and near the end of a reel, where the high note response from the recording is at a maximum, the resistance should be reduced to a lower value. C10 affects the bass

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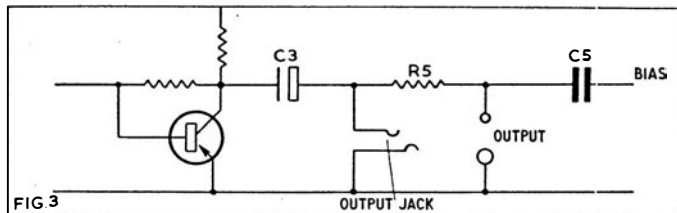
BUILD THIS RECORDER—(continued)

response, and if a variable bass cut is required for voice recordings C10 may be shunted by a variable 200k resistance.

As the equaliser output feeds the high impedance input of a tape recorder or amplifier, the equaliser components and controls should be screened, and there are many advantages in building it into a separate screened box—a tobacco or cigarette tin would do very well—this has the further advantages that modifications to the equaliser do not involve the portable recorder proper, and the equaliser is available for any other input to the static home recorder which may benefit from bass and treble lift. For instance many record players are sadly lacking in bass and treble, and if the Ext. LS. terminals of such a unit are fed through the equaliser, the response can be much improved for recording. In the same way many of the battery operated dictation quality recorders can be made to sound quite passable by a little equalisation.

Output Jack

A jack socket, or any other convenient type of outlet socket, should be connected between the junction of C3 and R5 and earth as shown in fig. 3. The equaliser input may be plugged into this jack whenever it is desired to listen to or re-record a programme which has been recorded on the portable recorder. This jack, however, serves a host of other purposes; it can be used for earphone monitoring of microphone or tape playback in the field; it will also serve as a high level input for recording from the Ext. LS. terminals of a radio set or another recorder. For this kind of recording, monitoring is aural, i.e. the LS signal to be recorded is set to normal listening level and the output



plugged into the portable recorder jack. The signal passes through the constant current resistor R5 to the head where it is mixed with bias from T3. Such recordings are probably the best source of test material for initial bias, recording level, and equalisation adjustments, and will serve as a reference when microphone recordings are attempted.

Switching

“Play”, “Off”, and “Record” switching is best done with a 4 pole 3 way wafer switch. Two of the poles are used to switch input and output of the two stage transistor amplifier, and the remaining two poles are used to break the main HT supply and voltage to the bias oscillator as and when required. Fig 4a shows the switching circuit, and fig. 4b shows it in diagrammatic form. The small link which joins the tap on the oscillator coil to the main HT busbar must be disconnected so that the oscillator may be switched. The switching should not be added until reasonable results have been obtained by interchanging the head plug from output to input socket and removing T3 as described in Part 2. By following this sequence, errors in switch wiring can easily be sorted out. If desired, a double pole double throw toggle type switch may be used for the “Record” “Play” switching, with a pair of separate single pole switches for “On-off” and “Bias”.

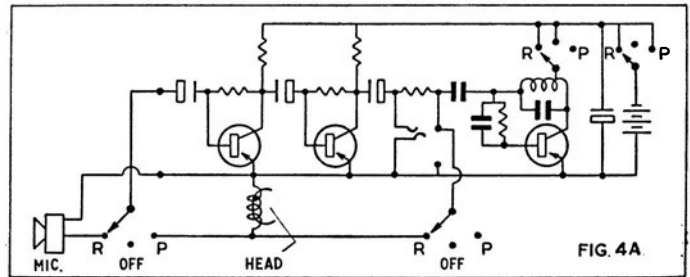
Testing Sequence

It is always difficult for an engineer with a room full of test equipment to put himself in the position of a home constructor with no test gear whatsoever beyond, let us say, a tape recorder or radio set in normal working condition. I thought therefore it might be useful to suggest a sequence of testing which would allow each part to be tested independently of the others as far as possible.

(a) Take a 3½ in. reel of tape and record about 100 ft. of

speech and music at normal recording level at 7½ i/s on the home recorder.

(b) Rewind and place on the portable transport mechanism, and connect the kit head to the microphone socket of the home recorder. If it is possible to monitor the microphone input without moving the tape of the home recorder, switching on



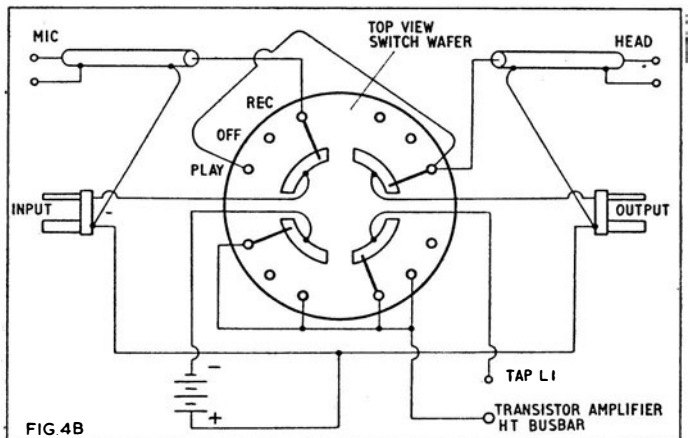
the portable recorder mechanism should result in low level playback of the original recording, rather lacking in bass and high note response, and playing slow near the start of the reel, but coming up to speed near the end of the test. In some home recorders it may be necessary to record this test before being able to hear it on the loudspeaker.

(c) If the two stage transistor amplifier has been built, connect the head to the input socket, and the output jack to the “radio” input of the recorder, or the P.U. terminals of any radio set or amplifier. The playback level should be high, but the quality may be poor due to inadequate frequency response.

(d) If the bias oscillator circuit is wired and appears to be working, plug the kit head into the head socket and run some of the recorded tape over the portable recorder head. On replay the level should be reduced due to the erasing effect of the bias on the original recording.

(e) Connect the Ext. LS. terminals of the home tape recorder, or any radio set, to the output jack of the portable recorder and record on fresh tape on the portable recorder. On replay this quality should be much improved, as record and replay azimuth are coincident. Bass response and extreme top response will be down.

(f) Connect the recommended equaliser between the output jack of the transistor circuit and the input of the replay amplifier. Quality should now be balanced for frequency response



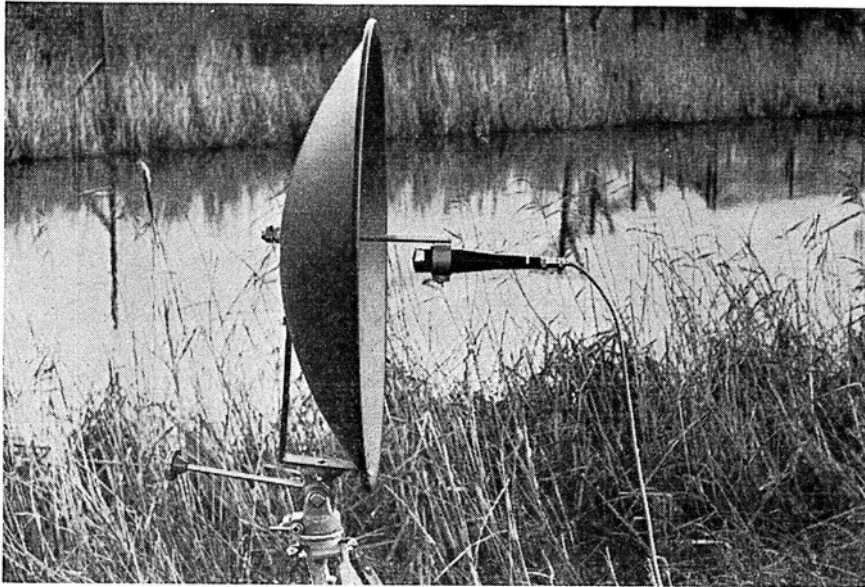
and sound very much like the original LS quality on the home recorder.

(g) If overload distortion is evident, repeat by recording at a lower level. If signal is weak and noisy, repeat recording at a higher LS level.

(h) Finally, the bias should be varied by altering the HT voltage on T3, and the recorded level altered again if necessary until the level and quality is comparable to that of the home recorder.

If all is well at this point you are ready to proceed with Part 4 which will deal with microphone recording, and microphone matching.

A. Tutchings



FIELD TR

When we heard of Grampian's plans to produce a microphone reflector we invited Mr. Johnson to give it a field trial. The photographs (left, and opposite) are by the author.

WHEN, last spring, I began my series of articles in *The Tape Recorder* on the design, construction and use of the parabolic reflector, I had little idea of the great amount of interest that existed in the recording of bird-song and other nature sounds; neither did I realize the amount of difficulty which readers were to experience in getting their reflector bowls made! It appears that I had been most fortunate in finding a craftsman prepared to produce so perfect a job for so modest a fee. It was with considerable interest, therefore that I learned that Messrs. Grampian Reproducers, Ltd., had marketed a low-priced parabolic reflector, approximately to my own specification. I was kindly invited to review this equipment and, although the last few weeks have not presented the best conditions of the year for the recording of bird song, I was able within a very short time, when weather permitted, to reach some very definite conclusions.

In kit form

Being intended as an inexpensive basic equipment for the amateur recordist, the Grampian Parabolic Reflector is supplied in kit form, the outfit consisting of the 24-inch reflector bowl proper, a supporting bracket for mounting it to a tripod, a microphone holder which also contains the sighting tube, the necessary screws and nuts for assembly, and a cable cleat for attaching the cable to the edge of the bowl. I assembled the

whole outfit in about five minutes with the aid of a small screwdriver. A Grampian DF4 Microphone was also included for my convenience and this I found to be a good fit in the holder clamp, although most "stick" microphones could be accommodated with little difficulty.

Setting up

In order to satisfy myself on the basic performance of the reflector, I carried out my usual setting-up drill with the aid of an electric buzzer a hundred feet away in calm, open surroundings. With the microphone positioned with its grille six inches from the bowl surface, I found that the effective angle of acceptance, within which the gain was quite remarkable, was rather less than ten degrees. Outside this cone the sensitivity fell away rapidly. This indicated that the characteristics of the reflector were those which I have found to be ideal for all-round work in the field. Of course, the angle of acceptance would be increased by the use of a microphone of larger diameter, but, in general, this is better avoided.

The reflector is well and simply constructed, and is intended to be used mounted on a heavy-duty ciné tripod. One feature which pleased me was the fact that the tripod bush was threaded to the $\frac{1}{8}$ in. Continental standard, the size I always prefer to employ when using larger items of equipment, as there is much less fear



Showing the author (right) using his own parabolic reflector to record bird songs on recent expedition in Spain (photo Eric Hosking).

IAL OF THE GRAMPIAN PARABOLIC REFLECTOR



of it working loose than with the British $\frac{1}{4}$ in. thread. The microphone holder consists of a tube of $\frac{1}{4}$ in. internal bore which forms the sight, with the clamp brazed to one end. It is carried by a gland with a set-screw which is placed just above centre of the bowl, thus positioning the microphone centrally on the axis of the parabolic section. Focusing and positioning the microphone is very easily achieved. There is no rubber or other damping material on the back surface of the bowl.

