the TAPE RECORDER

PRICE 1/6

JANUARY 1960
Vol. 1 No. 12

IN THIS NUMBER

STEREO without STYLUS

THE *New*

GRUNDIG

TK55

MONO/STEREO

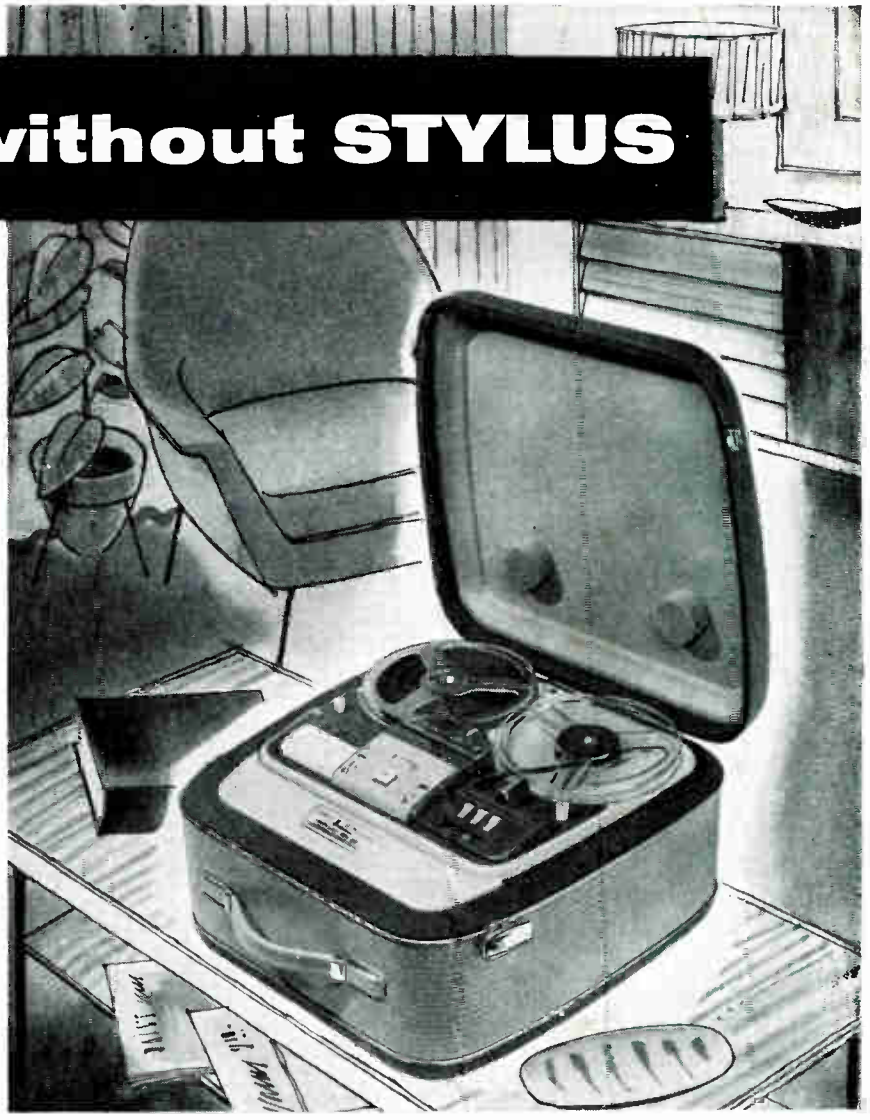
TAPE RECORDER

92 GUINEAS

(excluding microphone)

Stereo on tape—with the new TK 55—is stereo without tears. Superb stereo on tape that's indestructible *and* long play. How much more sensible to build your stereo collection on tape to start with. And what better way of hearing it than with the new Grundig TK 55. Examine this superb model, hear it at first hand; remember, you get *all* the features of a first-class Grundig Tape Recorder—3 speeds, six hours play, superimposition, —*plus* stereo play back.

Make a point of asking your Grundig dealer for a demonstration.



This switch gives you the choice of monaural or stereophonic reproduction —with superb fidelity.

Turn this speed change control, press the button marked '1⅞' and you get six hours playing time per tape.

These are the input selectors that enable you to make the most of any type of recording.

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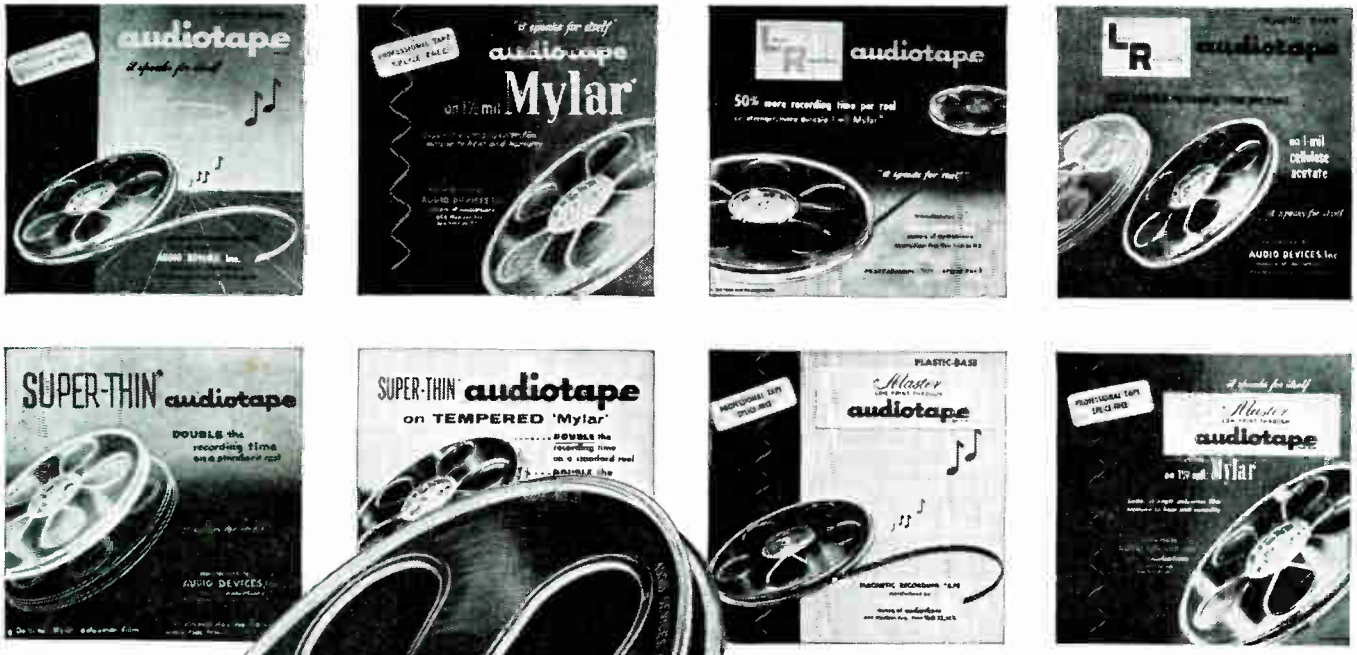
(Electronics Division, Gas Purification & Chemical Co. Limited)

ES176

AN ANNOUNCEMENT OF IMPORTANCE TO ALL TAPE RECORDER USERS



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AUDIOTAPE, manufactured in the U.S.A. by Audio Devices, Inc., is known the world over for its flawless perfection of sound reproduction throughout the entire audio range, and its *consistent, uniform quality* from reel to reel and from one type to another. Available in eight different types, with a base material and reel footage to meet every recording requirement, AUDIOTAPE has only *one* standard of quality—the finest obtainable. This sterling performance reflects Audio Devices' more than 10 years of experience in magnetic tape manufacture, and more than two decades of practical experience in the sound recording art.

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How true this is when it comes to obtaining first-class performance from your recorder. No wonder those enthusiasts who really demand the best—who spend many happy hours experimenting with sound insist on using a Brenell Mk. 5 Deck. The deck which has proved to many a proud owner over and over again that this is indeed a machine designed and built for the service demanded of it.

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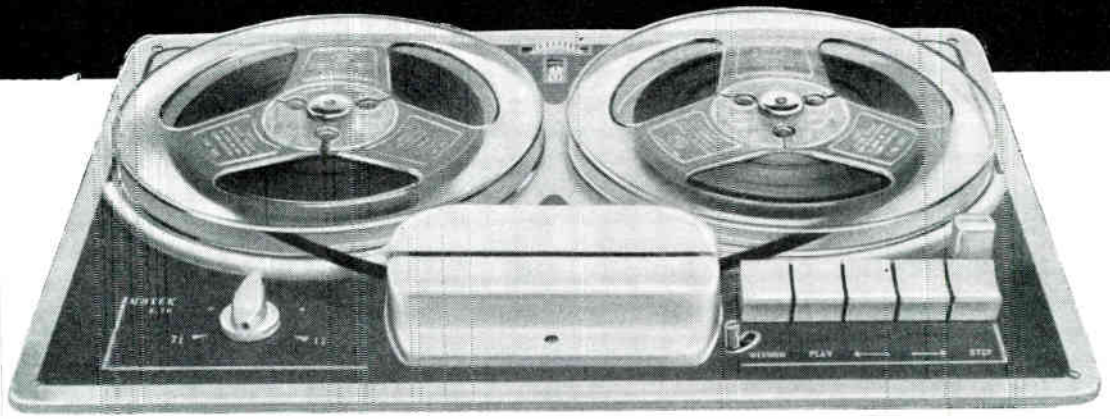
MOTEK



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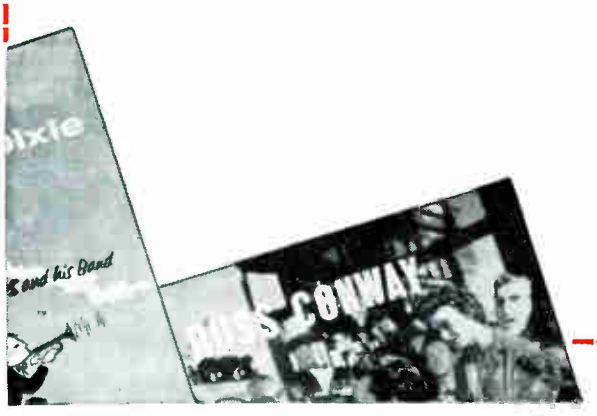

TECHNICAL SPECIFICATIONS

Mains Voltage: AC only 200-250v. *Consumption:* 70w. *Tape Speeds:* 3¾ and 7½ ips. *Frequency Response:* 40 c/s-14kc/s at 7½ ips. *Inputs to Record/Playback Amplifier:* Microphone socket - 2mV; Radio socket 300mV. *Speakers:* Large elliptical speaker and 4" tweeter. *Power Output:* 4w. *Signal/Noise Ratio:* Better than -40d B. *Dimensions:* 16½" x 12½" x 8". *Weight:* 23 lbs.

MODEL 505 57 gns.

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ES/R/78

Hand Made . . .

This is no idle statement, it virtually sums up the REPS recorders, for high quality products such as these cannot possibly be mass produced. Our production capacity is therefore strictly limited and for this we make no apology; rather we pride ourselves that all models manufactured comply with this published technical specification.

The whole mechanism is mounted on rubber which together with careful selection of motors reduces mechanical noise to a minimum.

Provision is made for the addition of a stereo head with both channels available either to an external stereo amplifier, or one channel through the internal amplifier and the other externally.

TECHNICAL SPECIFICATION

The R40
3¾ ips 60—8,000 ± 3dbs
7½ ips 50—15,000 ± 3dbs
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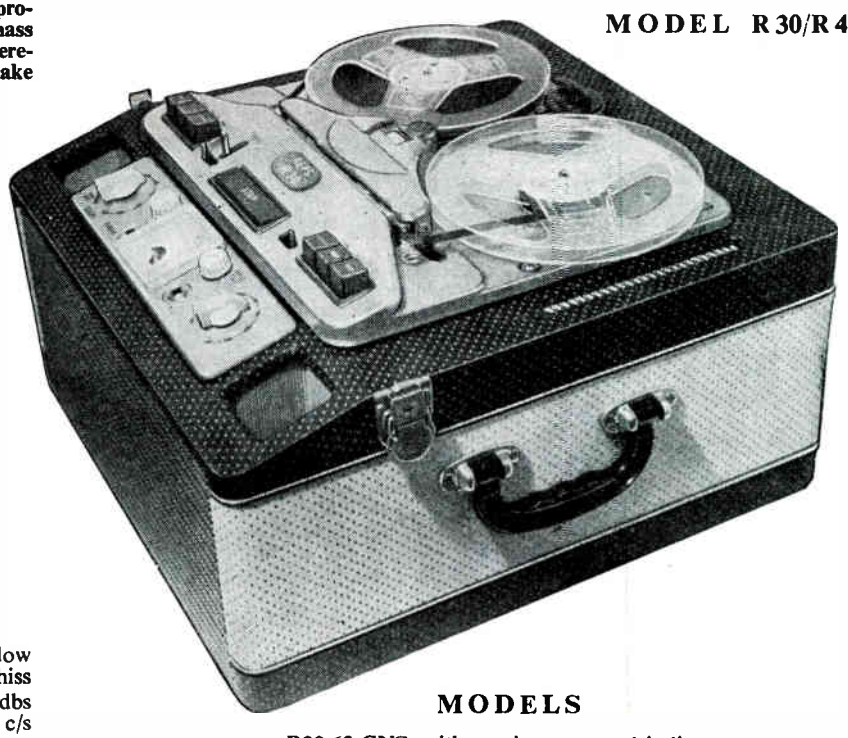
(signal-noise ratio at 7½ ips—48dbs)
Separate record amplifier
2 per cent total harmonic distortion at peak recording level 1 kc/s.
Push-pull bias erase oscillator for low tape hiss
Separate bass and treble controls ± 15dbs at 14 kc/s—15dbs at 40 c/s
Supplied complete with Acos 39/1 mic. stand. and 1,200′ P.V.C. tape

MODEL R30/R40



MODELS

R20 62 GNS. with magic eye record indicator
R30 66 GNS. with meter record level indicator
R40 70 GNS. as R30 but with push/pull sound output.

HOW MANY CYCLES?

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

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

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

A more plausible answer takes into account that at 7½in. per second at 7,500c/s a distance of 0.0001 in. between tape and Playback Head results in a loss of 6dbs or half the output; this loss is nearly proportional to frequency. Now below optimum bias the surface of the oxide coating on the recording tape is the most sensitive part and no distance loss can occur, subject to the tape making intimate contact with the Head. However, at optimum bias the point of maximum sensitivity or remanence is below the surface of the oxide giving a distance loss. This is borne out by the fact that a thinner oxide coating improves the treble response but with reduced overall sensitivity.

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

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

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

Fully illustrated literature available on request to—

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

Mr.....

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the TAPE RECORDER

JANUARY - - - - - - - - - - - 1960

VOL. I - - - - - - - - - - - - - - NO. 12

Editor - - - - - - - - - - - - - - - - MILES HENSLOW

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★

EDITORIAL

WELL, is has certainly been quite a year. With the last few date leaves remaining on the 1959 calendar as we write, it has been interesting to glance back through the pages of this magazine, and see the number of new recorders and decks that have appeared in our *New Products* and other sections—more than fifty of them, and that does not include the large range of other products, such as tapes, splicers, microphones, mixers and gadgets of a dozen different kinds. For tape, generally, it has been a year of tremendous development; and for tape enthusiasts too.

The statistics of tape would indeed make fascinating reading, if only one could compile them; but the whole industry is in far too urgent a state of expansion for accurate figures to be obtained; and figures without accuracy are worthless. Perhaps, in five or ten years time, if the industry has settled down by then, we shall know just what the expansion has been—from virtual zero in 1949 to its present level in 1959. Certainly the amazing growth of popularity of tape was not even dreamed of ten years ago—not even by the most enthusiastic of its believers. The production figures of the world's largest tape manufacturers are quite fantastic, and yet they are still being out-stripped by the enormous and rapidly increasing demand.

Though we, as a journal, are only eleven months old with this number, we have been actively concerned in other ways with magnetic recording since the days when only a handful of enthusiasts had any form of recorder at all. We recall with amazement the days of not-so-very-long-ago (ten years!) when the idea of a fast re-wind was a promised luxury. The first available wire-recorders in the U.K. played for about an hour: and they took precisely the same time to wind back as they did to wind forward! We recall, too, the occasions when the wire sprang loose and formed loops—and knots. True, "splicing" was easy: one tied a reef knot: but for anything but the most valuable recordings the "editing technique" was to cut the wire on each side of the tangle, and to throw away the middle! Then came tape—and fast spooling—with full-track recording. Half-track recording followed closely on its heels, doubling the tape's playing time. Long Play tapes increased it by 50 per cent. Extra Play tapes doubled it. Now Quarter-track recording is doubling it again. Ten years! What comes next?

Several very reliable birds have whispered several very important things into our editorial ears—things that are scheduled to cause no little excitement in the world of tape in the near future. At least one of them is timed to materialise well within the next twelve months. This we tell you, both as an appetite whetter and as a reminder that *The Tape Recorder* is well in touch with the world behind the scenes, and that you may rely upon it to keep you informed about all the latest news in the months of 1960, as authoritatively as it has in the months gone by.

May 1960 prove to be a Happy Year to you all, and a year full of even greater interest in the tape world. And to this wish we add our grateful thanks to all our readers, our advertisers and our distributors for their kind support and co-operation.

CONTENTS

COVER PICTURE

AGAINST a seasonal St. Moritz background, Kenneth and Ralph Gough of Fi-Cord Ltd., are seen simultaneously filming and recording. It is for just such combined operations that their popular battery recorder was designed. The completed film will show the local Alpine Club going through the various stages of conversion to the Austrian method of ski-ing, and may persuade other Swiss groups to follow suit. In fact, two Fi-Cord machines were employed; one relayed suitable music to which the pre-ski exercises were practised, while the other recorded the overall sound of the instructor's voice etc. It is this recording which will subsequently be synchronised to form the sound track on the film.

NEXT MONTH

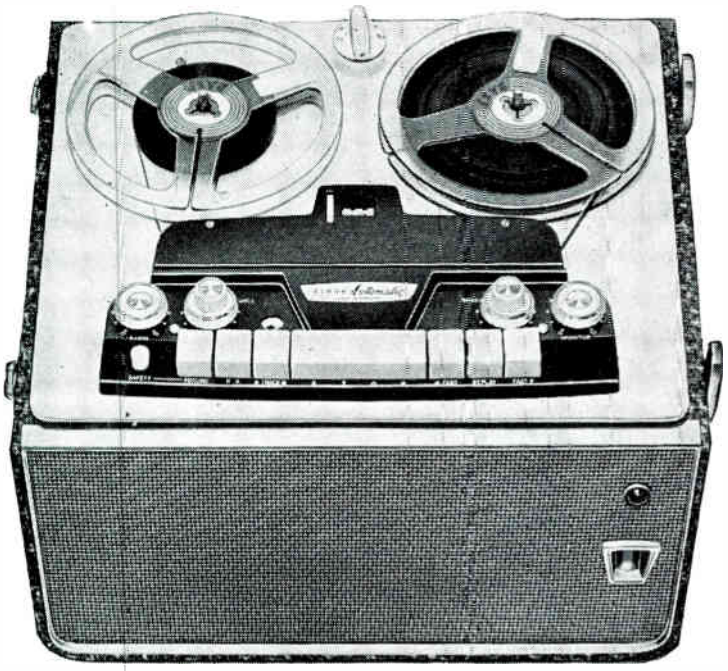
NEXT month's *Field Trial* will feature the Steelman "Transitape", the first of the American company's products to be made available in this country. It operates at $1\frac{7}{8}$ and $3\frac{3}{4}$ i/s, and has a real leather carrying case and shoulder strap. A. Tutchings will introduce followers of his "learn-while-you-build" series to the subject of HF bias, which will enable them to use the single transistor amplifier for making better quality recordings. There will be further instalments too of all our regular features, including *Reviewing Tape Recorders, Readers' Problems, Tape Recorder Workbench, Details of New Products,* and *Nature's Library of Sound.* In addition, there will be our usual full coverage of the world of tape, with news and pictures from *Here, There and Everywhere.* As this February issue marks Vol. 2 No. 1—our Birthday number—we are making a special subscription offer, which is announced next month.

