FEBRUARY 1962
Vol. 4 No. 1

the TAPE RECORDER

PRICE 1/6

INCORPORATING "SOUND AND CINE"

IN THIS NUMBER

Thirteen years ago we started something...

. . . Remember 1948 — the year Manchester United won the Cup and My Love the Derby. It was also the year of the Berlin Airlift and the Wembley Olympic Games. To us, however, 1948 has an even deeper significance for this was the year when we first demonstrated the Ferrograph — the year in fact which virtually witnessed the birth of a new industry. For until the coming of the Ferrograph no Tape Recorder had been designed and commercially manufactured in Britain. Now today no fewer than 69 different makes are available in this country alone and reels of magnetic tape are being used at a fantastic rate.

Yes, certainly we started something and we are justly proud of our many contributions to the art of Tape Recording. For let it not be forgotten that many of the features incorporated in that first Ferrograph were destined later to become standard practice and are today to be found on many competitive machines.

Did we say "Competitive"? Well perhaps that's not strictly true because with its impeccably high standards of performance and manufacture we venture to think — and users appear to agree with us — that the Ferrograph is in a class by itself.

Series 4A
For conventional Monaural Recording and Playback
Model 4A/N (3¾/7½ i.p.s.) **81** GNS
Model 4A/H (7½/15 i.p.s.) **86** GNS

Series 4S
As above but in addition fitted with stereo head to permit playback of pre-recorded stereo tapes through external hi-fi amplifiers and loudspeakers.
Model 4S/N (3¾/7½ i.p.s.) **88** GNS
Model 4S/H (7½/15 i.p.s.) **93** GNS

Series 420
For Monaural and Stereo recording and playback, with monitoring, re-recording from one track to the other, introduction of echo effects and many other advanced features. Requires power amplifiers and external loud speakers.
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Three Independent Motors · Synchronous Capstan Motor · Recording Level Meter · Brief Stop · Interchangeable Plug-in-Heads Switched Speed Change with Compensated Correction Network · Separate Tone Controls · High Fidelity 2½ Watts Output Stage · Uses 8¼" Tape Spools · Gear Driven Turns Counter · Automatic Switch Cuts Motors at end of Spool · Endless Loop Cassette (Optional Extra)

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Models TA-IM and TA-IS

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TA-IM £18.2.6 TA-IS £23.6.0 TA-IC £6.10.0

TRUVOX TD-1 Mk. 6 TAPE DECK. Some of the facilities of this Mono/Stereo Tape Deck are: record; playback; fast-forward; fast reverse; dual braking; two tracks, side by side. **£29.15.0**

TRUVOX Mk 6
With **TA-IS £52.1.0** With **TA-IM £46.17.6**

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'THE MALVERN'

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FM-4U

S33

HI-FI STEREO 6-WATT AMPLIFIER Model S-33. Attractively styled, completely self-contained. Printed circuit makes it easy to build. Only 0·3% distortion at 2½ W/chal. 20 dB N.F.B.; sensitivity 200 mV. U/1 output, ganged controls. **£12.8.6**

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S88

REMOTE XIR-1U

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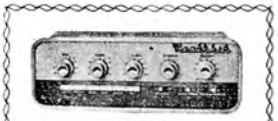
XIR-1U £4.3.0 **XI-1U £10.15.6**

MASTER XI-1U



USC-1

STEREO CONTROL UNIT
Model USC-1

Push-button selection, accurately matched ganged controls to ±1 dB. Negative feedback rumble and variable low-pass filters. Printed circuit boards. Accepts inputs from most tape heads and any stereo or mono pick-up. **£18.18.6**

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Model 545 'Unidyne III' for public address, tape recording, communications and similar applications requiring compactness with maximum operating efficiency.
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Model 540S 'Sonodyne II' This versatile new microphone features *variable frequency response*, allowing the user to tailor the microphone to the application.
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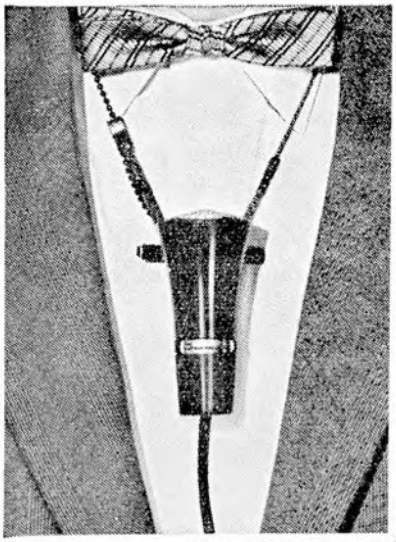

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Setting the world's standard in sound

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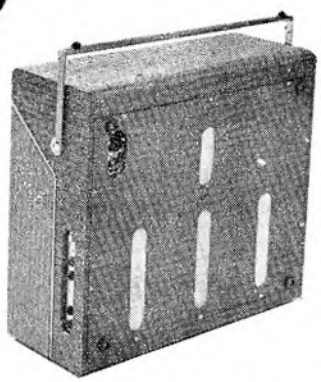
You buy the future-when you buy THE *BRILLIANT* SIMON SP5



Cabinet designed by
LUCAS MELLINGER, A.R.I.B.A., A.M.T.P.I.

(above) ready for use and (right) as it looks when carried. Note that the handle does double duty as a carrying handle, and also as a support in the record/play position.

Brilliantly designed, brilliantly styled, giving brilliant results—the SIMON SP5 uses well proved techniques and circuitry in a cabinet of revolutionary but functional design. The combination gives superb performance — and an outstanding range of facilities.

- ★ ***Seven-inch spools, twin tracks, two speeds, and pause control are features of the ruggedly designed high performance deck***
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IMPORTANT NEWS

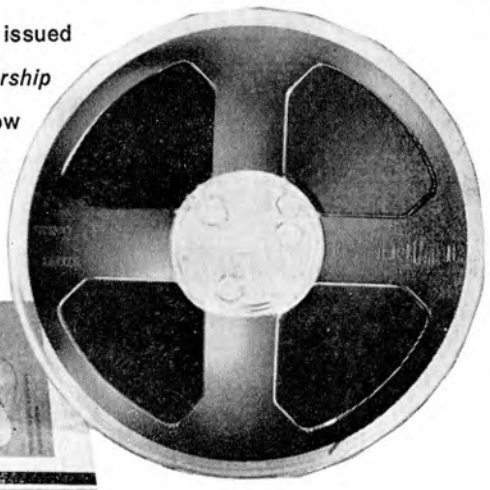
IF YOU OWN A STEREO TAPE-RECORDER

YOU NOW HAVE THE OPPORTUNITY TO HEAR THE FANTASTIC REPRODUCTION OF

STEREO 21

the newest, truest sound on tape today!

Revolutionary new STEREO 21 pre-recorded tapes (7½ ips twin-track) are issued exclusively by World Record Club. But they are offered *without membership commitments of any kind.* The first list of all-new STEREO 21 releases is now available. It features **30 superb stereophonic tapes** ranging from *Beethoven's Eroica* with Josef Krips conducting the LSO to a lavish full-cast production of *South Pacific.* As always World Record Club prices present unparalleled value — all STEREO 21 releases cost either 50/- or 60/- depending on playing time (up to 50 minutes). STEREO 21 tapes are now obtainable through leading retailers or direct, by post, from World Record Club.



Post the coupon for colour brochure with full details — *Now!*

STEREO 21 must be heard to be believed!

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Box 11, Parkbridge House, Richmond, Surrey

Please send me your free colour brochure showing the full range of STEREO 21 releases.

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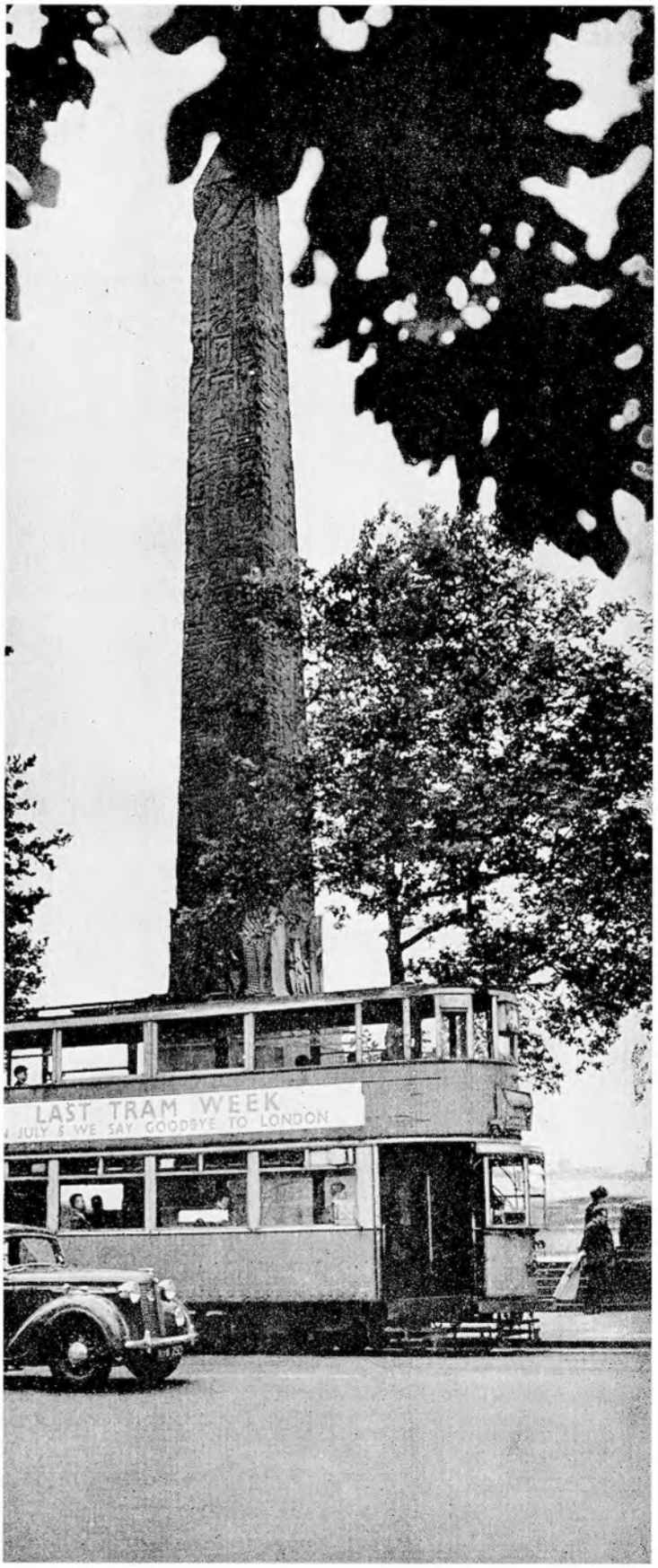
ISSUED EXCLUSIVELY BY WORLD RECORD CLUB

EMITAPE captures all the right effects



You can still hear the rumble-hiss-whine of a London tram in Covent Garden—it's just one of the 60,000 effects on Emitape at Stagesound, Britain's largest independent effects library. But, if Stagesound keep their tabs on the past, they've also got more than half an ear on the present with a satellite's bleep to match the croak of a klaxon.

All these miles of Emitape at Stagesound keep ITV, commercial radio and film studios well supplied with any effects they may want. Incidentally, Stagesound also supply most of London's West End theatres with alarums, excursions and noises off.

There simply *must not* be any mistakes in this business. That's why Stagesound always use Emitape—the world's finest magnetic recording tape.

EMI Emitape

E.M.I. TAPE LIMITED, Hayes, Middlesex.

ET30

FEBRUARY - - - - - - - - - - - - 1962
VOL. 4 - - - - - - - - - - - - - - - - No. 1

the TAPE RECORDER

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CONTENTS

EDITORIAL

BECAUSE the subject of service and servicing is of such importance, both to our readers and to the whole trade, we pursue it still further in this column. Ever since our first attempts to begin to sort it out, we have received a regular and increasing flow of letters, from dealers and from customers in practically equal measure; and from what we have ourselves read in another journal (published for the trade and for dealers only), we realise that our own approach to the problem must be the correct one—provided that we follow it strictly and impartially. For the moment, however, let us put our readers fully into the picture by lifting a corner of the curtain that usually hangs undisturbed: for we think that it will lend emphasis to what we are hoping and endeavouring to do.

Any form of service costs money: the difference between really good service and indifferent service can be measured in terms of relatively little money. A dealer who has his customers' interests high up on his list of essentials knows all this: he is not a man who will cheesepare to the extent of fitting a sixpenny component, when a ninepenny component will do the same job but will also please his conscience. And the man with this healthy outlook will not cheesepare when it comes to seeking and engaging the services of a good engineer. An extra forty shillings per week (a hypothetical example) when spread over the cost of servicing, say, twelve recorders per week, will add only 3s. 4d. to each bill . . . and as the genuine customer would cheerfully agree with the genuine dealer, such a small item would be more than worthwhile for a job well done, as compared with a job crudely "bodged up". There is, as we know, a reluctance on the part of some dealers to loosen the purse strings for their "service departments": and on the other hand there are, as we know equally well, many really good dealers who regard their service departments as an essential part of their businesses.

That said, let us return to our main theme. It would obviously be impossible for us to present our readers with a complete list of good and reliable dealers. We have got to do this job thoroughly, having started it; and the only fair way of doing it (we think) is to invite dealers to write to us and tell us about what they have to offer their customers—and, equally important, to invite readers to recommend dealers to us when those dealers have given them good and fair treatment. Obviously, this invitation works both ways, and we have (and are still having) letters from readers who express dissatisfaction about their dealings—both with dealers whose names we have still to publish, and with one or two whose names have already appeared in our columns, offering good service. One reader condemns us strongly for providing what he calls "a glorified advertising scheme for dealers". He is of course correct. We want this to be a strong advertisement for those who deserve it: but, equally, we are taking most careful note of all complaints. This, it must be clearly understood, is only the first stage of our campaign. Our first duty is to our readers; and within our modest limitations we intend to see that their interests are looked after.

It must not be forgotten, however, that dealers in tape recorders are up against two important factors in their aim to provide good service. First, the fact that several firms, now driven out of business by their own sloppy methods of trading, have been responsible for a lot of shoddy products which are still gumming up the works. Second, that there are unfortunately quite a few people who not only abuse fairness, but also make an over-loud song about their grievances.

