

the TAPE RECORDER

PRICE 1/6

APRIL 1960
Vol. 2 No. 3

INCORPORATING "SOUND AND CINE"



IN THIS NUMBER

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- Setting up and Testing the Home-built Parabolic Reflector
- Tape Recorder Workbench
- Readers' Problems
- Building My Own Tape Recorder—One Man's Experiences
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- Tape with Cine
- Club Notes and News

A Tape Recorder

by **HMV**



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a good microphone. Give it an Acos microphone.

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MIC 39

A crystal hand microphone of exceptionally attractive appearance. Extended frequency response; noise-free cable and die-cast liner to minimise hum and ensure excellent signal-to-noise ratio. Available with table-stands and floor stand adaptor. U.K. Retail price 3 gns. Other Acos microphones include the famous fold-away MIC 40 (35/-) the MIC 28 Lapel Microphone (50,-) and a superb new stereo microphone (£6.0.0)

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Booth 65

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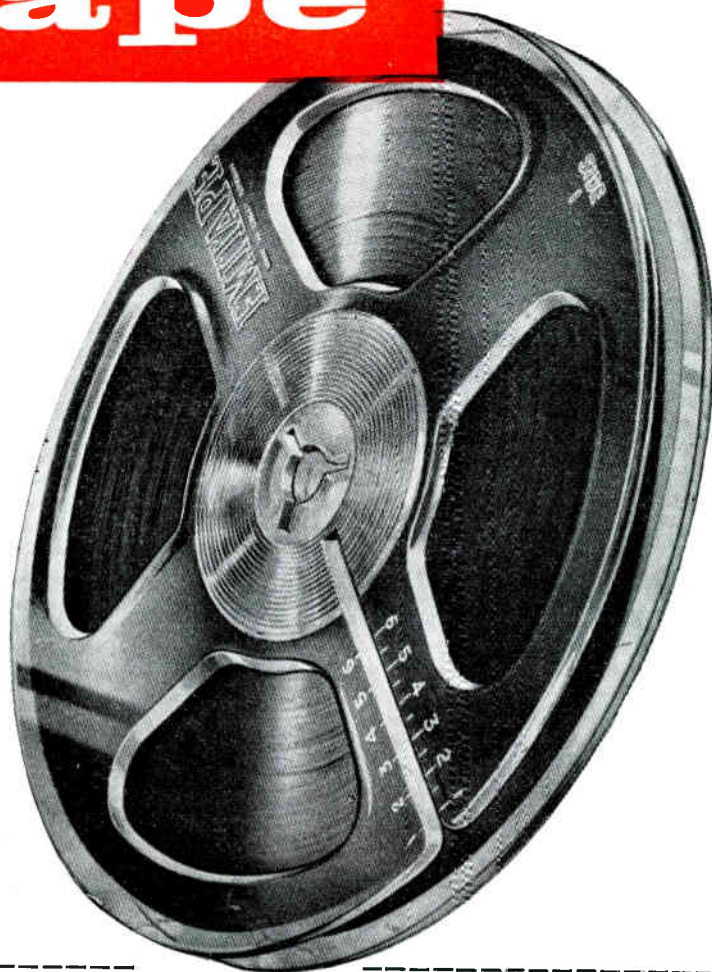
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EMITAPE "100"

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THINKING ABOUT

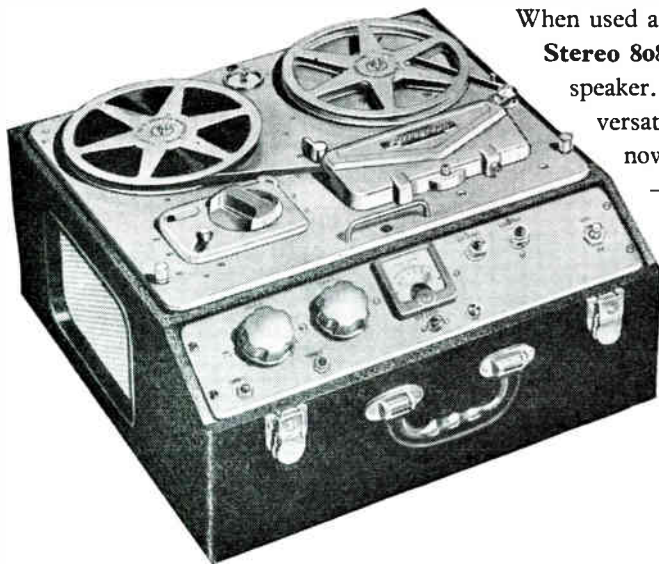
STEREO?

—then this may be your answer

Few people would now deny that Stereo is here to stay. Indeed, it's by far the most exciting thing that has happened to music lovers since the days of the old acoustic soundbox. For here at last is true realism—the ultimate in reproduction—the mirror-like re-creation of sound as it actually happened.

To you who may be thinking how the advantages of stereo can be applied to tape recording we offer a sensible solution. The **Ferrograph Stereo 808** is an all-purpose instrument with full mono- and stereophonic recording and playback facilities with a remarkably high standard of performance. To achieve this in small compass it has been necessary to omit the power amplifiers and internal loud speakers—thus saving weight and space. To high fidelity enthusiasts, however, this omission presents no problem since most will already possess hi-fi amplifier equipment and loud speakers of their own choice.

In the **Ferrograph Stereo 808**, the output of each channel, therefore, ends at low level, namely 1.5 volts across 5000 ohms and variable tone controls, normally included in the amplifier circuits, are omitted.



When used as a conventional single-track Tape Recorder the **Stereo 808** requires only one amplifier and one loud speaker. It will be seen, therefore, that it is an extremely versatile instrument fulfilling every requirement both now and in the future—monophonic or stereophonic—for live recording or recording from records—with playback facilities for all commercial pre-recorded stereophonic or monophonic tapes.

And, perhaps most important of all, it is manufactured to the same impeccable standards for which the incomparable Ferrograph has become so widely known.

Ferrograph Stereo 808

Two speeds: $3\frac{3}{4}/7\frac{1}{2}$ i.p.s.

Price 105 gns.

The Incomparable **Ferrograph**

BRITISH FERROGRAPH RECORDER CO. LTD.

(A subsidiary of the Ferrograph Company Ltd.)

131 SLOANE STREET, LONDON, S.W.1 · Tel: SLOane 1510, 2214 and 2215

CLARION HITS



◆ One song brings Cliff Richard more money than my prelude makes in a year

Reprinted from *Womans Own*

Immediately below you can see two more V.I.P.s of the Entertainment world recording their impressions on a Clarion at a recent Charity First Night. No prizes for guessing who the man is—it's **KENNETH MORE**, of course—but the lady may not be so easy to recognise below that Cossack-style hat as the one and only **EVA BARTOK**.