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).

'A new standard of quality, by which other machines will be judged'

Angus McKenzie in TAPE RECORDING AND HI-FI MAGAZINE



This is the enthusiastic opinion of an expert, an independent reviewer, after thoroughly testing the Simon SP4. Throughout the Hi-Fi world, this superb new tape recorder, with its combination of high performance and range of exclusive features, is sparking off similar praise from those who have seen and heard it. Look at this list of star features—then come and see it for yourself at your nearest dealer—try it, test it and you too will join the crowds of Simon enthusiasts.

*

- SIMON AUTOMATIC DECK fully 'push-button controlled'.
- AUTOMATIC TAPE REVERSAL without touching controls.
- 3-WAY MIXING FACILITIES on both record and playback.
- BASS AND TREBLE LIFT AND CUT with independent controls.
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* Automatic, in the simon sense, is meant to be taken literally; it means continuous replay—the machine stops, reverses and changes to the other track with only a two-second pause, and *with no necessity to touch any control.* Similarly, up to three hours continuous recording can be made without attention the machine automatically stopping at the end of the second track.

simon SP.4

incorporating the new Simon fully automatic tape deck

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TAPE RECORDERS IN (AN AFRICAN) PARLIAMENT

By ERSKINE GRANT-DALTON

IN November, 1959, the Federal Assembly of the Federation of Rhodesia and Nyasaland began to tape-record all debates of the House, to assist the shorthand writers to produce a more accurate report of what is said in the House.

The Assembly Chamber measures 30 ft. × 48 ft. and is 22 ft. high. The walls are panelled in oak-faced block-board to a height of 14 ft., and for the remainder of their height are covered with "Soniweave", a fabric woven of paper which is used in broadcasting studios and the like to assist in damping unwanted resonances. The ceiling is made of acoustic tiles. Foam rubber, covered with a thick woollen cloth, upholsters the heavy benches for members. The whole floor-space is carpeted, there being a foam rubber underlay to the carpet. The windows along the south wall are covered with heavy, lined, velvet curtains. All these factors help to make the room suitable for recording. In addition, as the Chamber is completely air-conditioned, it is not necessary for windows or doors to be left open for ventilation. This means that the noise of traffic does not penetrate to the Chamber. The slight hiss produced by the incoming air is picked up by the recorders, but does not interfere with the clarity of the record.

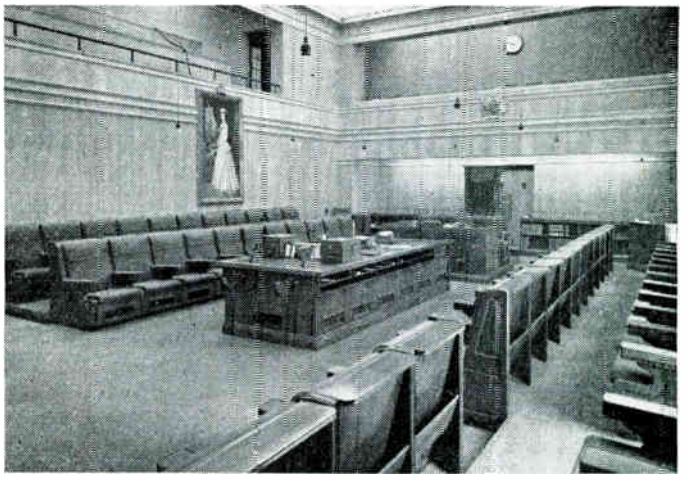
C.A. equipment used

As the Chamber was already equipped with microphones, which fed small loudspeakers in the galleries and in certain offices in the building, and points into which hearing aids could be plugged in the members' benches, it was a comparatively simple matter to couple in the tape-recorders.

The microphones used are the Standard Telephone and Cable Company's Model 4021, a moving coil type which from its shape is known as the "ball and biscuit". Four of these microphones are suspended from the ceiling above the front row of benches down each side of the Chamber; one hangs above the Speaker's Chair; and one stands upon the Table of the House. They are all connected to a switch-box in the left-hand corner of the Press Gallery, which is above the Speaker's Chair. On top of the switch-box is a ground-glass screen on which is a diagram of the seating in the Chamber. Down each side of this screen is a switch for each microphone.

When a switch is depressed to bring on a microphone, a light comes on behind the ground-glass screen, so that the operator can see at once which microphones are on. Normally, only the microphone on the Table of the House and the microphone nearest to the member addressing the House are on at any one time. The amplifier is a Leak TL12, with the "Varislope" pre-amplifier. There are two amplifiers in the circuit, either of which can be used. The second is a reserve against failure of the first.

Two "Ferrograph" YD/A recorders are used, of the latest type, the inputs being made to their 600 Ohm sockets. The recording is made at 3¾ i/s. It is found that once the recording level is set at the beginning of the day, it is hardly ever necessary to change it; and although, in addition to the microphone on the Table, the microphone nearest to the member speaking is also switched on, in fact a perfect recording can be obtained with only the microphone on the Table in use, even when the member speaking is in the far corner of the Chamber. This says a great deal not only for the acoustics of the Chamber, but also for the excellent quality of the various component parts of the recording chain.



Shorthand writers

The recordings correspond with the "takes" of the shorthand writers, who report in turn for 10 minutes at a time. Each reel is marked to correspond to the transcript made by the shorthand writer concerned. At the beginning of the afternoon, both machines are loaded and prepared for recording. As soon as the work of the day begins in the House, the first recorder is switched on.

As soon as shorthand writer No. 1 gets up to leave, the second machine is started, the first is stopped, the tape on it wound back, taken off, placed in its container, and then posted through a chute to an office nearby, where it is collected by an editorial assistant. The first machine is then reloaded, and made ready for the next recording it will be required to make. This process is repeated each time the reporters change over. The operator is so placed that, without leaving his seat, he can control both the microphone switch-board and the two recorders, and reach the chute into which he posts the recorded reels. He also has near him a button which operates a buzzer in the editorial offices, so that he can summon assistance without having to leave the recorders.

Transcribing from the tapes

Each shorthand writer has a small sound-proofed room in which his notes are transcribed. Each of these is equipped with a "Grundig" TK30 recorder fitted with ear-phones and a foot switch, for playing back the tapes. The record is most invaluable to the shorthand writers, for it is very clear, even when there are many interjections and what "Hansard" describes as "Interruptions". The recorded tapes are kept for 48 hours; then, at the direction of the Editor, they are "cleaned" on a "WAL" tape-eraser, and used again.

Maintenance is naturally of great importance. All recorders are checked every morning. Once a week the heads on each are cleaned with a "Klenzatape", and de-fluxed with a "Wearite" de-fluxer.

In a small Parliament, it is possible to produce a good "Hansard" without reporters at all. In such circumstances, it is necessary to have an official in the Gallery who notes down for each tape a list of the members whose voices are recorded on it, in the order in which they spoke or interjected. This list goes out, with the reel to which it relates, to the typist, who then makes a transcript direct from the reel. This method is used in some legislatures in the Commonwealth.

HERE AND THERE AND

Tape Reaches the Theatre

WE open our news pages this month with details of the latest tape installations in some of Europe's leading theatres. Our first picture is from the *Grande Opera de Paris*, one of the most famous opera houses in the world, and shows the well-known French actress Mme. Tscherina standing beside Telefunken's sound installation. Our second picture shows the sound installation control room at the State Opera House in Hamburg.

These installations are based upon *Telefunken* studio type equipment (M5 models), and they provide the theatres with a most comprehensive range of sound facilities. For instance, the Hamburg Opera House uses a battery of four M5's, and elaborate controls and amplifying equipment, so that complete recordings of the very highest professional quality can be made of Operatic works as they are performed. Such recordings are then immediately available for broadcast performances.

Again, by using the replay system, lifelike sound effects of every kind—from thunder and hoofbeats to the clash of swords or the noise of crowds—can be added to the normal stage and orchestral performances. Finally, by means of careful balance and control, the stage sounds and voices can be amplified and used to reinforce the original, so that an easier listening level is available in the auditorium.

* * *

Send us your Stories

Almost every month now, we receive details of new and interesting uses for tape recorders. If you have found an unusual use for a recorder, or if you know of any such uses, why not let us know about them—because other readers may well be interested. If you have photographs to illustrate the events, so much the better. All material which is unused will be returned, as will all photographs; and any contributions which are published will be paid for at our normal rates.

The New Garrard Tape Deck

IN reply to many enquiries about the new Garrard deck, we are now able to announce that this is in an advanced stage of production, and that supplies will soon be available for manufacturers. A section of Garrard's Swindon factory has been turned over to the quantity production of this revolutionary unit, and it should not be long now before the first recorders to embody it will be seen in the shops. It is not yet known whether supplies of the deck will be released for sale for the use of Home Constructors; but this is not at all likely until the very large demands from recorder manufacturers have been met. We shall be publishing full details and pictures of the deck in an early number, but in the meantime readers who are anxious to obtain more information are invited to write for copies of the preliminary illustrated leaflet *What Everyone Wants to Know*, to: Garrard Engineering and Manufacturing Co. Ltd., Newcastle Street, Swindon, Wiltshire, England.

* * *

Tape Brings the Church to the Bedridden

We have received numerous letters from readers, including Clergymen, which tell of the various ways in which tape recorders are being used in connection with the Church: for example, sermons, hymns and even complete Church services are recorded, and then replayed in part or in full to members of the regular congregation who are ill, or sometimes too old to be able to make the journey to the service. From Mr. Elkanah Pryke, Secretary of the Assembly of God Pentacostal Church, Hounslow, we learn that just such a service was started by him no less than four years ago.

The idea began when Mr. Pryke's father, house-bound as a result of paralysis of the legs, heard his first Gospel service through the medium of his son's tape recorder. Realising that there must be many other invalids who would appreciate these services, Mr. Pryke canvassed the streets, with his cheap tape recorder on the carrier of a bicycle, and the mike and spare tapes in a bag over the handlebars.

From this beginning, and as the weeks passed, the service grew into something more ambitious. Tapes of entertainment were added to the bag—sporting items, popular and classical music, bird song, etc., and Mr. Pryke's Samaritan work spread from private homes to Old Peoples' Homes. A larger, semi-professional recorder was bought, and the repertoire still further increased. The inhabitants of the Homes recited their poems and ditties of ancient dates for playback to the inmates of other Homes, and so on.

Mr. Pryke's work is entirely voluntary, and carried on at his own expense. As he says: "My greatest concern in life is for the aged people. Our visits give them something to think and talk about." Features in his library, of which he may well be proud, include recordings by a man aged 101, a lady of 100, and another of 84. Since 1958 the team has been enlarged by the Rev. Stephen Page and 19-year-old Peter Pyle, a keen photo-

EVERYWHERE

A group of old folks enjoy a "tape evening" provided by Mr. Elkanah Pryke and his helper,. For details see story on opposite page.

grapher who takes pictures of the 'evenings' and is then able to exhibit the results on the next occasion. The equipment now includes 40 boxes of tape, two recorders, 4 sets of phones for the slightly deaf, 3 microphones—and, a great asset, the car owned by a Minister who joined the team.

* * *

The Green lead is "Earth"

GRUNDIG LTD., request us to announce that the colour coding of all their machines fitted with three core mains leads conforms to the recommendations laid down by the British Standards Institution of Electrical Engineers for the electrical equipment of buildings. There never has been any deviation from this, which concerns principally the **green** coloured conductor which should be connected to an earth point. Furthermore, all instruction books which relate to Grundig tap recorders and other instruments which are fitted with a three core mains lead specify that the **green** lead of the mains cable should be connected to the earth pin of a three pin mains plug and **never** to any other pin.

A serious situation is created through the import of electrical apparatus which is colour coded for the country of origin, and which does not conform to British Standards—*So be careful!*

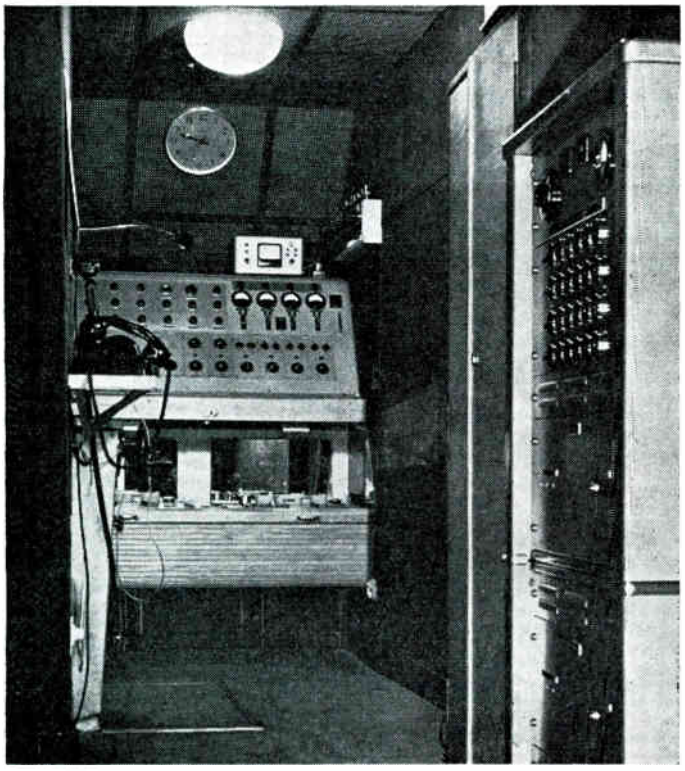
* * *

Recorded Tapes

PRE-RECORDED Tapes: A wide selection of pre-recorded tapes is offered from the catalogues of Concertapes and Omegatapes, these are suitable for playing on stereo and monaural recorders in two and four track arrangements and at 7½ and 3¾ i/s. These well-known American Tapes are distributed here by **Technical Suppliers Ltd.,** Hudson House, 63, Goldhawk Road, London, W.12., who have been appointed sole trade distributors for both labels for the United Kingdom and the British Commonwealth. Retail prices range from 35s. per reel to £4 4s., dependent upon the length of playing time.

* * *

THE appointment of Mr. G. S. Taylor as chairman and Managing Director of Grundig (Great Britain) Limited is just announced. Mr. Taylor has been with the firm since its inception some seven years ago, and until now has been Grundig's Commercial Director. At the same time Mr. Taylor joins the Board of Gas Purification and Chemicals Limited, the Holding Company of the group of which Grundig is a member.



The control cubicle of the tape installation at Hamburg.

A pet lends a paw at an Elkanah Pryke Social.

TAPE—AS OTHERS

Frank Weston must be one of East Africa's livest tape enthusiasts.

Tape in Tanganyika

A letter from a Tanganyika reader, enclosing a photograph and a newspaper cutting, tells of the formation of the Tanganyika Tape Recording Society. This club is run by Frank Weston and his wife Gina. His job is Assistant Superintendent of H.M. Prisons, but his off-duty enthusiasms are mainly tape, and he is also the East African Representative of Tape Respondents International: World Tape Pals: and the British Tape Recording Society.

* * *

Third Rose Bruford Tape Course

The Rose Bruford Training College is holding its third national Tape Recording Course next Easter, from April 19th to 24th, 1960.

The course will include the theory and practice of the basic skills, some programme exercises, and on the last day a final evaluation of the work done and a discussion of the problems raised.

Portable recorders like the Fi-Cord are very popular for recording pets' voices. In the photograph we see Nancy Jay (an early contributor to "The Tape Recorder") in conversation with a feathered friend.

NEWS FROM THE CLUBS

During the first three days members will be divided according to previous experience into three groups. John Borwick, I. W. Jarman, and F. C. Judd will conduct the practical sessions in studio operations, editing, and technical skills. Mr. Borwick will talk on how to get the best from equipment, and he and Mr. Judd will discuss the variety of equipment available to the public. Miss Daphne Oram will demonstrate how the recording of musical instruments and choirs is done. Plenty of equipment will be available, and the small groups for the technical and programme exercises will ensure individual contact with tutors. Application forms are available from: The Special Courses Organiser, The Rose Bruford Training College, Lamorbey Park, Sidcup, Kent. (Footscray 3024.)

* * *

WE have had no news from the Emerald Isle for some time, so it was with interest and amusement that we read of the exploits of three members of the **Ulster** Tape Recording Society, Belfast. Brian Gillespie, one of the trio, belongs to a local gliding club and, thinking it might provide an unusual recording session, John Douglas (the club Chairman) and Bill Scott, persuaded Brian to "take them for a spin". Little did they realise how unusual it was going to be!

However, the flight was organised and a Clarion Transitape taken along. It appears that all went well—interesting impressions were being recorded along with the wisecracks—until John Douglas agreed to Brian's performing a few aerobatics. From then on, we gather the proceedings became more exciting and, to quote Press Officer J. Stanley Mains, "His remarks are something we will treasure in our club archives". (You might have sent us a copy of the tape!)

Mr. Mains continues: "*Excuse me if we have a puff at our own trumpet—we are the only tape recording society in Northern Ireland*". They have just completed furnishing their own clubroom in Shaftesbury Square, Belfast, and will be installing heating and other comforts in a few weeks. They don't mention carpet slippers for members as yet . . . ! It appears that, being situated away from manufacturers and plentiful supplies of "experts", the club sometimes has difficulty in compiling interesting programmes.

Requests for the "Scotch" Brand Playing Time Calculator have exhausted two complete printings. However, we understand that further supplies are in preparation.

USE IT

Farewell words from one fair lady to another. On her last night in London Miss South Africa, Moya Meaker, went to see "My Fair Lady" at Drury Lane theatre. After the show she met the stars; and here is Anne Rogers (left), star of the show, giving Moya a bon voyage message on tape.

Our experience of tape recording clubs has proved that enthusiasts are extremely keen to swap tapes and also ideas for programmes, so perhaps readers of Club News will pass on a few suggestions. They also mention that any manufacturer's agent travelling in the vicinity of Belfast would be most welcome to call on the club. Any correspondence should be addressed to the Secretary—**Mr. W. J. Scott, 41 Haypark Avenue, Belfast.**

* * *

There must be many owners of recorders whose fingers have itched to get at some of the BBC's recording equipment—particularly the fingers of the more technically minded. Such a treat was enjoyed by six members of the **Bristol** Tape Recording Club when a few of the BBC staff prepared a mock programme on their behalf. No doubt many of you have heard the popular West Region programme, "*Round-up*"? Well, the version produced for the Bristol Club, where they were interviewed in a similar manner, was called "Dust-up"! Mr. Beaton of the B.T.R.C. says that these staunch members of the club were permitted to operate the "fabulous recording equipment".