These facts must be mentioned because they colour the whole picture. In the fullness of time, however, the scene will clear. The public will go to the dealers who inspire them with confidence, and in so doing they will automatically protect themselves by benefiting from the advice of those dealers when they want to buy. That, again, is a two-edged blade. The sincere dealer not only wants to see his customers satisfied for their sakes, but he also wants to be quite certain that he is recommending them to buy something that will cause him—and his good name—least trouble. Good dealers: good service engineers: good trading. The three are inseparable in this sphere. Our columns are wide open for material that will help to bring them all closer together.

COVER PICTURE

ONE man and two masters may not be a good thing; but one master and eleven slaves seems to be a very good thing, as portrayed by our cover picture—and one man manages to cope with the lot very comfortably. The units shown include the master recorder, the eleven slaves and the control unit. The picture was sent to us by the Ampex Corporation of America and was taken in one of their fully-equipped dubbing studios for the production of four-track stereo tapes.

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).

Great newcomer to the Greatest range of Tape Recorders

STAR VALUE AT ONLY 27 GNS!

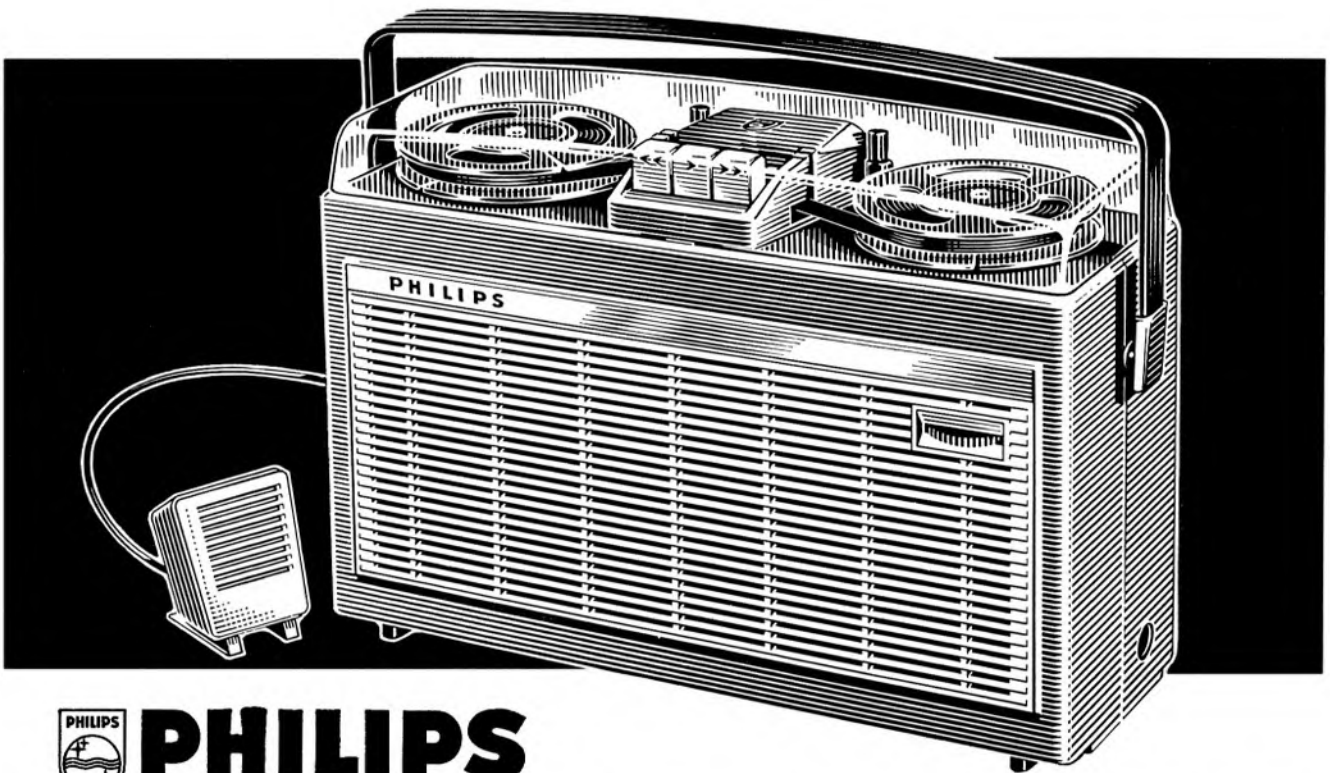
including microphone, 4" reel of L.P. tape and radio connecting lead.

Now the world's finest range of tape recorders gets a brilliant addition – the fabulous Philips 'Starmaker'. Combining snag-free ease of operation with revolutionary design and outstanding performance, it opens up a fascinating new world of exciting entertainment for the newcomer to tape recording.

Everything the 'Starmaker' does is governed *completely* by just six error-proof controls. It's got a whole host of other advantages, too: economical mains operation, 4-track recording and playback; 4 hours playing time on a 5" reel of double-play tape; fast winding and re-winding; moving coil microphone; *plus* brilliant reproduction from the 6½" loudspeaker.

The vertical design and lightweight compactness of this sleekly styled recorder make it exceptionally *portable.*

See the Philips Starmaker in operation and hear it play at your local Philips dealer. It will convince you that no other machine in its price range can give you such a marvellous performance.



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STARMAKER TAPE RECORDER

. . . the unique new mains 4-track machine

PHILIPS – THE FRIEND OF THE FAMILY

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(PR3897)

HOW OTHERS USE TAPE

Mr. C. V. Baker is welcomed to the Wendy House by three members of the Infants School. The recorder operator is Linda Lewis.

TO all outward appearances Barnham County Primary School looks very much like any other village school. That is where the similarity begins and ends. On arrival by train, 'bus, car, or on foot, the visitor is met long before he or she reaches the main door of the school and *not* as one would expect by a member of the staff.

As our car drew up eleven-year-old Linda Lewis accompanied by Keith Marner, eleven, and Paul Ingram, ten, came over to shake hands and invite us to the B.B.C. studio for a cup of tea. B.B.C., of course, stands for Barnham Broadcasting Corporation. Here we were introduced to Mr. H. S. Hooton, Headmaster, and two members of his staff, Mr. C. V. Baker and Miss E. A. Hortop. The studio, which also does duty as a chapel, has a complete closed circuit transmitting station housed in a cupboard in one corner of the room. Two tape recorders—one mains and one battery portable—form part of the broadcasting station's equipment. Every room is wired for sound so that recordings can be relayed to any part of the school at any time. How is it done?

Both Mr. Hooton and Mr. Baker are enterprising ex-R.A.F. radio mechanics with go ahead ideas on how to educate the young. Starting with two amplifiers, they then set about raising the money to purchase all the equipment necessary to run an efficient broadcasting studio. They organised raffles, bingo sessions, jumble sales, and any other means of getting in funds they could think of—and the donations rolled in. The result is a first-class system, and a hundred self-possessed, well-spoken youngsters with ages ranging from four to eleven, to all of whom learning is fun.

Script Writing

From the time they enter school, even the tots are taught to develop confidence. The Wendy house in the garden was built by the children, the path laid, the garden planned and tended by them. They have produced their own hymn books and for each hymn in the book there is a taped accompaniment. Scripture stories too, are taped, but with a difference. The children are given verses from which they must produce a script to cover a recording time of three-quarters of an hour, a task that would tax the wits of an expert, but to the pupils at Barnham who are trained to work with a tape recorder from the age of four, this presents no problem. When the finished script has been approved, the recording is made and transmitted to the classrooms at a suitable time. Other "exercises" include visits to places of interest with a portable tape recorder. Six of the senior pupils recently visited a local plant, interviewed the managing director, and on return produced a first-class programme on the visit. The managing director was invited along to listen to the broadcast after which the children listening in the classrooms telephoned questions through to him in the studio. His verdict—the most accurate write-up his works had ever had!

During our visit an impromptu reading from "The Wind in the Willows" with about half a dozen children seated round the table speaking the different parts, resulted in a perfect recording on the TK 1. Linda Lewis was at the controls of the machine. Not only were there no hesitant or faultering voices but each child got right under the skin of the part he or she was playing —and this with no rehearsal.

Any ideas we may have had about interviewing Mr. Hooton, his staff or any of the children were soon swept away. "*We* are interviewing *you*", announced Keith Marner. "I will run through the questions we are going to ask you, and then we will record the whole interview". Keith, Paul and Linda had been given the barest outline of who we were and where we came from. From that they compiled a series of questions most likely to produce answers that would be of interest to the school as a whole, for all interviews with visitors are broadcast later.

To many this may sound like all play and no work, but the system has proved itself by the high standard attained by the children leaving this far-from-ordinary village school. A very high percentage pass the eleven plus going on to Grammar School, and those who do not, have no sense of failure, passing out to do well in the kind of work best suited to their own particular talents.

This school really enjoys visitors. No special arrangements are made to receive them and anyone, however important he may be, is welcome to call on any ordinary working day. The result is that the children, from the tiny tots upwards, are natural and self-confident, without being precocious.

Mr. Hooton is to be congratulated on developing the use of the tape recorder in school to such a high level and proving the vital part this machine can play in the training and development of young children.

B. Marriott.

* * *

ONE British manufacturer knowing just how impatient a purchaser of a new tape recorder is on arrival home from the shop, has printed in the front of the detailed instruction book . . . "Now that you have tried it your way, please read the instructions".

* * *

New Tape Clubs

Mr. R. Black, 6 Victoria Avenue, Clifton, Brighouse, Yorkshire, is anxious to form a tape recording club in the Brighouse area. Any readers interested should write direct to Mr. Black.

MR. D. Dudley, of 37 Rupert Road, Holloway, London, N.19, would like to hear from any reader interested in joining the Islington-St. Pancras Tape Club.

News from around the Clubs

The above photograph was taken just after the Annual General Meeting of the York Tape Recording Society. The chairman of the club is seen on the extreme left of the group.

WALTHAMSTOW'S tape recording enthusiasts presenting one of their regular fortnightly series of "request" programmes to the Connaught Hospital had special recordings made by Mayor, Ald. E. C. Redhead, J.P., M.P., from the quiet of the Mayor's parlour and from the hurly-burly of Lonnie Donegan's dressing room at the side of the stage in the Hippodrome theatre, Birmingham. These recordings, together with many other unusual items, were combined in the extra long "special" edition.

Paying tribute to the Society's services, the Mayor commented, "Happily, by the courtesy and thoughtfulness of the **Walthamstow and District Tape Recording Society,** I have the opportunity to speak to you all through this little instrument, almost as if I were by your side at this moment. Will you imagine that I am?"

Introducing his contribution with his guitar, Lonnie Donegan spoke with a background of the pantomime "Cinderella" being performed on stage.

Announcers Tony Norton and Graham Ford introduced the programme with a recording taken just before Christmas of St. Saviours Church choir practising for the church's carol service. During the programme was featured their rendering of the 14th Century German carol "In dulce jubilo" (Ding dong, merrily on high). Several tributes were paid to the nurses and staff of the hospital by patients, ex-patients and visitors. Further information on club activities can be obtained from *K. Perks, 9 Third Avenue, Walthamstow, London, E.17.*

* * *

AMBITIOUS plans necessitating a change-over from fortnightly to weekly meetings were announced by the chairman, Mr. Don Hughes, at the annual general meeting in December of the **North London Tape and Hi-Fi Club.**

The full programme for next year will include five meetings devoted to assembling an electronic mixer and practice in using it. Mr. Hughes hoped that in the following year more equipment would be made during club hours.

Regular competitions carrying an annual "Tape of the Year" trophy, a quarterly newsletter for circulation to other clubs, brains trusts and debates would also be included.

The secretary, Mr. Richard Collinson, said that members had been extremely active on behalf of the club during the past year and should be congratulated on their efforts. Many members had competed in club competitions—the entries for which had to be produced at home. A programme about the Enfield Show in September was produced for local blind people and sound effects were recorded for a soldier in Belgium. A number of hymns and Christmas carols were recorded for an Enfield hospital. Meeting subjects varied from impedance matching and maintenance to dubbing and mixing.

The secretary and chairman were re-elected to office. Treasurer: Miss Pat Allbutt. Committee: Ray Maslin, John Wilson and John Davies. Meetings of the club are now held *every* Wednesday at Bush Hill Park School, Main Avenue, Enfield, Middlesex. Details from *R. Collinson, 30 Ridler Road, Forty Hill, Enfield, Middlesex.*

* * *

TEMPERATURES well below freezing, and roads sheeted in ice did not prevent a goodly gathering of enthusiasts on December 28th, to a programme of sound films given by members of the **Cotswold Tape Recording Society,** who practise the art of coupling sound to moving pictures.

Alfred Townroe began, with a series of films made at zoos over the country: Bristol, Paignton, Whipsnade and Dudley. To the films he had added musical accompaniment, with sound effects recorded on the spot mixed in. There were some particularly effective shots of lions rushing to grab pieces of meat, and of seals racing. Scenic effects at Dudley Castle were also much admired.

Ray Tingley followed with some quite different films, depicting incidents in the life of his family. These were accompanied by some very effective musical scores, partly provided by Ray himself; and also by a spoken commentary. Great interest was shown by members in the technical problems of sound-mixing involved.

Details of club activities during the coming months are available from *P. D. Turner, Cave Cottage, Oakridge Lynch, Stroud.*

* * *

Mr. R. Trotman, a member of the London Tape Recording Club, replaying extracts from the braille reading contest. Secretary T. Devereux (left) and chairman K. Blake listen intently.

News from around the Clubs

THE interest in tape recording in the **Huddersfield Tape Recording Society** has increased greatly during the last few months. In co-operation with the Huddersfield Hospital Broadcasting Association, members have recorded many interesting items. Permission has been obtained for a recording to be made of the Black Dyke Mills Band and the Colne Valley Male Voice Choir in the local Town Hall.