Reprinted from *Sporting Review & Show Business*



Lena Horne recorded a message of welcome to Danny Kaye before she left London, and he arrived recently. Peter Noble was there with his Clarion portable tape recorder to take the message from lovely Lena

Reprinted from *The Viewer*



FANS HAVE THESE STARS TAPED!

Latest fad is to take a portable tape recorder — like the Clarion used by two attractive girl fans in the picture on the left — on your star-seeking expeditions and tape a conversation with them instead of just getting an autograph. Enjoying the experience are **TERRY DENE** and **SYLVIA SANDS** (left).

Reprinted from *Melody Maker*

THE HEADLINES!



New portable starts a new recording craze

Top people and teenagers—everyone's catching on to the new Clarion. Including the British press as you can see on the left. Almost overnight this new *transistorised* tape recorder has started a new recording craze. A craze for *on-the-spot* recordings. Any time. Any place. Autographs on tape. Holiday impressions. Sound for movies. The Clarion opens up a whole new world of sound—for you to explore. See the Clarion. Try it out. Its performance is astonishing.

LOOK! ALL THIS FOR 25 GNS.

All transistor circuit. Fifty hours play on four torch batteries. Weighs only 5 lbs. Records anywhere. 44 minutes playing time, each tape. Can be used as a straight-through amplifier.

IMPORTANT.—The Clarion is the only transistor tape recorder at anything like the price with a constant speed of $3\frac{3}{4}$ i.p.s. All Clarion recordings are completely interchangeable with any other kind of tape recorder running at $3\frac{3}{4}$ i.p.s.

G.B.C. ELECTRONIC INDUSTRIES LTD.
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25 gns.

including microphone and tape

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T.R.1.

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GOING FOR THE NEW MAJOR!

New model with performance standards not previously available in any portable tape recorder.

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MAJOR 59 GNS

Microphone optional extra.

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Audio Fair**

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Going for tremendous performance . . . terrific value . . . and getting both. 3 speeds. 7" spools. four hours' playing time. Facilities for mixing and superimposing.

PRINCESS 39 GNS
COMPLETE



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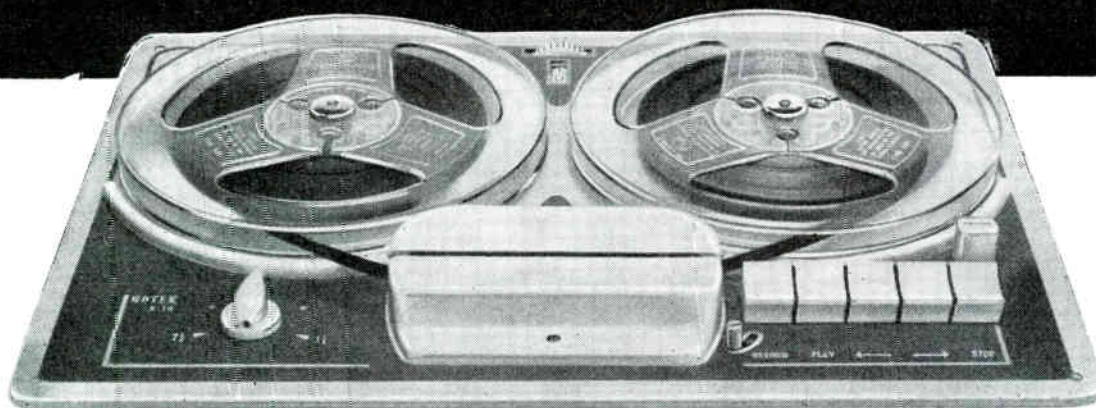
Going for today's most astonishing tape recorder value. A first-class machine with excellent recording quality and sound reproduction. With facilities for sound mixing and superimposing. With simple controls, elegant styling—and all at a record low price.

AVON 27 GNS
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MOTEK



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Three speeds, pause control, push button operation, accidental erasure prevention, positioning counter . . . these are a few of the outward signs of internal quality.

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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.

1½ 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.

Extension Speaker Socket enables you to play back the Minivox through any external amplifier.

New battery portable with mains quality!

The convenience of battery power and true portability. The quality reproduction of a mains tape recorder! Now you can have the best of both worlds, with the new all-British Minivox battery portable.

Overall measurements of the Minivox are 10½" x 5½" x 9". And the weight is only 9lbs. Yet no flimsy plastics have been used in this amazing little machine. The deck is of 3/16" duralumin, and that's typical of the standard throughout.

The British Minivox is robust and precision engineered. Built like a first-class mains machine. The same goes for the circuitry. The Minivox is the only battery portable that employs seven transistors and three constant speed motors.

In fact, it's the ingenious circuit, the meticulous attention to detail that makes the Minivox the only **battery portable** that gives you **mains quality**. But ask for a demonstration—hear music reproduced. Then judge for yourself! Price only 37gns. including microphone.

See you at the Audio Fair—Room 212, Booth 6.

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Please send me further details
of the Minivox battery portable.

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MINIVOX

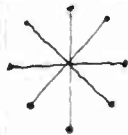
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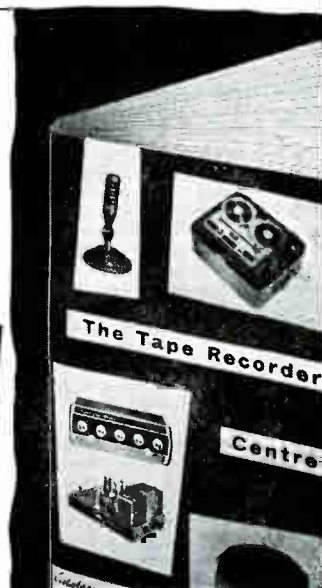
For free Catalogue send this coupon to:
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Dept. R, 75 Grand Parade, Green Lanes, Harringay, London, N.4.