“ Weather permitting ”

Field testing was, of course, the only safe way of forming a really authoritative opinion of the Grampian Parabolic Reflector, and on a few scattered calm, mild days I went out into the garden and the countryside to look for suitable material. I aimed the equipment at robins singing on the garden hedge and at the woodland edge; at starlings on the television aerial mimicking a distant song-thrush and then whistling trucculently at my microphone; at a pair of stonechats in an unseasonable courtship chase and, most revealing of all, a skylark rising to a height of some three hundred feet over the sand dunes.

Suffice it to say that at all times the performance of the reflector was everything that I would have wished for. The high-pitched notes came through loud and clear, and so did all the

little conversational clicking and grating sounds of the stonechats and robins, even when a hundred yards away from the microphone. The skylark song was recorded note for note as it rose, although here I began to notice one or two points where there was room for improvement. Damping material on the bowl has been omitted, quite frankly, in the interests of economy, so it is hardly fair to offer adverse criticism on this score. When recording a moving bird, however, its absence is soon felt, as the slightest movement of hand or cable, or even roughness in the tripod head, causes a ring which is clearly audible against the voice of the bird. For this same reason, I preferred not to attach the cable to the bowl by the cleat, since this gives a hard mechanical connexion through which sound can be transmitted if one's foot or the tripod leg comes into contact with the cable whilst swinging the reflector on to the bird or following it in flight. I would recommend that some form of damping material should be applied to the back of the bowl if much of this kind of work is likely to be tackled.

The sighting tube

Due to the narrow bore of the sighting tube I found that in certain circumstances it was difficult to find the bird, particularly when it was against a background with few “landmarks” and even coloration, and its small angle of view also made it difficult to find and hold a bird in flight. I would much prefer the tube to have an internal diameter of about $\frac{3}{4}$ inch to give a wider field of vision, with some sort of bead-sight or cross-wires to allow accurate alignment.*

Grampian are to be congratulated upon their initiative in producing a piece of equipment which will satisfy, at modest cost, a long-felt need on the part of all who wish to record and study the sounds of nature, whether for sheer enjoyment or in the course of scientific research. As a result of their introduction of this reflector, the next twelve months should witness a vast increase in the recording of outdoor sounds and the opening-up of one of the most rewarding fields of activity for the tape-recording enthusiast.

E. D. H. Johnson

* * *
Technical Specification: Diameter: 24 in. approx. Depth: 5 in. Weight: with DP4 Microphone 5 $\frac{1}{2}$ lbs. Finish: dark green matt. Gain: 14 dB over range of 500 c/s to 5,000 c/s. Directivity: frequencies over 1,000 c/s were obtained within a 10° angle from the focal point for a loss not greater than 5 dB, and at angles wider than 20° off the focal point the rejection was up to 20 dB. Focusing: not critical, 6 in. distance recommended between bowl and microphone grille when using Grampian DP4 mic. Sighting: $\frac{1}{4}$ in. dia. tube. Price: £5 15s.

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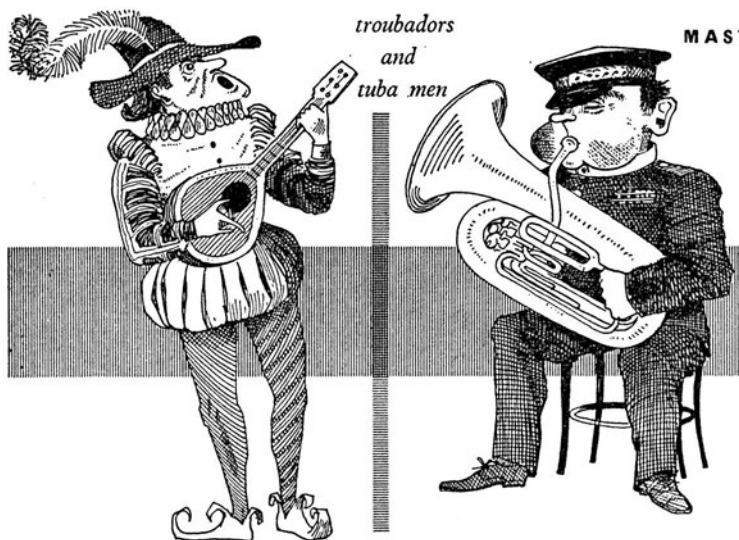
* The manufacturers are considering modifying the tube. (Ed.)

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4"	300	32 ..	10 0	450	48 ..	14 6	5½"	1700	3.. 0 ..	2 17 6
5"	600	1m 4 mins	1 0 0	850	1m 30 mins	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				
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By JOHN D. HONE

AN ADD-ON TAPE DECK FOR DUBBING

BY using an extra playback head, situated on a removable deck, which I attach to the right hand side of my Ferrograph (See fig. 1) I am able to copy one tape from another using the Ferrograph capstan to pull *both* recorded tape and "clean" tape at once. A supply reel, on the extra deck, feeds the tape past the external playback head, round a semi-permanent guide



double ended screw fitting and this keeps the reels tight together. At this stage I must point out that the reels must be separated, and the tape rewound on the tape recorder in the usual way.

Connecting up

Referring once again to the diagram, (fig. 1) you will see that the output from the external head is connected into a pre-amplifier or pre-amplifier section of a complete amplifier. An output connection is then taken from the pre-amplifier and into the microphone socket of the recorder. (A note here about the gain control. This should be kept at a very low position indeed. I find a setting of $1\frac{1}{2}$ on the dial the highest I need go). The "clean" tape goes from the usual supply reel to the lower take-up reel in the usual way.

I use a mixing unit with inputs for tape, pickup and microphone, and I find the extra deck useful for superimposing effects, etc.

There is no end to the things that can be done. Details of the magnetic head, pressure pad and guides, and also the supply reel spindle can be obtained from A. Tutchings (whose article on a portable, clockwork-driven recorder appears in this issue) by sending him a stamped, addressed envelope. For those readers wishing to make an "add on" copydeck, but having no pre-amplifier, Mr. Tutchings can supply a small transistor pre-amplifier kit quite cheaply, and this would be ideal.

Now a word about the actual construction of the deck. The deck is made from a piece of Formica $13\frac{1}{2} \times 9$ inch. (Your local "Do-it-Yourself" shop will have a selection of off-cuts—my piece was 1s.). A wooden frame is screwed to the underside, and two hinged struts, one at each end, are joined by a cross bar (all $\frac{1}{2} \times \frac{1}{2}$ inch. strip wood) (See figs. 2 and 3).

The reason for the hinges is that the unit will fold flat for
(continued overleaf)

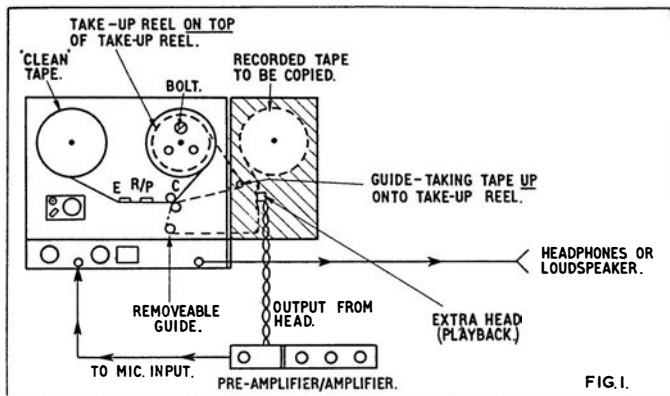
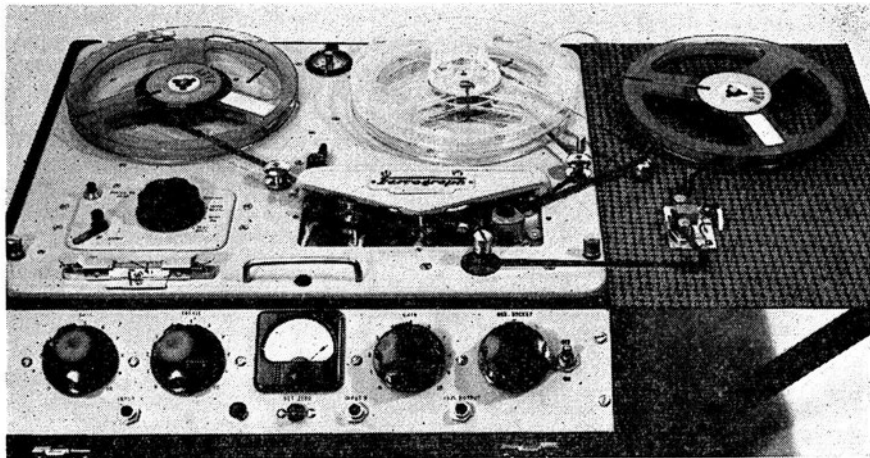


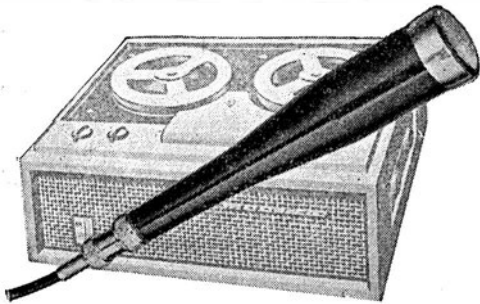
Fig. 1. Showing the add-on copy deck (shaded), with E, R/P and C the erase head, record/playback head, and capstan, respectively, on the Ferrograph. Note the capstan drives both take-up reels simultaneously.

(suction cup) on the Ferrograph deck in front of the capstan. The tape then travels past the capstan and round a special guide on the extra deck, then back up to a take-up reel which is situated on top of the normal take-up reel, these being temporarily but firmly fixed together. I actually use two plastic reels with three holes in the hub. In one of these holes I fit a



This latest contribution in our series of useful hints and modifications submitted by readers provides for the copying of one tape on to another, but using a single recorder. This requirement has been mentioned in these pages on previous occasions, and the solution given here works extremely well. Although the photographs and diagrams relate to the popular Ferrograph machine, we have no doubt that the principle could equally be applied to other makes. On the left is shown the general arrangement of the add-on deck, and the close-up photograph at the top of the page clearly shows how the two tapes are laced up.

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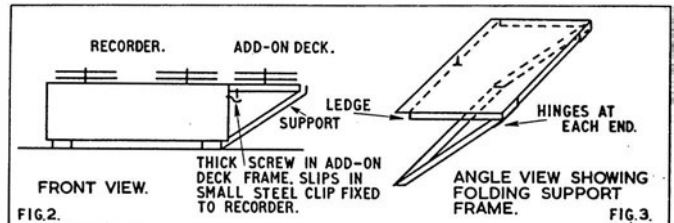
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ADD-ON DECK (continued)

easy storage. A thick screw is fitted on the underside of the frame nearest the recorder, and a small steel Terry's spring clip is screwed into the side of the recorder. With the ledge of the deck on the edge of the Ferrograph case (See Ledge in fig. 3) and the struts open, they are made to go between the bottom edge of the recorder and the table. With the screw snapped into the steel clip it holds satisfactorily.

The support

A great pressure must not be put on the deck, otherwise the screw will come out of the clip, but it is strong enough to support the deck and a full 7 inch. reel of tape. A supply reel



The author's neat method of fastening the add-on deck so that it may be quickly released for transport is shown in the above diagrams.

spindle with felt washer is screwed in position, and brass rod guides fitted in convenient places.