The lecture meetings organised by the club in the public library are well attended, many interested visitors have joined the club as a result of these lectures. Anyone with or without a recorder is invited to visit this club, the address of the meeting place can be obtained on request from *J. D. Iredale, 9 Ingfield Avenue, Dalton, Huddersfield.*

* * *

NEW club rooms have been acquired by the **South Birmingham Tape Club** and have been open since 1st January. Club nights will be as before, i.e. on alternate Mondays. The address of the new meeting place is the People's Hall, Oak Tree Lane, Selly Oak, Birmingham. Further details may be obtained from *W. A. Judd (Hon. Sec.), 1 Jeremy Grove, Sheldon, Solihull, Warwickshire.*

* * *

UNUSUAL experiments with microphones is reported by the **West Herts Tape Recording Society** in their monthly Newsletter. Mainly using an ex-W.D. throat microphone, interesting sounds were obtained by placing it in certain positions. Strapping the microphone round a glass jar full of water and then bursting a balloon floating on top produced a beautiful sound of bubbling liquid. One other experiment was the placing of a crystal microphone in a polythene bag and then breaking some glass in the bag. At a recent meeting at Watford, a lecture and demonstration was given to the Watford Cine Society by John Grainger at which some tapes made by the club were played. Further details may be obtained from *P. Holloway, 29 Fishery Road, Hemel Hempstead, Herts.*

* * *

THE **Bath Sound Recording Society** has acquired its own studio after two months of searching the City for a suitable room. This after much hard work is now ready for recording and the club members meet every Wednesday at 7.30 p.m. Details are available from *K. W. Gingell, Fistral, 45 Fairfield Avenue, Fairfield Park, Bath.*

". . . So they decided to leave the commercials out at the last minute. . . ."

Mr. P. D. Turner (left), secretary of the Cotswold Tape Recording Society, explaining the advantages of using tape.

THE fourth Annual General Meeting of the **Coventry Tape Recording Club** was held recently and twenty-nine members attended. Mr. R. Penfold, the chairman, reported that the club was now in a stronger position that at any time in its history. This he stated was due solely to the hard work put in by a comparatively small number of members who constitute the backbone of the club. After reports by the treasurer and secretary a new committee was elected. Mr. P. C. Warden was elected chairman for the coming year with T. C. Bagley (treasurer) and L. S. Day (secretary).

Readers interested in joining this club should contact *Mr. L. S. Day, 41 Moseley Avenue, Coventry.*

* * *

THE **Glasgow and District Tape Society** advise a change for future meetings. The club will meet in the Highlanders' Institute, Berkeley Street, Glasgow, on alternate Tuesdays and Thursdays fortnightly. Time 7.30 p.m. Several groups recorded the Christmas revels in George Square and also interviews made during a visit to the Kelvin Hall Carnival. New members welcome. Write to *G. Dryden (Secretary), 43 Daisy Street, Glasgow, S.2.*

* * *

THE **Crawley and Sussex Tape Recording Club's** third Annual General Meeting was most successful both from the point of view of numbers attending and for the lively debates that followed. With the president, H. Frost, in the chair, the meeting opened with a report from the secretary, and the reading of the financial accounts from F. Whittingham. A vote of thanks was given to the secretary, treasurer and committee for their valuable work in the past year.

During the interval refreshments were served by Mrs. V. Whittingham and during the latter part of the evening, members heard a tape produced by the treasurer. Club details for the next month can be obtained from the secretary, *R. C. Watson, 32 Southgate Drive, Crawley, Sussex.*

* * *

THE **Ilford and District Tape Recording Society** recently welcomed Mr. Tony Bernard, the entertainment editor of the Ilford Recorder, who spoke on the subject of "Commercial Radio and Local Broadcasting of the Future". It was pointed out that local tape recording clubs certainly could help with recordings, just as amateur photographers do now with exclusive pictures. Question time followed and it was soon realised that there would be plenty of willing helpers in the Ilford area. Meetings are held weekly at the R.A.F.A., Cranbrook Road, Ilford. Details from *D. Bolton, 13 Gloucester Road, Manor Park, London, E.12.*

* * *

A PERMANENT meeting place is the greatest worry of the **Bristol Tape Recording Club.** Members are requested to be on the look-out for suitable premises in the Clifton district. For further details write to *M. E. Hollier, 27 Dean Lane, Southville, Bristol, 3.*

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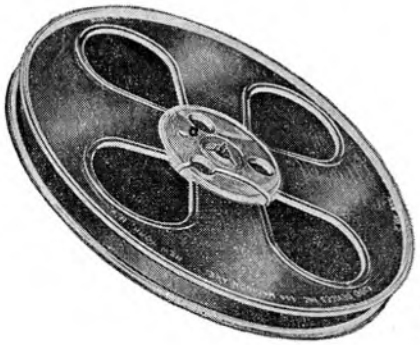

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NEWS FROM THE WORLD OF TAPE

GIANT airliners, taking off and landing at modern airports, pose one of the most difficult of noise abatement problems, as these airfields are naturally situated close to centres of population. As long as the trend towards bigger and faster aircraft continues, this problem will grow worse.

Bristol Siddeley Engines Ltd. are using professional magnetic tape recorders supplied by E.M.I. Electronics Ltd., in a research programme aimed at modifying engine designs to reduce noise levels. One stage of the programme is to investigate the distribution of noise around an engine at various distances and to determine what ranges of frequencies predominate.

Tests have recently been taking place at an R.A.F. airfield in Goucestershire, selected for its remoteness from residential areas and for the comparative absence of extraneous noise. A mobile test bed is firmly secured to the ground to withstand engine thrust. Up to four microphones are sited at various distances and angles from the engine. E.M.I. tape recorders and associated noise measuring equipment are housed in a mobile laboratory 50 yards away, the engine being controlled from a second caravan.

High by-pass ratio ducted fan engines are being designed and developed which reduce jet noise by 50 per cent., but this tends to emphasise the noise from the air intake. Considerable research work at present is, therefore, concentrated on the testing of intake silencing devices with a view to reducing compressor whine at source.

After an engine has been tested at various speeds and the resultant noises recorded, the tapes are sent to the Bristol Siddeley laboratories at Coventry. There they are analysed and, among other things, the various component noises are related to their respective sources within the engine. The design can then be modified, where practicable, to reduce the noise level.

Noise from aircraft in flight at various heights and speeds after taking off from London Airport have also been recorded and analysed in the same way. This technique, of recording and analysing noise levels of moving objects, requires the use of a high-quality tape recorder.

* * *

Ampex Win Large Order

AMPEX Great Britain Limited have recently received a substantial order from Ferranti Limited for Ampex TM.2 digital tape handlers. This order, worth more than £300,000, is the largest single order for digital tape handlers so far placed by a British computer manufacturer. These high performance machines will be used in the Ferranti Orion computer and the Atlas computer developed by Ferranti Limited in co-operation with Manchester University. Growing demands for these computers have brought about this order.

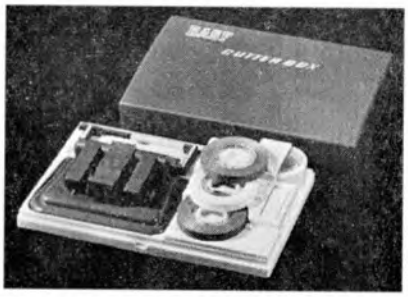
The machines are in addition to 57 similar machines on earlier orders now being delivered to Ferranti Limited. The machines are being manufactured in Great Britain by Ampex Electronics Limited of Reading who also manufacture digital tape handlers for other British computer manufacturers.

The Ampex TM.2 has advanced design features and is capable of high effective transfer rates. It is the successor to the FR.300 digital tape handler which has been proved in operation in many computer installations. The Ampex Corporation is now a leading supplier of memory devices to the computer manufacturers of Britain, Europe, and the United States.

★

B.A.S.F. TAPE EDITING KIT

★



A COMPREHENSIVE accessory kit has been announced by B.A.S.F. Chemicals Ltd., called the B.A.S.F. Cutter Box. It has everything required for tape editing and contains semi-automatic splicer with space knife and groove; 4 tape clips, 50 automatic stop foils, 35 ft. roll of splicing tape; 80 ft. roll of each green, red and white leader tape; and a supply of spool labels.

The contents are packed in an attractive rigid plastic box and costs £2 12s. 6d. Manufacturers **B.A.S.F. Chemicals Ltd., 5a Gillespie Road, London, N.5.**

* * *

MEMBERS of the **Friern Barnet and District Tape Recording Club** held their Christmas social on December 19th. The Fulton cup was presented to the winners of the tape competition Mr. C. Green and Mr. F. Inman by Miss G. Hunter. Details of future activities can be obtained from *A. Andrews, 13 Hartland Road, Friern Barnet, London, N.11.*

Mine won't do that, Bill! . . .

our readers write . . . . .

. . . about puppets and tape

From:—W.O. II R. J. Abbott, R.A.O.C., 12 Inf. Wksp. R.E.M.E., Osnabruck, Germany, B.F.P.O. 36.

Dear Sir:—With the unit Children's Christmas Party only three weeks distant we of the 12 Infantry Workshops R.E.M.E. Sergeants Mess decided it was time to do something about it. But what? Film shows are not much of an attraction to children in these days of television. Clowns? Being natural clowns all the year round wouldn't present anything new. Punch and Judy? Well, yes—but how? Where and with what? Staff Sergeant John Lee and myself gave the idea some serious thought and decided we should try and put on a show. With only three weeks to plan and practise we had no time to purchase the Punch and Judy puppets from England or locate the traditional story, so we wrote our own tale based around the German equivalent Caspar and used German puppets.

Being a very keen tape recording enthusiast I brought into use my Ferrograph and Vortexion recorders by pre-recording the show thus allowing us at the time of presentation to concentrate solely on the manipulation of the puppets.

Pre-taping also enabled me to use music and the show opened with an exerpt from Orpheus in the Underworld. King Tronky made his majestic entrance to the strains of March Slave and Caspar clobbered the wolf silly in strict tempo with Overture William Tell. All the parts were played by men including that of Princess Petal who was played (or voiced) by a somewhat hairy sergeant with a very forced falsetto.

The show, in spite of "first night nerves", was a huge success. The kids loved it, especially the gory bits, and we are now dreaming up new ideas for the entertainment of children (and adults) incorporating tape and puppets.

I enclose photograph of Johnny Lee (on the right) and myself with our equipment. The photos were taken by Sgt. Lee who gives his consent to reproduce should you so desire. If fellow readers of our magazine have had any experience in presenting hand puppet shows with the use of tape I would be pleased to hear of their experiences. *Yours faithfully.*

* * *

. . . about the Gramdeck pause control

From:—C. D. Kemshall, 72 Oakridge Road, Basingstoke, Hants.

Dear Sir:—Mr. Churchill's comments in the December issue on the method of pause control he uses on his Gramdeck were interesting.

As an alternative to holding the two spools as well as disengaging the pinch wheel, one can stop the motor driving the gramophone turntable by inserting a switch in the line from the starting control of the gramophone to the motor. There will be a very slight pause here on recommencing as the tape runs on for about half a second, but if that can be tolerated the main snag is to overcome the loud click that is picked up by the recording head when the motor switch is opened. This can be done by turning the control switch to "off" just prior to operating the motor switch. The reverse procedure applies to starting the Gramdeck and the method is better than starting the turntable normally, particularly if the gramophone used has auto-change; otherwise rapid fooling of the auto-changer may be required, which sometimes results in the pick-up arm hitting the take-up spool, causing tape spillage!

Converting the Gramdeck to 3¾ i/s allows many other tapes, recorded on standard machines, to be played. This can be done provided the owner has the use of a lathe, as a new capstan wheel needs to be made. These are easily fitted and detached but the only suitable size is 1.592 in. diameter run at 45 r.p.m. This figure is obtained from the formula: diameter in inches =

$$\frac{\text{speed required (i/s)}}{\pi \times \text{revs/sec of turntable.}}$$

In this case an elastic band fitted over the lever a m is needed to provide the required pressure. *Yours sincerely.*

* * *

. . . about tape prices

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

Dear Sir:—Do permit me to add my enthusiastic suppo t to the remarks of Mr. Bartlett Still. I recently heard Mr. Peter Walker make a similar point in his own inimitable style, when lecturing to the B.S.R.A. in Bristol.

The reason why we have permitted every technical advance to be "withdrawn by a reduction in tape speed or track width", however, is not playing time as such, but the cost of tape: a 7 in. reel of double play tape permits a full hour's recordin3 at 7½ i/s: and it is only rarely that one needs so long a run without the possibility of changing spools. The reason why people want to slow the tape and multiply tracks is because they resent the cost of tape, and rightly so. When one realises that despite the vast increase in the amount used, the price has not come down, though in the United States tape costs not relatively, but absolutely, only one-half to one-thi:d of the price of the same grade in this country.

I am convinced that, were it not for this question of cost of tape, not only would technical standards of recording be much higher than they are, but tape recording would be much more popular than it is, for the initial cost of a recorder can be borne by people who yet jib subsequently at the cost of establishing a library of tapes. With machines of the kind visualised by Mr. Still, giving true high fidelity for less than £50, and tape at a reasonable price, recording could indeed become the creative hobby of millions. *Yours faithfully.*

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SOUND and CINE

Compiling Sound Tracks

by Richard Golding

QUITE a number of film makers regard with horror the compilation of a composite sound track that has to contain narration and effects or just music and spot effects and although the equipment they possess is adequate for the purpose, they feel that the result hardly justifies the effort. This does not mean, however, that they resign themselves to a simple commentary and music track but it does mean that if they find, after a few evenings' work, that the desired spot effect is still some few frames out of sync they are inclined to leave it just that much out and hope that it will get by. Patience is needed for the exact synchronisation of spot effects, as many of my readers know, and the longer the film the more involved becomes the positioning of the required split second effect.

Most beginners find the recording of commentary and music enough of a headache as it is and, although they would like to impart a little extra punch to the track, they dare not attempt to place spot effects on a long separate tape or striped film.

Placing spot effects

An interesting experiment for old hands (and also one to start the beginners off slowly on the business of placing spot effects) is to have a sound gimmicked title to start the film. The following picture and track could have just narration and mood music, but the punch of the title could set an atmosphere to last through the early scenes. The most obvious example for a travel film could be the title superimposed over the introductory shot—let us say, a ship's funnel; and in this case, when the siren blows off steam, the sound lasting about four seconds could be matched perfectly to picture. As this point is close to the start it should be easy to locate the sound without the use of loops or any other complicated arrangement, and with a title of about seven seconds duration—and where the spot effect is to start three seconds precisely after the cue marks—the sound transfer should present no problem at all.