Telephone: Stamford Hill 1146

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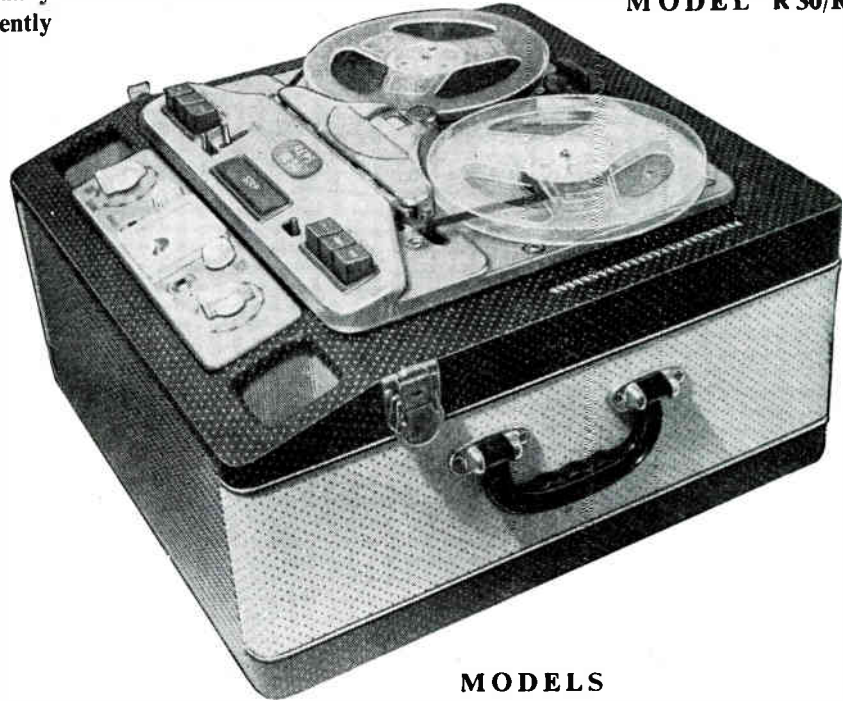


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MODEL R 30/R 40

1. $1\frac{7}{8}$ " ips can be fitted for an extra 3 gns.
2. Superimposing fitted as standard.
3. Mixing facilities.
4. Provision is made for the addition of a STEREO HEAD.



TECHNICAL SPECIFICATION

The R.40.

$1\frac{7}{8}$ ips 70—4,500 \pm 3dbs.

$3\frac{3}{4}$ ips 60—9,000 \pm 3dbs.

$7\frac{1}{2}$ ips 50—15,000 \pm 3dbs.

15 ips 40—20,000 \pm 3dbs.

(signal noise ratio at $7\frac{1}{2}$ ips—47dbs.)

Separate record amplifier.

Push-pull bias erase oscillator for low tape hiss.

Separate bass and treble controls \pm 15 dbs at 14 kc/s—15dbs at 40 c/s.

Supplied complete with Acos 39/1 microphone, Radio Record lead and 1,200' P.V.C. Tape.

FURTHER FACTS

It is not generally known that the Tape Deck mechanism is virtually re-built in the REPS machines. It is standard procedure to remove all rubber wheels—i.e., re-wind, idle and pinch—and re-grind them to a closer tolerance. Also the Capstan is skimmed to less than \pm 0.0001". This has resulted in a very low "wow" factor, especially at $3\frac{3}{4}$ ips which has lead to the logical introduction of $1\frac{7}{8}$ ips in place of the 15 ips. The principal cause of "flutter" is due to the eccentricity of the three-step pulleys which control the tape speed. This eccentricity occurs when the pulley is locked to the motor shaft and is due to the off-setting action

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.

of the fixing screws. This difficulty has been overcome by manufacturing pulleys over-size and machining to the correct diameter when fitted to the motor shaft. By this method a total variation of less than 0.0001" has been achieved at $1\frac{7}{8}$ ips. Initial measurement indicate total "flutter" content at $1\frac{7}{8}$ ips to be of a lower order than previously associated with $3\frac{3}{4}$ ips.

★

D. W. Aldous of 'GRAMOPHONE RECORD REVIEW' writes in March issue :

"The overall performance of this Repls R.30 recorder, coupled with its reliability and simplicity of operation, not to mention an attractive styling, must give it a wide appeal to tape recordists seeking an all-British machine of unusual quality."

Fully illustrated literature available on request to—

REPS (TAPE RECORDERS) LTD.

118 Park Road North, South Acton, London, W.3.

Phone: Acorn 4141

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

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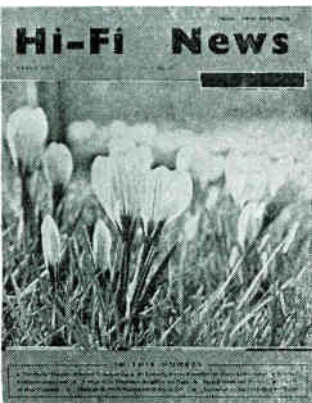
★
EDITORIAL

LAST month in this column we outlined the possible intentions of the big organisations with a natural interest in the future of tape as a medium for selling music. We also noted that the tape recorder should not be demoted to the ranks as a mere successor to the gramophone. The Magic Box of the next 50 years must give its owner a means of expression, and not be regarded only as a box for repeating packaged music, as purveyed. We are on the brink of a new era in domestic entertainment, and it is potentially so big that no one can yet see its limitations. Today the main medium is magnetic tape, and the theme is "sound". Tomorrow the theme will be "vision" as well, and colour may well enter the picture—and we shall undoubtedly be hearing more of electrostatic tape.

That said, however, let us leave "tomorrow" to bring the inevitable, and tackle the shortcomings of today. While the recorder must undoubtedly retain its place as a recorder, it is also a reproducer of music. And while some of the big organisations are trying to make up their minds about the number of tracks required, the widths of tape to accommodate them, and the types of cassettes that we ought to have—nearly all of which would mean new machines—let us remind our own suppliers of recorded music that there are probably a million tape recorders in the U.K. which will accommodate 5-inch spools and which will replay at 3½ i/s. Their owners are not waiting for new super-streamlined-cassette-players to appear, so that they can throw their existing machines under the stairs. They are waiting for music to play on what they already own.

Five years ago E.M.I. pioneered the field of music on tape at 7½ i/s. This Company has an enormous music catalogue, the largest tape plant in Europe, and all the facilities for extending its activities to 3¼ i/s tape records. We suggest that it should take urgent note of this big potential market. Other Companies with large and lively music catalogues might well follow suit.

* * *



AUDIO FAIR GUIDE

● This number of *The Tape Recorder* contains a guide to Audio Fair exhibitors of tape products. Readers with Hi-Fi interests may like to know that the April number of our sister journal, *Hi-Fi News*, contains a full 4-page guide to all Audio Fair exhibitors. Its other features include two items for home constructors, an article on stereo, and several non-technical features for beginners. It is on sale now!