John Mitchell, who hitherto was a Club Officer, has now been sent by his firm to Cape Town for a short tour of duty. Both he and club members are hoping that he will be able to contact a local tape recording group there, so that he can pass on his news and details of tape activities in that part of the world.

* * *

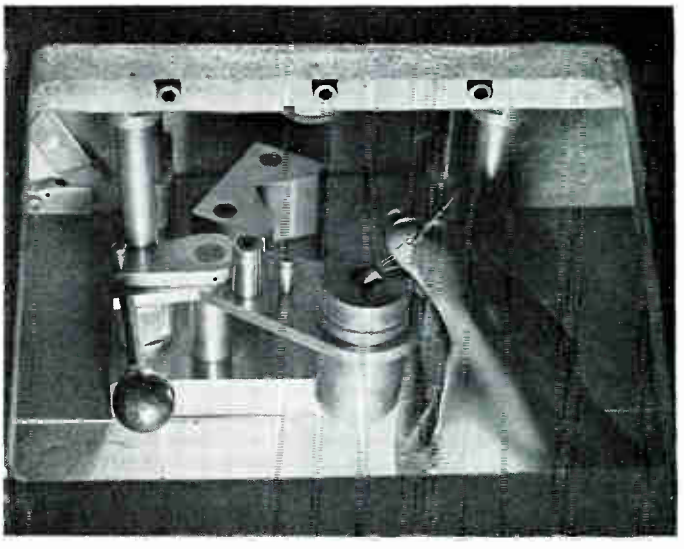
An appeal for advice—for a very commendable cause—comes from Mr. Eric W. Wallis, Secretary of the **Blackpool and Fylde** Tape Recording Club. They are organising a hospital service which they would like to start operating as soon as possible. Mr. Wallis would like some hints on how to begin this service on a well planned basis. Donations of "clean tape" to supplement their small existing supply would also be of great help. Future meetings are planned to include Hi-Fi and Stereo recordings, a tape competition and a taped "Tall Story Club"—we understand this latter is a very humorous feature.

The B.F.T.R.C. are keen to keep in touch with other clubs, and welcome the loan and exchange of unusual tapes.

* * *

A brief note was recently received from Mr. Colin Braddock, 266 Waterloo Road, **Blackpool,** who wishes to form a *tape group.* He writes: "The reasons for a group in place of the usual club,

The glasses were raised but the music went on. At a recent G.E.C. demonstration the high quality reproduction of the tape record was most dramatically proved. Many people were fooled!



Problem picture. What is it? Answer at foot of page 558.

is that more time will be available for active tape recording in its many aspects, and less valuable time will be wasted in matters completely divorced from tape, as is the case in many clubs " . . . over to Mr. Braddock.

* * *

A sound and film group has been formed in **Lillington,** the time of each meeting being divided equally between the two. They have no difficulty in presenting a full and interesting programme on the film side, but with their limited experience, they are somewhat at a loss to think up ideas for equally interesting sound evenings which, of course, would also attract additional members. They have two professional recorders (unfortunately the names were not given to us), and various other items of equipment. Once again, imaginative ideas are called for. Those interested, or kind enough to offer help should contact **Dr. P. Telcher, 27 Meadow Close, Lillington, Leamington Spa, Warks.**

* * *

Production of a really good competition tape is usually satisfying in itself, but Mr. Frank McManus, Treasurer of the **London** Tape Recording Club has gone one better in presenting a splendid cup which will be competed for by members. At a recent meeting, Mr. Roger Aslin brought along the transistorised EMI L2 portable recorder. The machine was examined, tried out and generally inspected to the interest of all present. The meeting was concluded by an enlightening talk by the club Chairman, Mr. Alan Stableford, on the formation and status of tape recording clubs.

* * *

An intriguing newspaper cutting headed "*Calling Dallas*" fell out of a letter from the **Luton** Tape Recording Society. It didn't take many seconds for the connection to become apparent, for Harry Matthews of Dallas, Texas, is President of the World Tape Pals Incorporated. The Luton Club decided to ask Mr. Matthews to be *its* president for, as Maurice Nichols, the club secretary, says " Harry Matthews, as President of World Tape Pals Inc., has done so much to foster better relations between countries of the world, we felt it would be fitting for him to head the officials in our Society ".

It is claimed that you can master the Magnus electric organ in a few minutes without reading music, since notes and chords are numbered or lettered to correspond to special music books. Price 39 *guineas. Further information from Magnus Organ Co. Ltd.,* 14/18 *High Holborn, London, W.C.*1.

MORE NEWS

The invitation to become their president was sent via a tape recording, and Mr. Matthews acceptance and presidential address was, needless to say. in the form of a tape recording. Now the Luton Club is busy making a tape of its activities of Luton town to send to Dallas. As one of the members said " Harry may be 5,000 miles away in Texas, but we aim to keep him in touch with everything we do ". It is now understood that at all future meetings members will check guns and cartridges at the door.

* * *

The **Reading** Cine and Tape Recording Society have been active in connecting tape and film. They were visited by a manufacturer's representative who showed his firm's tape equipment for use with film apparatus. Here again, Alan Stableford paid a visit. (A Havana cigar for Mr. Stableford for the tremendous amount of work and enthusiasm he puts into tape recording clubs throughout the U.K.)

* * *

The **Grantham** Tape Recorder Club are now boasting new club premises, consisting of two rooms at the Grantham Technical College, Avenue Road, Grantham. The rooms can be used by club members as frequently as required and have central heating and canteen facilities—all this for 3s. 2d. per night! It has been suggested that one room be used as a studio and meeting place, and the other for recording. Club meetings will be held in future between 7 p.m. and 9 p.m. on the following rota: 1st week of the month on Wednesday; 2nd week on Monday; 3rd week on Thursday; 4th week on Friday. In the past, meeting's subscriptions have been 1s. per member but henceforth it will be 6d.

Members were informed that a tape recording club was to be founded in **Lincoln** and it was agreed that members should either visit them or send a tape. A future competition open to all members will be a five minute " thriller " in sound effects only; this may be " home made " or taken from live radio or television.

A very useful feature is incorporated in the Grantham club's news bulletin—this is a glossary of terms appertaining to tape recorders, i.e. distortion, dB etc.; encouraging for those who may not be *au fait* with the intricacies of a tape recorder.

Silly tail at the end of the aforesaid bulletin:—One lunch-time, a few weeks ago, the chairman was copying one tape to another when in through the window buzzed a wasp. Having experienced more than a dozen stings simultaneously in his childhood, the chairman gave this critter a wide berth—leaving the two machines running—and viewed its activities from the other side of the room. The wasp settled on one of the merry-go-rounds (in actual fact a take-up spool) and, in its explorations, poked its head downwards, whereupon it was pinioned by the next layer of tape. In a rather undignified posture, with its sting madly waving in air (luckily held by only a light pressure), the wasp went on to the end of the transfer. Gingerly the tape was unwound (the machine had variable rewind) and the wasp found itself free. It sat there for a while, with its sting popping in and out frantically, then, as Geoff. Harris says (let's all try to forgive him for this): " It came to the conclusion that the chairman had it ' taped ', and flew out of the window ".

* * *

The **Jarrow and District** Tape Recording Society have been publicised in the local press following a meeting last month at The Central School—where they meet fortnightly. They have been promised visits from various manufacturers' representatives in the New Year and, in the meantime, are encouraging new members to join. All applications should be addressed to Mr. J. Rippington, 30 Breamish Street, Jarrow, Co. Durham.

FROM CLUBS

Those fortunate enough to attend a Gerald Hoffnung concert will appreciate the **Coventry** Tape Recording Club's enjoyment of one of his stories. Howard Freer, one of the members, brought along a hilarious recording which, quoting their bulletin, proves "It's not what you say, but the way in which you say it that gets the laughs". It was suggested some time ago that this club had a prize-winning tape competition. So far no one has competed, and according to their newsletter "*You* could have the prize for submitting any sort of tape". (Like the woman who entered for the fancy-dress competition aboard the Queen Mary when tossed by gales a few days ago . . . she was the only one who entered and she collected four prizes! She was also extremely seasick).

At their A.G.M. on the 10th December, Peter Warden recalled some of the highlights of the past year and gave the present membership figure of 53. New club officials nominated for 1960 are: Roy Penfold, Chairman; Roy Reynolds, Secretary; and Bill Palmer, Treasurer. Thanks were given to Peter Warden, the retiring Chairman and Mr. Dave Reynolds, who declined to offer himself for re-election as the club's librarian.

* * *

By the time you read this, the **Edinburgh** Tape Recording Club will have finished (and undoubtedly enjoyed) their first Christmas party . . . with 70 people present and (one assumes) unlimited music, why not? John Penman told us he was going to ban "rock and roll" and eightsome reels as the party was to be held in a flat—and he didn't want complaints about falling plaster! Mr. Penman says he is frequently being asked by people to play tapes for relatives in Edinburgh; he says he is happy to do this.

E.A.P. (Tape Recorders) Ltd., have a Moon Rocket Station at this year's Schoolboys' Own Exhibition at Olympia. Here is Michael Bentine's impression of a moon landing! An Elizabethan "Bandbox" will go to the boy who records the best impression of such a landing.

Script in hand, lovely Anne Heywood settles down to a session of solo rehearsal with her Grundig TK35. We shall soon be seeing Anne in her latest film—"A Terrible Beauty."

The **Warwick and Leamington** Amateur Tape Recording Society are also carrying on this rather heartwarming activity of carrying personal sound messages. A tape was received from a serviceman's wife in Düsseldorf for her parents in Warwick. Two members of the club went to the parents' house and played the message. They recorded a reply and subsequently sent it back to the daughter.

"The Scilly Isles", the beginning of a series of tape/slide shows photographed and recorded individually by members, was presented by Chris Barnacle at the last meeting. Summer holidays in Switzerland, Italy and Spain are to be featured in this way during forthcoming gatherings.

* * *

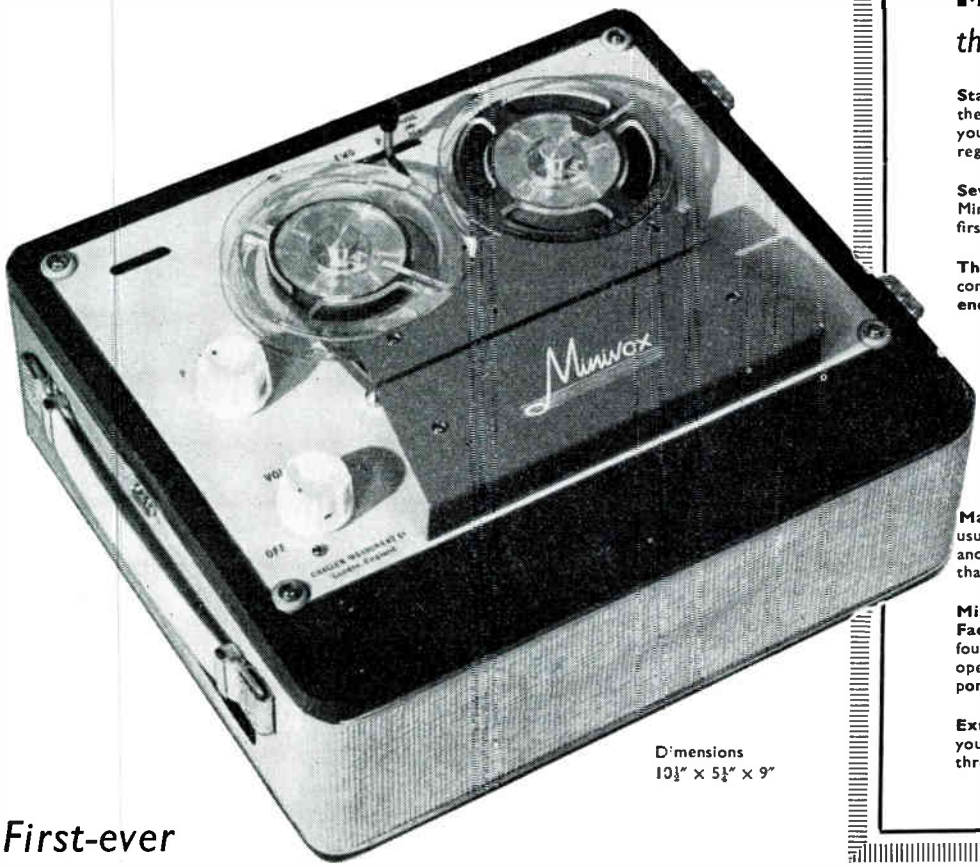
The **Sheffield** Tape Recording Society have been given a demonstration of Hi-Fi equipment by Mr. M. Murray who ventures that his equipment was probably ideal for most members, since it made an admirable compromise with elegance, quality and cost. A Garrard record player and a Pye amplifier were neatly housed in a secondhand radiogram cabinet and ex-cinema Celestion speaker in a Prelude cabinet. The Wharfedale tweeter aroused a great deal of interest for it was housed inside an old clock, the dial of which was covered with a piece of tapestry. Demonstration recordings ranged from operatic arias by Maria Callas to tunes from "South Pacific". Members were very impressed with the quality of the recordings. Owing to the loss of their Y.W.C.A. clubroom, the next meeting is still in the planning stage until other premises can be found.

* * *

Mr. J. L. Langley of 4 Clifton Rd., Newbury Park, Ilford, is anxious to form a tape club for **Ilford** and the surrounding district. It is hoped that this club would, in due course, be affiliated to the Federation of British Tape Recording Clubs.

* * *

In last month's issue, we published skeleton details of the Star course being produced by the **Rugby** Amateur Tape Recording Society; now we have been given full details of this excellent project—to which we add congratulations to the organisers.
We look forward to receiving news of the first meetings of the syllabus in time to report them in these columns in our February number. In the meantime, to remind readers who may have missed our earlier announcement, the meetings are to be held on six consecutive Thursdays at 7.45 p.m. at the Red Lion, Sheep Street, Rugby.



Dimensions
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Only the new **MINIVOX** *has all these advantages*

Standard Radio Batteries power the new Minivox, and they'll give you at **least** 100 hours of regular recording.

Seven Transistors in the new Minivox give high sensitivity and first-class reproduction.

Three governed motors ensure constant tape speed **until the very end of the life of the batteries.**

Standard Tapes are used with the new Minivox, unlike most portables which need special tapes.

1¾ hrs. Playing Time with the new Minivox, using extended-play tapes.

Magic Eye Level Indicator not usually found on portables is another example of the careful design that has gone into the Minivox.

Mixing and Superimposing Facilities are features normally found only in high priced mains-operated machines—yet the portable Minivox has them.

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First-ever British battery Tape Recorder gives

PORTABILITY AND PERFORMANCE— AT THE RIGHT PRICE

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The new Minivox is the only portable that gives first-class results at a tape speed of 1⅞" per second. (It's twin track, of course.) The audible frequency response extends to 8,000 c.p.s. Wow and flutter are inaudible. The case combines accurate acoustic performance with a most attractive appearance. The total weight is only 9 lb. Yet, although the new Minivox is so portable, it is really robust and precision engineered. The deck is of $\frac{3}{16}$" duralumin. (No flimsy plastics have been used!) The circuitry has the same high standard of quality. The Minivox employs *seven* transistors and *three* constant speed motors. All this for only 37 gns. including microphone! Get your Dealer to show you the new Minivox. This is a case when one demonstration really will convince you.

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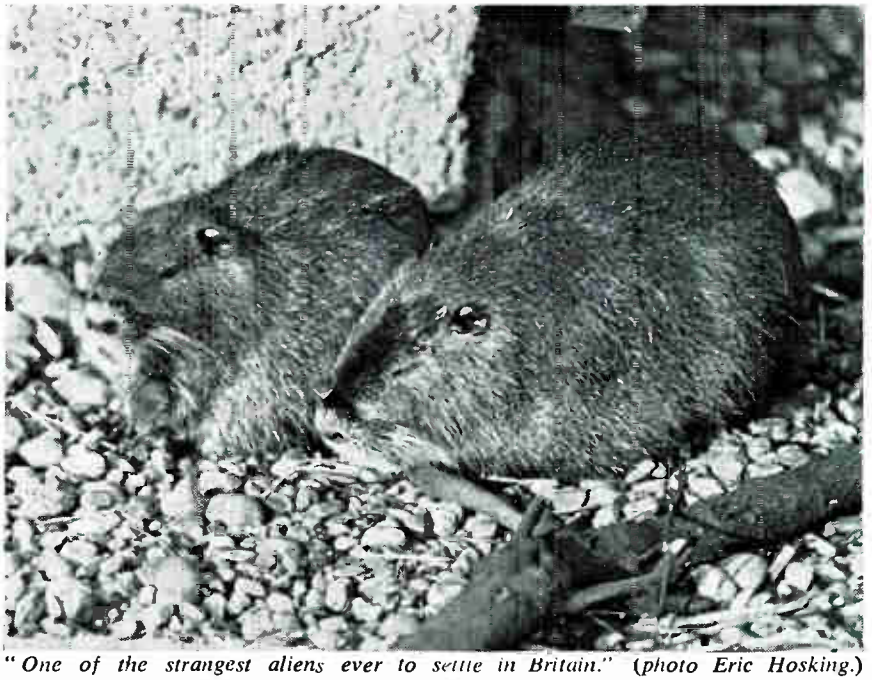
By Eric Simms

NATURE'S LIBRARY OF SOUND

PART 8 — A MISCELLANY OF ODD CREATURES



"One of the strangest aliens ever to settle in Britain." (photo Eric Hosking.)

IN this series of articles I have described some of the exciting recording expeditions that I have undertaken to various parts of Britain and Europe in search of Nature's sounds. Each article has dealt in some detail with the triumphs and frustrations associated with each trip. This time I am going to write about the results of our attempts to record some of the stranger noises of Nature.

Some of the most fascinating of these sounds are made by insects, either by stridulation or by the beating of their wings. It is well known that crickets and grasshoppers produce their chirping "songs" by rubbing one part of their anatomy very fast against another. One species of aquatic insect—the lesser water-boatman—can make an appreciable sound in this way. Its front pair of legs is specially adapted for grasping but the animal is also able to rub these legs against the side of its head which, shaped rather like a dustbin-lid, acts as a very useful sounding-board. This action produces a steady, rhythmic chirping sound. It is in the spring that the lesser water-boatmen start up their little songs and they are most noisy when the temperature of the water is at 19 degrees Centigrade.

Water Insects

In March 1954, Bob Wade and I set about recording this sound by fastening a moving-coil microphone flat up against the side of an aquarium in which several were swimming about. In this way we were able to pick up the stridulations from the insects through the water, the glass side of the tank and the face of the microphone. In still conditions in a room it is possible to hear the insects as much as eighteen feet away.

One day Mr. W. J. Akester, who is an expert on hawk-moths, brought a silver-striped hawk-moth to a BBC studio in London. It is one of the magnificent hawk-moths which are very rare vagrants to Britain. It has a wide range in the Tropics and Sub-Tropics and is probably resident as far north as the European coasts of the Mediterranean. In some years, such as 1950, appreciable numbers find their way to this country. Mr. Akester's moth had been sent to him as a pupa from Malta and he had reared it at Edgware in Middlesex. Before taking to flight the moth warms up by vibrating its wings. We took it out of its travelling case and placed it in front of the studio ribbon microphone. The tape recorder was started up.