I do not want to complicate matters at this stage by making added suggestions for uses of this deck, but I am in the process of fitting a stereo head on the deck, in a position somewhere behind the mono head. By feeding the output, as outlined above, to the *tapehead* input of a stereo amplifier, and the selection on Tape Stereo, stereophonic tape records can be played quite easily.

The settings

The tape recorder must be set for playback and the gain or volume control set at 0, otherwise you will hear what is on the tape that is on the recorder deck. I say this because the Ferrograph must have a tape threaded through the heads and capstan before it will play back. Any old tape will do, because you won't be hearing it anyway. Incidentally, referring back to fig. 1 again, I can monitor the *ingoing* signal through headphones or loudspeaker, which is quite useful.

Final notes

When using reels that have protruding screws through the hub, such as Ferrograph metal reels, a washer made out of ¼-in. plastic foam of about 1¼-in. diameter is pushed over the add-on deck supply reel spindle, so that the protruding screws do not catch on the supply reel spindle base.

Another point to remember is that there is no mechanical back tension to the tape coming from the add-on deck supply reel, except that tension caused by the drag of the reel on either the felt or foam washer, and also the external head pressure pad.

This tension is quite adequate, but it will be found that if the tape has any uneven splices in it, a noticeable distortion of the material being copied will result, and of course this will show up on the new copy.

I hope that you will be able to adapt my add-on deck for your particular tape recorder, and that you can follow the instructions and diagrams quite easily.

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SOUND AND CINE

IN THIS THIRD ARTICLE, RICHARD GOLDING DISCUSSES THE USE OF JAZZ AND ALSO THE ART OF CUTTING IN FILM-MAKING

LAST month we discussed how to underline changing moods in a travelogue by using varying types of music. Now I should like to go on to where one distinct kind of music could be suitable for a whole film.

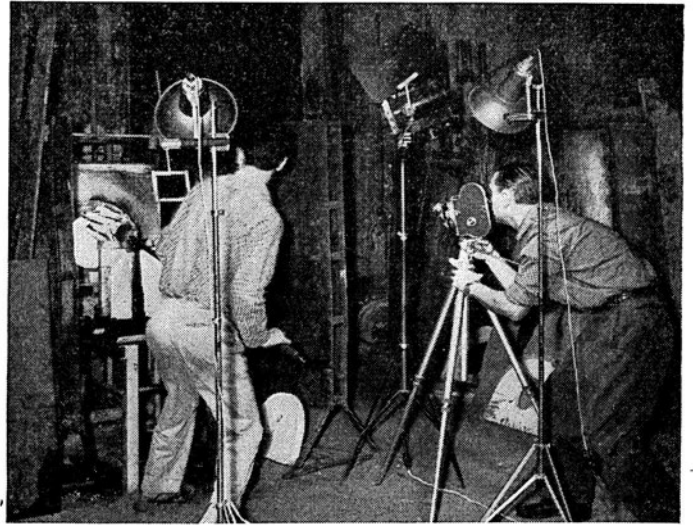
Jazz is a popular choice for winter film makers at the moment and the indoor craze, it seems, is to make a short Kaleidoscope film to a favourite disc. All you need are some highly coloured abstract patterns, mirrors and a turntable, which saves considerable effort by the elimination of all that painting and drawing that the usual abstract film demands and gives such fluidity of movement that the result is invariably a delight to watch.

Modern Jazz in the French manner too, is the choice of my old friend Pierre Robin of Paris for the track of his latest documentary—"Heliotechnie" (the art of fire) which he shot during his summer holiday at Merano, Italy, last year. The film is an account of glass-moulding and is superbly photographed. Pierre says, about his film: "Glass has a magical radiance. The worker who fashions it has to be an artist extraordinary, and it sometimes takes him ten years to acquire the dexterity needed to avoid the premature cooling that is disastrous to the material. It is always surprising to see that he cannot touch the glass directly but must wield it with the most clumsy and enormous tools before arriving at the sculpture of such harmonious shapes. The subject is exciting and so I must choose exciting music to go with it."

The result has already obtained two major French awards and the UNICA Grand Prix.

Beatniks in Embryo

This type of music is worthy of filmic development on its own account. I am thinking, of course, of subjects such as the basement coffee-bar with attendant beatniks-in-embryo, or the local Art school rag where big close-ups of colourfully dressed musicians can be punctuated by shots of highly acrobatic jiving by young students. The Jazz theme has not been over exploited and there is plenty of room in competitions for such a film providing it is well thought out and conceived. Most amateur films of this type that I have seen, however, have suffered badly from a lack of pre-planning, with the maker usually shooting every-



Pierre Robin (above) is seen filming "Heliotechnie". Below are two "stills" from "Jazz on a Summer's Day".

(Photos Hillcrest Productions Ltd.)

thing "off the cuff" and relying on his editing skill to patch up the continuity. In other words he has not devoted enough pre-thought, time or material to capturing a subsidiary theme to the main musical one and in consequence his film jerks spasmodically through the evening.

In all documentary productions, whether travelogues, family films, local events, industrial records or what have you, it is essential to shoot as many interesting cutaways as possible and to illustrate this I should like to examine that very good film "Jazz on a Summer's Day" by U.S. top still photographer Bert Stern.

Stern begins by introducing the people going to Newport, Rhode Island, Festival of Jazz. The main theme saunters in quite casually with informal shots of the musicians playing their instruments as they are driven along the roads leading to Newport. The subsidiary themes begin to build up immediately with fans coming in by road and steamer—the yachts racing in the regatta, which is being held at the same time—and short glimpses of Newport itself, its life and its atmosphere. Shots of the platform and auditorium; the chairs being arranged; the fans streaming through the gates. Then, with the appearance of



bring out the hidden **SOUND**

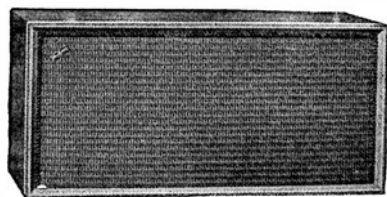
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SOUND AND CINE—(continued)

Thelonius Monk, the pianist idol of the subterraneans, the commencement of the Festival proper.

From now on, the emphasis is on the jazz musicians and the cutaways begin to form a pattern of parallel action. That is to say several groups and individuals among the thousands of spectators are selected by Stern to re-appear at intervals, so that we are given a continuity of re-acting in these people whom we come to know and look for. As the jazz goes on, Stern cross-cuts to show continuity in the life outside with daring experiments with yellow and blue filtered shots of yachts, shots from helicopters, an excursion into a guest-house beer-and-jive-session, children playing in the park, a cellist, low lit, with immense close-ups in a lonely room, practising some classical composition. Then back, suddenly, to intense facial close-ups of our jazz musicians with the Chico Hamilton Quartet dominating the scene and the hypnotic spell cast by his drummer.

Stern now shooting directly into the stage lighting, with its flare and colour providing vitality for the performers, then more crosscutting to the audience—now in the dark of evening—drinking, eating, jiving but ever absorbing the excitement of the music. In all a fast, fascinating record of a day's jazz. A whole day condensed into one hour or so by means of cutaways and parallel action.

This last sentence, I think, is quite important and not only to those contemplating a jazz film, for almost any subject we chose to record on film *has to be condensed into a shorter space of time than it actually took to happen in real life.*

The time element is a curious one and difficult for the beginner to motion-picture making to appreciate fully, but it is a fact that as soon as some parallel action is introduced, that is two lots of movement going on at the same time, whether in the same area or not, it is possible to cut from one to the other and, in doing so, indicate a lapse of time.

Apart from this need to condense time in such a fashion, there is also another factor in favour of parallel action. Most of us are limited to a certain extent by the amount of film stock we can afford to use on a sequence, and most of us have spring wound cameras which is even more limiting when attempting to capture a complete event. With a spring-wound camera, if we were to film, say a carnival procession from one viewpoint the result would consist of a collection of jump-cuts; but if we were to film later on during the procession perhaps some short sequences of crowd reaction, and these preferably from a variety of angles and viewpoints, we could then use these as cutaways and have a more complete and digestible film sequence.

This is logical, I know, but it is surprising to find even experienced film makers falling down on this over and over again and leaving unbridged jump-cuts in their finished films.

Jump-cutting

For those who are not completely with me on this question, an outstanding example of a jump-cut could be as follows:— we are filming a kitten climbing a tree, and it has reached the end of the branch when our motor runs down. By the time that we have rewound and begun shooting again the kitten is on its way back along the branch. The result on the screen is that the kitten's impossible transition within one shot is jarring and unpleasant, and to rectify this a reaction shot, or a detail of something relating to the main story, must be inserted. The intervening shot will seem to allow (and all audiences accept this automatically) enough time for the kitten to adopt its new position.

The major part of this article has been concerned with some basic techniques which perhaps have not been apparent to you before, and next month I should like to extend this excursion from Sound and go into film making proper.

In the meantime may I commend, to those of you engaged in making films of your children, a short documentary from the Polish Educational Film Studio. It is full of charming little sequences where children, left entirely by themselves, carry out the most ordinary tasks of the moment, such as trying to dress themselves, in a most natural, amusing and interesting manner. It lasts 16 minutes, B and W, and its title is "*Me Alone*" and during its length not one child looks directly into the camera lens.

TAPE, RECORDERS & ACCESSORIES

FIRST DETAILS OF NEW PRODUCTS

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

★
**THE
 MAGNAVOX
 "MAGITAPE"
 2-TRACK
 RECORDER**

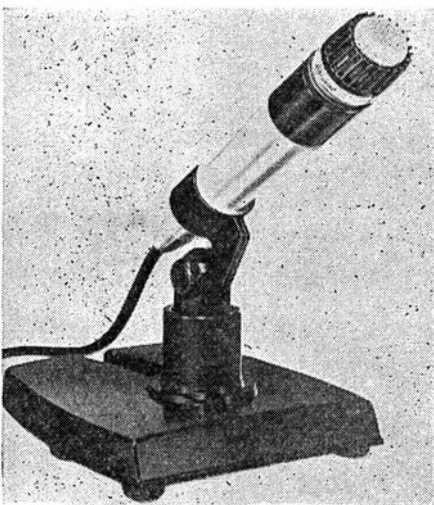


THE first tape recorder to be released by Magnavox in Britain is now available. The "Magitape" two-track recorder has many features, and retails at an inclusive price of 39 gns. "Magitape" offers a choice of three speeds, giving a very wide range of reproduction.

The exclusive Magnavox microphone controls sibilance in speech recording and can be used as a monitor when not in use for live recording. A special feature of the "Magitape" is the vented overall acoustically designed cabinet with vented base and motor panel. An 8 in x 5 in. elliptical wide-range speaker—a superimpose switch—fast left and right wind controls—pause control—numbered revolution counter—are included.

The control system on the "Magitape" minimises the risk of accidental erasure as there are three steps in the record control sequence. The two-tone cabinet measures—Length 17 in. Width (back) 17½ in. Width (front) 15½ in. Height 11½ in. There are separate treble and bass tone controls, and the audio power is 4 watts. Further information from: Magnavox Ltd., 129, Mount Street, London, W.1.