AUDIO FAIR—APRIL 21-24

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COVER PICTURE

WE received this very fine Boxer picture from our friends in Hannover, home of the Telefunken recorders. As our *Hi-Fi News* readers know well, we welcome any excuse for a good animal picture on our front covers! Unfortunately we could not use the 3-word title that was suggested. It came a little too close to a registered Trade Mark that other friends at Hayes have used for about 50 years. No prizes for guessing!

NEXT MONTH

ONE of our most popular features appears to be the *Field Trial* reports on battery portables, and we are pleased to announce another of these for the next number—The *Stuzzi Magnette*, which has a number of most interesting features. Other items will include a further instalment in James Moir's series, *Reviewing Tape Recorders*, and more about the *Parabolic Reflector*, by E. D. H. Johnson. *Workbench*, and *Reader's Problems* will be of special interest to beginners, and we have a large selection of letters from our postbag which are awaiting publication. The series on *Cine Soundtracks* is continued with an exceptionally useful article on *Editing with Stopwatch, Scissors and Tape Measure*. Six pages of news and pictures, plus another selection of tape records reviewed, promise to make the May *Tape Recorder* a particularly lively issue. But, please place a firm order with your supplier. The magazine was "sold out" again last month within a few days, and many readers were disappointed.



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).

HERE AND



It is becoming an increasingly common sight in London. Instead of the miniature camera and the shoulder strap full of filters, lens hoods, and what-have-you, the miniature recorder and microphone. Here is a visitor to "the Big Smoke" taping the peal of Oranges and Lemons from the R.A.F. Church of St. Clement Dane in the Strand with his Fi-Cord.

ONE of the more intriguing and stimulating byways of the Tape Recording world is the Honeywood House organisation, of Rowhook, Horsham, Sussex. The photograph below shows one of their more recent creations, in the shape of a bridge; the supports are mammoth enclosures containing single Axium 300's while the superstructure contains a Ferrograph stereo 88 deck, Garrard 301 with Decca fss pickup, with the Jason J210 Mk. 111 and two Jason JTV2 tuners.

Honeywood House is a charitable convalescent nursing home, but with a difference; whereas most charitable institutions have to rely in whole or in part on the generosity of the public, Messrs. Miller and Bellord, who founded this organisation, have made a point of never appealing for money, but have earned it themselves by their own elbow-grease and ingenuity. By building tape recorders and the like, a certain profit is naturally made, which is promptly handed over so that more impecunious patients can be helped and rehabilitated.

Tailor-made Installations

The personalities behind all this are Sidney W. J. Miller and J. M. E. Bellord. The latter, a quiet and modest ex-boxing promoter, is responsible more for the execution of the designs, while the former, who was totally paralysed at an early age and only recovered through study of Yoga and metaphysics, provides a slightly more flamboyant touch. Besides making and using tape recorders in a hundred and one different ways, they manage to run the convalescent home, print all the literature, take an active interest in photography, quite apart from their external activities as lay readers in the Church of England!

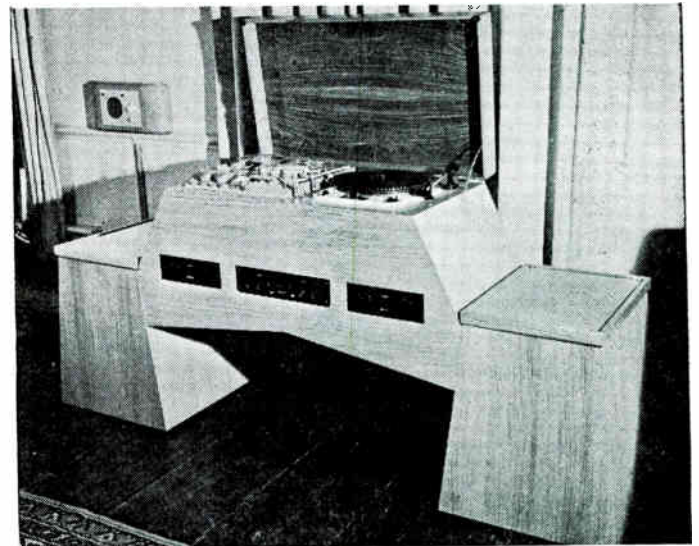
The machines they produce are all "tailor-made" to individual requirements, and the room into which the recorder will go is measured before any plans are drawn up. Thus no two recorders are ever the same (that would be too dull!) though all are distinctive for their light oak veneer finish, and all are made

with 9-ply throughout, and with speakers mounted on 1 in. blockboard. All carry a four year guarantee, and customers to date range from the Lord Bishop of Guildford (a most enthusiastic owner) to a variety of schools, churches and so on. The churches they have supplied are especially fortunate in that a free library of church music on tape is made available (or made up to order) from Honeywood House. These tapes are collected in from a number of sources, and many are live recordings which Miller has made in the field with a TR 51. Indeed one of the most astonishing 'sounds that we have heard was the reproduction (through the equipment illustrated) of a large church organ, recorded "just for fun" when engaged on church activities. Before tapes are sent out to churches, however, they are clearly marked with red tabs throughout, so that the most unmechanically minded member of the congregation merely has to operate the stop and start buttons.

A rest for the Ringers

So adept have the two principals become at this taping of church music that they have proved it practicable to have the entire range of Introsits and Responses for a Sung Eucharist at the touch of a button. In this way, the celebrant intones the words and the congregation is "accompanied" by a cathedral choir or similar, and thus encouraged to join in with more gusto and less self-consciousness. This was achieved, without a single "hitch," at the Sung Eucharist celebrated by the Bishop in the Chapel last December, marking their inauguration as a registered charity.

Similar tapes, but for the more normal services of Matins and Evensong, are taken along whenever the principles venture out to local churches as lay readers. Believing firmly that good music is one of the first essentials for a good service, they pack into a car whatever stereo recorder is to hand (usually a Brenell or Reflectograph), and set off knowing that having prepared the music beforehand, nothing can upset the proceedings short of a power cut—which would paralyse a pipe organ anyway. Not content with music, they always take a spare Goodmans 300



A product of the Honeywood House team, as described on this page.

THERE AND EVERYWHERE

Axiom along, plus the requisite tape, just in case the local bellringers want a rest!

Since the primary function of the charity is to heal the sick, tape recorders, not unnaturally, find their way into this field as well. For one thing, music is a well-known medium for helping to relax tension, especially in nervous cases. The whole subject is far too interesting and far too complicated to be dismissed in a single sentence here; but briefly the analogy of music to colour is all-important, in that organs are usually red, violins blue and so forth, and maximum relaxation is achieved by studying and gauging the "colour" of the patient, and selecting music of the opposing colour (i.e. from the Antipodes in the rainbow, so to speak) from the tape library. In this way the electromagnetic fields of which the body is composed, and which have become distorted through stress, are countermanded by an opposing field and brought back to a more normal shape.