Apart from superimposed and home shot titles this can be carried out with the great number of commercial titles that can be had in both 8 and 16 mm. Capitol Films, for instance, market some catchy animated titles that lend themselves to this idea. "Scotland", with its marching bagpiper, "Spain", with its charging bull and disappearing torero, and "Italy", with its Tower of Pisa suddenly leaning over, with suitable spot effect could give the introduction that something different that we are always searching for.

Animated sound titles

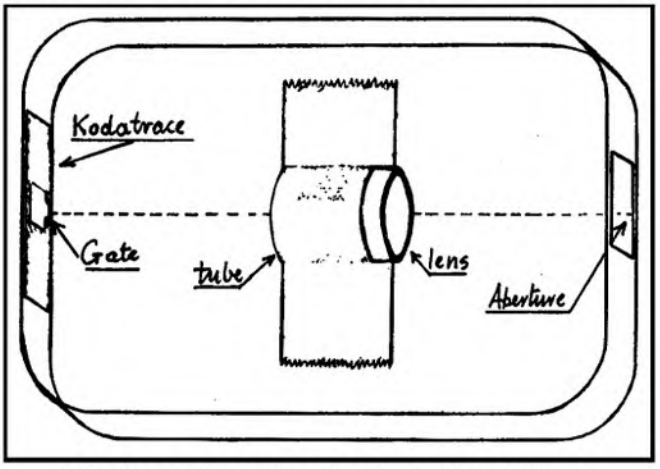
Although the bought title can be right for the film and can save time and work, there is always great satisfaction to be had from making your own title, especially now with the improved and easy-to-use lettering on the market. Animation of a title is not really as difficult as it seems. Some drawing ability, of course, is needed, but know-how is just as important as artistic talent.

For a very effective sound title of 120 frames lasting 7½ seconds at 16 f/s (180 at 24 f/s) to precede our holiday cruise film the four pictures in this brief storyboard illustrate what can be done with a simple basic idea. The animation of the steam and the seagull is best painted on celluloid sheets (cels) while the ship's funnel can be painted on a piece of sky-blue card. The background and cels should register perfectly with one another and one way to do this is to punch holes at the baseline of each with an office punch. A registration bar with pegs to fit these holes can be made from a strip of ¼ in. thick wood and two brass screws. Take a punched cel and place it on the strip of wood and mark both holes with a pencil. Into these pencilled circles the brass screws may be set well down and the heads cut off with a hacksaw. The screws must fit the cels and background perfectly otherwise cel wobble may result and upset registration.

The animation will start immediately the seagull appears on the top right frame line and this can be frame 1. The sound effect will start immediately the steam is seen coming out of the siren. To simplify the painting sessions the animation can be designed for double frame shooting, i.e. each cel is shot twice instead of once. At 16 f/s this means that there are 8 movements to each second, and this is about the minimum, for any drop below this rate will give a flicker effect on the screen. At 24 f/s double framing works very well indeed, and quite a number of Commercials are shot at this rate.

The painting of the cels with a simple story line like this where the seagull moves only a few inches backwards and forwards during less than four seconds should not take a great deal of effort and the filming can be helped out by drawing up a "dope sheet" (camera instruction chart) to correspond with the action of the scene. If the title is to be bumped on—that is, placed on the artwork either as a complete title that appears within one frame, or as individual letters which run themselves on (one per frame)—the shooting is straightforward. On the other hand, if it is required that the title write itself on, and for this you will need a hand-painted title, then the "scrape-back" method must be used, and all the cels and artwork shot in reverse and upside down.

The timing on which to base the dope sheet could be as follows: the seagull flies in, taking 32 frames (48 at 24 f/s). On the 33rd frame we see steam coming from the siren and this,



The lens, is fastened to the viewer with Sellotape.

with the startled seagull being pushed out of picture, takes from the 33rd to the 60th frame. At double frame shooting this gives 30 cels to be painted but, with a small object such as our seagull, could be done easily in two or three evenings. The lettering can appear, or start to appear, immediately the seagull goes out of picture, and if the letters are appearing individually this animation can last to the 100th frame, the last 20 frames being held still.

The sound of our siren starts exactly two seconds after the picture start, and should be easy to place; but if the sound is required to last through the title, then the steam animation should be continued and this can be done simply with a series of 8 cels in a cycle. Over this sound the call: "All Ashore Who's Going Ashore" can be laid, and the composite track can be mixed in to the following mood music.

It sounds complicated, I know; but once the method of advancing a drawing a fraction of an inch and the technique of painting on celluloid sheets has been mastered you will find this a

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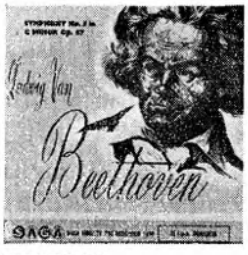
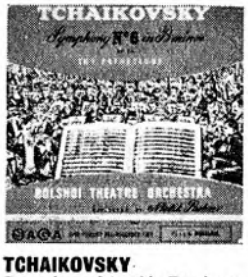


BEETHOVEN
Symphony No. 5 in C minor
Hamburg Pro Musica
Erich Riede, *conductor*
Mono 3¾ i.p.s.
STG 7011 25/-



TCHAIKOVSKY
Symphony No. 6 in B minor
'The Pathetique'
Bolshoi Theatre Orchestra
Melik-Pashaev, *conductor*
Mono 3¾ i.p.s.
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Teagarden, trombone and vocals, featuring Ruby Braff, *trumpet*
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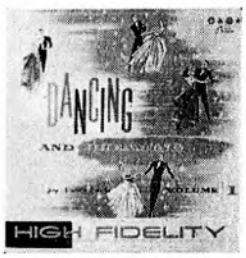

DANCING & DREAMING
Jay Norman Quintet
Mono 3¾ i.p.s.
STG 8041 32/6

SILK SATIN & STRINGS
Caesar Giovannini Orchestra.
Mono 3¾ i.p.s.
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OLD TIME DANCING
Harry Davidson Orchestra
Mono 3¾ i.p.s.
STG 8042 32/6

very agreeable way of making a title come to life. Cels are not expensive and they can be ordered from Tele-Production (Sales) Ltd., 67 New Cavendish Street, London, W.1. There is a six-week delivery time, however, but if any of you are anxious to go and want to get down to this fascinating pastime before the Summer is on us, I could probably help out with some of mine, providing the demand was not too great!

Setting up for titling

Without a reflex camera or a framed titling stand, lining up can be difficult. The easiest way I know with a camera where you can remove the pressure plate and see through the gate is to place a piece of tissue paper or Kodatrace over the gate and adjust the baseboard until it is correctly framed. There are some cameras, of course, where this is not possible, and a magazine camera is one of them.

I often use a 16mm *Autoload* magazine camera for it is extremely portable and has many advantages over my *Bolex* when it comes to fast work; but without some means of lining up, close work and title shooting can be difficult. I have therefore made a very simple piece of apparatus which serves as a reflex viewer, ensuring perfect framing and focusing with the minimum of time lost. The components are an empty magazine (cost 2s. 6d.), a piece of Kodatrace and a small magnifying lens (1s.). Time taken up in making the unit—less than one hour.

Firstly I removed the pressure plate and all superfluous parts and Sellotaped a small piece of Kodatrace (good tracing paper would do as well) over the gate to serve as the equivalent of a ground glass screen. Then, from the other end of the case, I cut a small viewing aperture in direct line with the gate. The small lens was taped to the end of a metal tube to give it length for securing to the magazine and, after some trial and error to find the position which gave the sharpest image, this unit was taped roughly half-way on a straight line between the two apertures.

With the side replaced the whole magazine can be placed inside the camera for direct through the lens viewing. There are two methods to keep the shutter open while viewfinding: the spring can be run down so that the shutter opening is directly opposite the gate or the magazine chamber catch can be depressed at the same time as running the camera. The image is upside down but this is of little importance although the addition of a prism could give luxury viewfinding.

Sound Alphabet

Barney: describes the portable sound muffling camera apparatus made of thick felt and covered with green duck which is sometimes used when conditions prevent the use of the regular blimp.

Blimp: is a custom-built, sound-proofed cover for a film camera.

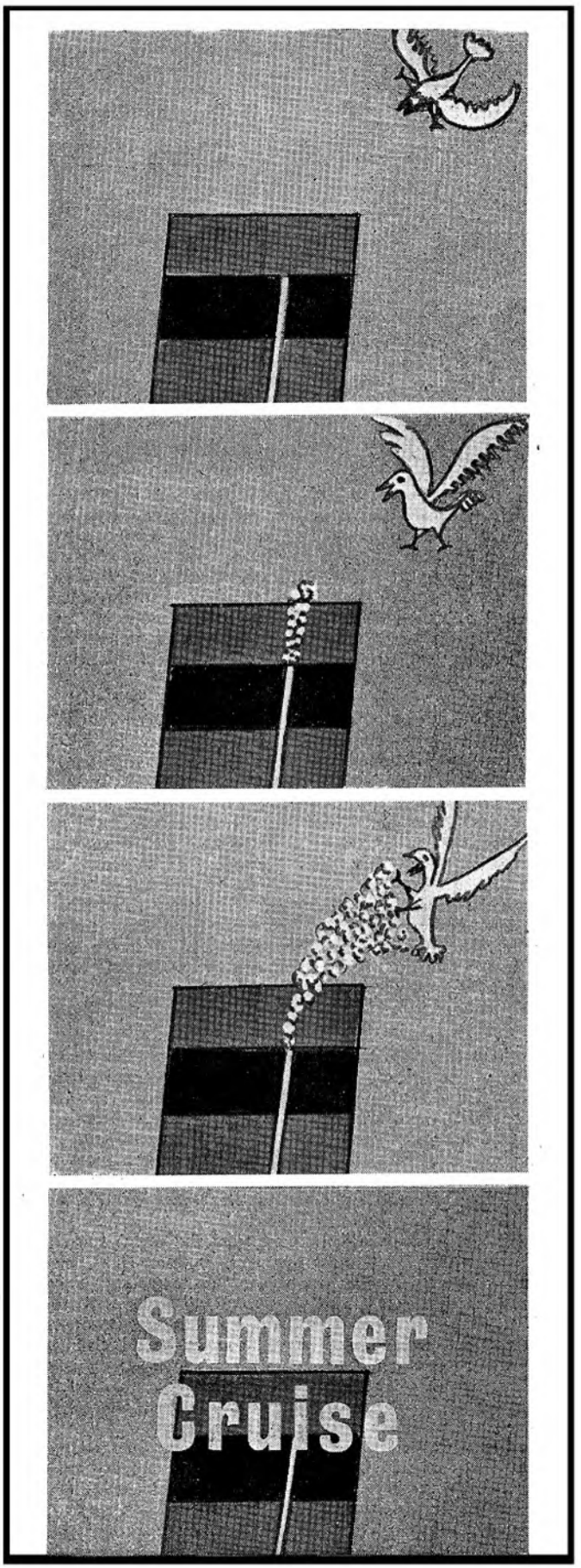
Bloop: is the sound of a splice when it passes over the sound head. This term is also used to describe the painting of the relevant area on the sound track.

Boom: refers to the special movable extension arm carrying a microphone and which can be directed over the actor's head but just out of picture.

Click Track: is a sound track carrying a series of metronome type clicks and which is relayed over headsets to singers during a recording or dubbing session.

Decibel: is a relative measure of sound intensity or volume. It expresses the ratio of one sound intensity to another. One dB is the smallest change in sound volume that the human ear can detect. A whisper at 3 ft. is about 20 decibels above the audibility threshold. Speech at average level is about 60 decibels. An orchestra will register up to over 100 dBs, while the threshold of pain stands at 128 dBs.

Distortion: is any difference between the original signal and that produced by the recording apparatus or projector. High fidelity may be obtained from relatively low frequencies providing that distortion is at a minimum.



TAPE RECORDER SERVICING

No. 2 The Collaro Studio Deck

By H.W.Hellyer

IN the first article of this series the BSR *Monardeck* was discussed and one of the comments made was upon the simplicity of its design. In this second look at tape decks from the servicing point of view, we meet a more ambitious instrument, yet one that has retained the keynote of simplicity. In the Collaro *"Studio"* we have a three-speed, three-motor, key-operated machine, with the added refinements of a digital counter, space for an extra stereo playback or monitoring head, and for an extra knob, but with a drive and control system that is a masterpiece of streamlining.

The *Studio* is not a development of the previous Collaro decks that went under this general name, the well-known Marks I to IV. It is a completely new development, using different principles of switching and control; fortunately, for both owner and serviceman. **Fig. 1** shows the general layout of the deck, the schematic diagram being a view of the top, with the decorative cover removed. The sketch on page 23 gives an impression of the underside, with the vital mechanism drawn to approximate scale, and parts extraneous to this text omitted. Both drawings show the deck with the edge of the plate normally toward the operator at the bottom, so that movements of levers, etc., described as "upward" are away from the operator, and vice versa. The space for the extra head is shown dotted in **fig. 1,** and the decorative nameplate at bottom left covers the hole provided for an optional extra control.

Adjusting The Brakes

Perhaps the most troublesome adjustment on this deck is the setting of the brakes. Because of the very fast rewind time (65 seconds for a 7-in. spool of 1,200 ft.), it is vitally necessary for there to be a positive braking action on both drums. Unfortunately, as the adjusting screws are easily accessible, minor alterations may be made which appear to effect a more positive braking action, but, in our experience, ultimately lead to drag. The correct procedure for setting the brakes on this model is laid down by the makers, as follows.

With the machine disconnected from the mains supply, press the start button, then press the pause button. Next, locate the screw *Y* (see **fig. 2**) and turn it until the toggle spring just fails to return the lever *V*. Screw *Y one full turn clockwise* from this point. Then locate screw *Xx*, which is sprung through the flange in the main lever *P* into a fixed nut on the end flange of the brake operating lever *X*. This screw is easily accessible from the front of the deck in its normal position. Still keeping the machine in *start* and *pause* condition, turn this screw until the washer under its head is just free to move. Don't be too generous with this clearance, as the action of the "wrap-around brakes" *W* is such that they are aided in application by the direction of rotation of the drums *Dd* and *Ee*, and what may appear to be insufficient friction with the machine stopped becomes quite effective when the spools are rotating.