* * *



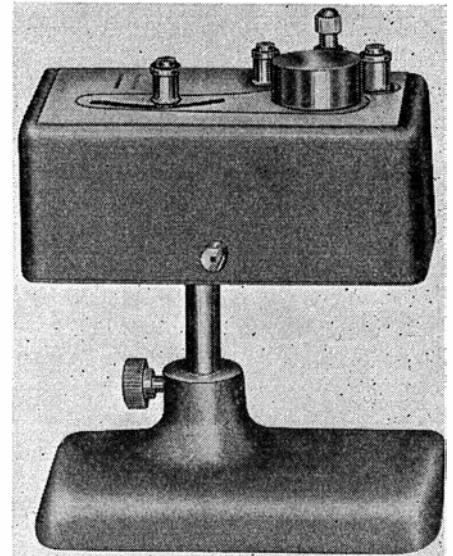
★
**THE
 SHURE BROS.
 UNIDYNE III
 MODEL 545
 CARDIOID
 DYNAMIC
 MICROPHONE**

SHURE BROTHERS INCORPORATED, have announced the release of Model 545 "Unidyne III", claimed as the world's smallest cardioid dynamic microphone. A slender moving-coil microphone only 1½ in diameter by 6 in long, the "Unidyne III" provides wide-range reproduction of music and speech whilst the

uni-directional characteristic largely overcomes problems of feedback and unwanted noise and ensures highly satisfactory performance under adverse acoustic conditions. For a given feedback level the microphone can be placed at 75% greater distance from the performer than is possible with conventional models. Of dual-impedance, the "Unidyne III" can be connected direct to a 50-250 ohm line or high impedance input. It is supplied complete with 18 feet of high-quality shielded cable and plug and with an adjustable swivel adaptor which permits instant withdrawal for hand use. Also available is the Model 544 Series, comprising the "Unidyne III" mounted on a flexible support for fitting to control desks and consoles. Price of the 545 "Unidyne III" Microphone is £29 15s. and the 544-G12 "Unidyne III" with 12 in. support and flange, £29 6s. 3d. Obtainable from: J. W. Maunder, 22, Orchard Street, London, W.1.

* * *

★
**THE NEW
 SPECTO
 SYNCHRONISING
 UNIT TYPE 209
 KEEPS FILM
 AND TAPE
 IN STEP
 DURING
 RECORDING
 AND SCREENING**



THE Specto Synchronising Unit Type 209 enables the owner of a Specto Royal or Specto '8' projector to add sound—commentaries, music, background effects, etc., to his or her films, quite simply and efficiently. Designed for use with any tape recorder having a tape speed of 3½ i/s, with a tape deck which permits a loop of tape being drawn through the synchronising unit, the Specto Unit Type 209 enables projector and tape recorder to be synchronised for both sound and picture. Basically, the unit is an electro-mechanical device which compensates the difference in the film travelling speed (2.4 i/s at 16 frames per second) and the recommended tape speed (3½ i/s). Not only does the Synchroniser compensate these differing rates of progression, but also controls any tendency for the projector and tape recorder to lose synchronisation during recording or screening. The unit is simple to operate, being connected to the main shaft of the projector by means of a flexible drive and the main electric supply. All Specto-Royal and 8/200 projectors are internally electrically wired and have the main shaft already prepared for this connection. Price of the Specto Synchronising Unit Type 209 complete with stand is £14 19s. 6d., and is manufactured by Specto Ltd., Vale Road, Windsor, Berks.

(more New Products on page 35)

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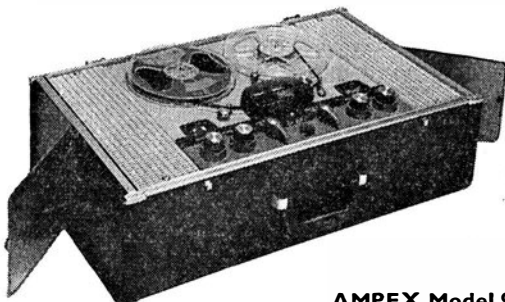
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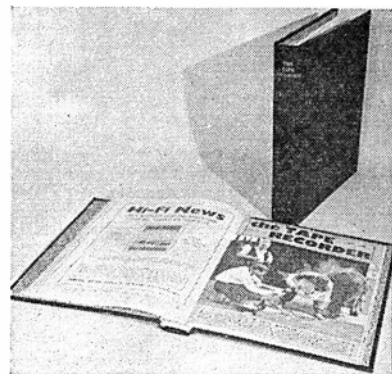


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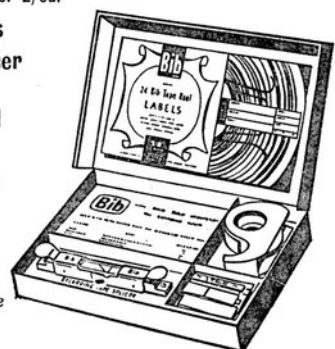
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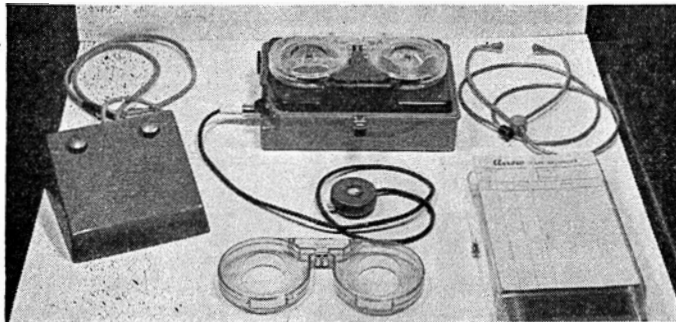


MORE NEW PRODUCTS

★
A NEW
TUNER UNIT
FOR TAPE
RECORDING
BY STUZZI
★



STUZZI have introduced a radio tuner which will convert a tape recorder into a radio, for 5 gns. Measuring only 5½ in. × 4¼ in. × 1¾ in. deep, this new tuner plugs straight into the input or microphone socket of your tape recorder. A slide switch on the left-hand side of the Radio Tuner selects the wave band—long or medium—and the left-hand knob on the front is the on/off switch and sensitivity control. On the right-hand side is the tuner and in the centre is a fine tuner which enables you to make reception as near perfect as possible. Its smart plastic case makes it exceedingly handsome, running costs are almost negligible—a set of four No. U12 batteries costs only 1s. 2d. and lasts for several months. Manufactured by: Recording Devices Ltd., 44, Southern Row, Kensington, N.W.7.



A low-cost dictating system

THE "Arrow" battery-driven speech recorder is a small portable dictating machine measuring 8¼ in. × 6 in. × 3½ in. and weighs 4½ lb. complete with four standard U2 leak-proof torch batteries. It is designed to meet the demand for a reasonably priced portable speech recorder, which can be used in the office, at home, in the car, or while carried over the shoulder. It is provided with the usual accessories to enable it to be used as a transcription machine in the office. The recording medium is standard ¼ in. magnetic tape on standard 3¼ in. spools, which may be fitted in transparent plastic cassettes for easy handling and changing. Dictation time on one track of the tape is 22 minutes, affording 44 minutes for both tracks. A set of new batteries provides an intermittent running time in excess of 50 hours. Control is provided by one small lever having four positions—off, record, fast rewind and play-back. The microphone, which is also used as audio reproducer, is fitted with a switch to start and stop the recorder. Instantaneous braking avoids loss or partial loss of words on play-back for typing. The circuits are entirely transistorised and the recording intensity is automatically kept at the correct level. A volume control is provided for play-back. The recorder can be used in any position. The case is of shock-resistant plastic material, the top cover being

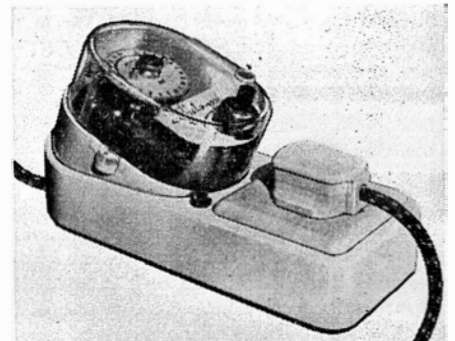
transparent to enable the position of the tape supply to be seen at a glance. As a separate unit, a foot-operated switch is provided for transcription purposes, together with stethoscopic earpieces for the typist. Additional items are a small loudspeaker and a telephone pickup device to enable phone conversations to be recorded. Price, including microphone, batteries, cassette with spools and tape, will be £25 approximately. The manufacturers are: W. H. Sanders (Electronics) Ltd., Gunnels Wood Road, Stevenage, Herts.

★
THE
SONIC V
PORTABLE
RECORDER
USING THE
COLLARO
"STUDIO"
DECK
★



THE Sonic V tape recorder is a 3-speed, half-track instrument accepting up to 7 in. reels, with a claimed amplifier frequency response of 40-12,000 c/s ± 3 dB. The wow and flutter figures are less than 0.15% @ 3¼ i/s, with a signal to noise ratio of 45 dB. The machine is fitted with a Collaro Studio Deck and two 8 in. × 5 in. loudspeakers, and the power output available is 5.3 watts. Other features include superimposition, "magic eye" recording indicator, digital counter, safety interlocking button, straight through amplifier, mains indicator lamp, tone control and a pause key. The Sonic V two-track and four-track models are priced at 47 and 50 gns. respectively and are available from: General Sonic Radios, 92, Caledonian Road, London, N.1.

★
THE
VENNER
"AUTOPOINT"
TIME
SWITCH
★



VENNER LTD., famous for time switches in the industrial field, have now introduced the "Autopoint" time switch which can be taken from room to room and will switch on and off any electrical appliance exactly when it is required, automatically, day after day without resetting. It can be used to switch on a tape recorder to record a radio programme (provided the recorder does not have to be manually operated after the switching on), and switch off shortly after the programme has finished. In addition to controlling a recorder, the radio can be used instead of an alarm clock in the morning. Many other uses can be made of the Autopoint time switch which is obtainable from most electrical retailers price £5 17s. 6d. complete and ready to use. Manufacturers: Venner Ltd., Kingston By-Pass, New Malden, Surrey.

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by John Borwick

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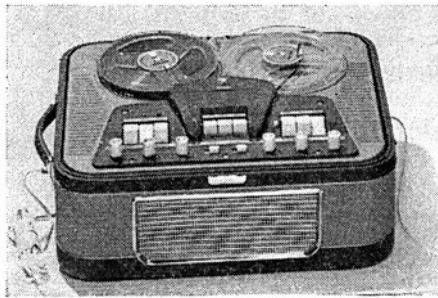
FOR EVERYONE WHO HAS JUST STARTED, OR IS ABOUT TO START THIS HOBBY.

MILES HENSLOW PUBLICATIONS LTD. 99 MORTIMER ST., LONDON, W.1



EQUIPMENT REVIEWED

★
PHILIPS
4-TRACK STEREO
RECORDER
TYPE EL3536
★



Manufacturers' Specification

Power Requirements: 110-127, 200-250 volts, 50 c/s, 90 watts. **Output Power:** 4 watts per channel. **Frequency Response:** $7\frac{1}{2}$ i/s, 50-20,000 c/s; $3\frac{3}{4}$ c/s, 50-15,000 c/s; $1\frac{1}{8}$ i/s, 50-7,000 c/s. **Signal to Noise Ratio:** better than 40 dB. **Wow and Flutter:** less than 0.2% at $7\frac{1}{2}$ i/s. **Cross Talk:** better than -50dB. **4 Track Stereo Heads.** Valves: 2 EF86, 3 ECC83, 2 EL84, EM84, 2 crystal diodes and one rectifier. **Spool size:** 7 in. **Dimensions:** $20\frac{1}{2} \times 15\frac{3}{4} \times 11\frac{3}{8}$ in. **Weight:** 43 lb. **Loudspeakers:** in cabinet and detachable lid. **Price:** £96 12s. including moving coil stereo microphone, and tape.