Again in the medical field, a specially designed suction-type microphone, plugged into a recorder, is used to measure the heart beat. Whereas the more orthodox stethoscope is liable to be inaccurate, owing to the nervousness of the patient and the corresponding quickening of the pulse, this method ensures accuracy, since by plugging in and walking out of the room, all nervousness resolves itself after 2-3 minutes, and an accurate reading is obtained from the relevant section of the tape.

The Not So Silent Deep!

THE film and book of "*The Silent World*", by Captain Jacques Y. Cousteau, have thrilled millions of people all over the world. His fascinating adventures under the sea, and brilliant underwater photography, have exposed the weird and wonderful world that exists below the waves. But this world is not absolutely silent—as we discovered when we wrote to Captain Cousteau to ask about his recording apparatus at the Institute Oceanographique, Monaco, and the equipment aboard "*Calypso*", the American minesweeper converted into a submarine research ship directed by Captain Cousteau.

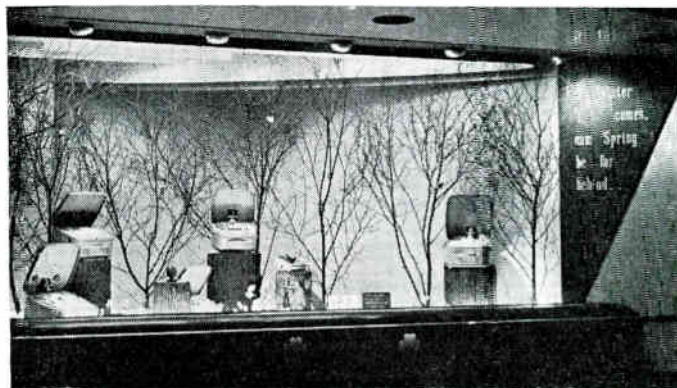
He writes:—"Yes, we use tape recorders to record underwater sounds here at the Oceanographic Museum, as well as on board the '*Calypso*'. We use hydrophones on board, while the ship stands still, or echo-sounding crystal transducers while the ship is under way. The baryum titanate transducer is connected to a Swiss '*Perfectone*' recorder, giving good response from ten to thirty thousand cycles. We have been able to record successfully noises, shrieks and groans of porpoises, pilot whales, and sperm whales. Recently we recorded a very loud modulated series of shrieks from an unidentified animal at a depth of 1,300 ft!

"At the Museum we have been carrying out a more detailed study of sounds on live porpoises in a large pool."

Details of the results of these studies are being sent to us in the very near future, together with methods of recording etc.

A picture from the book and film, "The Silent World," where bubbles and slow motion suggest extreme excitement—and yield sound previously unheard.

(Photo by courtesy of Hamish Hamilton)



The theme of Grundig's clever window display is "If Winter Comes, can Spring be far behind." Stark, leafless trees silhouetted against a winter sky are relieved by crocuses popping up in the foreground. But the buds are coming out in London as this picture reached us, and the odds are that Grundig will have the sign-painters at work by the time you read this!

AKG Lightweight Headphones

MESSRS. Politechnia (London) Ltd., 357, Euston Road, N.W.1 announce the addition of ultra lightweight headphones to the AKG products for which they are appointed trade distributors for Great Britain and the British Commonwealth.

These headphones are normally supplied wired for single channel operation but are easily adaptable to stereo requirements. They are extremely light in weight and comfortable in use. AKG Headphones Type K.50 are dynamic, with special coil and diaphragm assemblies to provide a frequency response from 30 to 20,000 c/s, and are therefore ideal for monitoring requirements. Minimum power requirements one milliwatt; maximum 20 milliwatts mono, or 2 x 10 milliwatts stereo. Impedance 800 ohms mono, or 2 x 400 ohms stereo. Complete with 4½ ft. thin plastic shielded lead, retail price—£8 4s. 6d.



TAPE—AS OTHERS ARE USING IT



Road Users' Met Service!

Yet another unexpected use for a tape recorder! A private "Met Service" for the benefit of long distance lorry drivers. The HQ is at a snack pull-in at Leeds, on the main Manchester road. Here, a driver is seen recording details of road conditions on the stretch that he has just covered. The recording is then available for drivers going in the other direction, and provides them with invaluable details of what to expect—fog, slippery patches, and other unexpected hazards. This is a bright idea if ever there was one. Are you Interested, Minister of Transport?

For Those who Like Exhibitions

The 1960 A.S.E.S. (Electrical Engineers) Exhibition opens at Earls Court on 5th April for 5 days. One of the main exhibits will be part of the side of an aircraft carrier, showing compartments, cables and switchgear. We are reminded that just over 70 years ago any rating who switched a light on or off had to report to the Officer of the Watch so that the voltage of the series-parallel electrical system could be adjusted! This exhibit will show how times have changed.



Home Constructors—How about it?

ALMOST every year since 1948, the British Sound Recording Association has held an 'Amateur Competition', in which its members have entered equipment which they have constructed themselves. This year for the first time it is renamed the "Home Constructors Competition", and will include a section for work by non-members of the Association. Entries are invited for this competition, which will be held at the Royal Society of Arts, London on Saturday 21st May, 1960. There are two classes as follows—(A) Entries submitted by B.S.R.A. Members. In addition to the President's Trophy, there will be the "Wireless World" award of 10 guineas, and the Guy R. Fountain award of technical books to the value of 10 guineas. (B) Entries submitted by Non-Members. The winner in this class will receive the "Hi-Fi News" award of 10 guineas. Apparatus submitted for the Competition should be associated with the recording and reproduction of sound, including appropriate test equipment. Exhibits will be judged on the score of technical originality, suitability for purpose, design and finish. Application forms may be obtained from the Association offices at "Greenways", 40 Fairfield Way, Ewell, Surrey and entries should be submitted not later than 14th May, 1960.