The action thus obtained is an upward movement of the left-hand end of the lever *P* when the bracket on which the stop key is mounted pushes the protruding piece. Among other functions, this releases the tension on the flange of brake lever *X*, allowing it to move forward, assisted by a spring not shown in diagram, which lies longitudinally beneath the deck. The bands of acetate, or canvas-like material are fixed at the outer extremity and thus tighten around the drums together when their inner ends move upwards with lever *X*.

The "other functions" performed by lever *P* are also important. It is pivoted near its centre and coupled to lever *S* at the point *Q*. When P is pushed upwards by the bracket of the start lever, in opposite sense to the movement initiated by the stop key, described above, it snaps into place, assisted by the loop spring *R*. This is a positive action, and any weakness of this spring, or binding of the levers should be investigated: it can lead to erratic record and playback, intermittent wow, or a teasing distortion that may appear to originate elsewhere—due to faulty pad pressure. The reason will be seen as we inspect the action of the start function further.

Lever *S* is pivoted at its outer end. When the coupling to *P* causes *S* to move upwards the idler wheel *L* engages the pulley of capstan motor *J* and flywheel *M*. The drive capstan *N* is thus activated. At the same time, a part of lever *S* protrudes above deck level and allows the pinch wheel and pressure bracket to move into place, so that pinch wheel *A* engages the tape with the capstan spindle. The reverse, downward, movement of lever *P* pushes the forked arm *Z* into position to lock the speed change control. This last function was absent on some earlier models, and on these care must be taken not to alter speed when the machine is operating. This is quite the opposite to many machines, and the reason can be seen when we note what the speed change entails.

The capstan of motor *J* is stepped, and idler wheel *L* is engaged with the appropriate step by being raised and lowered

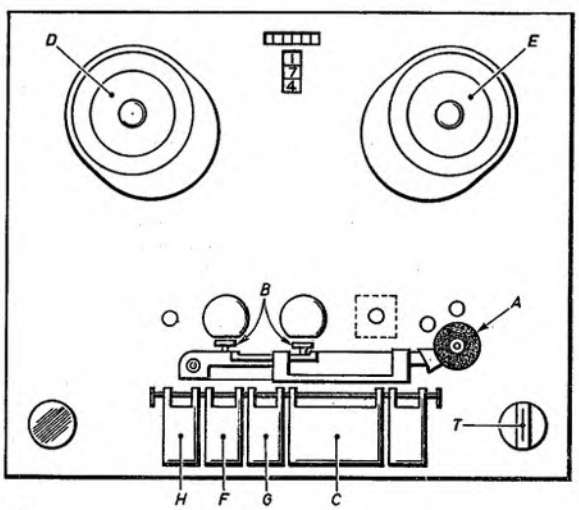


Fig. 1

(true direction this time) as lever *U* moves laterally in response to the rotation of speed-change control *T*. The shaded lines on the diagram indicate differences in level of lever *U*. The idler

wheel is attached to swivel lever *V*, which is raised and lowered by the action of *U*. Any vertical movement while the idler is engaged will result in distorted pressure at its periphery. As a general rule, idler-driven machines require speed change when disengaged, belt-driven machines when the capstan is rotating and driving.

Setting the motor capstan is not a difficult matter. Wow on this machine can be caused by the edge of the idler wheel rubbing

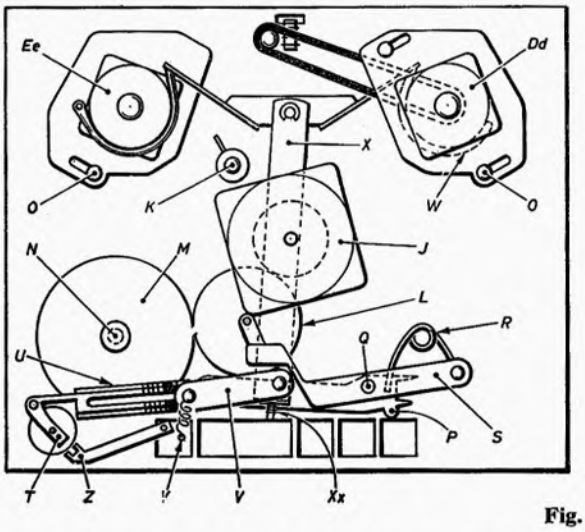


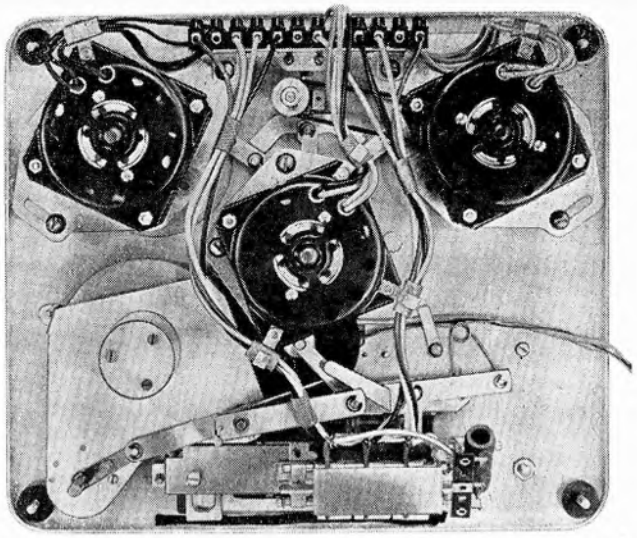
Fig. 2

on the next largest step to that which it is engaging, when the capstan will need slight adjustment. First, switch to 3¾ i/s, loosen the two screws on the fan boss, accessible from the side of the machine. Press the start key, adjust the boss until the edge of the idler sits centrally in the middle diameter of the pulley, ensuring that the underside of the idler is clear of the lower, largest, step.

To do this properly, take time, and do not loosen the screws too much, then move the boss by slight pressure with a broad-bladed screwdriver. Adjustment when the boss is too loose may result in the fan not staying flush. Make these adjustments with the deck in the normal position, to allow for the end-play of the motor spindle, which is quite in order.

Before coming to the conclusion that wow and flutter are the result of a rubbing idler or faulty pinch pressure, check that it is not simply a spool rubbing on the plate. The height of the spool carrier is another simple adjustment worth mentioning here. Each of the spool motors is mounted on a sub-plate, with two heavy springs securing the level. Alteration of the nuts on the outer screws gives a "rocking" adjustment from right to left. The rearmost screws allow a similar back-to-front adjustment. The overall height can be altered by loosening the two grub screws in the brake drum, then turning the screw in the top of the centre boss of spools *D* and *E*. Clockwise to increase height, and vice versa. After adjustment, check that the tape leaves the spool cleanly, without rubbing on flanges. Finally, tighten the grub screws.

The other adjustment on the motor sub-plate is a slotted carrier, shown at *O* in **Fig. 2**, which allows the deck to be used



Showing the disposition of the three motors, the flywheel, and the tag-strip for making all electrical connections to the deck. The photograph on page 22 shows 7-inch spools fitted.

either for seven-inch spools or, if no overlap is desired, for 5¼-inch spools.

Mention was made earlier of the necessity for positive engagement of pinch wheel and pressure pads. The pinch wheel is mounted on a separate rocker arm, with a spring-assisted pivot. It is most important that this rocker does not bind. Cleaning of pivot and spindle is easily effected by the removal of the right-hand of the three screws holding the pressure bracket, and a drop of light oil at this point will help matters. The pressure pads themselves should not cause any difficulty. They should spring cleanly against the heads in the start position, and no further adjustment will be necessary if the preceding points are watched. Hardening of the pad surfaces may cause noisy recording (or even physical squeaks), and can be cured by softening with methylated spirit and roughening of the contact surfaces with a pen-knife or nail-file.

It should not need mentioning in these pages that proprietary cleaners or petrol are anathema to deck mechanisms, and abrasives, such as sandpaper, emery, etc., *should never be used.* The minimum of light oil, kept clear of rubber and plastic surfaces, and the maximum of patience, is the recipe for deck repair. Plus that common sense we took pains to stress last month.

Azimuth Adjustment

Azimuth alignment is a simple matter, and rarely needs attention unless the setting has been disturbed. The two screws securing each head are painted over with a sealing compound when the deck leaves the factory, and evidence of tampering is immediate. If adjustment is necessary, or if heads have been replaced, the left-hand screw *only* should be varied for maximum output of an 8 kilocycle tone. If the record/playback head is removed, remember to replace the long screw with washer and spring in the *right-hand* position. Then insert the short screw in the left side and turn until the plate is approximately horizontal, compress the spring of the right-hand side by only two to three turns, finally carrying out normal azimuth alignment. The erase head is mounted directly on the sub-plate, screwed from the bottom (6 B.A.), while the sub-plate is held by four self-tapping screws.

The recording head is a standard 30,000 ohms at 10 Kc/s type with a 2½-thou' gap. Bias and erase frequencies are between 45 and 60 Kc/s, the erase head is a low impedance type (200 to 300 ohms at erase frequency), requiring approximately 25 volts at 120 mA. Matched to a suitable amplifier, this deck is capable of a frequency response at 7½ i/s of 12 Kc/s ± 3 dB. In all, a pleasing instrument, and certainly not designed to break the serviceman's heart. A great improvement on previous Collaro marks.

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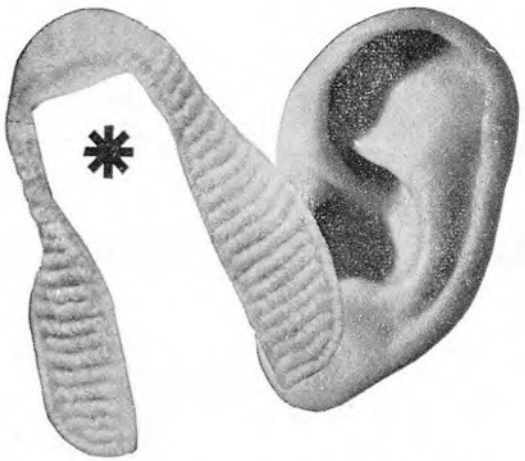

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THESE DEALERS OFFER GOOD SERVICE

OUR recent articles on after-sales service, have brought us a great deal of most welcome correspondence—from all sides; and we thank the many readers who have written to us to tell us of their pleasant experiences with dealers who have, it seems, often gone beyond the normal definition of the word "service" in order to ensure that their customers were fully satisfied. The names and addresses of these retailers are on record at our office, and they will most certainly be recommended to other readers in or around those areas when the occasions arise. Of course, not all is milk and honey: we have received one or two bitter laments, and also two really vituperous complaints. We mention these particularly because their very nature made it urgent to follow them up in detail. In each case, it is interesting to note, the manufacturers in question had similar letters on file, and had gone to great lengths to give satisfaction. We would like all our readers to appreciate that we understand the magnitude and importance of what we are trying to take on, and that we are not merely content to record and publish the names of those dealers who claim to give good service. We realise that confidence in the trade is essential, in terms of service; and we intend to do all within our power to ensure that good dealers receive the support they deserve. That said, we have pleasure in publishing the following additional notes and letters which we think will be of use and interest to readers.

* * *

From: A trade serving organisation in Liverpool.

Dear Sir:—We are in sympathy with the views expressed in your Editorial for the current month and, through the retailers detailed below, are in a position to assist your readers locally

in the servicing of tape recorders of all principal makes. The section is staffed by specialists and full use is made of manufacturer's training facilities.

As a trade service organisation we do not transact business direct with the user and it will lead to confusion if our name is quoted, but the following firms employ our facilities and can be recommended to your readers with confidence.

William E. Potter Ltd., 64 Dale Street, Liverpool, 2.
E. A. Stevenson (Electrical) Ltd., 178 Oakfield Road, Liverpool 4.
29 Walton Hall Avenue, Liverpool 9.
14 Victoria Road, Widnes.
Scala Buildings, High Street, Runcorn.
Sidon Electrical Contractors, 10 Greenway Road, Higher Tranmere, Birkenhead.

It is of further interest that we are officially appointed area service agents for Telefunken, E.A.P. and Wyndsor recorders, and execute free of charge repairs during the guarantee period on behalf of the manufacturers mentioned. *Yours sincerely,*
Wm. E. Potter, managing director.

* * *

From: Howard Tape Recorders, 218 High Street, Bromley, Kent.

Dear Sir:—As some of our rivals appear to be blowing their servicing trumpets, you may care to quote us as saying: "Apart from having a separate testing department which rigorously soak-tests all new equipment on arrival from the makers and again, before dispatch to our customers, we offer 12 months free servicing on all new machines (3 months on secondhand). This covers all parts, including valves which normally have only the BVA 90 days guarantee, and no charge is made for labour. Our own guarantee is therefore superior to that of any manufacturer we know of. No charge is made for delivery and collection within our van area and outside that, we return all equipment free of charge.

"Recently, due to an increase of staff, we have been able to turn round most repairs very quickly and in December, we finished 184 repairs. The only time we experience a holdup is when we have to return a machine to the makers for special servicing or wait for a special part from them. We can accept machines for repair, even if not purchased from us originally, and in the pre-Xmas week repaired most of these within 3 days.

"The only reservation we make is to ask non-customers not to expect us to repair junk equipment which we have never stocked or recommended when new—for the very reason that we knew when it became old and secondhand, servicing would be an ever-present headache. As we had the experience and sense not to sell new rubbish, we do not want to be involved in servicing someone else's worn-out junk—take it back to the dealer who robbed you in the first place. *Yours faithfully,*

* * *

From: Albert E. Ford Ltd., 84 Cornwall Street, Plymouth.

Dear Sir:—In response to the editorial in the current issue we wish to state we offer service facilities for: Ferrograph, Brenell, Robuk, Grundig, Philips and G.B.C. (Clarion) instruments. We carry *reasonable* spares.

Our Mr. Roberts is in charge of the department and his main assistant on this particular work is Mr. Higginson. Both have had many years' experience. *Yours faithfully,*
Albert E. Ford, director.

* * *

From: Audio Electronics (Midlands) Ltd., 203 Stafford Street, Walsall.