Manufactured by Philips Electrical Ltd., Century House, Shaftesbury Avenue, London, W.C.2.

AS this Philips 3536 machine is the first four track recorder reviewed, it has been kept in daily use for some months before completing the objective measurements. It has come out of the test with high marks and can be recommended for either monophonic or stereophonic use. The inclusion of stereo record and replay facilities opens up an exciting new field to the amateur interested in recording.

The pros and cons of four track versus two track machines were more fully discussed in the April issue of *The Tape Recorder*, so it is only necessary to outline the main points. Four track machines use standard $\frac{1}{4}$ in. tape but record four tracks each 43 thou. wide separated by unrecorded bands 25 thou. wide, whereas the old standard two track recordings employed two tracks each 110 thou. wide separated by bands 30 thou. wide. The reduction in track width decreases the signal in proportion, but the noise due to the tape is only reduced in the ratio of the square root of the track width change. Thus the signal/noise ratio should only be 3 or 4 dB below that of a two track machine. Frequency response is unaffected by width of track, but as the high frequency loss due to head misalignment is less serious with narrow tracks, the frequency response obtained in practice may be slightly wider on a four track machine.

4-Track Economics

Playing time per length of tape is doubled, a significant reduction in recording cost per hour and one that will accelerate the swing towards tape as the medium for domestic entertainment. Where the tracks are used in pairs to provide a stereo recording, the cost of tape is brought down to the present level of monophonic recordings. Though there are no professionally recorded four track tapes available in this country, they have been released in the United States and are likely to appear in England in 1961. The existing twin track stereo tapes available from E.M.I. can be replayed on a four track stereo machine without any difficulty.

The Philips EL3536 is a very versatile machine providing almost all the facilities that a skilled amateur could wish. Monophonic (single track) and two track stereo signals can be recorded and reproduced, two separate amplifiers each employing an EL84 output stage (4 watts nominal) being provided. When playing single track recordings, both amplifiers may be

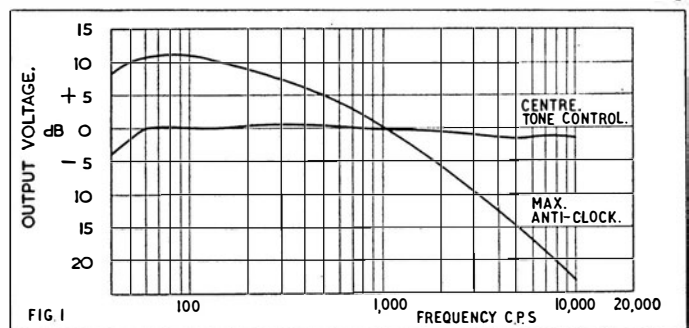
used to drive separate speakers. A double unit microphone for stereo recording is included in the price of 92 gns.

The machine is commendably portable, measuring $20\frac{1}{2} \times 15\frac{3}{4} \times 11\frac{3}{8}$ in. and weighing 43 lbs., this weight including the two loudspeakers, one in the machine and the second in the lid. Spools up to 7 in. diameter can be used, and thus 16 hours playing time can be obtained from a single spool of double play tape at the lowest of the three tape speeds provided.

The Controls

Deck layout is conventional and convenient. In the rear centre is a four-digit tape footage indicator inclined to facilitate reading. Nine push keys are grouped together in three clusters of three. On the left, the three keys control "play", "record" and "pause". The centre group gives "fast wind", "stop" and "fast rewind", while the three on the right select tape speeds. The "record" key is protected against accidental operation by a mechanical interlock. Along the front edge are six knobs and two slide switches for circuit control. Separate controls allow microphone and gramophone signals to be mixed in any desired ratio, permitting the addition of a musical background to a commentary or vice versa. An allied facility is given by the inclusion of a "superimpose" switch to allow material to be added to a tape previously recorded. A four-position function switch selects "mono" or "stereo" or allows the two amplifiers to be used for PA or reproduction from pickup. When playing single track recordings, any one of the four tracks can be used. Two mono positions are included on the function switch marked "track 1 and 3", and "2 and 4". Thus track 1 (top track) is played with the switch in the track 1 and 3 position and the "tape start" leader wound on to the right hand spool, while track 3 (next to bottom rack) is obtained with the switch in the same position (tracks 1 and 3) but with the "tape finish" leader wound on to the right hand spool. Track 2 and 4 can be replayed in the same way, but with the function selector switch in the "track 2 and 4" position. It sounds complicated, but the operation is very obvious after a little experience.

The right hand group of three knobs provide control of "Volume", "stereo balance" and "tone", the tone control being a twin ganged unit with concentric knobs controlling



● Frequency response with and without top cut.

each channel. This is a useful facility if dissimilar speakers are employed for stereo reproduction, for it allows the acoustic response of the two channels to be balanced.

The Connections

All the input sockets are grouped on a small inset panel on the left hand side, while the output sockets are grouped on a similar panel on the right hand side. Indicative of the thought given to the facilities, is the socket included to allow stereo headphones to be used, and the switch that disconnects the internal loudspeaker when external speakers are in use. Two

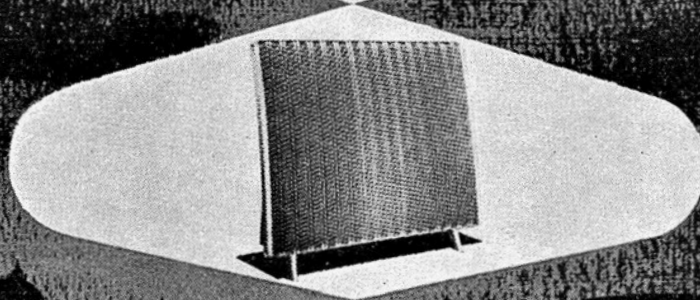
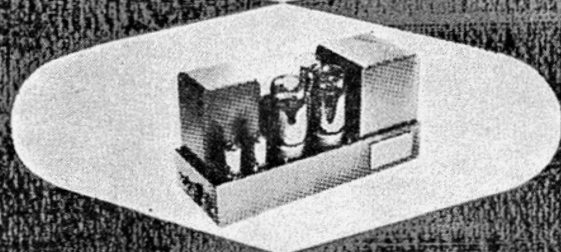
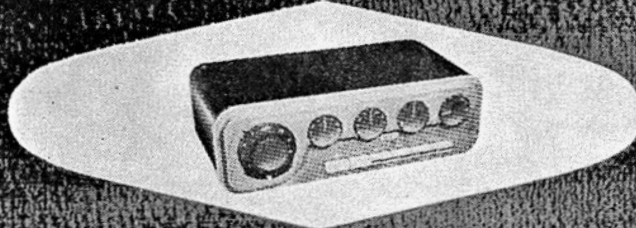
(continued on page 39)

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sockets are provided for external speakers. With this survey of the extensive facilities provided we can look at the results of the objective tests.

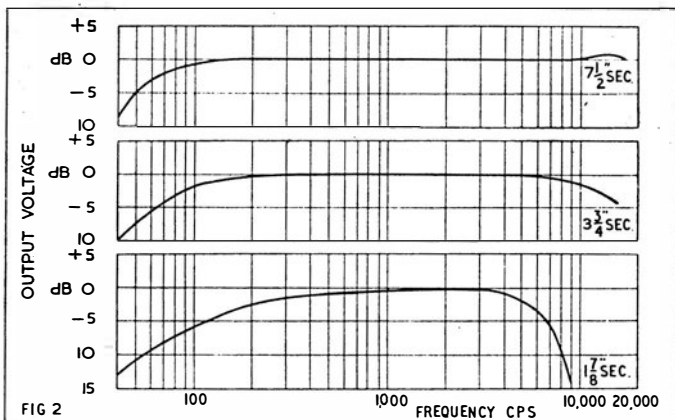
Frequency Response

When replaying pre-recorded professional tapes, the response of the replay system is significant. The test tape available restricts the measurements to an upper limit of 10 kc/s, but over this range the response obtained with the tone control knobs in the centre position is shown in Fig. 1. The two tracks were within about ± 0.5 dB over the whole range, a performance worthy of comment. Fig. 1 also shows the response at the extremes of the tone control. The right hand half of the tone control movement produces practically no change in response.

When recording and replaying, it is the combined record and replay response that is significant. This is shown for the three speeds in Fig. 2. The range achieved is remarkably wide at all three speeds.

Signal/Noise Ratio

A wide frequency range and the adoption of narrow tracks might be expected to result in a rather low signal/noise ratio, but the measured values shown in Table 1 are better at all



● Combined record/replay response at 3 speeds.

tape speeds than many other two track machines. It is interesting to compare the results with those obtained on the Philips two track machine reviewed in the July 1959 issue of *The Tape Recorder*. When this is done it is found that there is no very significant difference between the performance of the two track and four track machines in respect of signal/noise ratio. This rather suggests that extra care in the design of the four track machine and some improvement in tapes during the last eighteen months has made it possible to secure the same performance from a four track machine as was obtained a couple of years ago from a two track machine.

It will be noted that the signal/noise ratio is substantially constant at all three speeds and is better than the makers' claim.

Wow and Flutter

Table 2 lists the results of the measurements of wow and flutter. The values obtained at $7\frac{1}{2}$ and $3\frac{3}{4}$ i/s are remarkably good. At $1\frac{7}{8}$ i/s the values are higher (and higher than they were in the two track 8108G machine) but the performance is absolutely adequate for speech and most pop music, being about the same as most of the popular record players setting at £20—£30.

Acoustic Noise

Many machines produce sufficient mechanical noise for it to be audible during quiet passages in the music, a point on which I receive many complaints. Measured at two feet from the centre of the machine, the EL3536 produced a noise level of 33 phons. The test conditions have been standardised and all future test reports

Table 1
Signal/Noise/Ratio

$7\frac{1}{2}$ i/s:	
Weighted ...	53 dB.
Unweighted ...	48 dB.
$3\frac{3}{4}$ i/s:	
Weighted ...	52 dB.
Unweighted ...	47 dB.
$1\frac{7}{8}$ i/s:	
Weighted ...	51 dB.
Unweighted ...	48 dB.

Table 2
Wow and Flutter

$7\frac{1}{2}$ i/s:	
Record and Replay...	0.06%
$3\frac{3}{4}$ i/s:	
Record and Replay	0.13%
$1\frac{7}{8}$ i/s:	
Record and Replay	0.42%

will contain an indication of mechanical noise level. (See article elsewhere in this issue).

A typical living room in a house in a quiet street has a noise level of around 35—45 phons. In the evening and in the absence of aircraft noise it may drop below 30 phons, and in an exceptionally quiet house, below 25 phons, but a 10-mile an hour wind or a noisy electric clock will bring the noise level above 30 phons. Thus a machine noise level of 33 phons is audible in a quiet room but is unlikely to be the subject of adverse comment. If you are a critical listener living in a very quiet location it may arouse comment but no serious criticism.