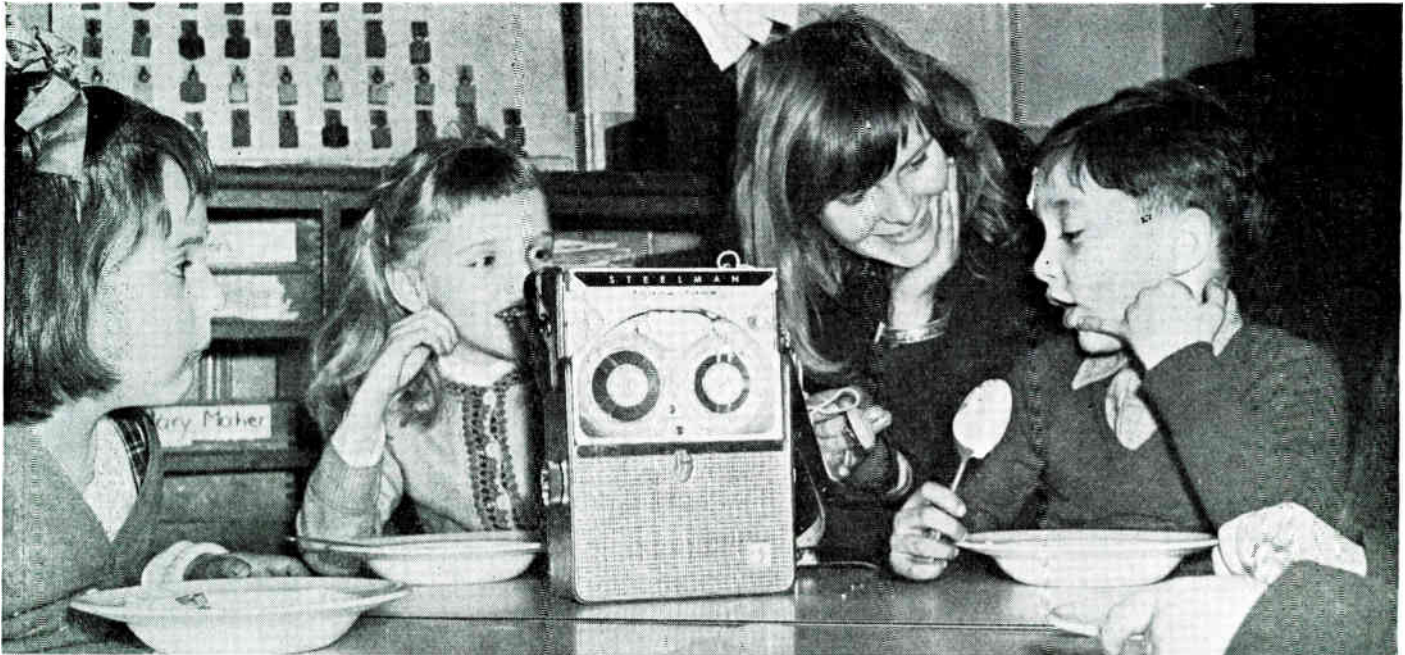
Noise—Noise—NOISE!

THOSE who heard the BBC broadcast on March 10th, will be glad to know that at last something is being done in the direction of noise abatement—even though "the something" can so far only be measured in words. The country dweller can slide up his windows in the early morning, and a microphone on the window sill will catch him all the wonderful sounds of the awakening day. But let the town dweller do the same thing...! A microphone on a London window sill, at any time between the hours of 8.00 am and midnight, will give the recording enthusiast a shock when he plays back his tape. As the BBC press service hand-out remarks, "Britain lags behind other countries in legislation for noise nuisance. Many countries regulate sound insulations between houses and flats, and some have maximum noise levels for road vehicles. In some countries a factory area is not allowed to exceed a certain level of noise where it joins on a residential area." In Britain, it would almost seem that certain makes of motorcars and motorcycles are sold because of their ability to annoy everyone else but the users. Those who dislike unnecessary noise—and that should take in almost everyone interested in recording—should write to the recently formed *Noise Abatement Society* for details of membership. The address: **Mr. John Connell, Hon. Sec. and Organiser, 6 Old Bond Street, London, W.1.**

The End of the Line!

Recently Leeds in Yorkshire gave up the passenger tramway service in favour of buses, and on November 7th 1959 gave them a ceremonial end. Ten special trams travelled the last two routes with civic and transport officials and 600 tramway enthusiasts from all over the place! To commemorate this event, M. B. (Mick) Drury a local tape fan has written and edited a short feature tape entitled "The End of the Line!" which includes on-the-spot recordings of typical tram noises and a speech by the chairman of the Transport Committee, all of which were made by his totally blind friend James E. Hodgson using a Simon SP/2 and 12 volt Valradio Converter. Although no mixer was used in making the final tape, it has received favourable comment from all who have heard it and a copy has been requested for use by the City Museum.

We have received letters from the following two people who wish to form tape clubs in their areas: Mrs. S. Wakely, 3 Chadwell, Ware, Herts., and Mr. Denys G. Killick, 6 Disraeli Gardens, Fawe Park Road, Putney, London, S.W.15. Interested readers should contact them direct.



(Photo: Colour Printers)

Field Trials of portables have taken our editorial and photographic staff into many unexpected and interesting places. It was decided to sort out something particularly noisy in terms of background, and to see how the Steelman behaved, so a visit was paid to an infants' school in Holborn, London. To quote photographers Tina Tranter and David Wedgbury, "The din was terrific. Plates and spoons banging. Scores of shrill voices." Here, as may be seen, the interest was keenly divided between food and tape! The recorder "took it" well.

Dennis Brown, secretary of the **Birmingham Tape Recording and Audio Club**, says they have just celebrated the club's anniversary and membership is now just over fifty.

At the third A.G.M. of the **Bournemouth and Poole Tape Recording Club**, held on February 23rd, Mr. W. Rawlins was re-elected Chairman, and Mr. H. R. Jones Secretary and Treasurer. Plans for the rest of 1960 were made and will include a play, competitions, demonstrations and visits to places of interest in the area—the first of these being to the H.Q. of the Bournemouth Fire Service. Club member Mr. Finlayson has constructed a "most accurate" stroboscope which will be available to other members wishing to check their equipment. A demonstration of Lustraphone equipment was given by Mr. Pontzen of that company.

A cine-tape meeting was held recently by the **Crawley and Sussex Tape Recording Club** when a silent film of London scenes, taken in 1930, was shown. A number of members were invited to add a commentary on one recorder, whilst another supplied background music. We are told that this experiment in synchronisation was a complete success and thanks were given to Mr. Woods for the use of his Eumig P8.

At the first meeting of the **Doncaster and District Tape Recorder Club**, Mr. L. Hayes, a G.P.O. engineer was elected Chairman and has given two lectures on Basic Electricity and Magnetism. Mr. F. Bloom, Manager of a South Yorkshire newspaper, has agreed to be President. This club would welcome suggestions for club activities and any help in founding a hospital service would be appreciated.