After some thirty seconds at rest the hawk-moth began to vibrate its wings. Gradually as we listened to the loudspeaker a very low frequency hum began to reveal itself. The sound was suggestive of some kind of electrical interference or mains' hum but it grew steadily in volume until, after about two minutes, the insect rose and became airborne in the studio. The sound that we had recorded was surely one of the strangest in all Nature, but I could hear exactly the same frequency if I placed my ear close to the moth's vibrating wings.

A year or so later Mr. Akester brought another rare and beautiful hawk-moth to the studio. This time it was a gray, pink and black convolvulus hawk with a wing-span of five inches and a tongue of four inches with which it probes the tubular flowers of petunias and tobacco-plants. Like the silver-striped hawk-moth this species also "warms-up" by vibrating its wings for some time before taking off into the air. As we have seen, the former took some two minutes to achieve this, but the convolvulus hawk-moth spent some seven minutes in this warming-up activity before launching itself into the air. The frequency of the vibrating wings was lower than that of the other hawk-moth and lay between 60 and 90 cycles per second. At one point the wing-tips reached such a height in their arc of movement that they touched and produced a flutter above the overall vibration.

One kind of hawk-moth is capable of producing a squeaking sound if molested; this is the death's-head hawk-moth and in 1956 Bob Wade recorded one and half minutes of squeaking from this insect. It was later broadcast, like the other moth noises, in one of the monthly BBC "Countryside" programmes. This interesting noise is not made by stridulation or by wing-vibration, as with most other insect sounds, but by the expulsion of air from the air-sacs of the tracheal system through the proboscis—a manner not unlike the way in which human sounds are made. This sound has often been likened to the squeaking of a mouse, but to my mind it is more like the squeak made by finger-tips drawn over the surface of an inflated toy balloon. The aquatic screech beetle, which I recorded in September 1959, also squeaks if chased by a water-shrew or handled by man; but this is a stridulatory sound.

Fish are Usually Silent

Sound production in fish may be achieved by air-bladder mechanisms, or stridulation, or by a combination of both. Most fishes remain silent unless they are subjected to external or internal stimuli, but the sounds are voluntarily produced on occasion at the time of breeding, to express fright or alarm, or as a method of orientation. In fishes certain parts of the body may be modified to produce sounds; often the chief part is the swim-bladder which may have a transverse diaphragm dividing it into two chambers, and having a hole in the middle. A sudden pressure on one part of the bladder will cause an unequal pressure on the gas in the two chambers, and the diaphragm is accordingly

presenting the

PRINCESS

* *

Another Elizabethan triumph—the new Princess—the most outstanding recorder of the present day. Three speeds and true-to-life reproduction. Four hours' playing. Most versatile features including mixing, super-imposition and listening while recording. Attractive two-tone cabinet, small and light. Simple push-button controls. Altogether, top for performance, top for looks, and TOP for value at its remarkably low price.

To be top of the poll—present the Princess.

39 gns **Ready to use, Complete with microphone, tape, etc.**

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BLOCK LETTERS PLEASE

vibrated. Various methods may be used by the fish to alter the pressures—muscles or fins, for example. Air-bladder sounds are usually low in pitch, hollow and drum-like with their principal frequencies in the 75 to 150 cycles per second range. The eel is an example of a fish that makes sounds of this kind.

Stridulatory sounds are made by rubbing one part of the fish's body against another. The commonest way of doing this is by grinding the gill-teeth on the pharyngeal bones, but it is sometimes done by the general vibration of the pelvic bones by scrapings of the vertebrae. The characteristics of these sounds are, as might be expected, rasping, scraping, scratching or whining; they are given in short bursts with a frequency range of from 50 to 5,000 c/s. So far, research in America at the Narragansett Marine Laboratory has shown that the highest frequency to which any fish has responded has been below 7,000 c/s. There is, however, one marine mammal, Tursiops truncatus, which may produce sounds as high as 120,000 c/s and these, like the bat's high-pitched squeak or the notes of the cave-dwelling oil-bird, may well be used in echo-sounding and orientation.

Using Hydrophones

As a result of our experiments in the summer of 1955 with hydrophones and a magnetic tape recorder, I found that carp and chubb, if deprived of food for a time and then fed, made sounds of a stridulatory origin. When competition was high for the scraps of food dropped in the tank, numbers of the fish made a strange, somewhat melodious whining sound maintained in bursts of from 15 to 34 seconds in length and of fluctuating pitch. This suggested an active and immediate response to the new stimulus brought by the action of feeding and may well have contained some element of threat. This, of course, represents the very fringe of knowledge about the underwater world, but the tape recorder has played an important part in the permanent preservation of such sounds for future analysis.

Here, too, the sound spectrograph which, by various filters, breaks down sounds into their constituent frequencies, enables comparative work to be done that no longer depends on the observer's memory. It is even possible to study in detail the utterances of various species as well as variation of call in members of the same species, to find out the pitch ranges and differences, and to keep a permanent visual picture of the results. Many of the recordings of bird-song, sub-song and calls which I have placed in the BBC's Natural History Library have been analysed and compared in this way.

The Coypu

Mammals are also able to make strange and fascinating sounds, and we collected many in the London Zoo such as the aircraft-engine-like threat of Geoffroy's cat from South America, the bucolic swearing of the Tasmanian Devil and the ear-shattering roar of the hippopotamus. Perhaps one of the most interesting of our quests for unusual sounds took us in December, 1953, to the Norfolk Broads. Our quarry was one of the strangest aliens that have ever settled in Britain—the coypu. This great rodent, often exhibited at fairs as "The Biggest Rat in the World", looks like a cross between a rat and a beaver and comes originally from the swamps and rivers of South America. It was introduced into Britain in 1929 to be bred in captivity so that its valuable pelt, known as nutria, could be farmed and marketed commercially. In the next ten years about fifty farms were set up mostly in southern and south-eastern England, but with a few in the North and West and two in Scotland. Just before the last war some of the coypus escaped from the farms and others may have been released. In any case, those that gained their freedom quickly adapted themselves to a wild life in our countryside and, being semi-aquatic, they soon spread along a number of rivers and waterways.

These animals, which may weigh up to 28 pounds, have found the reed-fringed water-courses to their liking and they have become a familiar sight in many parts of East Anglia. Coypus are essentially vegetarians and their favourite food seems to be reeds. This is, of course, a head-ache to those who grow reeds commercially, but for those who have difficulty in keeping their waterways free of reeds the coypu may be a valuable ally. Although it has been suggested that, like the musk-rat which was also introduced to Britain, the coypus burrow in the banks, the evidence is greatly against this as a general habit and their nests are reed-platforms in the open. Two litters of young may be born in a year, and the female carries her mammary glands on the back so that the young can be suckled in the water.

Although in origin a sub-tropical animal, the coypu seems to have little difficulty in living through the severest winters, and groups of them congregate in caverns beneath the snow to keep warm. They do not object to salt water and so are able to travel from rivermouth to rivermouth. Water is essential to the coypu and it is an expert swimmer, able to remain underwater for long periods. In the hours of winter darkness it is especially active, and then on some of the rivers and broads of East Anglia strange pumping screams enable the animals to keep together.

We recorded on tape a number of these extraordinary explosive, screaming nocturnal calls. These cries grow in intensity and pitch with short breaks while the animals take in anxious breaths; then the screams reach a peak of sound and passion. According to the current number of "Bird Notes", issued by the Royal Society for the Protection of Birds, the coypus which have recently arrived at Minsmere—one of the sanctuaries in Suffolk of the Society—do not seem to disturb or upset birds on the water feeding quite close to them. Although the coypu is active at night it will move around in the daytime as well, and I saw several in the reeds among wild duck, and with wild geese and a harrier flying overhead.

In our quest for recordings Bob Wade and I travelled 100,000 miles and during the time in which we worked together we were helped by many societies, naturalists, landowners and private individuals. A great, and in some cases still uncharted, world lies before the nature recorder and there is much still to be done. I must, in conclusion, repeat what I said in the first of these articles. The welfare of the animal or bird must always be the first consideration and curiosity or persistence must never be allowed to interfere with this. Many factors make bird and animal recording the most glorious and thrilling sport of all, but it has exact and unambiguous rules. Please observe them.

"So that's where the tape of the Director's wedding disappeared to!"

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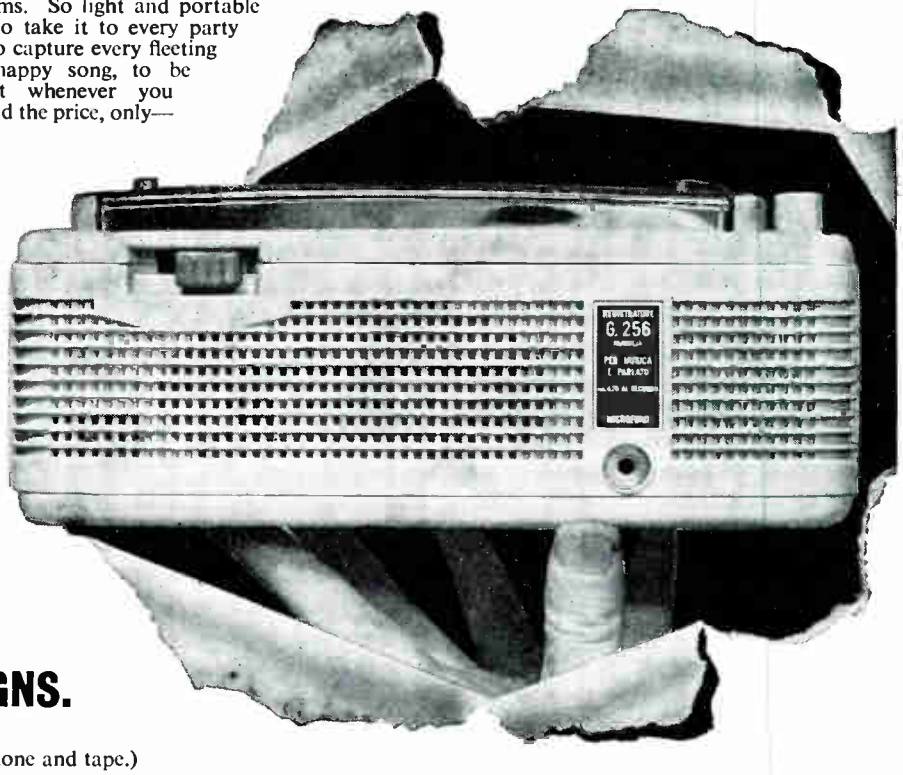

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LP. 133

. . . . tape recorder workbench

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

PART 8 —— CONNECTING TO RADIO OR TV

AS a result of a chance remark of our Technical Editor I am going to deal with a problem that seems to worry several readers, judging by the number of letters that have been received recently.

The main question appears to be concerned with the correct way to record from a TV set. In view of the fact that most TV receivers are of the AC/DC type it is also important that recordings should be made in the *safe* way.

Let us consider, then, this whole idea of recording off the air, examine the various ways in which it can be done, and thus find the advantages and disadvantages of each. Probably the first way to be tried by any new tape recorder owner, because it is plainly the simplest, is to put the microphone in front of the radio loudspeaker. Simplicity is, however, about the only advantage of this method, which has, on the other hand, several drawbacks. Suffice it to say that the recording may be of poor general quality, restricted in frequency range, having right in the middle a well-nigh perfect record of the front door bell!

Microphone not required

The obvious step then, if only to avoid the odd non-musical interruption, is to dispense with the microphone and make a direct connection to the radio (or TV for that matter). Here I must sound the strongest possible note of warning—most TV sets and a number of Radios are of the "Universal" or AC/DC type

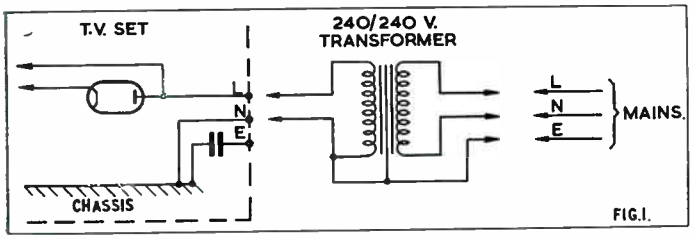


Fig. 1: *A 1:1 isolating transformer should be used on AC/DC equipment.*

and these can be dangerous, due to the direct connection between the chassis and the mains supply. If the set is connected to the mains through the medium of a *double wound* mains isolating transformer, then signal connections may be made with complete safety and earthing carried out if necessary. It should be noted that the same degree of safety can be achieved by the use of a transformer in the signal line. While such a transformer might be smaller, it might well cost as much or more, if the frequency response of the signal is not to be affected.

On the assumption, then, that AC/DC apparatus is to be made safe in the above manner (and it should be stressed again that without such protection a direct connection can be lethal) we can pursue the question further.

Using the Radio inpnt

In addition to the microphone input, most tape recorders have provision for a "Radio Input". This is usually of lower sensitivity, requiring a signal of upwards of 200 mV, though the figure is unimportant. If two wires are connected, one to each of the radio loudspeaker terminals, to the radio input, the next step has been achieved. If at first you get no results, or a loud hum, reverse the connections of the two wires. What have we gained? No longer using a microphone, the front door bell will not worry us, nor can the frequency response of the microphone be a limiting factor. But there are still some snags. The volume of the radio has to be turned up in order to produce the necessary signal across the loudspeaker, so we cannot record in silence. Any frequency limitation or distortion arising in the power stage of the radio or TV will be recorded. As we should surely aim at a recording limited only by the frequency response or distortion of the recorder itself, let us have another try.

If we were to take our recording signal from the earliest point in the set at which it is in the form we want, virtually the only

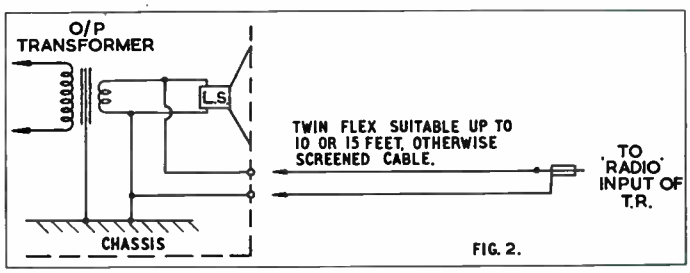


Fig. 2: *The correct way to use Ext. L/S terminals.*

limitation on it will be those imposed by the transmitter, so it looks as if the goal suggested in the last sentence will have been reached.

This does mean taking a connection from inside the set, so those of my readers who rent their radio or TV will have to leave me here! The volume control potentiometer is easily found, and will be seen to have three terminals on it. The centre one does not concern us, but the other two do. Looking from the rear, the one at the clockwise end of the larger arc should be found joined to the chassis; the third then has the sort of signal we require. Now, if this were connected directly to the radio input of our recorder things would be fine, except that the volume level of the radio would go up and down as the connection to the recorder was broken and made. This can be overcome by using a potential divider, as shown in my third circuit. The two resistors are connected together, and between the two terminals of the control. It should be noted that screened cable is used to feed the recorder via the *microphone* socket. Since we have deliberately reduced the signal level, the higher sensitivity input is needed. Care will have to be taken that the screen of the cable does not touch any live point inside the set, but if screened cable with an outer PVC sheath is used, no trouble should arise.

Listening volume independent

With this arrangement, the output stage of the radio is bypassed, the volume control can be turned right down to silence,

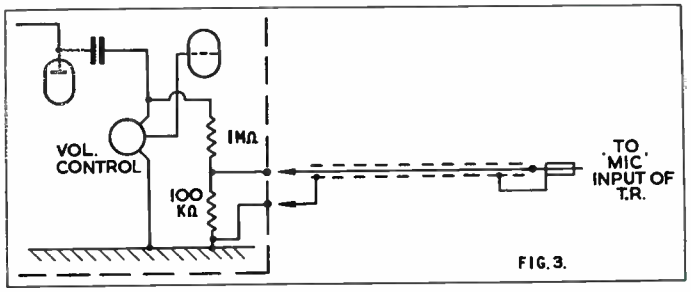
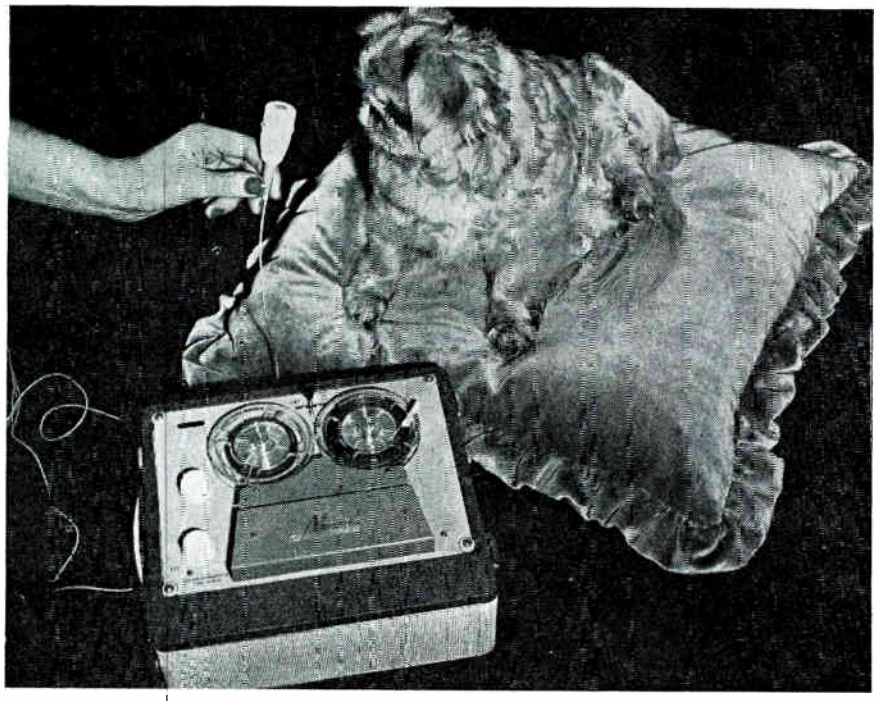


Fig. 3: *The "diode" connection goes to the microphone socket.*

and yet the signal level for recording will normally be of constant magnitude. Once you have found the Record Level setting required, you should get perfect recordings every time!

Next month we will return to the question of maintenance, having a look at the electronics of the average recorder.

WARNING: Never work on TV or AC/DC equipment while it is plugged into the mains.



FIELD

NO. 3

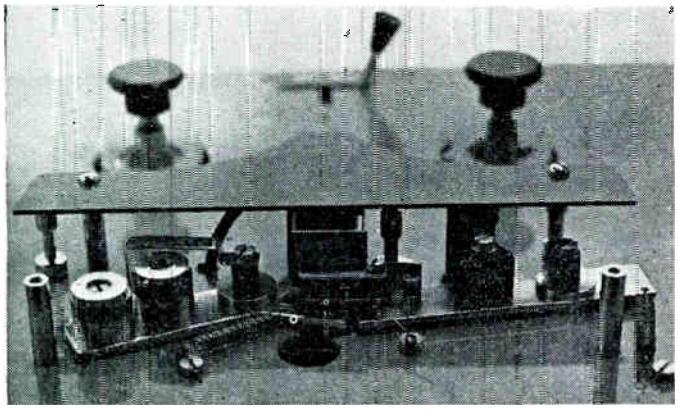
As in the earlier field trials, we have concerned ourselves here less with technical performance than with handiness and ease of operation. A few technical details have been included, but the Minivox was tried out on a number of actual recording sessions—outdoor and indoor—in search of the answer to such questions as "Can I really *take it anywhere?", "Can* anyone *learn to operate it easily?", and "Are its tapes interchangeable with other machines?" When it came to the animal kingdom, we taped comments on this mini-recorder from, appropriately enough, our advertising department's mini-dog! (see left.)*

THE subject of this month's field trial is bigger, heavier and costlier than the previous models, but the extra facilities offered make these factors relatively unimportant. After all, the Minivox still weighs less than 10 lbs., and measures only 10¼ × 5¼ × 9 in. It presents a very smart appearance, in two tones of grey, and the sloping top gives an impression of slimness to the whole machine.