Subjective Performance

There are so many respects of the performance of a tape recorder that are not amenable to measurement that the personal impressions of an experienced user are of considerable value. The EL3536 is mechanically quiet and relatively free from vibration even when rewinding at high speed. The braking system is excellent and never left a loose loop of tape on any occasion during the three months' use. In this respect it is one of the best machines I have ever tested. The tape spools up very evenly, tightly and neatly, both in normal playing or when rewinding.

All the keys operate smoothly and firmly without any significant amount of side play or looseness. The four-digit tape footage indicator is a valuable improvement over the usual three-digit type, but with this machine, as with most others, the accuracy with which a given point on the tape could be retrieved is hardly high enough for a critical user.

Used with external speakers the sound quality is very satisfactory. The internal speakers are adequate for monitoring and for the non-critical listener, but do not do justice to the rest of the machine. The single-ended EL84 output stages produce some obvious distortion at high levels, and a critical user may prefer to run the amplifiers at low level and feed the signals into his own hi-fi amplifiers, for this is justified by the mechanical performance of the machine.

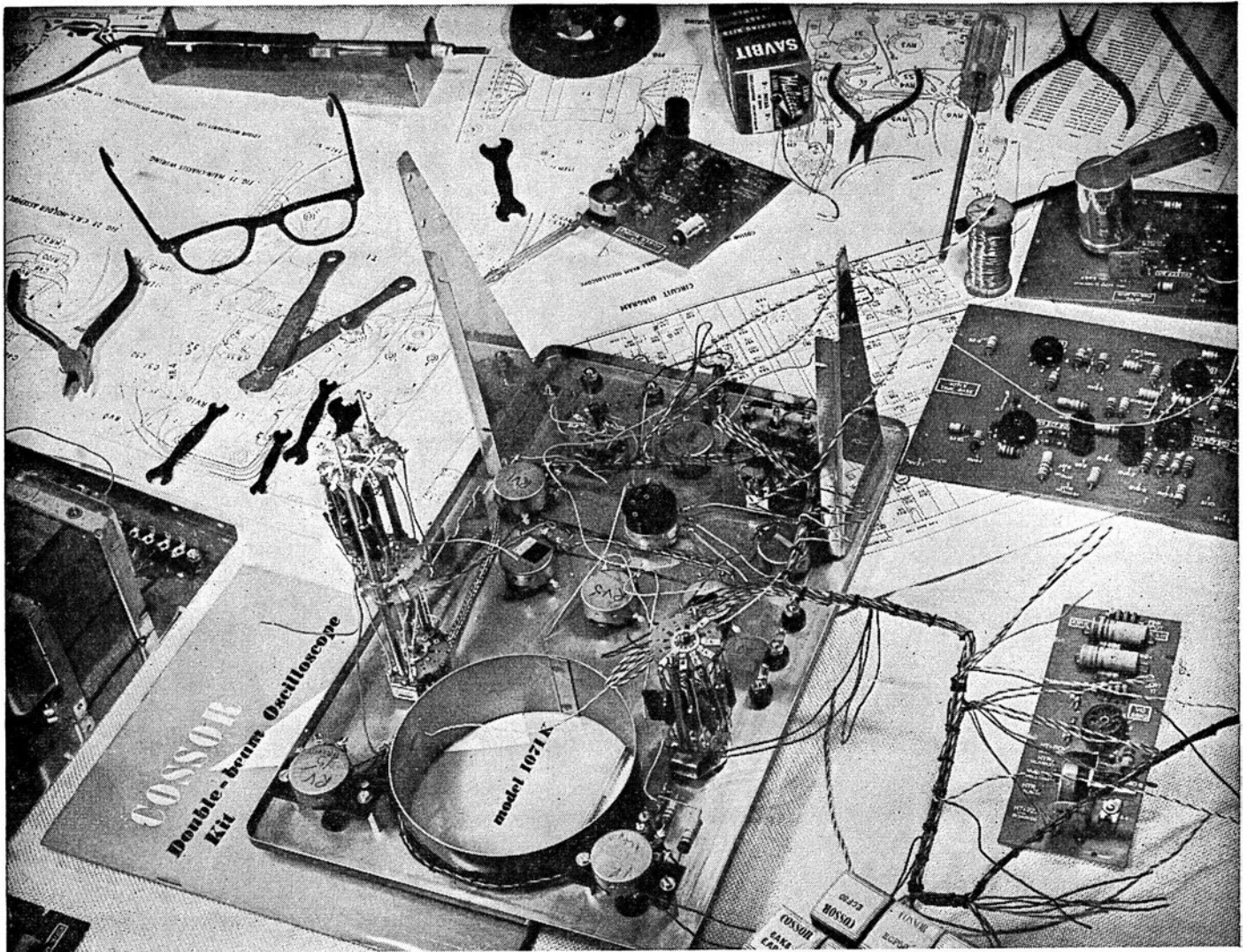
Summing up

Though the statement is not supported by the figures quoted, the signal/noise ratio judged subjectively is not quite so good as in the two track machine, but except to a very discerning listener the difference is not significant. The performance on commercial stereo tapes was good without being outstanding, but it is certainly in the top half dozen machines for stereo performance. The microphone provided, gives good crisp speech on both monophonic and stereo recordings. Recordings, even of such simple material as a conversation, shows up the advantage of stereo in reproducing the acoustic atmosphere of the room, a reversion from stereo recording to a monophonic recording of the same material resulting in a marked contraction of the size of the sound source and a reversion to "small box" reproduction.

The mechanical performance of the EL3536 is sufficiently good to justify the purchase of a high quality stereo microphone, if a serious interest is taken in the stereo recording of good music. The facilities provided are exceptionally comprehensive and include almost everything that the serious amateur could desire. At a price of 92 gns., the EL3536 is particularly good value for money.

James Moir

(more reviews on page 41)



Notice to Manufacturers

Whatever your product, and whatever its state of development, a photographic record can be invaluable — for future reference — for publicity — and for sales. We specialise in the photography of industrial products — particularly electronics — in black-and-white (as above) or in colour, for showcards and catalogues. We are the official photographers for Hi-Fi News and The Tape Recorder. Our prices are very competitive, and we invite your enquiries.

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*

**THE TANDBERG
SERIES 6
TAPE DECK
DISTRIBUTED
BY ELSTONE
ELECTRONICS
LTD.**

*



* * *

Manufacturer's Specification

Power requirements: 110, 125, 145, 200, 220, 245 volts. 50 (or 60) c/s, 65 watts. **Inputs, Sensitivity and Impedance:** Two microphones, 0.00125 volts RMS 5 Megohm; two high level, 0.05 volts RMS 1 Megohm; two low level, 0.005 volts RMS 100K ohm. **Playback Outputs:** With the output control knobs set to max. (6) the recording level light beams touching to give 3% tape distortion, the cathode follower output is adjusted to 1½ volts RMS. **Frequency Response:** 7½ i/s, 30 to 20,000 c/s (± 2 dB, 30 to 16,000 c/s); 3¾ i/s, 30 to 15,000 c/s (± 2 dB, 40 to 11,000 c/s); 1¾ i/s, 30 to 7,000 c/s (± 2 dB, 50 to 5,500 c/s). **Distortion:** A recording level 10 dB below maximum level results in 2/10 of 1% distortion of a 400 c/s signal when played back. **Bias and Erase Current Distortion:** 4/10 of 1%. **Noise Level:** 55 dB below maximum recording level of 3% tape distortion. **Bias and Erase Frequency:** 80 to 100 Kc/s, common bias supply to each recording channel. **Wow and Flutter:** 0.1% RMS at 7½ i/s; 0.2% RMS at 3¾ i/s; 0.25% RMS at 1¾ i/s. **Speed Accuracy:** $\pm 0.2\%$ or ± 3.6 seconds in 30 minutes. **4 Track Stacked Playback Head:** Designed for ideal playback characteristics of highest frequency response, plus maximum sensitivity, gap width 0.00012 in. **Cross Talk Rejection:** Better than 60 dB. **Motor:** Hysteresis synchronous motor, System Papst. **Automatic Stop:** When metallized leader tapes are used. **Valve Complement:** 6 ECC83, 3 ECC82, 2 Selenium Rectifiers, 2 EAM86. **Dimensions:** Teak cabinet 16 in. long, 12 in. wide, 6 in. high. **Weight:** Instrument alone 25 lb., with carrying case (priced extra) 30 lb. **Retail Price:** 110 gns. from Elstone Electronics Ltd., Edward Street, Templar Street, Leeds, 2.

* * *

THIS three speed four track recorder is designed to be incorporated in a high fidelity installation with wide range power amplifiers and loudspeakers. It can, however, be used as a compact portable recorder with headphone monitoring from the tape during recording. It is primarily designed for stereo recording from microphones, lines, or P.U., but it can equally well be used for mono recording with resultant increased storage capacity. It is also possible to playback one track and record on the other simultaneously with full mixing facilities, so that a complex track may be built up without the degradation of quality which is common with the usual superimposing process.

The layout of controls, input and output sockets, etc., are so exactly right that correct operation is almost instinctive, and one does not have to refer to the beautifully produced instruction book very often to find one's way about. Nevertheless the instruction book, and the extra data sheets supplied by Elstone Electronics Ltd., will repay careful study, as they contain a mass of detailed information which is invaluable during installation and early operation. For instance the A-B test is not immediately obvious from the marking of the controls, but

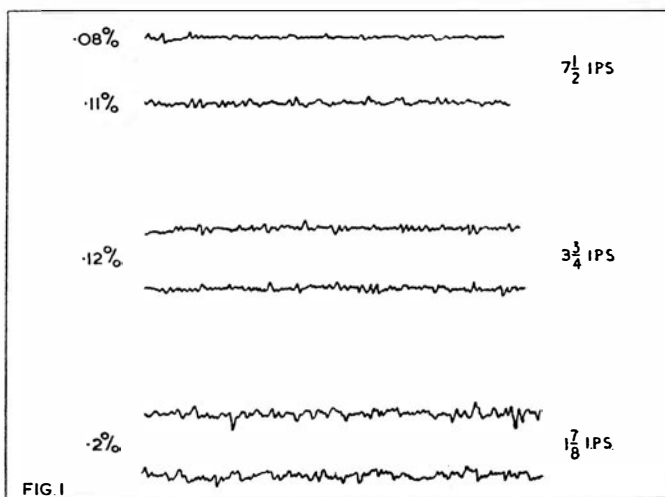
by using this switch it is possible to compare the incoming signal with that from the tape a fraction of a second later so that the slightest change of quality, noise, or distortion can be detected instantly.

The quality and level are so exactly matched that one has to stop the tape occasionally to convince oneself that the signal heard is actually off the tape. Even at the lowest speed of 1¾ i/s, on certain programme material, it needs a keen ear and a wide range speaker, together with a low ambient noise in the listening room to be sure which is which. With such a performance you can be sure that I could hardly wait to connect it to my test equipment and measure the responses, signal noise ratio, and wow and flutter that made such a performance possible.