The newly formed **Ilford and District Tape Recording Society** has met with such success, and its members are so enthusiastic, that meetings are to be held weekly in the future instead of fortnightly. The club's first project was to make a complete sound picture of local life in the immediate area, in the form of a tape recording, which would be presented to the municipal archives. Walter Gillings, the club's P.R.O., informed the press of their plans to make this tape, pointing out that it would be of great value to future historians, and the resultant publicity is expected to help them considerably. The write-ups asked

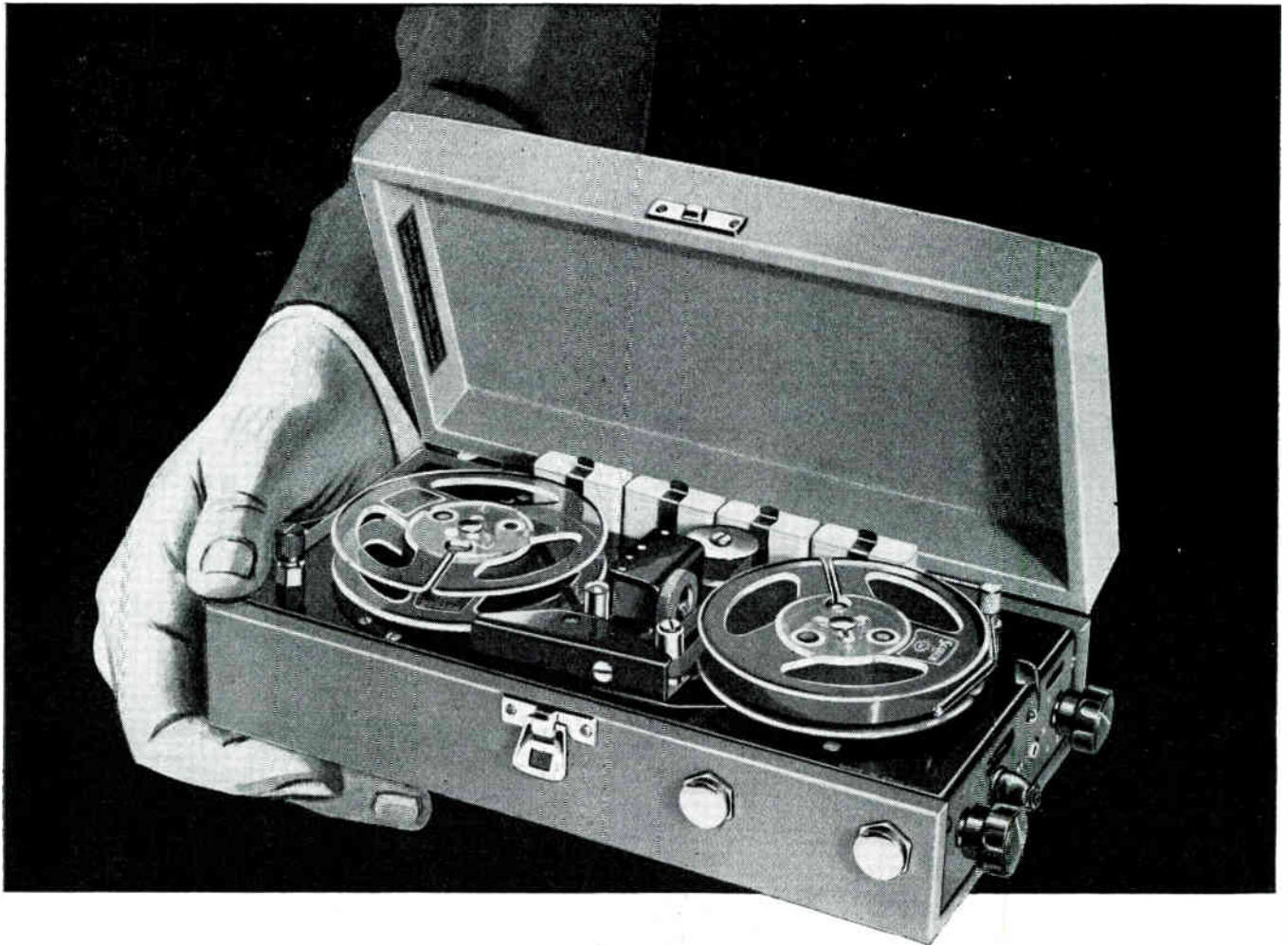
V.I.Ps centenarians, child prodigies and "unusual" personalities—or anyone who knew of such and thought they should go down to posterity—to contact the club's secretary. Recordings will be made at such places at Romford Market, the Kursaal, Southend Airport and, possibly, the Dunmow Fitch Trial.

The final session of the **Star Course of Tape Recording**, organised by the **Rugby Amateur Tape Recording Society**, was attended by representatives of the Leamington and Coventry Tape Clubs as well as RATRS members. The Secretary, Mr. M. Brown, gave an account of the results of the questionnaires which had been handed to students attending the course, and after saying how successful the course had been, mentioned points which could have been enlarged upon. Mr. J. O. Bannister, President of the club, then presented Mr. Brown with a gift in appreciation of the work he has done for the club and his efforts in organising the Star Course. A high percentage of people who took the Course and were previously non-members have now joined.

The **Staffordshire Tape Recorder Society** now has, after much searching, a suitable room for meetings; this is at the White Lion, Lichfield Road, Stafford. Dates of future meetings have been fixed up to October 4th and on April 5th there will be an "open" gathering to attract new members. On that evening, Mr. Wilson of F. A. Hughes & Co., will show a film and talk about the manufacture and properties of magnetic recording tape. After April 5th, meetings will continue at fortnightly intervals until June 28th and then once a month on July 26th, August 23rd and September 20th.

The history of the microphone industry was related by Mr. Pontzen of Lustraphone Ltd., when he recently visited the **West Wales Tape Recording Club**. Several members were so impressed with Mr. Pontzen's lecture and demonstration that they have since placed orders for the particular microphone featured—the Ribbonette. One of these people, using his newly acquired Ribbonette has since made an excellent recording of Haydn's "Creation", performed by the University College of Wales Choral Union and Symphony Orchestra.

A few weeks ago, the **Portsmouth Hi-Fi Club** was formed by Mr. B. G. Pilcher (228 Somers Road No 10, Fratton, Portsmouth) and one night a week is to be set aside for the tape recording section. The first meeting was held on March 1st when a secretary



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LETTER FROM NEW YORK



"Welcome to the *Etessa Tape Recording Club*", says Alan Howard, the Chairman, to Marie Lockmuller—the 100th member to join. Geoff Jones records the proceedings, and Treasurer A. Needham looks on.

and treasurer were to be elected. Mr. Pilcher, the President, tells us that the club room is in the course of being acoustically corrected and that he will supply the "resident" equipment. New members are welcome.