Dear Sir:—With reference to your "Editorial" in the *Tape Recorder* of December, 1961. We would like to bring to your attention the fact that this company have recently commenced operations in the town of Walsall and we are happy to confirm that our technical department is fully geared to carry out full after-sales service on any tape recorder which we sell.

We are, in fact, one of the companies which have made it a policy from the outset, to specialise in recording and dictating equipment, and we feel it is absolutely essential to offer the customer first-class after-sales service.

We are, therefore, in a position to service and maintain all makes of machines, but especially Philips, Grundig, Stella, Cossor and Fi-Cord. We will be pleased, therefore, if you will kindly add our name to the list of retailers who are prepared to co-operate in the scheme for providing first-class service facilities. *Yours faithfully,*
M. L. Chambers, Birmingham area manager.

By A. Tutchings

AN ADD-ON CINE SOUND UNIT

Part 3 — ERASING AND SUPERIMPOSING

WHEN the amplifier described last month is set up for recording (i.e. with the microphone plugged into the input jack and the record head in the output jack) a steady direct current of .5 ma is passed through the coils of the head in addition to the amplified signal current from the microphone. If we now consider tape which has been bulk erased, or erased on a normal recorder using a high frequency current in the erase head, then **fig. 1** illustrates its magnetic state by what is known as "the initial magnetisation curve".

Referring to **fig. 1,** an increase of H (magnetising force, proportional to current in the record head) in either direction has little effect on the remanent magnetisation Br. until it passes the knee of the curve a, or a^1. A further increase of H produces a linear change in Br until the top knee b, or b^1, is reached. The direct current through the head can be selected so that the working point is midway up the linear part of the curve so that the effect of the superimposed audio current is to vary Br in a linear fashion to produce a distortion-free recording.

It will be seen that the polarity of the current through the head is unimportant with this method of recording as the effect is simply to change the working range from a-b to a^1-b^1. If, however, the tape has been erased by passing over a permanent magnet, the tape will be 'saturated' at point A or B, depending on the polarity of the erasing magnet. A further change of current in the head will not cause the working point to retrace the initial magnetisation curve, but instead, it will trace out the 'hysteresis loop' shown in **fig. 2,** and the polarising current through the head will shift the working point to X or Y. With

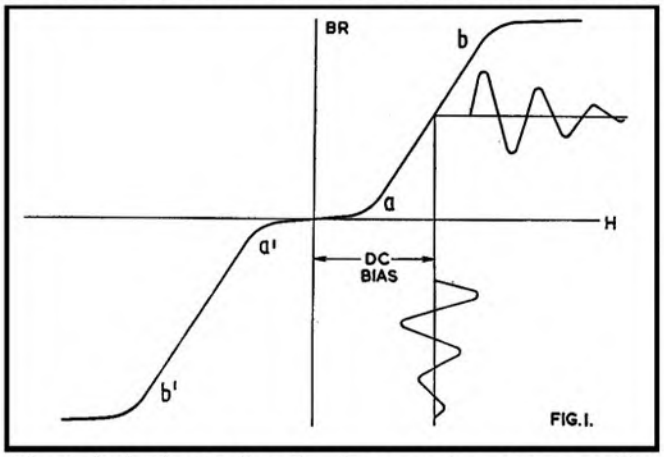
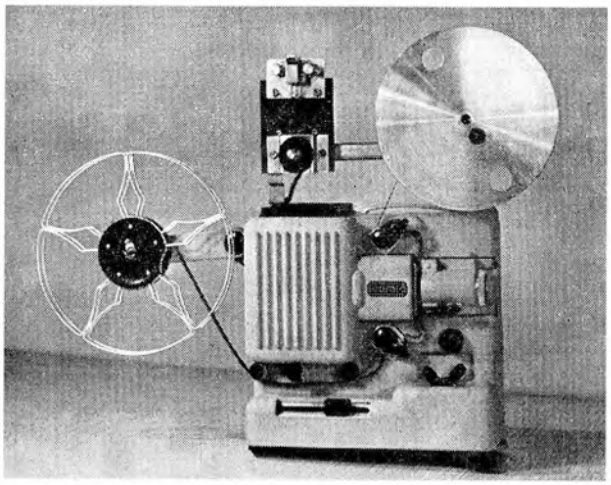


FIG. I.

this method of recording the linear portion of the working characteristic is much longer, and the exact value of D.C. bias is less critical. It also has the advantage that the tape is automatically erased by the application of the saturating magnet, *but* the D.C. bias must always oppose the erasing field, so that polarity of erase magnet and head became important.

A new magnetic material has just become available which is ideal for magnetic recording applications; it is a *magnetic plastic* which can be cut or shaped with a razor blade and which has adequate magnetic power to saturate a tape even when sliced into very thin pieces. In this particular cine application there is no problem of erasing one track and not the other as we are, so far, only recording one track on the tape. The flux provided is sufficient to erase from the back of the tape—i.e. through the base if required.

A two inch length of this material can be used as a magnetic



'rubber' and simply placed against the tape when it is desired to erase a recording. If a slow 'fade out' of a recording is required then it is placed into contact with one edge of the tape and moved slowly across the track with the tape in motion.

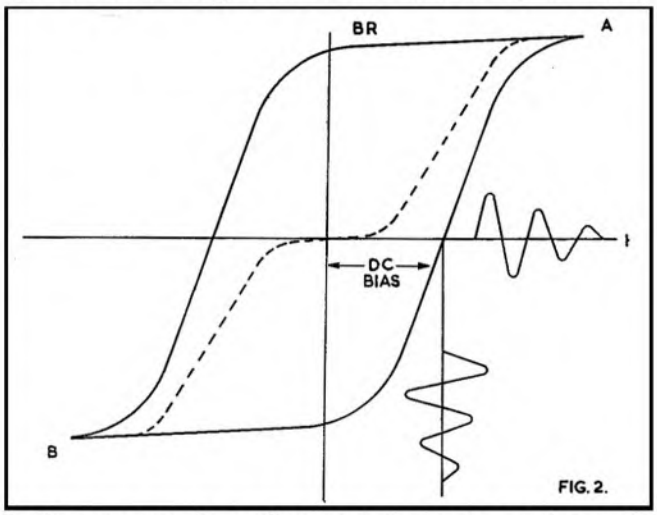


FIG. 2.

In the same way, if an effects track is already recorded on the tape and it is desired to drop its level behind the commentary, then half or three-quarters of the track can be wiped off and the commentary superimposed on top.

It will be necessary to find the correct polarity of the erase magnet to suit the head connections, and to do this one end of the magnetic plastic strip should be marked with a piece of white splicing tape, and a recording test made on the cine attachment, first with the marked end out, towards the operator, and then with the marked end in, towards the projector. On replay, one recording will be thin and distorted, and the other loud and clear. The strip should then be plainly marked for future use. If desired the erase strip can be mounted permanently in position on the head plate, so that the tape can be threaded round it during recording, and arranged to by-pass it during replay; see **fig. 3.** I think this magnetic rubber is a fascinating material and I have planned a whole series of experiments with it, some of which will undoubtedly appear as future articles.

And now for a few hints and tips about the operation and setting up of the cine sound attachment. I may not have made it clear in my first article that I can only supply the basic kit parts and that the fitting to any individual projector is something you will have to work out for yourself. For instance, some supply reel spools revolve in the opposite direction to that on my prototype, so that the tape winds into the top of the flywheel slot. In this case the head plate will have to be turned through 90 degrees to keep the tape in contact with the guides, **fig. 4.**

(*Continued on page* 28)

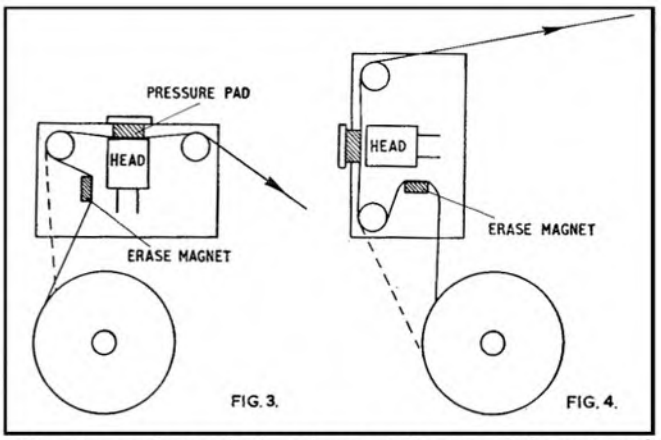


FIG. 3. FIG. 4.

On other projectors both reels are at the rear of the unit, and it may be necessary to devise a rather different mounting arrangement. A few drilled strips of steel or heavy aluminium, or a raid on your son's Meccano set, will do the trick! A screened lead should be used to connect the head to the amplifier, and the screening should be connected to the brass body of the head or to the head mounting plate. If projector motor noise can be heard on the speaker with no tape moving over the head, then the body of the projector should also be earthed to the head plate. A certain amount of projector noise will be picked up acoustically on the microphone which should be placed as far away from the projector as possible during commentary recording. A useful hint, during initial tests, is to use a 3¾ in. reel and gramophone motor to pull the tape over the projector attachment, as in last year's portable recorder, so that there is no projector noise, acoustic or electrical, to contend with and the quality and dynamic range of the recording system may be more easily judged. Indeed if the head unit is designed to clip on to a spring wound motor, as well as the projector, a self-contained portable recorder for the collection of sound effects or background noise recording is available.

By Graham Balmain

DISTORTION ON TAPE

DISTORTION, you may remember from my opening paragraph last month, is the subject which has evoked more nonsense than anything else in audio. Look at these three snippets from manufacturers' tape recorder leaflets, for instance: (a), "Distortion—5 per cent. at maximum level". (b), "3rd Harmonic Distortion: 2 per cent at full modulation, 1 Kc/s". (c), "Harmonic Distortion: 3 per cent. at full recording level"; and now note that machine **a** costs about £35; machine **b** just below £100; machine **c** about £75. The distortion goes up as the cost comes down; nothing wrong there, apparently. But now look at this extract from the specification for a large and expensive professional recorder: "The modulation indicator is normally adjusted to show peak modulation when a 1 Kc/s steady sinusoidal signal suffers a 3rd harmonic distortion of 2 per cent.". Full marks to the writer of that specification for getting the horse in front of the cart, where it ought to be.

Readers of this journal will have realised long ago that *all* recording and reproducing systems distort the signals they handle to some extent. The best amplifiers achieve as little as 0.1 per cent. total harmonic distortion over the nominal working range; the average radio set output may add about 10 per cent. A F.M. tuner can reduce this to 2 per cent. or less. Just in case you think this is shocking, a really good commercial long-playing record—the kind which works up a crescendo just when the pickup approaches the centre—is probably giving you up to 20 per cent. more noise at that point than you paid for. (To be fair, this is an inevitable result of the geometry of the groove-stylus system; the disc manufacturer is not to blame.)

Not Only Tape is to Blame

Tape recorders also add distortion, as you can see above, but provided they are designed and used within reasonable limits the distortion is not of a particularly unpleasant kind. The important question is, where and how does it arise?

Fig. 1 gives a rough idea of the transfer characteristic of an A.C.-biased tape system. This is not nearly as clever as it sounds; "transfer characteristic" is merely a descriptive term for a particular kind of input-output curve: one which shows how an input waveform is transferred, instant by instant, to the output. By using a simple drawing technique we can construct the output waveform corresponding to any given input waveform. We see here that a small input signal is transferred with no visible waveform distortion, the somewhat larger input is beginning to show some flattening of its peaks, and the largest input suffers very considerably. The middle waveform corresponds roughly to the "maximum-level" of machine.

The point to be made here is that this behaviour is a characteristic of the *system*, not of a particular machine, nor of any machine worth its salt. The diagrams show behaviour which is basically due to the tape alone; almost any tape machine with pretensions to quality has heads and amplifiers which can sufficiently exceed the tape itself in performance to let it finally limit the quality of reproduction.

Note also that, although this is a fault, it is an unavoidable one arising from the particular (using the word in both senses) nature of the tape coating. Why make it that way? Because, like the stylus-groove system referred to above, it gives the best overall results obtainable economically in practice.

To translate our transfer characteristics into more practical terms, we can take a series of measurements of output and distortion against input, and plot a curve such as that in **fig. 2.** The exact shape of the curve will depend somewhat on the type of tape, the amount of h.f. bias (within the common working

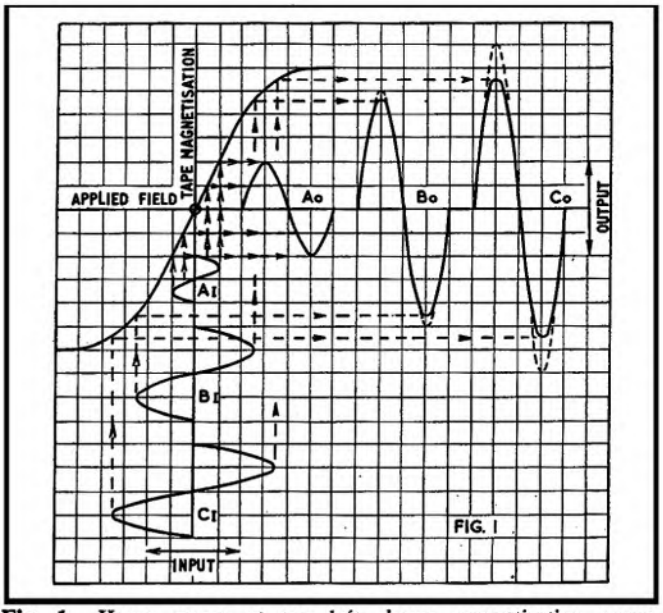


Fig. 1. *Heavy curve at top left shows magnetisation curve (transfer characteristic) of A.C. biased tape. Input waveforms A, B, C result in output waveforms A, B, C. Peak distortion suffered by B and C; dashed "caps" show correct waveform peaks in absence of transfer characteristic curvature. B corresponds roughly to "maximum" modulation for 5 per cent. 3rd harmonic distortion in input; A about −8dB, C about +3dB on this.*

range) and on other working conditions; this one represents the behaviour of one particular tape running at 7½ i/s and biased with 1.2 times the h.f. field which produces maximum 1 Kc/s output. The distortion curve itself has been omitted for the sake of clarity, but some values are shown by circles on the input/output curve.