Wow and Flutter

The tape transport system on this machine is so good that wow is almost non-existent, and the flutter is determined more by the surface finish and edge smoothness of the tape than by any part of the tape drive. The fluttergrams of fig. 1 were taken with a popular brand of double play tape, and it will be seen that the flutter has a random noise-like character without any periodic effect that can be associated with any part of the drive mechanism. The "noise" is mainly due to the very slight friction of the tape on the heads and the tape guides, and the fact that the tape is a slightly elastic medium which can be shocked into longitudinal oscillation by such friction. This effect is reduced to the absolute minimum by eliminating pressure pads on the record and play heads. A pad is used on the erase head, but its function is to provide a constant back tension rather than to hold the tape against the head.

At 7½ i/s the flutter remained below 0.1% RMS for very long periods, only very occasionally did it rise to 0.11% where friction effects happened to build up to a maximum. At 3¾ i/s the readings averaged 0.12% RMS with very little change in reading from beginning to end of a reel. At 1¾ i/s the flutter increased to 0.2% RMS, but it was still fairly random in character with



● Fluttergrams used to check for short term speed variations.

only a bare suspicion of wow at capstan rotation frequency when the cumulative record and replay wows happened to coincide.

This performance is quite outstanding, and appears to be due to the use of the Papst multi-pole hysteresis motor, which provides a very smooth drive by virtue of its heavy dynamically balanced outside rotor so that the stepped pulley, idler wheel, and flywheel are mainly used to provide the three alternative tape speeds, and do not have to smooth out the pulsating torque of the drive motor as in most other drive systems. The relatively low speed of the Papst motor allows the stepped pulley to be much larger in diameter than usual, so that the effects of slight eccentricity and dimensional tolerances are reduced. The idler wheel is also kept large for the same reasons. The flywheel is small for a recorder designed to work at 1¾ i/s,

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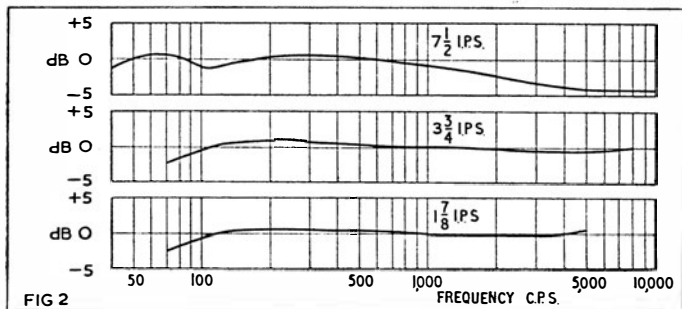
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but, as explained above, the drive is so smooth that it has little work to do. It goes without saying that the capstan, bearings, and pressure roller are finished to the highest possible accuracy.

Playback Response

C.C.I.R. test tapes having surface induction characteristics of 100 microseconds, 200 microseconds, and 400 microseconds, were played at the three speeds and the responses are shown in fig. 2. The step in the $7\frac{1}{2}$ i/s response indicates that the playback equalisation at this speed is matched to a 50 microsecond characteristic; this corresponds to the American N.A.R.T.B. specification for a speed of $7\frac{1}{2}$ i/s. British pre-recorded tapes with a C.C.I.R. recording characteristic will thus need a little



● Playback responses on C.C.I.R. test tapes.

top lift to play back with a level response. The $3\frac{3}{4}$ i/s and $1\frac{7}{8}$ i/s playback responses match the 200 and 400 microsecond characteristics which have been adopted in this country and Europe, so that British and Continental pre-recorded tapes will play with a level response. I understand that recent American $3\frac{3}{4}$ i/s tapes are now also recorded to the 200 microsecond response, but earlier ones used a 100 microsecond recording characteristic which will sound rather edgy and over recorded in high note response; a slight top cut in the associated amplifier will, however, soon put this right.

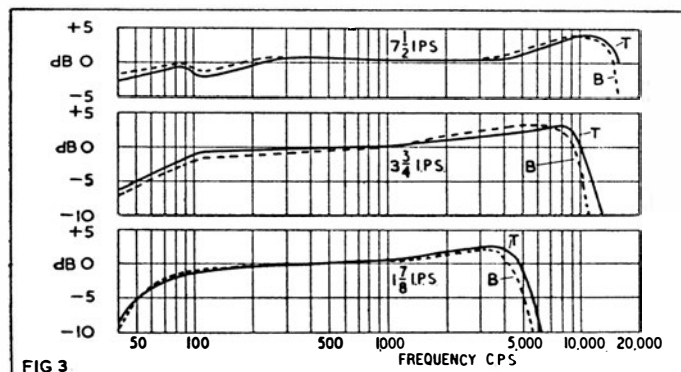
Signal Noise Ratio

The hum and noise was almost exactly 40 dB below test tape level on each of the three speeds. If we assume tape peak recording level to be 12 dB above test tape level, the peak S/N ratio should be in the order of 52 dB. This was confirmed by later recording tests.

Record Play Tests

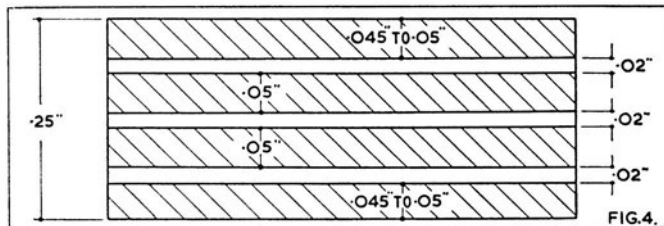
With the magic eyes just closed, each channel recorded a level + 10 dB on test tape level, and, with the tape sample provided, + 14 dB on test tape level could be recorded with negligible distortion. Thus hum and noise are at least 50 dB below the recording level produced when the magic eye just closes, and 54 dB below approximately 3% tape distortion level.

Fig. 3 shows the overall record/play responses for each of the speeds for top and bottom channels. The agreement between channels is all the more remarkable when one considers that record and replay heads are involved, together with the possibility of vertical and azimuth track misalignment, and a



● Record/playback response curves.

hundred and one small differences in equalisation and amplifier circuits. It just shows what can be done by meticulous inspection



and testing on a machine designed up to a specification rather than down to a price.

A circuit diagram is provided, and it was found that pre-set controls for bias, equalisation, magic eye sensitivity, etc., are provided for each channel. A covering letter from Elstone Electronics Ltd. suggested that bias may have to be altered if a different type of tape is used. I therefore tried a few other makes of tape and found that Continental tapes gave a more sharply rising high note response at all speeds, thus indicating the need for slightly more bias for such tapes. Conversely some British tapes gave a slightly restricted, but more level, high note response, but I have little doubt that reducing the bias very slightly would have duplicated the responses of fig. 3. The compromise bias adopted for this machine has therefore been chosen very carefully to give a passable performance on all available tapes, and the bias need only be altered for the absolute perfectionist or professional user.

Track Placement

As a matter of interest, the tracks on a recorded tape were made visible by a new preparation called Indicord; this is a colloidal suspension of magnetite in a liquid with a low surface tension which, when placed on the oxide surface of the tape, makes the magnetic pattern visible. It can, however, be wiped off again when required without harming the tape. The pattern

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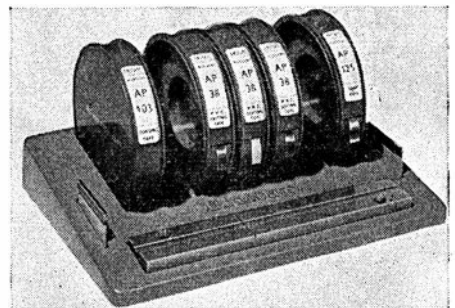
was examined under a calibrated microscope and the track widths were found to be approximately 0.05 in. wide, with the edges of the top and bottom tracks coincident with the edges of the tape, and with an unrecorded gap of 0.02 in. between each of the tracks, see fig. 4.

Reviewing this recorder gives me a chance to ride my favourite hobby horse once again, and to underline the difference between *clean* reproduction and wide frequency response regardless of any other consideration. The frequency responses of fig. 3 are not outstanding for a playback head with a 2 micron gap, but this is because Tandberg have chosen, quite rightly, to set the bias for minimum distortion at the highest tape speed, and to retain this optimum bias for the lower tape speeds regardless of some slight limitation of the *recorded* frequency response. That this policy pays is very evident after a few minutes juggling with the A-B switch and the tape speed control. The only audible effect of operating the speed control is to curtail the frequency response very slightly (one octave!) and to increase the tape noise slightly due to the tape "grain" noise coming down into the audible range at the lowest tape speed. The reproduction remains *clean*, even by immediate comparison with the original, and this, to my mind, is infinitely preferable to another octave or two of frequency "with whiskers on".

This recorder is a delight to test and use, and it is necessary to remind oneself constantly that it is a four track machine with two of everything in the space normally occupied by one. The performance would be considered excellent for a two track machine, but for four tracks it is quite remarkable. I can recommend it unreservedly for incorporation in any Hi-Fi installation.

A. Tutchings

★
E.M.I.
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THE new E.M.I. Editing Kit, mentioned in our December number as a useful Xmas gift, has now been given a good chance to prove its usefulness under average, amateur conditions in the home, and it emerges with all but full marks. It is indeed one of the better ideas in the realm of tape accessories. It is well thought out, well made, and very practical.

Its grey plastic base (8 in. × 5½ in.) slopes pleasantly from back to front, and provides fore-and-aft slots to hold seven 3½-in. containers. Five of these are supplied with the kit, leaving two spaces free for whatever item the individual user finds necessary. The reviewer immediately installed and filled the vacant slots with rolls of standard and long-play tape. The five cassettes as supplied, contain red, green and white PVC leader, stop foil—and *half-inch* width jointing tape. And that accounts for the proviso of "nearly full marks". Why not the widely used and recommended ¼-in. width?

A beautifully finished editing block (the Emitape "Edj-tall") is also included in the kit. This is solid and sturdy, measuring 6½ in. × 1 in. × 5/16 in. thick, and is slotted for 90° and 45° splicing. It is "undercut" so that tapes and leaders are gently held for working, and two countersunk holes are drilled for fixing it—either to the plastic base (also drilled) or the tape deck or work bench. Two slots in the base for two razor blades (provided) complete the kit.

This accessory is thoroughly recommended in every way, with the advice to purchasers to buy ¼-in. jointing tape to use with it! However, for those who do not mind an overlap of ¼ in. of sticky nonsense at either side, plus the use of scissors to trim it away, the ½-in. roll provided will do! But do *not* risk spoiling the channel in the jointing block by trying to trim the unnecessary excess, laterally, with a razor blade! E.D.

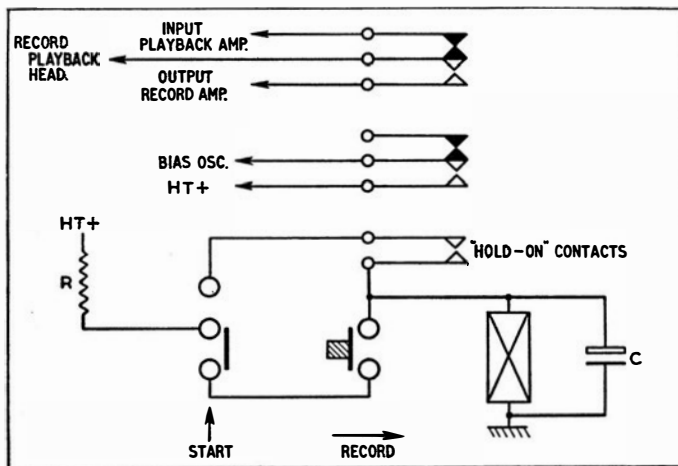
our readers write

. . . about an interlock "mod"

From:—D. Elston, 23 Rochester Road, Rock Ferry, Birkenhead, Cheshire.