The lid has still got to be found a home for, when you are operating the machine, though it would obviously be possible to start recording or playback, and then replace the lid if you preferred. There are handy clips inside the lid to hold the microphone and extra lead in transit, and the lid fastens with the usual type of catch. I have to admit to opening this accidentally, when picking up the machine—but I made this mistake once only.

The first outdoor recording I attempted with the Minivox consisted of a few car sound effects, with a spoken identification before each. For this I threaded the microphone through my lapel button-hole, and found that speech was recorded quite well over the noise of the engine. Some of the effects were not as clear as I would have liked, but I found that this was a question of microphone balance. Remembering B. W. Read's suggestions in our April issue, I made a cushion for the microphone on the car floor, over the exhaust pipe, and recorded better gear changes etc., in that way.

Another kind of recording I made, which normally presents some difficulty, was the sound of gun shots. There are two problems here; first setting the level, so as not to overload the recorder, and second finding a position for the "weapon"—a starter's pistol, toy pistol, cane on chair seat, etc.—which will neither damage the microphone nor sound too far away.



Close up of the sound channel shows the twin permanent magnet erase heads (left), the record/replay head, and pressure roller.

Quite realistic results were obtained on the Minivox, and the provision of a Magic Eye Level indicator, which operates without the machine running, was of great assistance. Each sound could be "balanced" before recording, so avoiding unnecessary use of tape. This is only one of the interesting facilities that can be obtained by judicious operation of the controls, and it is worth devoting a little space to outlining these in more detail.

Joystick Control

The ON/OFF Switch is combined with the volume control, and this operates both on recording and playback, as is usual on small machines. The remaining controls consist of a 3-position switch, for Play, Wind, and Record, and a 4-position "Joystick" lever, labelled Forward, Play, Pause/Reverse, and Record. Now mathematically there are 12 possible combinations of these controls, and I found it helpful to list the six useful setting for the family's benefit.

Switch Position	Lever Position	Facility
Playback	Playback	Playback
Record	Record	Record
Wind	Reverse	Fast Rewind
Wind	Forward	Fast Wind On
Record	Pause	Using Magic Eye to set the level prior to recording.
Playback	Pause	Moving tape by hand to find exact position during editing or prior to playback.

Using this table, I found that 9-year-old Robin operated the machine with great confidence from the word "go". Of course, the danger position of the lever is *Record*, which moves the erase head into contact with the tape, and accidentally putting the switch to Wind (or Playback) would erase any material on the tape. By the way, the erase system is unusual in that two heads are employed spaced approximately 1¼ in. apart. They are small permanent magnets, which seems to be standard on miniature and transistorised machines. The use of two erase heads is pre-

By John Borwick

TRIALS OF PORTABLES

THE CHALLEN "MINIVOX"

sumably found to be more efficient than one—the manufacturer's description is "erase is balanced for minimum residual noise".

Turning now to a few notes on the Minivox's performance, I first tried to discover if the extra low running speed of 1⅞ i/s seriously restricted the quality. Recordings made through the machine's own microphone had, not surprisingly when the cost and weight are considered, a restricted frequency range. But the loss of high frequencies, which one might have expected to be severe, was no worse than that with comparably priced mains machines. This is no doubt partly explained by the tendency to "toppiness" of inexpensive microphones, and clever matching of this to the recording amplifier. I tried a number of other microphones with the Minivox, including one which costs considerably more than the complete recorder, and decided that the original microphone was quite good enough for general purposes.

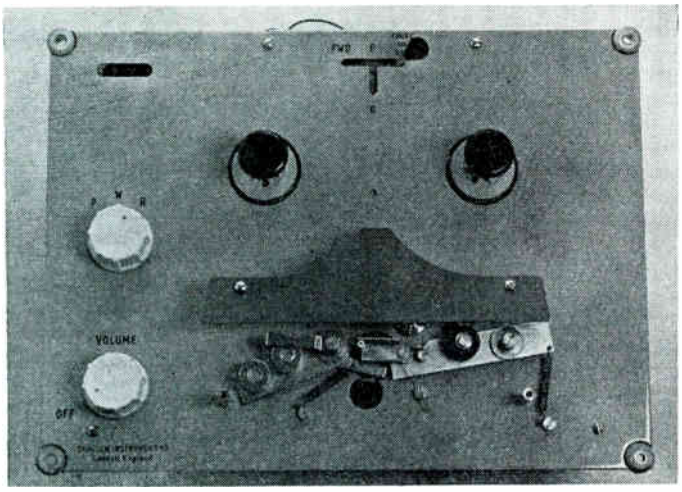
Magic Eye Came in Useful

Recording from radio, TV, and LP discs was very successful, both from the External Loudspeaker sockets and the special recording output of my pre-amplifier/control unit. Again the Magic Eye came in useful, since the correct level could be set for each new source prior to recording. An auxiliary lead is supplied with the Minivox for this type of recording. It is four feet in length, and is plugged into a special Radio socket on the recorder.

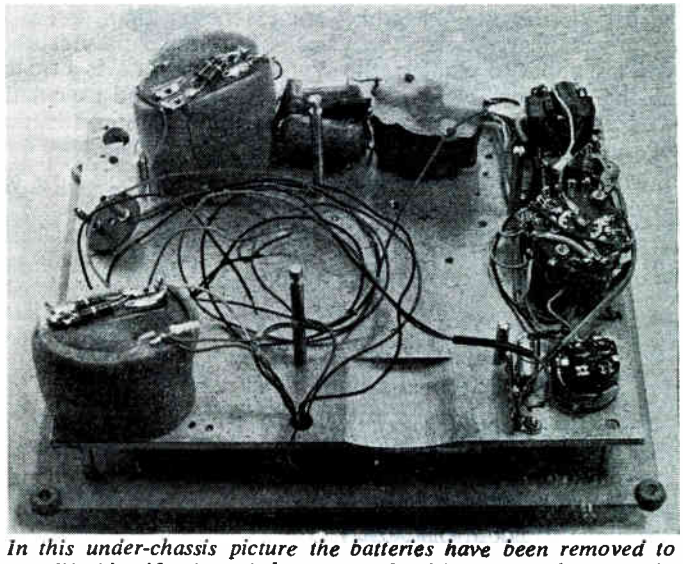
This lead is used also for replaying from the Minivox through an external amplifier or loudspeaker. This gave better reproduced quality than we could expect from the small built-in loudspeaker, but I could detect a rushing noise in the background, particularly on recordings made through the Radio lead, which seemed to suggest that the frequency correction resorted to was excessive if used in conjunction with Hi-Fi equipment.

The great advantage of 1⅞ i/s speed is the great saving of tape, and this fact will recommend it to users who need to make very long, continuous recordings, or must pack a lot of information on a single spool. The 3-inch spool of standard tape used in these tests gave over half-an-hour's recording on each track. By fitting a double play tape, it would be possible to accommodate 1⅞ hours altogether. Fast wind and rewind is motor driven at 10 times the playing speed by a pair of auxiliary motors, so that spooling the standard tape took just over three minutes.

This is the first British tape recorder to be reviewed in this series of field trials, and it is good to be able to pay it a sincere compliment on that most vital of features—speed consistency.



Showing the selector switch and joystick lever for comparison with the table printed in the previous column.



In this under-chassis picture the batteries have been removed to simplify identification of the parts. The drive motor (bottom left) is enclosed in foam rubber for tropical use, as is the rewind motor (top left). The third (fast wind) motor is to the right.

Music of all types was recorded, from discs, etc.—guitar solos, string quartets, orchestras and crooners—and fluctuations in pitch, due to the terrible twins, wow and flutter, were virtually non-existent.

Other good features of this machine are the long battery life, which means the machine will run for several months of normal use without changing the batteries, and the fact that the microphone and radio inputs may be used simultaneously.

Although I have drawn up a table, as mentioned earlier, to help a newcomer to operate the controls correctly, I ought to say that the instruction leaflet is written clearly, and has a helpful summary of "Points to Remember". However, with typical British reticence, the circuit diagram is not supplied, nor any technical information.

Technical Specification

Battery complement: 1 × AD42, 2 × B123. **Operating life per set of Batteries:** 100 hours. **Transistors:** 3 × OC71, 4 × OC72, 1 × OA81. **Magic Eye level indicator. Playing time:** 70 minutes, or 1 hour 45 minutes with double play tape. **Spool size:** 3 in. **Recording Sense:** Standard; top track, left to right. **Tape speed:** 1⅞ i/s. **Frequency response:** maintained to 7,000 c/s. **Output Power:** 200 milliwatts, push-pull stage. **Inputs:** microphone and radio, separate or mixed. **Output:** for 3 ohm extension speaker. **Dimensions:** 10¼ × 5¼ × 9 in. **Weight:** 9 lb. **Price** £38 17s. including microphone and tape.

Manufactured by the **Challen Instrument Co., 179 Hamilton Road, London, S.E.27.**

LISTEN BEFORE YOU LEAP

THOSE of us who know little about decibels and flat frequency responses might not raise our eyebrows at the facts and figures describing the much-talked-about new Wyndsor " Victor " portable. Those who are genned up to translating the specification into words and music are not surprised that the " Victor " sounds better than some tape recorders nearly twice the price. But make no mistake if you are about to plunge: the Wyndsor " Victor " is a quality-all-the-way portable, so beautifully designed and executed as to bring professional-sounding recordings within the reach of the most non-technically-minded amongst us.

Mark these following features and ask yourself how does Wyndsor do it at the price.

* frequency responses:—
  $7\frac{1}{2}$ i.p.s.—50 to 15,000 c.p.s. better than ± 3 dB.
  $3\frac{3}{4}$ i.p.s.—50 to 9,000 c.p.s. better than ± 3 dB.
  $1\frac{7}{8}$ i.p.s.—50 to 5,000 c.p.s.
* full frequency equalisation *at all speeds.*
* 10″ × 6″ elliptical speaker in detachable lid.
* up to 8 hours playing time on one D.P. tape.
* monitoring through its own speaker with independent control.
* finger-tip controls closely grouped.
* mixing facilities for mic and gram/radio inputs.
* additional output with automatic speaker cut-out.
* facility for use as an amplifier.
* three independent 4-pole motors.
* unique styling in two-tone grey with gilt fittings.
* twin tracks * pause control * tone control.
* guarantee: 12 months (valves 90 days) and the name of Wyndsor.

And how *do* they do it? By the experience that ten years' manufacture of quality tape-recording equipment only can bring. By design-creation only after intensive market research and nation-wide trade inquiries, so that Wyndsor tape-recorders virtually sell themselves, without sales-force, without large advertising campaigns, without exhibiting at you-know-where, and with minimum servicing requirements after sales. All these overheads are conspicuous in the price by their absence.

If history is anything to go by, widely publicising the " Victor " would overwhelm the Wyndsor factory. Wyndsor policy is never to sacrifice quality for quantity and the fact is that there were never enough of the " Victor's " predecessor, the " Viscount ", to satisfy the demand. So now is the time for all good enthusiasts to inquire at Wyndsor dealers or to send postcards (clean variety still preferred) to the modestly proud makers for the names of nearest stockists. There is nothing more annoying than hearing a Wyndsor just after buying an ordinary tape recorder.

the *new* Wyndsor " VICTOR " complete with crystal microphone, 1,200 feet of tape, and spare jackplug, is only 45 guineas.

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By James Moir

REVIEWING TAPE RECORDERS

PART ONE——————MEASURING THE FREQUENCY RESPONSE

The subject of our very first review (February 1959) was the Grundig TK35.

WHEN you are considering the purchase of a tape recorder, a transaction that is likely to reduce your bank balance by something in the region of £50–£150, it should be helpful to have the opinion of an experienced user, unbiased by commercial considerations. Test Reports in *The Tape Recorder* are intended to provide this guidance. They cannot offer to name the " best " tape recorder if only because there is no " best " tape recorder, though there may be one best suited to your requirements. There is no car with such unchallenged supremacy as the Rolls-Royce, yet my wife would prefer to have a Morris Mini-Minor for her shopping trips.

Thus a test report must concentrate on the special features of a machine and on its suitability for a particular field, drawing attention to both its weaknesses and its strengths. Price must be kept firmly in mind when commenting, for it is obviously unreasonable to expect a £100 performance from a £40 machine. Low-priced recorders are lent to a few non-technical (and therefore more representative) friends, in order to eliminate professional bias for studio machines.

Figures are Necessary

If it is to be something more than an expression of opinion, albeit expert opinion, a report must include measurements of those aspects of performance that can usefully be expressed in figures, for figures enable machines to be compared with some confidence. Not all the aspects of a machine's performance can be expressed in this way, nor when figures can be given, is it always possible to judge the performance on the basis of measurements alone. An example of this will be given later when we come to consider " Wow and Flutter ". Test reports must be based on the results of measurements on a machine but they have to be seasoned by experienced opinion. In some

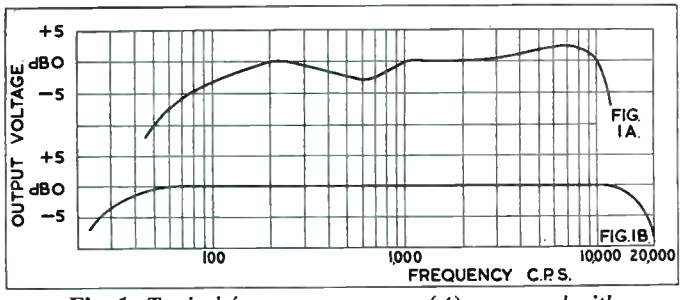


Fig. 1: *Typical frequency response (A) compared with excellent response (B).*

instances the results of measurements depend on the method of measurement, signal/noise ratio is a good example of this. Where methods of measurement have been standardised by such bodies as the British Standards Institution they are used, but the art is not yet in that state of finality where everything is standardised. It is, therefore, well worth while keeping this series of articles on file, for the test techniques cannot be described in each test report.

Frequency response, signal/noise ratio, wow and flutter, harmonic distortion, sensitivity, rewind time and power output are all parameters that can be expressed in figures so each of these will be dealt with in one article in this series.

Frequency response is one aspect of the performance that is widely publicised, by all advertisers, and as it is relatively easily measured, it will serve as an easy introduction to the test techniques. But first a few words about the importance of frequency response. Speech and music signals contain energy components having frequencies between about 30 cycles per second and 15,000 cycles per second. It would appear obvious, therefore, that, if a perfect reproduction is to be obtained, all the frequencies present in the original signal should appear in the output from the loudspeaker in exactly the same proportions that they appeared in the signal at the microphone terminals. The tape recorder should not attenuate or emphasise any frequency components between 30 and 15,000 c/s. This is a counsel of perfection that is never met in a practical tape recorder of domestic calibre but it can be closely approximated.

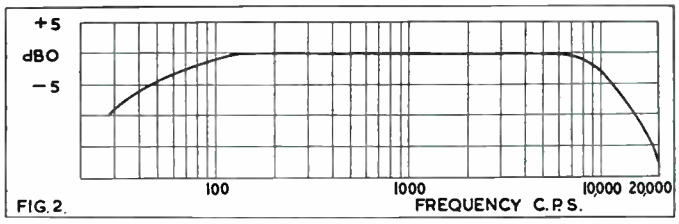
Measuring the Response

How is this aspect of a machine's performance evaluated? In essentials it is not too difficult. An audio oscillator is used to feed into the " microphone " input socket, signals of (say) one millivolt at a series of frequencies between 30 c/s and 15,000 c/s. The recorded tape is replayed with a valve voltmeter connected across the loudspeaker terminals, and the output voltage at each frequency noted. When the figures are plotted, the relation between output voltage and frequency is generally something like that shown in **fig. 1a.** If the tape recorder was perfect, the curve should be something like **fig. 1b,** and the machine would be said to have a flat frequency response or a flat frequency characteristic. In practice (though never in the advertisements) the performance of actual tape recorders always falls short of the perfection suggested by the dotted curve, though the expensive machines are surprisingly close to the ideal.

Quoting Decibels

Advertisers rarely display frequency response curves such as **fig. 1a,** preferring to make a claim in such words as " Frequency response 50–12,000 c/s ". Without some further explanation, this statement can be almost meaningless. All amplifiers, loudspeakers and tape recorders have a response that falls away at both ends of the frequency range, while quite a few machines have response curves that exhibit marked " wiggles " in the middle of the range. Thus a mere statement giving two frequencies is meaningless unless it is qualified by an indication of how far the output has fallen at the frequencies quoted. Standard engineering practice is to quote the two frequencies at which the output has fallen by 3 dB. However, advertising departments often try to gain (on paper) a few extra c/s, while still giving an air of engineering authenticity to a claim, by quoting the response as ± 3 dB between 50 and 12,000 c/s thus allowing themselves 6 dB tolerance over the frequency band.

The advantages to the advertising manager of either using ± 3 dB or merely claiming that the frequency range is from 40 to 15,000 c/s,



without indicating the loss at these frequencies, can be appreciated from **fig. 2,** which might be claimed as " 3 dB down at 60 and 10,000 c/s," " ± 3 dB between 40 and 12,000 c/s," or " response from 20 to 20,000 c/s."

However, frequency response is a much over-rated criterion of the performance of a tape recorder (or an amplifier or loudspeaker either),

(*Continued on page* 539)

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The frequency response of a tape recorder can always be extended by allowing the signal/noise ratio to fall off, or in some instances by allowing amplitude distortion to increase, and thus the final frequency range should be the best compromise between all these factors. In practice the public have become so bemused by the apparent advantages of a phenomenally wide frequency range that this tends to be the considered primary criterion of a tape recorder. I have known an owner of two machines, one costing nearly £100 while the other cost less than £50, strongly maintaining that the difference in sound quality was entirely due to the expensive machine having a frequency range extending to 20,000 c/s whereas the cheaper machine stopped at 15 kc/s. In fact, when reproducing ordinary programme material, there is little to be gained, and a great deal may be lost, by extending the frequency range much above about 12–14 kc/s.

Achieving a flat response

If a record/replay system is not to distort the signals, i.e., alter the frequency spectrum, it must have a flat overall frequency response. Signals of equal amplitude, but different frequencies, applied to the input terminals of the recorder should result in signals of equal amplitude at the output terminals of the replay system.

The simplest and most obvious way to obtain a flat overall frequency response from a recording and replay system is to design the separate record and replay sections to have a flat frequency response. Thus, at the output of the recording system, the tape would carry magnetic signals of the same amplitude at all frequencies within the audio range. (Those skilled in the art will appreciate the slight ambiguity in the phrase " magnetic signals of the same amplitude ", but it is hoped that this will be overlooked in the interests of simplicity.)