You can now see that the *possible* harmonic distortion produced by a recorder with a given tape is indeed a function of the recorder, but not quite in the way implied by most specifications. It depends entirely at what input level the pointer is arranged to cross into the red band on the scale, or the VU meter to read 'O' or the magic eye to close; in fact on what level the manufacturer decides shall be called 'maximum modulation'. We could at any time limit the possible distortion to 0.5 per cent. by lowering the maximum input by some 8-12dB (see **fig. 2**), or to any other figure correspondingly, but we should at the same time lose a similar amount of signal/noise ratio—possibly more, for the aural effect of the rise in noise following a complementary increase in playback gain might well be greater than a simple noise measurement would show.

Noise is the Worst Enemy

This is why we push the modulation up into the 2-5 per cent. region at all, of course; we profess great intolerance of distortion, but in practice find background noise far more disturbing to the illusion which we are trying to create. Given the choice between two recorded programmes, one with 5 per cent. maximum distortion and 2 per cent. background noise (i.e., 54dB below maximum signal), the other with 2 per cent. distortion and 5 per cent. (−46dB) background noise, I fancy most listeners would choose the former without hesitation. The average listener would hardly detect the difference in distortion, whereas the change in background noise would be obvious.

Two questions spring to mind at once here. Firstly, why bother to choose between 2 per cent. and 5 per cent. if most listeners cannot appreciate the difference? And why, for that matter, stop at 5 per cent? Secondly, how can we bear as much distortion as this when the textbooks tell us that as little as 1 per cent. can be detected in normal programme material and 0.1 per cent. in steady pure tones, under favourable conditions?

The answers to both arise from the nature of programme

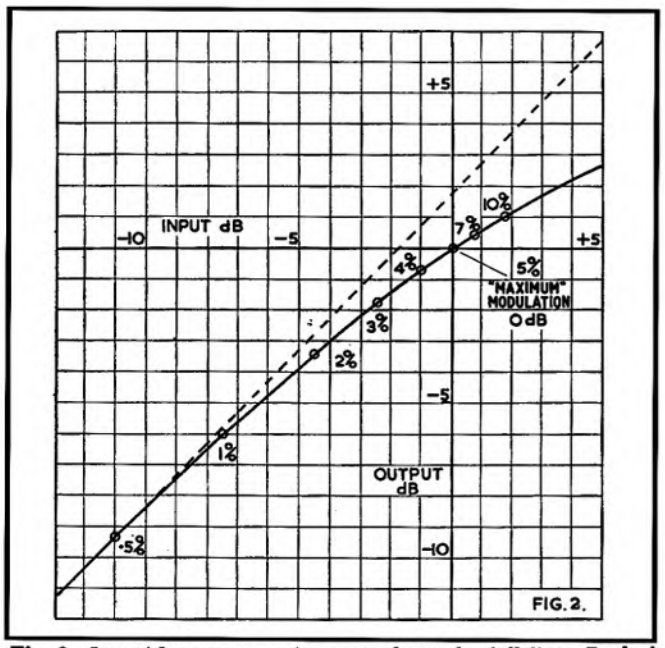


Fig. 2. *Input/Output curve for tape, shown by full line. Dashed line shows perfectly linear characteristic. Percentage figures against circles show 3rd harmonic distortion at those points. The majority of properly recorded material lies below the* 1 *per cent. point on the curve.*

material—music, speech and other interesting noises—and from certain characteristics of the hearing sense. The steady, pure tones on which the engineer bases so much of his measurement work are, mercifully, largely absent from entertainment material. Programme waveforms are peaky, irregular, fuzzy, infinitely variable: almost anything you care to name except purely sinusoidal. In engineering terms, pure tones of many frequencies are generally present simultaneously at any time, whose individual time-relationships and intensities each contribute to the composite signal waveform and its final subjective effects of pitch, loudness, rhythm, tone quality, and—for want of a better word—impact.

To try to assess the distortion of such a signal in terms of the harmonic distortion of a pure tone is obviously a gross simplification. The truth is that programme distortion (like the truth) is never either pure or simple but usually much more complicated than the signal itself. Not only does each frequency present acquire a retinue of harmonics (frequencies which are integral multiples of the fundamental—usually odd multiples with thirds predominating if the tape recorder is working properly), but the various fundamentals and their harmonics also cross-modulate each other, producing a multitude of sum-and-difference frequencies which are generally unrelated either to each other or to anything else in the original signal. You can imagine that bad cases of intermodulation distortion sound most unpleasant.

Perhaps you can also imagine that it is extremely difficult to devise a reliable and reasonably simple way of measuring such distortion, let alone one which will bear any close relationship to the unpleasantness experienced by the listener. The nearest practical approach is to feed two widely separate frequencies into the system under test, and to analyse the output in detail, expressing the result either in terms of each separate intermodulation component detected or as a ratio of the total intermodulation products to the fundamental signals. The exact figures obtained will depend on the frequencies used, their separation, their levels and their relative levels, so the test conditions must either be standardised or quoted whenever results are published. Several standard test conditions have in fact been suggested, but none seems to be in agreed general use.

The impression gained from an accumulation of such tests is that intermodulation distortion depends *very roughly*, and over the limited range between aurally detectable and aurally intolerable, on the square of the simple harmonic distortion of a pure tone. One might thus expect intermodulation figures of *about* 25 per cent. when the harmonic distortion is 5 per cent.

However, the figures just quoted do seem to represent the limit of our tolerance, which answers one question. It still seems an awful lot, you object? Agreed. But the average ear—again mercifully—has a bad memory.

We must here make a firm distinction between *good* reproduction and *faithful* reproduction. The former, in general, contains sufficient of the original to conjure up a pleasurable sound picture, without introducing so much distortion that the illusion is destroyed. Faithful reproduction, on the other hand, must stand direct comparison with the original.

But perhaps the most important factor in our acceptance of distorted reproduction from tape is that only about 1% of a well-recorded programme should be appreciably distorted at all; 99% or more of the material should be free of perceptible harmonic or intermodulation distortion, even when subjected to a test of faithfulness. This is because the loudness of most material varies around a fairly steady average value, and only occasionally rises to peaks clear above the average. The peak/average ratio usually lies between 8dB and 20dB, depending on the programme, which means that (referring to **fig. 2**) the great majority of recorded material will suffer less than 1% distortion provided the peaks remain within maximum modulation level. This figure is less than the distortion content of most programme input sources anyway, and is consequently insignificant.

Only when someone hits a cymbal really hard, or recites "Sister SuSie'S Sewing SHirtS for SoldierS", within hugging distance of the microphone will the level leap up to and perhaps over the 5% mark, and even then the ear would be disinclined to notice distortion of the former since the peak of a cymbal crash lasts for so short a time. Our ears help yet again here by being progressively less sensitive to the distortion of peaks as their duration falls below about 5 milliseconds.

One question remains: the choice between 5% and something lower as a maximum modulation point. This is really quite simple. The domestic machine is made to a budget which usually precludes anything beyond the routine reduction of tape and amplifier background noise to a reasonable level. Since the average listener is considered to be (begging his pardon) fairly tolerant of distortion, a tolerable signal/noise ratio can usually be maintained by modulating the tape up to the 5% level. Although this apparently gives only about 4dB advantage, it may make all the difference, as explained earlier.

The Faster the Speed . . .

However, manufacturers must also cater for more critical listeners, and produce for them (as well as for professional users who have to allow for the worst case, so to speak) a range of high-quality domestic and professional machines in which the background noise is low enough to permit recording up to only the 2% point, or even lower. The position is helped in most cases by the higher tape speeds usually used. A further advantage of such recorders is the gentler overload characteristic; the occasional accidental overmodulation might reach the 5% point, which is nothing like as disastrous as overmodulating by the same amount on a less conservatively-designed machine.

Summing up, there are three important points to remember in considering distortion on tape. Firstly, harmonic or intermodulation distortion is an inherent function of the tape itself; the recorder should contribute little or nothing significant. Secondly and in consequence, distortion figures quoted in specifications are not really assessments of recorder quality at all, but merely show at what input level the modulation indicator reads "maximum". Third is the overall impression of distortion as the least worrying of the various nuisances (wow and flutter, background and modulation noise etc.) which afflict tape recording. This last depends *very heavily* on the machine being well-designed and used, within reasonable limits of both modulation and frequency response. (For a discussion of the latter, see last month's article).

The necessity for controlling tape modulation accurately makes the modulation indicator one of the key features of a tape recorder. I hope to discuss next month how well various kinds of indicator do their jobs.

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NO. 31. ADDING A METER

by A. Bartlett Still

ONE or two readers have recently queried the possibility of "adding on" a meter type of record level indicator to their existing tape recorders. Now there is nothing against this, and in some instances a meter is more useful than a "magic eye"—apart from looking more professional! The first step, as with a complete recorder, is to decide exactly what the indicator is required to do; draw up a specification, so to speak. A machine that employs three heads (i.e. a separate playback head and amplifier) allows you to monitor your recording off the tape almost as soon as it is made, keeping an eye, or rather ear, on the volume level and distortion. Under these conditions the record level indicator is not so vital as in the machine that utilises a combined record/playback head. In such a case the recording is being made "blind" and the user relies on the indicator to ensure a good quality recording.

To avoid possible confusion the above point must be stressed. The record level indicator is your passport to a good quality recording, the volume level being the sole concern of the reproducing amplifier. Variations in the level at which a recording is made can affect the quality of that recording at either extreme. If the recording level is too low, the playback

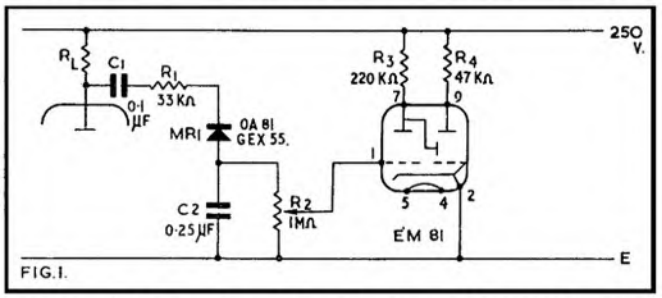

FIG.1.

volume will be low also. This will mean that increased gain is required during playback, bringing up unwanted noise such as hum or tape hiss. In other words, the signal-to-noise ratio will be poor. A recording made at too high a level, on the other hand, may well pass the rather sharp dividing line between acceptable and unpleasant third harmonic distortion.

This question of correct level recording is something that should have been covered by the maker's instructions, but all too often it is left unsaid. However, let us get away from the "whys", and concentrate a little bit more on the "hows".

Magic Eye Circuitry

The electron beam tube, more generally known as a magic eye, has proved its worth many times. These indicators usually incorporate a D.C. amplifier triode and, taking a modern example, the EM81 requires a grid voltage of about -15V to produce zero shadow angle. The maximum shadow angle of about 80° requires a steady level of $-\frac{1}{2}$V, normally obtained by grounding the cathode and producing grid current bias. A practical circuit is shown in **fig. 1**. The condenser C_1 couples from any point in the amplifier at which a suitable signal is available, though this will normally be the anode of the valve that feeds the record head. The indicator feed network will, in consequence, be in parallel with the head circuit. It is in view of this that R_1 is included, and it should be noted that the value given, 33K, is very nearly the minimum that can be entertained. Were R_1 omitted, the "front-to-back" ratio of the rectifier MR_1 would allow negative-going half-cycles of the audio signal to be severely shunted, resulting in distortion of the head current.

The audio signal at C_1 is likely to be about 20V r.m.s. for full modulation. Rectified, nearly the peak voltage will appear across C_2, giving about 27.5V D.C. As only 15V D.C. are required, we have plenty in hand and could, in this instance, increase R_1. C_2 and R_2 are chosen to have a long time constant, so that the "eye" will not fall off too quickly. Too great an increase of R_1 will tend to prevent the quick "rise time" that is required unless C_2 is reduced (with a corresponding increase in R_2).

We have just seen that we can produce, if needed, about 25 V.D.C. from the signal, and this surely should be ample to drive a meter. Unfortunately the recorder will normally only expect to drive about 200 μA of head current, and to load it with a meter movement in addition is a little unfair.

Providing a D.C. Amplifier

A second glance at the magic eye gives us the answer. These devices incorporate a D.C. amplifier whereas our meter does not, so one must be provided. As with the magic eye, a triode is suitable, which may be half of a double triode. Strapping the anode and grid on the other half does away with the need for a separate rectifier. A practical circuit is shown in **fig. 2**, which may be usefully compared with **fig. 1**, in respect to the signal network. C_2 now forms a time constant circuit with R_3, however, and to overcome the effects of meter inertia this constant is made considerably longer. The value of R_4 will depend on the meter current; up to 5mA f.s.d. can be used successfully with suitable adjustment. R_6 is made variable in order that the electrical zero of the meter may be set.

Depending on the current consumption of the meter, and 1mA f.s.d. is probably the best compromise, the "law" of the whole device will be dependent on the Ia/vg curves of the valve *starting from zero*. The result will be that the meter is insensitive to low value signals, but has an expanded scale over the range that you will normally expect to work. The value of R_4, by the way, should be set to limit the current and prevent overloading of the meter. If the opposite sort of sensitivity is needed—the stronger the signal, the less in proportion, the meter moves—this too can be arranged. The law has to be reversed, so we must reverse the operation of the circuit and start this time from Full Scale. The circuit will look similar,

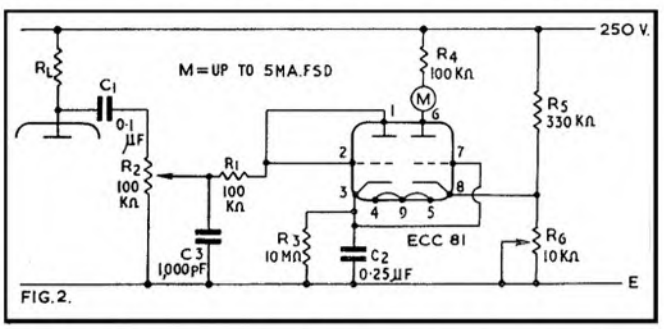

FIG.2.

but the diode is reversed. R_1 will now feed to pin 3 and pins 1 and 2 will connect to R_3. R_6 has to be adjusted for zero, which will be *maximum* current through the meter, maximum signal will reduce the current to zero. Hence the meter can never be overloaded.