Dear Sir:—The interlock device shown on page 601 of the January issue has one serious drawback, which is admitted in the final paragraph, namely, that recording can be started during playback by accidentally pressing the button.

The enclosed circuit does not suffer from this fault, as the record button has to be pushed *first* to actuate the relay *before*



the start button is pressed. If the start button is pushed first, the recorder is automatically connected to playback and recording cannot be started until this button returns to "Off". This circuit therefore has an electrical interlock. The value of "R" is determined by the current required to operate the available relay.

The value of "C" should be chosen to give a 2 or 3 second "hold" on available relays, until "start" switch has completed circuit. If the switch can be altered to "make-before-break", then condenser "C" can be omitted. Yours faithfully.

* * *

. . . about variable speed replay

From:—S. Jepson, Pentcliffe, St. Aubin, Jersey.

Dear Sir:—Mr. Lewisham (January) asks about a variable speed lightweight replay machine. If he can get an old-fashioned electric gramophone deck with governor, and put a Gramdeck on this, he will have what he wants.

I had (until I gave it away "pour encourager les autres") such a machine and could get speeds from below 3.75 to over 7.5 easily, with constant speed, and a weight of a few pounds, with a price a mere fraction of machines like the Reflectograph and Vortexion. When plugged into a Filmsound machine (12 watts) it gave very good reproduction, and the speed could be varied slightly during projection to keep perfect sync. Yours faithfully.

* * *

. . . about experts

From:—A. J. Merrill, 112 Elms Road, Harrow Weald, Middlesex.

Dear Sir:—Three cheers for Mr. P. H. J. Pittam. But why should he think that Leeds is the only city of unreliable tape recorder "experts"? I have had a new 4-track machine for three months, and up to now it has developed no less than five separate faults. One was corrected by accident, when the dealer took the mechanism out of the case to "look" at it.

How infuriating to be told by these unskilled shopkeepers that I have been unlucky!

My tape recording shop inform me that British-made tape is not suitable for continental machines because recording characteristics are so different, and that tape width varies in any case. (Although they are quite willing to sell me some).

When spending so much on a precision machine, the public has a right to expect that it should be trouble-free. But when this is coupled with such a display of ignorance on technicalities and general indifference, something must be done about it.

I should be grateful if you could help me with a problem which has arisen, and which several retailers have been unable to answer. Recording at a speed of 3½ inches per second I find an audible lapse in sound, which although momentary, is sufficiently disturbing to interfere with the listeners' pleasure. It has occurred on six LP tapes of different manufacture all costing 50s.

Although I have conducted extensive experiments, the faulty sections of tape continue to show themselves, and I can only conclude that the tape is not of a very good quality. Only the worst patches are noticeable at 7½ i/s, but still sound very bad.

Yours faithfully.

The trouble you are having with short breaks in recording is no doubt due to "drop outs", and may be faults in the tape, or just possibly maladjustment of pressure pads or tape guides (Ed).

* * *

. . . about salesmanship

From:—Grundig (Great Britain) Ltd., 39-41 New Oxford Street, London, W.C.1.

Dear Sir:—I am sorry that your correspondent, Mr. P. H. J. Pittam, has had such bad luck in picking a good Tape Recorder dealer in Leeds. I know both from our records and from personal experience a number of first class Grundig dealers in the City, but I agree that very often the salesmen in some shops everywhere seem to have very little knowledge of Tape Recorders, and not much interest in selling or demonstration.

We, at Grundig, hand-pick those people who sell our products, but we don't just leave it at that. In the last issue of our House Journal, the *Grundig Gazette*, which circulates only to Grundig dealers, we published an article on selling generally, and you might be interested in these brief extracts which formulate six golden rules for Retailers.

1. Let your staff read any of the trade papers you take when you have finished with them.

2. Pass round this copy of the *Grundig Gazette*, mark this article in red, and ask the staff for any suggestions they may have for improving the flow of communications and information.

(continued overleaf)

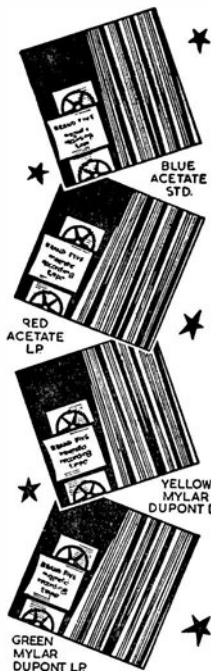


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Enquiries from Tape Recorder Manufacturers and Foreign Importers to:

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101 Leadenhall Street, London, E.C.3.
Telephone: AVE 6982



READERS' LETTERS—(continued)

3. Bring to their notice the contents of any manufacturers' letters or newflashes that aren't private and confidential.

4. Make sure they know the prices of current models in stock.

5. Make sure that someone is responsible for stocks of leaflets, and when stocks are running dangerously low, let it be someone's job to contact the representative, or manufacturer's publicity department and ask for specific quantities of specific leaflets, showcards, price tickets, etc., that are wanted urgently.

6. Above all, please do make sure that all the staff know how to operate and demonstrate the stock. Lunchtime is a danger time here, when perhaps the 'expert' of the shop is at lunch himself, and this is the only time that many members of the public find convenient for their shopping and enquiries. If John Public comes in at 1 p.m. for a demonstration of a Grundig Tape Recorder, and is met with a certain amount of disinterest, he will be put off straight away. If the shop assistant has to hunt around for a lead to connect the recorder, then can't start it without looking for the instruction book that has somehow got mislaid, you're in trouble from the start.

If the prospect survives long enough, and the machine is got into working condition only to find there's no mike, nothing on the tape, or perhaps even no tape on the machine, then your sale is as good as lost."

Yours faithfully.

* * *

... about listening levels

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

Dear Sir:—I was asked by some music lovers recently, "Why do you play your records at a 'louder than normal' volume?" Now, anybody's idea of a normal volume differs a great deal, and it would not be good for everyone to be alike, but I do like to hear music or records reproduced at a lifelike level.

I would like to point out that I do *not* always play my records at a "lifelike" volume, having respect for my neighbours, of course, but we are lucky in that our music room is situated right away from the adjoining house, with one wall running along the side passage. I explained to these people (who, by the way, did not ask the question because they were being deafened, but because they were curious) that if they sat quite near an orchestra it would sound quite loud. I also told them that I would like to sit right on top of the orchestra.

Of course, for background music, where people want to talk, soft music is suitable, or should I say adequate, but where a recording (a tape in this case) of a motor race is concerned, it is no use trying to suppress the noise of high-powered sports cars.

Surely, the sound of these cars racing past you excites the senses just as much as the senses are excited by seeing them. Remember—when you rely on *sound only*, a lot more concentration is needed than when looking at moving pictures as well. When watching a film, even Cinerama, the sound level could be lower than in real life, but watching the film would excite the senses and be mainly responsible for the illusion of reality.

To me, if you are going to *listen* intently to any reproduced sounds or music, it must be played considerably louder than background music. I think that this is most important. I would indeed be interested to read other readers' views about listening levels, as I think this has a direct connection with such complexities as loudspeaker size, cabinets and placing.

Yours sincerely.

* * *

... about copyright again

From:—R. P. Markham, 24 Greame Road, Bridlington, East Yorks.

Dear Sir:—Regarding letters about dubbing fees in the November/January issues of *The Tape Recorder*, I am also of the opinion that some "definite relaxation in restriction" is long overdue, not only in regard to dubbing, but to the structure of the Copyright Law and the reproduction of records to the public. I once owned a tape recorder, but like Messrs. Hall &

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Masters soon found out that, due to the standing laws (which date back to goodness knows when) it had its limitations.

Take the keen hi-fi enthusiast willing to take his equipment to his mate's Christmas party, which is being held in a local café, but does not hold the necessary licence—what a state of affairs—a lot of correspondence—a lot of money—and just to play half a dozen records for dancing in between games? What about the individual who wishes to make a recording of the outstanding events of the year taken from B.B.C. programmes, etc., and wishes to play back his recording outside his own four walls at, say, his Club, Society or Fellowship, at one of their social functions?

The tapesponder, the cine enthusiast wishing to add sound, have no freedom at all after purchasing expensive equipment. A composer claims a fee every time a composition of his is played as a public performance (anyone really found out yet what constitutes a public performance?) and for 50 years after his lifetime. Other people do not get the same recognition; for instance a carpenter does not, every time someone sits on one of his chairs. Surely the product of a man's hands are just as much entitled to be considered as another man's brains.

Yours sincerely,

* * *

... about the cost of tape

From:—A. H. Parkinson, Averlon, South Elkington, Louth, Lincolnshire.

*Dear Sir:—*On looking back through the correspondence columns of past copies of *The Tape Recorder*, I discovered two letters asking for articles and reviews on different makes of tape. In one case, a promise for such evaluations was given, but your pages have kept a stony silence on the subject ever since. Now, with American tapes available on the market, the difficulty of choosing which type to use, especially when one has a machine capable of using practically any tape fed into it, is prodigious.

One's choice is also governed by economy. It is surely no coincidence that nearly all leading manufacturers in the country charge 35s. per 1,200 ft. and 50s. per 1,800 ft. (Long Play). A price-fixing agreement is obviously in force, which is not in the best interests of the consumer. Tape is used so much more widely these days that one would have thought a reduction in price was possible. The situation has led to the establishing of a cut-price and surplus market, which deserves every encouragement from your magazine. One such firm already advertises in your columns. A London Store recently sold high-quality CBS Long Play tape at 32s. 6d. per 1,800 ft., and I regularly use the services of another firm selling admittedly inferior, though perfectly satisfactory, tape at 16s. 6d. per 1,200 ft. I, for one, am no longer prepared to pay the exorbitant full market price, when I can obtain equally good tape at a much lower rate.

Yours faithfully

* * *

External Loudspeakers

From:—P. J. Buxton, 14, Stephenson Drive, Burnley, Lancs.

*Dear Sir:—*I have the Ferrograph 2 A/N model. Its internal speaker is very good, but is it likely that the Axiette in proper enclosure would give even better results. I realise the more expensive speaker systems must be better, but how about the small unit, such as the Axiette?

I have a Goodman's 10 in. speaker (age and model unknown)—would it be likely that this unit, in a proper enclosure, would give better results than the recorder's speaker. I would appreciate any advice you could give me.

Yours faithfully,

We can say quite definitely that the quality of reproduction from your Ferrograph recorder would be improved by using a loudspeaker, such as the Goodman's Axiette in a suitable enclosure—for example, the cabinets for which Goodman's supply free scale drawings.

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No responsibility will be accepted by the editor, the publishers, or the printers of "The Tape Recorder", for the quality of any goods offered, bought, or exchanged through the medium of these columns, or for any failure in payment, etc., though the greatest care will be taken to ensure that only bona-fide advertisements are accepted.

All advertisements for the March issue must arrive not later than February 3rd.

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