The reproducing system would also have a flat frequency response, so that an oscillator signal injected into the input terminals of the replay amplifier would result in output signals of equal amplitude at all frequencies. In practice, this apparently simple solution proves to give a very inferior performance, for noise, hum and distortion are all intolerably high. This is not a problem that is unique to tape recording for disc record/replay systems have exactly the same difficulties. A disc recording system that gives constant lateral amplitude of groove excursion at all frequencies results in quite intolerable distortion.

Taking noise into account

Noise or distortion inherent in the recording or replay system generally makes it advantageous to modify the frequency response of the recording system to maximise the signal energy in those parts of the frequency spectrum in which the system noise is inherently high. In a tape record/replay system the major components of the total noise are due to mains frequency sources, to partial uniformity in the orientation of the magnetic domains, and to clumping of the particles composing the magnetic layer on the tape. An upper limit to the amplitude of the signals that can be recorded is set by saturation of the magnetic material, and, as the energy in the acoustic signal presented to the microphone is non-uniformly distributed throughout the frequency range, it becomes extremely difficult to decide on the optimum recording characteristic.

A flat overall response can be secured by combining any pair of response characteristics that are complementary. Thus, if the record-

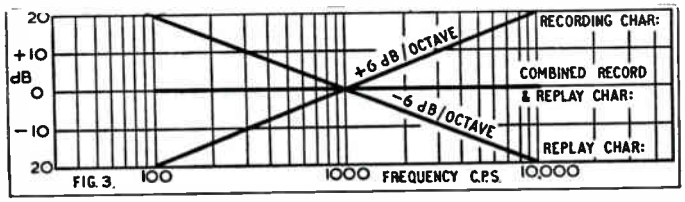

Fig. 3: *Combination of rising and falling graphs to give flat response.*

ing characteristic has a positive slope of 6 dB per octave, then a flat overall response will be obtained when the replay system has a negative slope of 6 dB/octave, a result that is illustrated by **fig. 3.** In theory the recording characteristic could be allowed to wiggle up and down all over the frequency range provided that the replay characteristics could be persuaded to have the inverse wiggles. In practice, a simple form of non-uniformity must be chosen for the recorder response in order that a cheap and simple type of equalising network can be used to achieve compensation in the replay unit, for the equalisation network must be built into every reproducer.

Unless some recording characteristic is standardised it becomes impossible to replay tapes recorded on another machine, and tape interchange is rendered extremely difficult. The industry has had one example of this in the gramophone record field, for until a few years ago each company used its own recording characteristic and every replay amplifier had to be equipped with a multi-position switch allowing a choice of about ten different replay characteristics.

Tape Recorders—Price Change

WE are requested by Tape Recorders (Electronics) Limited to announce the following: " With the cost of recent improvements in performance and reliability and also rising costs of raw materials and components, we advise that the following models in our range are increased in price with effect immediately, as shown:

	Present List Price	*New List Price*
Sound Prince	32 gns.	34 gns.
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Next Month—Competition Result

WE must apologise—and we have had to make many apologies since the printing dispute—for the unfortunate chain of circumstances which have held us up throughout the entire running period of our first competition. In the first instance, because of the strike, many readers were left " high and dry " without copies of the magazine! Then, as notified in our early announcement, requests for copies of the rules and entry forms began to come in late. Accordingly, we extended the closing date to cater for late arrivals from overseas, and we thought we were clear of our troubles. The entries were played through by a preliminary panel of judges, and those which did not conform to the rules were separated from those which did.

Then, with everything set for the official judging, two members of the judging panel were unavailable. Once more a postponement was necessary.

Now, as we close for Press, and too late for adequate inclusion in this number, we are at last in the final stages of judging. So, regrettably, and with faces red with shame, we must ask you to bear with us until next month's number.

ON THE WAY TO A

PART FIVE — EXPERIMENTS

WE used a tape loop for the early experiments because it was easy to drive at a constant speed without complicated mechanics, there were no problems of take up, rewind, or tape traction. Most important of all, the tape tension was kept high so that satisfactory contact between tape and head was maintained without the use of a pressure pad.

The next step is to use a reel of tape so that recordings of longer duration may be made. This poses a number of new problems, and, if carried to a logical conclusion, would involve us in the design of a complete tape deck mechanism which would be outside the scope of these articles. Instead let us see what can be done with the simple apparatus at our disposal.

Experiment 14—Turntable spooling

Given a turntable, a reel of tape, and a head-amplifier system, an obvious preliminary experiment is to place the take-up reel on the turntable so that it pulls the tape from the supply reel across the head, and winds it up on the turntable reel. **(Fig. 1.)**

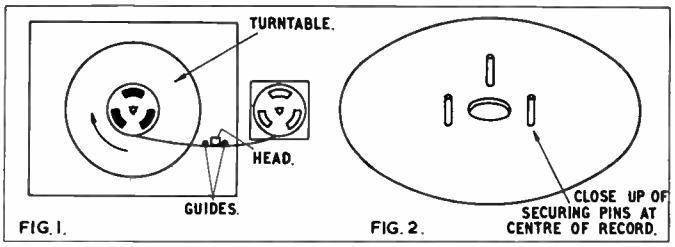


Fig. 1 (*Left*) *Using the take up spool on a gramophone turntable to pull the tape past the head.* **Fig. 2** (*Right*) *Securing pins may be fused or drilled into an old disc, to give firm drive of the spool.*

I suggest you start with a standard 3 in. or 3¼ in. "Message" spool of tape and a similar empty spool. It is first necessary to anchor the reel firmly to the turntable so that it runs true and does not slip or wobble. One way of doing this is to insert a short length of plastic or rubber tube into the centre of the reel. When the tube is forced over the turntable spindle it will expand and lock the reel securely to the spindle. The outside diameter of the tubing should be a loose fit into the centre of the reel, and the inside diameter should be slightly smaller than the diameter of the turntable spindle.

Alternatively you can use an old record, and fit three pins near the centre hole which fit the radio slots in the reel centre, see **Fig. 2.** These pins may be heated and pushed through the record material so that when cool they are firmly embedded in the plastic or lacquer base. As an alternative, you may drill the disc and use 8 BA bolts and nuts, filing the screws or the reel slots to give a firm fit. The disc drive will be essential if a record changer turntable is used, with a fixed non-rotating centre spindle.

At a turntable speed of 78 rpm, the tape speed will vary from about 6 i/s at the start of the reel to about 12 i/s as the reel fills with tape.

Experiment 15—Playback tests

As in the first loop experiment, you should obtain some tape recorded at 7½ i/s for playback tests. The supply reel should be supported to make it exactly the same height as the turntable reel, and as close to the turntable as possible. The cotton reel, pencil, and half brick system described by Mr. Towes in last month's Readers' Letters might prove useful here. The head mounting and guide system is the same as that used for the loop experiments, and is similar to that shown in the photograph which headed Part 2 of this series. (October)

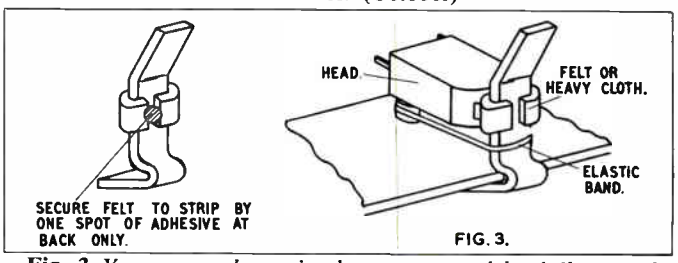


Fig. 3 *You can make a simple pressure pad by following the above sketches, and the description in the text. Failing this, it will be necessary to adjust the tape tension accurately to ensure close tape/head contact.*

It will be found that the 7½ i/s recording will play back too slowly at the start of the reel, OK about one third full, and much too fast towards the end of the reel. The important thing in this part of the experiment is to concentrate on the tape-to-head contact, and disregard the speed change. It will probably be found that the reproduction is variable and intermittent unless the back tension of the tape is increased by braking, or adding friction to, the supply reel. Alternatively the tape may be held gently in contact with the head, by using a finger as a pressure pad. The aim should be to do without the pressure pad if at all possible, and it will be found that the required tape tension is directly proportional to the tape thickness. Extended Play or Double Play tape needs very little added tension or pressure, and it also winds more evenly and solidly. Therefore you will find the wow and flutter using this type of tape drive is lowest with the thin tapes. If you are buying new tape for these experiments, your choice should be Polyester Double Play Tape. If, however, you are using older, thicker tape do not despair. A pressure pad will be required, and **Fig. 3** shows a simple design which can be added very easily to the head plate described earlier. Recording should not be attempted until adequate playback of a pre-recorded tape is achieved.

Experiment 16—Record Replay

When you feel confident about the tape transport, a recording should be made from beginning to end of the reel, using the erase, bias, and playback arrangements found to be most suitable during the early loop tests. A programme should be chosen which is constant in frequency content for the duration of the test recording, i.e. News Bulletin for speech or Music While You Work for music. On playing back these recordings, you will find that there will be no change of pitch or tempo, despite the two to one change of tape speed, as the speed change during recording is exactly duplicated on playback.

There will, however, be a perceptible change in recorded quality from beginning to end of the reel; the high note response improving towards the end of the reel where the tape speed is highest. If you have a multi-speed turntable, you should try a recording at a turntable speed of 33 rpm. The mean speed of

By A. Tutchings

HOME BUILT RECORDER

WITH TAPE DRIVES

the tape near the centre of the reel is 3¾ i/s. As the tape speed is reduced, the sound becomes more muffled and more vigorous pre-emphasis and playback equalisation is required to maintain passable quality. Try doubling the value of the pre-emphasis condenser, or using the microphone without the equaliser we described last month. Finally, try recording at a turntable speed of 16 rpm, where the mean tape speed is 1⅞ i/s. It will be found that this speed is just adequate for speech, but that musical quality is seriously affected.

Experiment 17—Suggestions for a more constant speed drive

With constant improvements in tape and heads, a speed of 3¾ i/s is now considered adequate for most domestic requirements. It was felt that these articles would not be complete without making some effort to describe a tape transport system which would allow interchange of tapes betweeen our simple experimental recorder and more orthodox units at this nearly universal speed of 3¾ i/s. The principle used is a very old one first incorporated in early wire recorders, where a relatively large diameter reel was used with a recording medium which built up the diameter of the reel only very slightly throughout a recording.

The ear is not sensitive to small changes of pitch, providing the change is gradual and does not take place too quickly. As an example of this, let us consider TV film broadcasts; most sound films are recorded at 24 frames or pictures per second, but almost all television films are broadcast at 25 frames per second, as 25 is a sub-multiple of the 50 c/s frame recurrence frequency used in this country. The resultant speed change is 4%, but unless you know the voice very well the change in pitch is not very obvious.

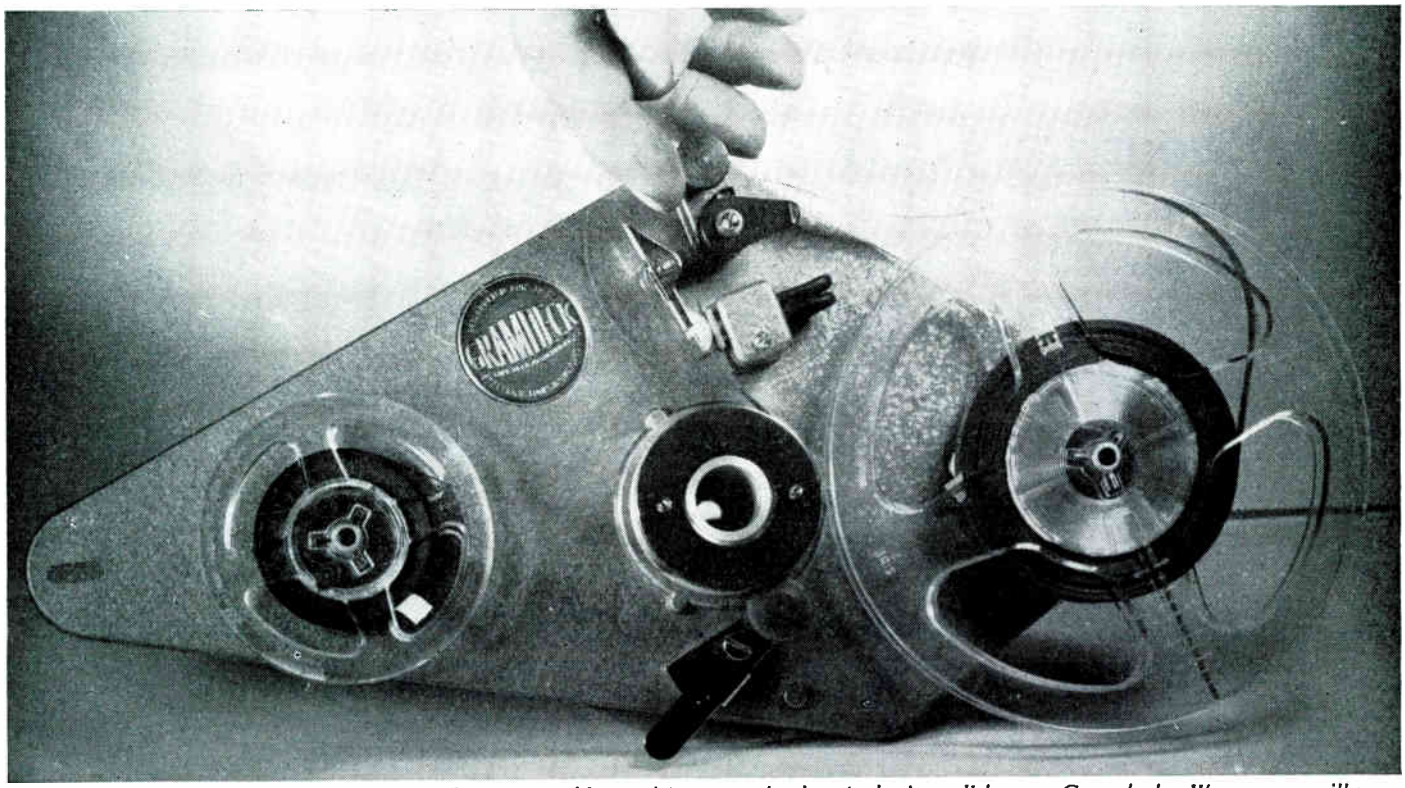
If we decide on limits of plus or minus 4% on a mean tape speed of 3¾ i/s we get a tape speed ranging from 3.6 i/s to 3.9 i/s. To use a large diameter reel, we have to select the lowest possible turntable speed, which is of course 16 rpm. At last we seem to have found a use for this speed which is provided on most turntables, but seldom used! The calculated reel diameter to give a starting speed of 3.6 i/s is 4.3 in.; as the tape builds up on the reel it passes through an exact speed of 3¾ i/s at a diameter of 4.5 in., and the speed has increased by a further 4% when the diameter reaches 4.75 in. With double play tape, which has a thickness of approximately one thousandth of an inch, we get a playing time of between 8 and 9 minutes.

Further Drive Experiments

If you want to experiment with this pseudo constant-speed drive, you should fill a 5-in. tape reel with unwanted tape to a diameter of 4.3 in., pulling the tape very tight so that it is truly concentric, and then seal the loose end with splicing tape. You can, of course, make up reels of other diameters for normal or extended play tapes, or for other turntable speeds.

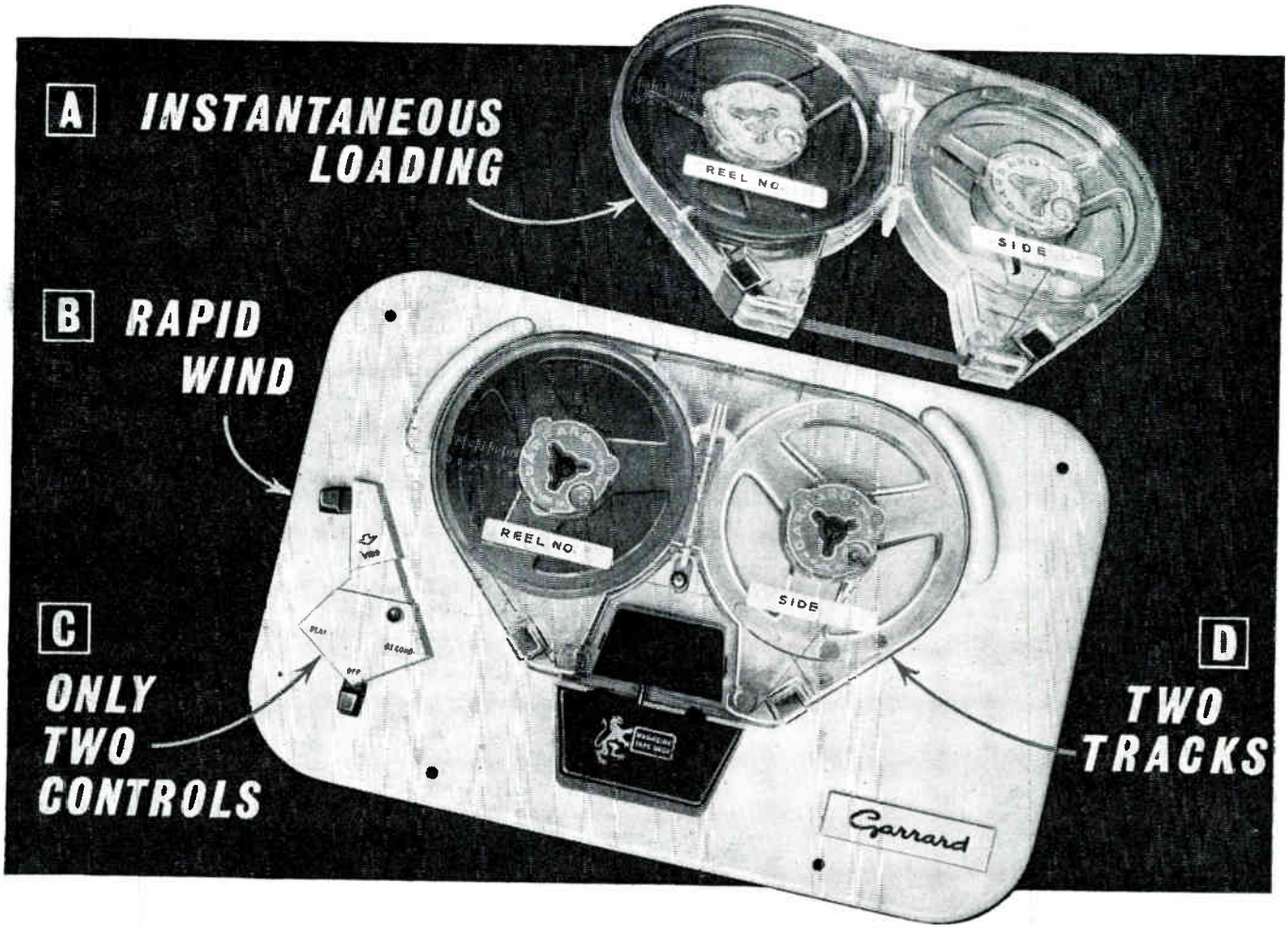
* * *

Next Month: H.F. bias, the final requirement for low noise and distortion-free recordings. Constructional details will be given of a bias oscillator using the plug-in transistor and spare socket provided in the basic kit.