Suitable back-to-front meter movements can be obtained, but if you want to use that system with a conventional meter movement, turning it upside down will put the scale zero back in the right place.

My circuit of **fig. 2** has been drawn as if the meter were built into the recorder. The signal could just as easily be taken from one of the output sockets, the high impedance output for preference, though this may need the removal of a potential divider if sufficient signal is to be obtained.

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JASON ARGUS TRANSISTOR A.M. TUNER

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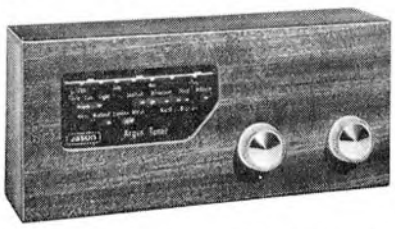


RECEIVED just too late to be included in the January issue a new three-transistor tuner, the "Argus", is announced by Jason Electronic Designs Ltd. A medium wave superhet sufficiently sensitive to receive continental programmes, it is designed to be used with any tape recorder or amplifier, is battery operated, with an internal ferrite rod aerial. Output voltage is approximately 100mV, with an impedance greater than 100K. The "Argus" has two controls, one for tuning and the other for wave change and on/off. The long wave tunes from 1200 to 1800 metres and the medium wave covers 186 to 530 metres. The price is £7 10s. Further particulars can be had from **Jason Electronic Designs Ltd., 2a Kimberley Gardens, Harringay, London, N.4.**

* * *

Miniflux Erase Heads

A COMPLETE set of Miniflux miniature erase heads having single hole fixing have now been developed by the Technisch-Physikalisches Laboratorium in Germany. These follow the previous Miniflux types in using a low loss Ferrite pole material which allows the use of a high erase frequency without causing heating of the head. The hardness of Ferrite material also allows a practically unlimited life so far as head wear is concerned.

Three types are available: ¼ track erase type LFS which has a dissipation loss of only 120mW. Type ZLF5 is a stereo ¼ track head which enables either top or bottom tracks to be erased without interaction between systems, the total dissipation loss being only 250mW for both systems connected for full erasure. The third type is the VLF5 stereo ¼ track erase head which again has a dissipation loss of only 250mW and can be switched from one to both tracks. All these heads are constructed to give an erase figure of −65dB at a tape speed of 7½ i/s at a low frequency of 300 c/s. These head types will shortly be available with double gap systems, in which case for a 50 per cent. increase in dissipation losses the erase figure is increased to −80dB.

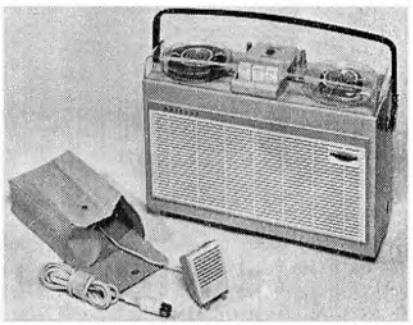
All enquiries should be made direct to: **Miniflux Electronics Limited, 8 Hale Lane, London, N.W.7.**

* * *

★

PHILIPS STARMAKER FOUR-TRACK RECORDER

★



PHILIPS have extended their range of tape recorders with the Philips Starmaker. Among the features of this new machine, is a vertically styled cabinet designed to take a large (6½ in. diameter) loudspeaker for quality sound reproduction.

The cabinet is in light grey polystyrene with a removable transparent box top which protects the reels and recording mechanism. The model is supplied with a 4-inch reel of long-play tape giving 88 minutes recording time—usable with the 'lid' on. Without the 'lid' a 5-inch reel of double-play tape can be used to give up to four hours recording. Sockets are provided for the connection of a microphone, radio or gramophone in addition to an extension loudspeaker.

The Starmaker is supplied with a high-quality moving coil microphone, mains and audio connecting leads and a clip-on plastic accessory pouch. The technical specification supplied claims: Fast Winding and Rewinding Time: Less than 130 secs. for 600 ft.; Frequency Response: 80 c/s-10 Kc/s ±3dB; Signal-to-Noise Ratio: Better than 40dB; Output power: 1.5 Watts; Tape Speed: 3¾ i/s; Microphone: Omni-directional moving coil, 500 ohms impedance; Dimensions: 9¾x13½x4¾ in.; Weight: 10¼ lb.

Manufacturers: **Philips Electrical Ltd., Century House, Shaftesbury Avenue, London, W.C.2.**

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EQUIPMENT REVIEWED

★

UHER UNIVERSAL TWO TRACK RECORDER

★

Manufacturer's Specification: Sound tracks: dual track to international standards. Tape speeds: 3¾ i/s, 1⅞ and 15/16 i/s. Max reel diameter: 5 inches. Frequency response: 3¾ i/s, 40 to 16,000 c/s, 1⅞ i/s, 40 to 8,000 c/s, 15/16 i/s 40 to 4,000 c/s. Signal to noise ratio: 45dB. Wow and flutter: ±3%. Output 3 watts. Power consumption: 50 watts. Operation: Electro-automatic keys, remote control, dictation microphone, foot switch, or manual switch. Dimensions 5⅜ × 9⅜ × 12¼ in. Weight 17 lb. Price with dictation microphone and radio-phone lead £87 3s. Distributors: **Bosch Limited, 205 Gt. Portland Street, London, W.1.**

FROM the range of control equipment available for use with this recorder one might be excused for thinking that its main function was dictation recording, but my tests show it to be quite outstanding in its electrical performance and, with a wide range microphone and external speaker, results are definitely in the Hi-Fi class with no reservations about the relatively low speeds. If you have tried a four track recorder and are not fully satisfied because of poor signal noise ratio, drop outs, etc., then this is a very practical alternative if tape economy

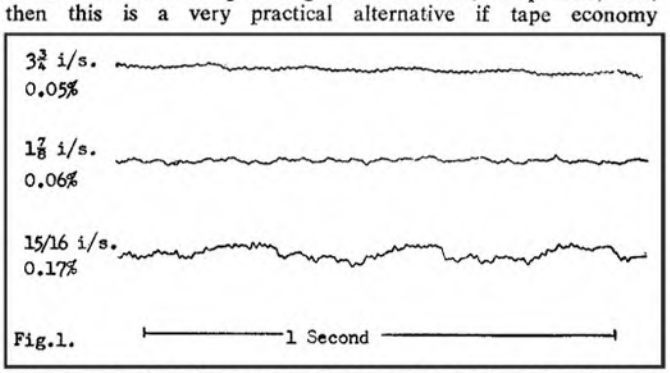

Fig.1.

is important. The frequency response at 1⅞ i/s is comparable to that of most 3¾ i/s recorders, and half track gives excellent signal to noise ratio and freedom from tape edge effects. At 3¾ i/s musical quality is quite a revelation, and the very low speed of 15/16 i/s is perfectly satisfactory for good quality speech or dictation recording.

Wow and Flutter: The fluttergrams of **fig. 1** were checked and rechecked several times because quite frankly I just did not believe them! 0.05% to 0.06% R.M.S. total wow and flutter would be considered very good on a 15 i/s recorder, but here we have them at one-quarter and one-eighth of this speed! Even at 15/16 i/s the reading was only 0.17%. These figures may be due to a favourable combination of circumstances on this particular machine, but I satisfied myself that cancellation between the recorded and replay flutters was not the answer by repeatedly stopping and starting the machine and testing for very prolonged periods. Whatever the reason, the tape transport on this machine sets a new standard of performance at these low tape speeds.

Record Replay Responses: **Fig. 2** shows the overall record replay responses for the three speeds, and it will be seen that the specification is fully met for frequency response. A 3¾ i/s 200 microsecond test tape was played to establish standard recording level, and a check made that true peak recording level of plus 12dB could be recorded without distortion; the magic eye

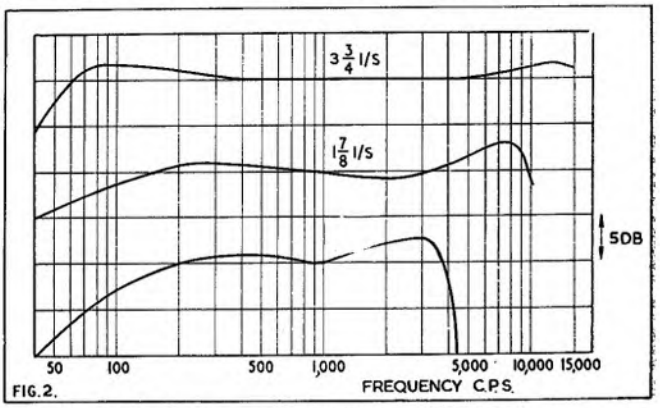

FIG.2.

The bottom curve should read 15/16 i/s.

indicator beams just closed at 10dB above test tape level. Next the test tape was played at the three speeds to learn something about the recording characteristics used on this recorder; they all showed a 5dB fall at the high frequencies so that it can be deduced that the recording characteristics were: 100 microseconds at 3¾ i/s, 200 microseconds at 1⅞ i/s and 400 microseconds at 15/16 i/s.

Signal Noise Ratio: Tape and valve noise was 38dB below test tape level at all speeds, so that dynamic ranges of 48dB and 50dB from noise up to the indicated peak, and true tape peak recording level, respectively, are obtained.

Acoustic Response: The response of the speaker and cabinet was measured by recording 20 one third octave bands of filtered white noise and measuring the sound output on replay with a calibrated microphone at a distance of one foot from the speaker fret. The response, indicated by **fig. 3,** shows that the high note response is well maintained to 10 kc/s and that the bass response is limited by the small speaker and cabinet. The effect of the tone control is shown by the dotted curve.

Microphone Response: The dictation type microphone, which also doubles as a low level speaker for speech checking, was tested in a constant sound field and gave the response shown in **fig. 4.** The response was smooth and free from peaks and perfectly satisfactory for speech recording and replay.

Control Accessories: The dictation microphone mentioned above is fitted with a slide switch and pilot lamp so that one may record, replay, backspace, stop or start by finger tip operation

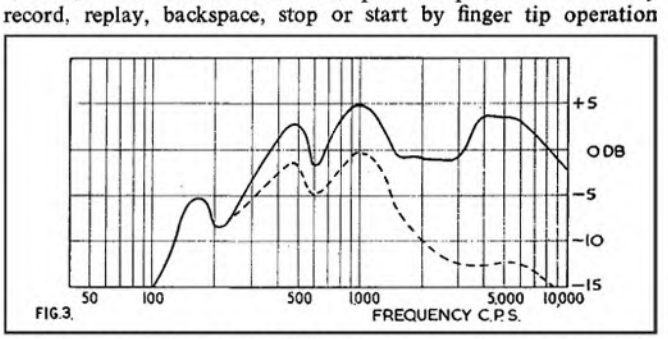

FIG.3.

of this control. For transcription purposes a foot control unit, or a thumb operated unit, which fits under a typewriter keyboard, are available as extras.

Another accessory is the "Synchro-Akustomat" which will start the tape moving whenever a sound reaches the microphone,

EQUIPMENT REVIEWED—(continued)

stopping about one second after the cessation of the sound. Thus we have real "voice control". The same unit can also be used to place sub-audible signals on the tape to control a slide projector so that the slide is changed at a predetermined point in the programme without any audible break or interruption of the commentary.

Comment: The range of accessories makes this one of the most versatile recorders I have ever handled. Despite its multi

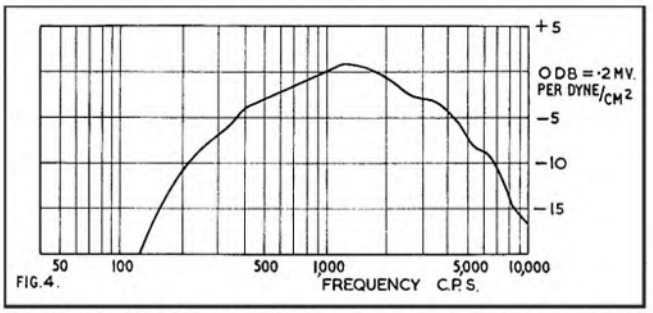

FIG. 4.

function facility the controls are simple and direct and clearly marked, and in the same way the sockets on the side of the machine allow the many units to be plugged in without constant reference to the instruction book. Such apparent simplicity hides a lot of very careful design and I was very impressed by the meticulous attention to detail in the design and styling of this recorder.

A. Tutchings.

* * *

The Ager Talking Hypno Disc.

THIS disc will send you to sleep! But it is meant to—unlike some which are so classified by reviewers!

Mr. P. Ager, N.D. D.O., who recorded it has had over 30 years' experience in dealing with psychological ailments. His previous recordings have ranged from Memory Training to Slimming, a reduction in Smoking and for people who require specialised treatment, he also makes personal tapes.

The 10 inch "Hypno Disc" sent to this office for review, plays at 45 r.p.m. and is in the form of a two-part programme. *Side one* contains a talk which explains how a subject must condition his mind, so that he can be hypnotised. (And, incidentally, it also removes any doubts about the business of waking up again!) It points out that not everyone will respond to the first playing of the disc, and that it may have to be repeated a few times before full co-operation is given. The second side contains the post-hypnotic suggestion, and also a revolving pattern on the disc which the subject is told to watch. When the recording reaches the end of *side two*, the person should be in a hypnotic state, and may wake himself at any time he wishes by following the instructions given.

I admit that I had to listen to the record several times before the hypnotic state was reached, but this was almost certainly due to the fact that I had made up my mind that it would not work on me. However, I now know differently, and I am able to hypnotise myself whenever I wish!

Recordings can be obtained in two versions, tape or disc, both at the same price of £3 3s. Details can be obtained from **Educational Recordings Ltd., 27 York Road, Ilford, Essex.**

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

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Recording Tape. See my advertisement on page 34. Nobody has yet asked for his money back.—Villiers.

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Bradmatic Deck in case £16. Telefunken stereo amplifier little used £6. Powell, Old Meeting Road, Coseley, Bilston, Staffs.

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Wanted

Ferrograph 4A/N or Simon SP4 must be in mint condition. Details to Mr. Evans, 206 Bow Common Lane, Burdett Road, Bow, London, E.3.

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