A classic example of utilising a gramophone turntable to drive tape is the Author's well-known Gramdeck. We gave an illustrated report on this ingenious device in the very first (February) issue of "The Tape Recorder", and promptly sought out Mr. Tutchings to prepare this series.

What everyone wants to know . . .



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By I. W. Jarman

TECHNIQUES IN EDITING

IN the last issue we dealt with basic editing, including removal of coughs, stumbles over words and hesitations. In this article we deal with the problem of inflection, editing music and repetitive effects and the use of identification leader tape.

Inflection

One of the most awkward of editing problems is caused by inflection—sometimes caused by cutting from halfway through a sentence to the beginning of the next.

In a case such as this, a conjunction or a preposition could be used with effect as a bridge between the two pieces. For example, "I shall be coming down later (after I've finished the job and cleared up). When I do..." The portion to be removed is shown in brackets, but if the cut was made as written it would be noticeable because of the inflection on "later". By taking the conjunction from before "cleared up" and inserting it between "later" and "When", continuity of inflection could be maintained, the edited piece being "I shall be coming down later and when I do..."

Hesitations in speech delivery require different treatment. Hesitations made by the speaker who tends to talk with his hands rather than his voice will need cutting, since these tend to irritate the listener. On the other hand, there are hesitations which occur when a speaker is pausing for thought or to search for the word he wants to use.

Throughout speech editing it is necessary to maintain the character of the speaker, to realise that people do need time for thought, and that a balance between presenting a polished product to the listener and maintaining the essential characteristics of the speaker should be possible.

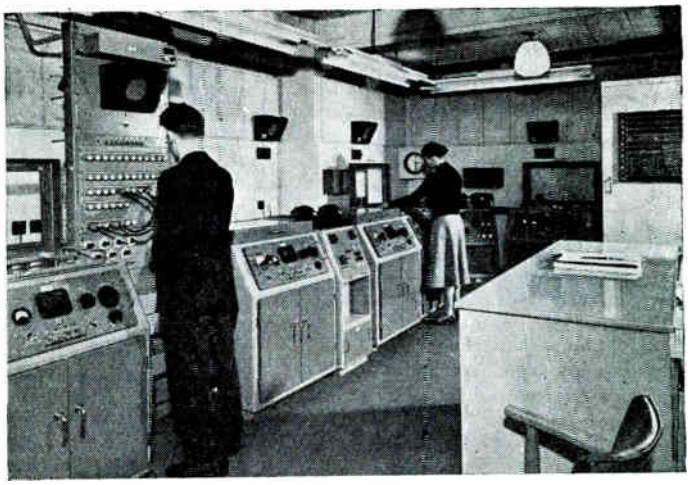
When editing repetitive effects, e.g. applause, one should take into account (a) is the content the same (in this case are there roughly the same number of people applauding in the two pieces to be joined together) and (b) are the levels the same.

The most suitable cutting point will normally be found in the build-up or die-down rather than the peak of the applause. In the case of effects such as train noise or bird song, it must be remembered that these are made up of a sequence of sounds which are repeated and that in editing, these sequences should be preserved.

Editing Music

In editing music, the question of maintaining tempo mentioned earlier becomes of paramount importance. As a general rule, the easiest cutting point to find will be on a solo instrument. Cutting in repeats of particular portions of an item should present little difficulty, since these repeats will normally begin at an easily recognisable point. But when shortening an item, e.g. a piece of dance music, the easiest cutting point to locate will not necessarily be at the beginning of a chorus—it could be halfway through the chorus on a change of orchestration (from ensemble to solo instrument).

However, the problem can be made more difficult still by a change of key during the item. If this happens, and it is impossible to produce the required result without a change of key (either from the point of view of duration or shape of the item), then the change from one key to the other as played by the orchestra should not be cut out.



Professional recording engineers have to solve just the same problems when editing tapes as face the amateur. A good sense of timing, etc., is found to be more important than having lots of expensive equipment. (BBC photo.)

If reverberation—and this applies equally to effects or music—is to be shortened, do not do this by cutting off the end of it. Rather make an internal cut in the reverberation and retain the natural fade at the end of it. Copying and fading should be discouraged since the fade will affect not only the reverberation but also the general background atmosphere. The techniques described in these articles are intended only as a guide to editing. There are, of course, times when these techniques will not meet the requirements and so will have to be adapted accordingly.

To avoid confusion when editing, particularly when transposing pieces, it is necessary to maintain an accurate labelling system. For this purpose, manufacturers supply a number of coloured plastic leader or marker tapes. They cannot be recorded on, but merely serve as a visual aid to identification.

Labelling and leadering-up of tapes

The boxes of all tapes recorded should be clearly labelled and if both tracks have been used, the labelling should indicate this. The simplest and most efficient method of labelling tape boxes is to stick along the edge a length of half-inch wide white adhesive tape on which you can write. The information shown should include your own reference number (if you have a library of tapes), the title, the tape number, whether track 1 or 2, e.g. PC 24—Piano Concerto No. 1 Grieg, Reel 1 of 1, Track 1. If both tracks are used on the same item then the box label would show this.

If the second track contains a different item, then the other edge of the box should be taped and the information written on it. It will be seen from this that with boxes so labelled, stored in an upright position, in numerical order in a cabinet, it will be easy to locate any particular tape quickly.

In addition to labelling the tape boxes, the tapes themselves should be labelled by attaching a length of leader tape to the start of each track. On the leader tape should be written the track number, the title of the recorded material, etc. This will reduce the chances of tapes being put in the wrong boxes.

Remember, when identifying separate items on a tape by cutting marker tape between them, that this cutting will affect both tracks. If marker tape is used to identify separate bands of effects or music to be used more or less as "spot effects", then it is important that they should be cut as close as possible to the markers.

Finally, wherever possible, script your material before attempting any cutting. As you mark up the script or score, listen to the tape, since edits which on paper appear quite feasible may be impossible when you reach the cutting stage.

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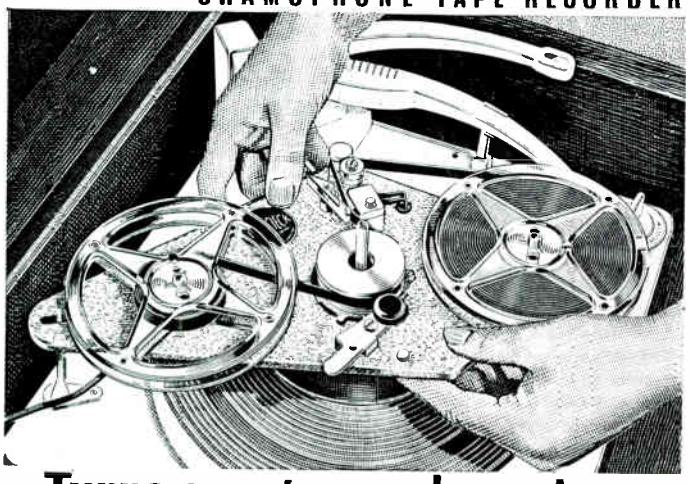

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5¾"	850	45½ "	1 7 6	1200	1 hr 4 min	1 15 0
7"	1200	1 hr 4 min	1 15 0	1800	1 hr 36 "	2 10 0
8½"	1750	1 hr 33 "	2 10 0	2400	2 hr 8 "	3 10 0
	DOUBLE PLAY			SUPERGRADE		
3"	300	16 min	10 6			
5"	1200	1 hr 4 "	2 5 0			
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Readers' Problems

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

Matching decks and amplifiers

Dear Sir:—Some time ago I purchased (as separate items) a Collaro Mark III tape transcriptor and a record/replay amplifier (Mullard design), but it was quite obvious from the start that the results I obtained from this equipment were far from good. The main trouble seemed to be the lack of high frequencies, and even when—through various experiments—such high frequencies were obtainable there was severe distortion present.

It was not until I happened to be reading Mr. H. Lewis York's fine articles in *Hi-Fi News* again, that I came across the interesting statement contained on Page 277 of the November 1957 issue, relating to the fitting of a resistor and capacitor in series with the record/replay head to lift the high frequencies. I tried this little circuit with a 100 K resistor and 430 pf capacitor and was really pleased with the result. I am able to get a more level response on replay now, and the only adverse effect it has is to cut down the output slightly. I think there is probably still room for improvement, but it is a good step in the right direction.

From the technical books which I have read, and other articles and letters which have appeared in *Hi-Fi News* and also *The Tape Recorder*, I am beginning to wonder if enthusiasts like myself are taking chances by purchasing individual items? There appears to be a case of having to adjust each amplifier to suit the particular recording head in use if one is to obtain the best results. Although the method I tried produced satisfactory results, I am not sure whether this is a right approach to the problem, or whether one should attempt to improve the frequency response by adjustment of the correction circuits within the amplifier itself. Perhaps you would like to let me have your views on this. *Yours sincerely*, **W. T. B., Slough**

The correct equalising (i.e., frequency compensating) circuits to incorporate in the recording and playback chains of a recorder do depend to some extent on the impedance characteristics of the head. It is therefore important to go into this question when choosing or building a record/replay amplifier for a deck bought separately.

Fortunately, although manufacturers have nothing like standardised the values of head impedances, only a few figures occur in the popular machines, and a few preliminary enquiries should determine what modification to the circuit is necessary.

A more important question affecting the equalisation network is that of the tape speed. You do not mention this in your letter, but I expect you know that additional lift of high frequencies is necessary at the slower tape speeds. This is called for since HF losses are greater if the tape passes more slowly over the head.

An amplifier working with a three-speed deck like the Collaro ought, therefore, to have three slightly different correction networks, switched automatically from the speed-change selector. If you have done this, well and good, but if there is still a poor response at high frequencies, it might be a useful experiment to try a low frequency compensation circuit—say 3¾ i/s—with the 7½ i/s speed to obtain additional top boost.

* * *

Splicing polyester tape

Dear Sir:—I wonder if anyone can help me. I have been trying to find either a patented compound or organic chemical with which to join polyester magnetic tape, as I find that splicing tape is rather unsatisfactory for joining tapes which are in constant use. I have been unsuccessful in finding any compound suitable. I am sure other readers have the same problem.

I have read your magazine from the first edition and find it extremely comprehensive . . . only one fault . . . a month is too long to wait between each issue!

After reading the review, some months ago, on the Telefunken 85K, I sold my original machine, and bought one, after further investigation into its features. I have found no faults and am extremely pleased with it.

Yours faithfully, **A. G. C., St. Andrews.**

We dealt with a similar problem in our July issue, and, after consulting I. W. Jarman, suggested that at least two materials were available for jointing polyester tapes. If you prefer to use a jointing fluid, you should investigate the variety specially made for polyester by the M.S.S. Recording Company; or the jointing tape, type 41, from the Minnesota Mining and Manufacturing Company (Scotch Brand) is claimed to give good splicing of polyester tapes.

* * *

English/French Correspondent wanted

Dear Sir:—I am a French schoolboy, 13-years-old, in my second year of English, and I should like to have an English correspondent, preferably a boy living in London. My father who speaks English fluently is wishing to help with the use of his R.C.A. tape recorder.

So my request is—*Wanted:* Sensible father and son, with an interest in the French language, conversational topics, etc . . . ready to use the magnetic tape as a bond of tuition and friendship, out of the common track.

Should such a wish be of genuine interest to any T.R. friend, we are ready to make the first recording as soon as we have your answer with a name and address. Recording speeds: 7½ and 3¾ i/s.

Yours faithfully, **Patrice Rouchette, 246 Rue F. de Pressense, Villeurbanne, Rhone, France.**

* * *

Method of erasing

Dear Sir: I have recently acquired a "Lane, Mark VI" tape recorder, and would appreciate your assistance on one or two points. 1. The method of erasing a previous recording. I have tried what I assume is the correct way, without success, so should there be a fault, I should be glad to know what to look for. 2. The address of the makers or agents, in order to get replacements if necessary. 3. Is it necessary to use both volume controls on recorder and radio when recording from radio set.

Incidentally, I am not too technically minded, so would be glad if you could make the explanations accordingly.

Yours faithfully, **C. A. S., S. Croydon.**

The accepted method for erasing a previous recording, except when a new recording is being made and the erase head is automatically brought into circuit, is as follows:—

Unplug all input leads and/or fade the Record Gain or Volume down to zero, switch to Record and run the tape through from start to finish of the unwanted recording. You may think this is a tedious method of erasing, but of course once you have set the machine running, you can leave it to look after itself while you get on with something else. On a very few machines it is possible to erase during the fast wind or rewind, which cuts the time down considerably, and the most efficient method of all is to use a bulk eraser. This consists of an electromagnet with a spindle on top. Turning the spool a few times by hand (with your wrist-watch safely left in the next room!) leaves the tape in a completely erased condition.

When recording from radio, it will always be necessary to set the recorder's Gain Control to a suitable volume, and the radio set's too—except when using a "diode" connection, which by-passes this control (see this month's Tape Recorder Workbench feature on page 533).

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our readers write . . . . .

★ We award a prize of one 5-inch spool of Tape each month for the best letter printed either on this page or amongst "Readers' Problems." This month the prize goes to Eileen Jones. Letters not intended for publication should be clearly marked NOT FOR PUBLICATION.

. . . about mike position and wow

From:—L. V. J. Reid, 31 Abbey Park, Knock, Belfast, 5.

Dear Sir:—When recording choirs, etc., much time is usually wasted making trial recordings to find the best balance. This can be avoided if an extension lead is fitted to *headphones* as well as the mike. With this set-up, no recording is necessary as the effect of any change is heard immediately in the phones. When satisfied, one can then ask the choir to begin again and this time start the tape. Phone leads can either be permanently lengthened, or a detachable extension lead made from ordinary flex fitted with suitable connectors. There is a very neat jack plug and socket on the market for mike extensions, and these would be ideal.

In the absence of a signal generator, the BBC's tuning note is a good substitute, but this is seldom heard at a convenient hour. However, our old enemy, mike feed-back, which produces some startling howls, can be made to serve the same purpose. (If your recorder cuts off the internal speaker on "record" you will need an external speaker.) With V/C turned down, place mike close to speaker (the distance apart varies the pitch; as does type of mike), by juggling with V/C and mike position it is possible to produce a steady tone. Any movement near the mike makes the sound unstable, so keep still. When recorded and played back, this home-made signal will show up any wow present. *Yours faithfully*

Thank you for your first suggestion. As to the second, isn't there a danger of overloading to such an extent that it may be difficult to erase your first experimental howls? We suggest readers take a deep breath and whistle a long drawn out note, or perhaps invest in a penny whistle. (*Editor*)

* * *

. . . about slow speeds

From:—Ian Leslie, 140 Holland Park Avenue, London, W.11.

Dear Sir:—With reference to the letter from H. F. Worth and your comments on it (in the October issue), I should like to point out that, even if a fine gap makes for reduced head life, the slower tape speed and the lack of pressure pads in the new continental machines must secure a compensating reduction of wear.

I have not (so far) encountered the gradual loss of top that Mr. Worth complains of. I think this would vary very much according to the type of tape used. With the great economy effected by use of the slower speeds and the four-track system there is no deterrent to buying the most expensive tape and using a continental double-play tape. I am obtaining great enjoyment from recordings of music made even at $1\frac{7}{8}$ i/s.

Yours faithfully

* * *

. . . about "live" recordings

From:—Miss Eileen Jones, 26 Hampton Street, Leamington Spa.

Dear Sir:—Like many other readers, I have read with great interest every issue of *The Tape Recorder* and I was very interested in the cover picture of the July number, for I myself prefer to do live recordings. I hardly ever record anything from radio or disc, even though I am not able to go on such adventurous expeditions as Colin Turnbull. The letter from Mr. Turnbull in your September issue I found one of the most interesting things you have published so far! I am very interested in travel and people of other lands, that is perhaps why I found the letter so interesting—everything in it was from the personal angle of recording, little things about some of the people he met, and what he did to get his recordings. Is it possible to have more of such personal material?

Sgt. Woodrow's letter was one of that type, but it was so short! I should like to hear more of his experiences, and of those of other people who make live recordings, especially any done under unusual conditions, but as longer articles and in more detail.

I now have a Fi-Cord and a Philips machine and so am particularly interested in "outside" recordings. I should also like to hear about peoples' flops and *why* they were flops.

In August I travelled alone right through France and across Andorra and Spain to Madrid, and back through France visiting Lourdes and Paris en route, and in addition to my suitcase, I carried two cameras and my Fi-Cord everywhere I went.

Eileen Jones prepares a tape/slide show to entertain clubs and friends.

In Avignon I recorded some children singing "Sur le pont d'Avignon" (not very musically I fear, but at least it was a live "on-the-spot" recording), and the sound of an Avignon church. Then at Perpignan, I caught some children at about 11.15 p.m. one evening, playing singing games in one of the squares. That was one of the few occasions I had not got my Fi-Cord with me, so I dashed back to my hotel and got it. Fortunately the children were still there (even though it was then 11.30). So I walked round them, under the street lights, with the Fi-Cord turned on. They took no notice of me, so I was able to get a very "natural" recording. The game, I think, must have been a French equivalent of our "Oats and Beans". It sounded and looked very like it. Then I ran the tape back and played it, and walked among the kiddies. They immediately stopped their game in astonishment. When they realized they were hearing themselves, they jigged up and down with delight and asked to hear the recording over and over again (my poor batteries!) Then I asked them to sing other French songs for me (by now it was after midnight) and when they knew I was going to take the sound of their voices back for children in England to hear, their delight was terrific. And by this time, their parents and patrons from all the local cafés nearby had joined us. It was all great fun. All (especially the men) were intrigued at the small size of the Fi-Cord and its capabilities—the recording is one that I am very proud of—and it brings back very happy memories of that evening in that little French town.

Later I got some good tape of a bullfight in San Sebastian. I met an English man there (no, sorry, a Welsh man), he took me to the fight and by talking with him during the proceedings, we unthinkingly put a commentary on to the tape. Recording with company enables one to do that—when travelling alone such facilities are not possible!

In Lourdes I made some lovely recordings. Then in Paris I recorded the chime of the hour bell of Notre Dame. And what a little insignificant chime it is for so magnificent a church!

Altogether, the sound picture of my holiday could have been better than it is. But one must learn by experience. Next year I hope to do better.

Back here in Leamington, one of my tape recording friends, from

(*Continued on page 549*)

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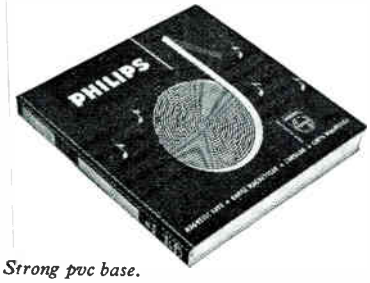

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our club here, and I had great fun last year making recordings of some of the sounds heard during the season of the "Lights of Leamington". On the opening evening, the weather was bad—it was drizzly and quite cold, but as there was only one opening ceremony, we braved the elements and took one of our machines—a Grundig TK.8 (I hadn't got the Fi-Cord then) out on to an island in the lake, where the opening ceremony was to take place. We fixed the mike on to one umbrella which we pushed down into the ground under a bush, so that we could, perhaps, get the sounds of everything from the Mayor's opening speech to the sounds of the crowds over the water at the lake-side, and also the quacking of the ducks as they glided by on the water. Then the Grundig was under another umbrella under another bush—while we two were getting wetter and wetter ourselves! But it was all for a good cause.

On another occasion we were rowed out to a rat-infested island on another lake, to make a recording of an illuminated dramatic performance of the Willow Pattern Plate Story, given to an audience on the lake shore. Fortunately the strong lighting kept the rats at bay most of the time! On many occasions we were up to our knees in mud, while trying to place the mike in good positions. And on another occasion, in the darkness, we were (unknowingly by the attendants) mistaken for gatecrashers trying to get in through the bushes, and we were ordered out in no pleasant tone of voice until the speaker realized who we were. And we have a lovely recording of the whole occasion, ordering out and all! Yes it was all *great* fun!

Another time, we took the Grundig down to London to make some recordings of items at the Annual Festival of the International Concertina Association. At that event, we used our two microphones and a 40 ft. microphone extension lead which we had just bought. As the items were taking place in two different halls, our extension lead was very useful. First we dropped the lead through a window and it went outside and down, through another window and across a passage and into the hall below. We then connected one mike up and fixed it to a coat hook in the hall and just left it there. The other mike we kept in the upper hall. In this way we were able to record from either hall at will, by just connecting up one mike or the other. And I must say the recordings we have got (with and without the extension lead) are exceptionally good. We did find a little loss of power when using the extension, but made up for it by recording at one number higher when using the mike on the end of the extension lead.

Then, this year, I took to the seaside four children of seven years old who had never seen the sea. I took my Fi-Cord too, and some of their comments and those of their parents who met us off the coach at 10 o'clock that evening, are a souvenir of a memorable day. Such a day as those children will never again experience—for only once in a lifetime can one go to the seaside for the first time.

I didn't intend to write all this to you when I started this letter; I just got carried away I'm afraid! But that in itself proves what pleasure tape recording can give. And it has certainly given me plenty! Also, it will substantiate what I said earlier about the more personal side that there is to recording (when you keep *off* recording from "a box").

I hope you might be able to include more of this side of our hobby in future numbers of your magazine. And also "tape recording in woman's life, not only in man's!" *Yours sincerely*

* * *

. . . about hubs again

From:—R. G. Fowler, 5 Denbury Avenue, Stockton Heath, Ches.

Dear Sir:—Very soon after acquiring my first recorder, this year, I found myself frequently faced with the questions—"Have I enough room left on my spool of tape to record item 'X' ?" and "If I cut my tape to edit one track, where on the second track will the cut occur?"

I found a simple answer which I am sure will be of interest to many other readers who, like myself, possess recorders having accurate digital counters. It is as follows: First, with the aid of a stop-watch or timer, run a reel of tape through the recorder and write down two columns of figures, the first being lapsed minutes and the second the digital reading for each minute. Now re-write the second column, but *upside-down*—i.e. write the first minute's digital reading against the last-but-one lapsed minute and so on.

The table is used as follows: To determine the recording time of tape left on a reel, find the number of turns in the third column of the table; the recording time still available is then read off in the first column. To determine the equivalent position on one track to a given number of turns on the other track, simply read the second and third columns on the same row.

It is, of course, necessary to interpolate digital counts between minute intervals, but this can be avoided if required by plotting the figures on graph paper. Two points should be noted: firstly, separate tables must be compiled for standard, long play and double play tapes; secondly, the tables are strictly accurate only so long as the same make of spool is always used, owing to possible differences between the core diameters of spools made by different manufacturers, although I have not found that much variation occurs when using the tables as suggested. *Yours faithfully*

* * *

. . . about playing off-speed tapes

From:—Frank X. Micallef, 25 Broadway Grove, York.

Dear Sir:—Now that there are many popular recorders with any one or two of three speeds, it may happen that one receives a tape recorded at one speed less than that available on the machine. This problem occurred to me once and its solution was this. The tape I received was recorded at $1\frac{7}{8}$. Both my machines have the speeds of $3\frac{3}{4}$ and $7\frac{1}{2}$ only. I played the received tape at $3\frac{3}{4}$ simultaneously dubbing it at $7\frac{1}{2}$. After the dubbing, I simply played the dubbed copy at $3\frac{3}{4}$. Reversing this procedure will result in a recording at $1\frac{7}{8}$ when only the speeds of $3\frac{3}{4}$ and $7\frac{1}{2}$ are available. With a little thought to this novel pattern of dubbing one can work out limitless and exciting possibilities to create *musique concrète* . . . a third machine with a mixer will multiply those possibilities!

Mr. Micallef visits a German studio.

Like many others I find your magazine highly informative. One quick way of locating items of particular interest to me, without having to wade through several issues of *The Tape Recorder* or wait for the annual index, I cut out the items concerned and paste them in a large index register.

During the four years I have been a tape fan, I have noticed many improvements in tape recording equipment both technical and financial. Yet to my knowledge the price of tape has virtually remained static. Ownership of a tape machine is becoming as common as having TV and rightly so. Surely it is high time that the trade got together and gave us a New Year present by making a drastic cut in all types of tape.

I am surprised that in such an historic city as York no one has yet started a tape club. I would gladly take the trouble myself but, unfortunately, I am not a permanent resident of this fair city. I would like to pass the honour of setting up a club to some York gentleman or lady. Meanwhile I would be happy to see any local tape fiends any evening at my address given above.

Finally, through the medium of your world-wide circulating magazine, may I make a plea to any reader in Italy or in Malta who has access to a recorder to drop me a line or better still a tape. I am most anxious, even desperate, to establish contacts in these two countries. *Yours tapefully*

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

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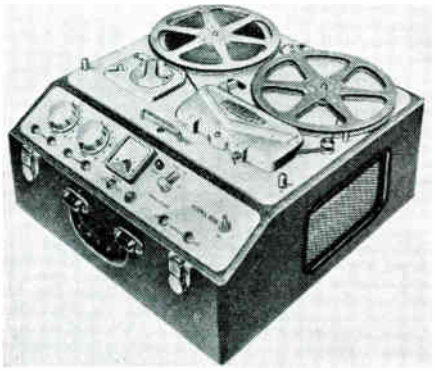
THE TAPE RECORDER

99 Mortimer Street, London, W.1

TAPE, RECORDERS & ACCESSORIES

FIRST DETAILS OF NEW PRODUCTS

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



★

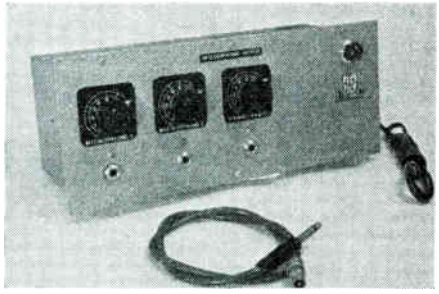
Ferrograph introduce the new Model 808

★

FERROGRAPH have announced a tape recorder that is bound to meet with enthusiasm by all serious users. It is a stereo recorder and incorporates the well tried Series 4 deck operating at 3¾ and 7½ i/s. In order to keep it as a portable recorder, there are no power amplifiers or speakers; most people already have these units so it avoids unnecessary duplication and keeps the weight and price to a minimum. It is suitable also for mono recording. The claimed frequency response at 3¾ i/s is 60-8,000 c/s and 60-14,000 c/s at 7½ i/s both ± 3dB. Track separation on stereo approx. 40 dB. Signal to Noise Ratio in the range 200-12,000 c/s better than 50 dB; Unweighted, including hum 45 dB. Output on both channels 1·5 volts across 5,000 ohms. Suitable for mains voltage of 100/250 V AC 50 c/s (60 c/s to order). Price £110 5s.

A fully illustrated brochure is available from **British Ferrograph Recorder Co. Ltd., 131, Sloane Street, London, S.W.1.**

* * *



★

A range of electronic mixers from Rotech

★

ROTECH ELECTRONICS have produced a range of three-way electronic mixers. These have a basically similar specification. Frequency response: level 30 to 20,000 c/s referred to 1,000 c/s, −2 dB at 20 c/s, −5 dB at 15 c/s; hum and noise 50 dB below output at maximum output. Sensitivity for full output; Microphone channels, 3 mV; Radio and pickup 250 mV; output voltage 800 mV (can also be supplied with outputs down to 40 mV or up to 1 v max.); output impedance 600 ohm. A cathode follower output circuit is employed which permits the use of long connecting cables.

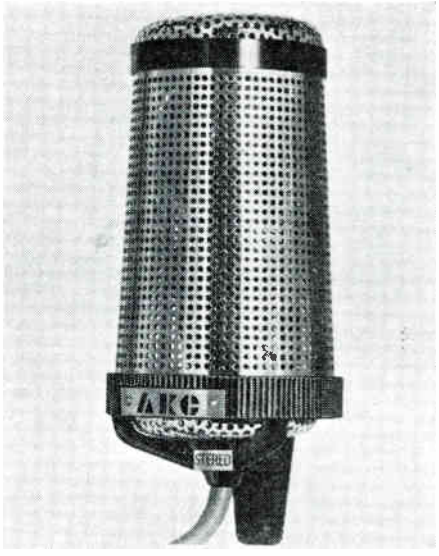
The four types are: **RM1,** two high impedance mic. inputs, one high level input. Built-in power supply and spare power socket for external tuner, amplifier or additional mixer. Price £19 19s. **RM2,** as RM1 but with low impedance mic. inputs. Price £21. **RM3,** as RM1, but for operation from external power supply 6·3 V at 1A and 250 V at 5mA. Price £18 18s. **RM4,** as RM3 but with inputs for low impedance mic. Price £19 19s.

These mixers are all 12 × 5 × 4½ in. and are stove enamelled in grey or hammered bronze. Any number of these mixers can be connected together when more than three channels are required.

Rotech can also supply sheets of transfers for use by home constructors. Each sheet has the following dials transfers, Microphone 1, Microphone 2, Sensitivity, Set-Zero, Gain, Gram/Radio, Bass, Treble, Stereo-Balance, all 1⅞ × 1⅞ in. Also these labels: Output meter, Microphone mixer, Playback, Record, Stereo-adaptor, On, Ch. 1, Ch. 2, Input, Output, LH-RH; Off. S.R.S.M. (for stereo switch). Price 3s. per sheet.

Available from **Rotech Electronics, 152 Maybank Road, South Woodford, London, E.18.**

* * *



★

An interesting moving coil stereo microphone from the Austrian firm A.K.G.

★

A.K.G., the well-known Austrian firm of microphone manufacturers, have produced a medium priced stereo moving coil microphone which is available in the U.K. and the Commonwealth from **Messrs. Politchnia (London) Ltd., 357 Euston Road, London, N.W.1.**

It comprises two matched moving coil inserts vertically mounted and housed in a tapered cylindrical perforated metal case. A double cardioid characteristic is obtained for stereo recording or, if it is used for mono, a single broad-angle cardioid pattern results. Each insert is matched to provide a frequency response flat from 80 to 15,000 c/s with an output impedance of 200 ohms.

A Line transformer is supplied which gives an output of 50 K/ohms per section. The microphone, known as the **D88,** is supplied for stand mounting with five yards of cable and a standard miniature 5-pole plug. The price with transformer is £22.

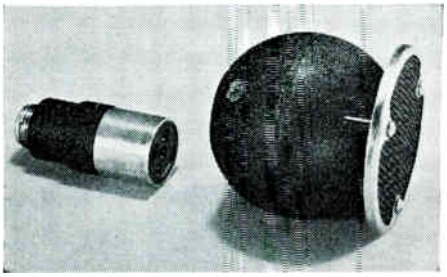
* * *

Viscount available as console

AS the result of repeated requests, Wyndsor Recording Co. are to release a limited number of "Viscount" console recorders. The cabinet is the same as was fitted to the "Dauphin" (now out of production). It is covered in oak and ivory rexine. Price £60 18s., or finished in sapele mahogany veneer, price £63. These prices include the matching stool, for standing the recorder on, and 1,200 feet of tape, but no microphone. The mechanics of this recorder are the same as the popular "Viscount" portable reviewed in the August issue.

Further details from **Wyndsor Recording Co. Ltd., 2, Bellevue Road, London, N.11.**

EQUIPMENT REVIEWS



★

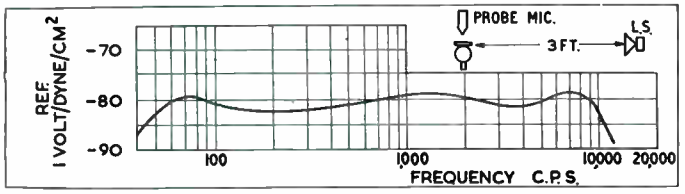
THE S.T.C. TYPE 4021 MICROPHONE (Ball and Biscuit)

★

Manufacturer's Specification. Omnidirectional moving coil. **Impedance:** 30 ohms. **Sensitivity:**—80 dB per microbar, reference 1 volt. **Price:** £21. Manufactured by **Standard Telephones and Cables Ltd., Connaught House, Aldwych, London, W.C.2.**

* * *

The unit is a miniature moving coil transducer, set into a spherical shaped outer casing about 2½ in. in diameter. This shape was determined to reduce diffraction effects to a minimum; a baffle fitted in front of the diaphragm also assists in preserving the polar response at high frequencies. When the microphone is used in the vertical position (with the baffle horizontal) the horizontal polar diaphragm is circular irrespective of frequency and the response is remarkably uniform to 10 Kc/s, as shown in fig. 1. Because of the high electro-acoustic efficiency of the basic transducer, the sensitivity is also high, and is some 10 to 15 dB higher than most competing units of the same overall rresponse. The flatness in frequency response is due to introducing a series of acoustic impedances at appropriate points.



●*S.T.C. 4021F Free field response on open circuit.*

The diaphragm proper is about ¼ in. in diameter, and is sufficiently rigid to behave as a piston at all frequencies below 15 Kc/s. Being of all metal construction it is not sensitive to changes in humidity, although a special model for tropical use is available.

The nominal impedance of the microphone is 20 ohms, and it will generally be used with a matching transformer into the preamplifier. When used with a high quality transformer with a turns ratio of 1:50, the sensitivity is then about −45 dB referred to 1 volt per dyne/cm². and peak levels of 0.1 volt can be obtained from a small grand piano played rather loudly in an average studio of 20 × 16 ft.

(*Continued on page 555*)

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HOWARD PHOTOGRAPHIC

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For the purpose of this review, apart from the objective measurements we compared the latest model (Mark F) with several allegedly "high fidelity" microphones (both crystal and dynamic varieties) on a professional type tape recorder: the difference in "attack" and string tone was very apparent, whilst the absence of the 6 Kc/s peak attendant on most diaphragm operated crystal units was most welcome. The sensitivity was such that background noise, hum, etc., were negligible, and the increase in dynamic range, which previously had been limited by microphone sensitivity was about 15 dB.

We find it hard to contain within reasonable bounds our enthusiasm for this microphone.

★

THE S.T.C. TYPE 4038 RIBBON MICROPHONE

★

Manufactured by Standard Telephones and Cables Ltd., Connaught House, London, W.C.2.

Price £38 10*s*.

* * *

The frequency response of this microphone is exceptionally level. In its axis it is within 2 dB from 60 c/s to 10,000 c/s, whilst the sensitivity (from a 30 ohm source) of −85 dB below 1 volt gives adequate signal to noise ratio for modern recording and broadcast requirements. A built-in transformer is incorporated to match the low impedance ribbon to a 30 ohm line. This transformer is of toroidal construction, and hum pickup, which can be very annoying with this type of microphone, was, under our test conditions, below the noise level of the system. Its size and weight have been reduced considerably, which has resulted in the horizontal polar response being uniform up to at least 10 Kc/s, whilst in the vertical plane it is more than adequate.

Figure-of-eight response

It cannot be emphasised strongly enough how the clarity of recordings can be improved by reducing the microphone sensitivity in unwanted directions! The fact that the ribbon is fully protected against mechanical damage from shock and the wind shielding is successful was proved operationally during recording sessions at home!—Any microphone which can withstand the onslaught of the Kelly junior engineers (four of them, aged two to seven) is suitable for use under battle conditions. The 4038A withstood this accelerated life test!

During the period (two months) we have been using this microphone under a variety of test conditions, it has proved to be without peer. When compared with the 4021 microphone under "live" recording conditions we noticed the same "crispness" of attack and freedom from spurious resonances. At the same time, by virtue of the "figure 8" polar diaphragm, we could get much better control over studio ambience than with pressure microphones, whilst the background noise was sufficiently low to be negligible.

This is not a cheap microphone in terms of £ s. d., but is worth every penny of its price. We unhesitatingly recommend it for professional or serious amateur use, where quality is *sine qua non*.

Stanley Kelly

Reviews abridged from *Hi-Fi News*

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Advertisements for this section must be pre-paid, and accompanied by a postal order, money order, or cheque, made payable to **"The Tape Recorder"**, 99 Mortimer Street, London, W.1. They must be clearly written or typed, and must be in the form of a separate sheet of paper if included with a letter dealing with other subjects.

The rate is 6d. per word, with a minimum charge of 7s. 6d. Box numbers may be used for an extra charge of 1s. 6d. The trade rate is 9d. per word, plus 2s. for a box number, conditions on application.

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

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C.Q. Q-Flex as new £5 also Bradford Perfect Baffle cabinet £4 10s.—Box 239.

Special Purchase! 1,800 ft. Agfa-Wolfen L.P. tape on 7 in. spools, only 32s. 6d.; 1,200 ft. 7 in. Ferrotape, 26s. 6d.; P. & P. 1s. 6d.; send for complete list of tape bargains (including American Audio tape, BASF etc.) and list of new and secondhand tape recorders. E. C. E. Kingsley & Co., 132 Tottenham Court Road, London, W.1. EUS 6500.

Spectone 151, complete Cost £79 16s. in May. Best offer over £50. Derwent 2157.

3¾ in. Tape-Records of mixed piano medleys, old songs and new, price 17s. 6d., Recording Dept., 76 Water Street, Nelson, Lancashire.

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Grundig Cub, £20. B.S.R. Monardeck, £8. Both new. 70 The Hurst, Birmingham 14. Springfield, 4541.

Give-away Bargain—Famous Sugden disc cutter—as used by Decca. Plus suction and heater unit, stylus and blank records. This is as new. Offers! Demonstration on application to Caldaire Records, 2 Syke Street, Castleford 2145.

Lustraphone Mixer, new, cost £22; £17 10s. Dupré, Tisbury, Wilts.

Special offer, Easysplice Tape Splicer 3s 9d. P. & P. 6d. Guaranteed, makes tape splicing easy and accurate. Easysplice, 30 Lawrence Road, Ealing.

Wanted

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C2/E.

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86 db below 1 volt/dyne/cm²
DP4/M 600 ohms—
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Retail price DP4/L/pack 1:— low impedance microphone, complete with connector, 18 ft. screened lead, swivel holder and circular base. £8 19s. 6d. (Extra for H or M impedance models—£1 0s. 0d.).

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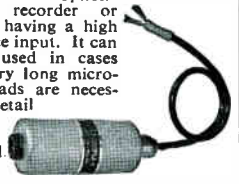
For use in cases where it is desired to use a low impedance microphone with a recorder or amplifier having a high impedance input. It can also be used in cases where very long microphone leads are necessary. Retail price £3 5s. 0d.



Literature on this and other equipment readily available.

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FREQUENCY RANGE	60–16,000 cps at 3¾ ips and 60–9,000 cps at 1⅞ ips
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