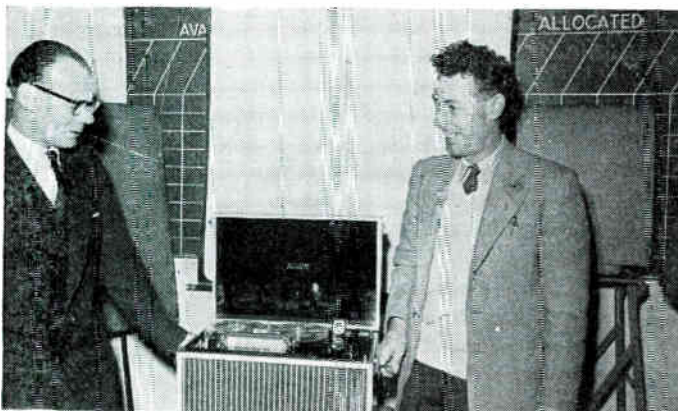
* * *

Dear Sir:—The *Malta Tape Recorder Club*, the first and only one of its kind in Malta, was inaugurated on the 10th February, 1960. Supported by a small (as yet) group of very keen amateur tape recordists, it exists for the usual reasons including, for want of a better expression may I call it "World-wide Inter-Club Mutual Service". That may sound very important and expensive but it merely means that we are prepared; in exchange for similar services; to go anywhere in Malta and record sounds, play recorded tapes as received (Messages etc.), record replies to those tapes and return them to the sender. The return postage being borne, of course, by the sender.

Being a brand new Club and having very little experience, we should greatly appreciate any assistance and guidance from established Clubs or Societies on successful management and procedure.

May I before closing thank you, and providence, Sir, for the existence of *The Tape Recorder* from which publication I have learned much of what I know of tape recording.

Yours sincerely, G. E. W. Cook, Secretary, M.T.R.C.,
10-14 Cachia-Zammit Street, Birzebbugia, Malta, G.C.



Mr. W. Rawlins, M.B.E. (left), Chairman of the Bournemouth and Poole Tape Recording Club explains to Mr. H. Jones, club secretary, how he constructed his "Rawlins" home-built recorder.

* * *

We were glad to hear from Mr. Maurice Chambers, organiser of Tape Programmes for the Blind, that after numerous setbacks during the past few months they are hoping to resume their service to blind people very soon. They have now been granted official recognition by the G.P.O. and are able to send tapes to and from blind listeners at the privilege postal rate of ½d. per tape; this rate will also apply to tapes donated to the organisation by the public.

IN my last letter I mentioned the all-embracing arms of the newly formed U.S.T., and listed the many well-known disc labels involved, chiefly "London" (your "Decca"). For tape fans this means that many hundreds of the best disc titles will soon be available as four-track stereo at 7½ i/s. Latest rumour also has it that an equivalent of U.S.T. may soon begin probing the European market for a similar tie-up of disc catalogs for release on tape. Or have you heard that already?

Latest news from this side indicates a strong countermove to push tape cartridges against reel-to-reel; and many stores, including some big department stores, are already offering cartridge tape players and selections of tapes. Biggest names so far behind the cartridge drive are Bell and RCA Victor, who are in production with players; but numerous smaller manufacturers are planning equipment against the day when cartridges are more generally known.

Already the tape catalogs show about 120 titles available in cartridge form. RCA list more than 50, priced between \$4.95 and \$5.95 (about 35s. to 42s.—*Ed.*), and as the latter represent about the same running time as an average LP disc, the competition should be keen. Additionally, cartridges of blank tape are available from such well-known producers as Minnesota Mining, Reeves Soundcraft, and RCA Victor. The average tape content is 560 feet, for about 60-minutes, and the prices are from \$4.00 to \$5.00. Though it is too early to forecast the future of one against the other, experts reckon that both systems (reels and cartridges) have an equal chance in the market, and that both will thrive side by side.

The New G.E.C. Thermoplastic System

The biggest tape news of all is still the G.E.C. development of the new thermoplastic tape. I note from your dailies that you already know the outline; but for those interested, the G.E.C. system, invented by Dr. W. E. Glenn and disclosed in the past few weeks, could well challenge magnetic tape as we know it for many uses. News of the invention caused a big stir on the New York Exchange. So much so that Ampex stock fell 11 points in a day, and General Electric rose 3½ points. Though this may be due to overnight excitement, it is hinted that when developed the new Thermoplastic system could make possible much smaller equipment than that now necessary for videotape recorders, most of which are now made and sold by Ampex. Again, experts prefer to wait before talking, but say that it may be a long time before the new system grows up; and they comment that "home picture recorders will be in the stores, using conventional tapes, before that day comes!"

Be that as it may, the new Thermoplastic tape is exciting. Instead of changes of magnetism forming a semipermanent record on magnetic tape, an electron beam, in conjunction with heat, impresses the record on the Thermoplastic tape. Though erasure is equally possible, it is claimed that the recorded trace is virtually permanent until intentional heat erasure is applied. So far it seems as though the recording procedure may involve apparatus too complicated for inclusion in home recorders, but—and it is a big *but*—home players, for sound *and* pictures, could eventuate with "videotapes" on sale in the stores for home use.

One big advantage claimed for the new tape is that copying can be done by pressing, in much the same way as discs are pressed; whereas present day conventional magnetic tapes must be copied by dubbing. This is possible because, after the electronic impulses have been recorded, the upper layer of the tape is momentarily melted, forming minutely visible ridges. It is these ridges which are used to create a reproduced picture image in a specially designed optical system. I hope to have more details about this development shortly, and will keep you posted. But do not expect too much of it too soon! It is still very new. Still in the laboratory. You will have to wait several years for it! In the meanwhile what with reel-to-reel and cartridges, and what with 4-track and the shadow of 2-track on narrow tape, there is plenty to complicate the issue.

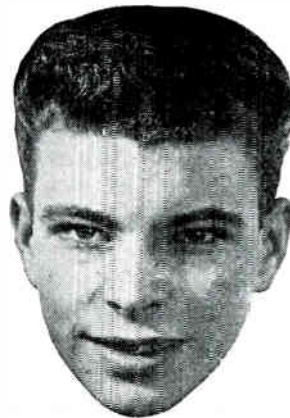
Yours Sincerely



**I like the look of it—
a really nice piece of furniture for
the home—look at that lovely sapele
mahogany—so easy to use too—those
magazines—simple as putting on a record**



**I like its entertainment
value—my favourite
programmes, music,
recordings of the kids—I can
keep them—enjoy them when
I like.**

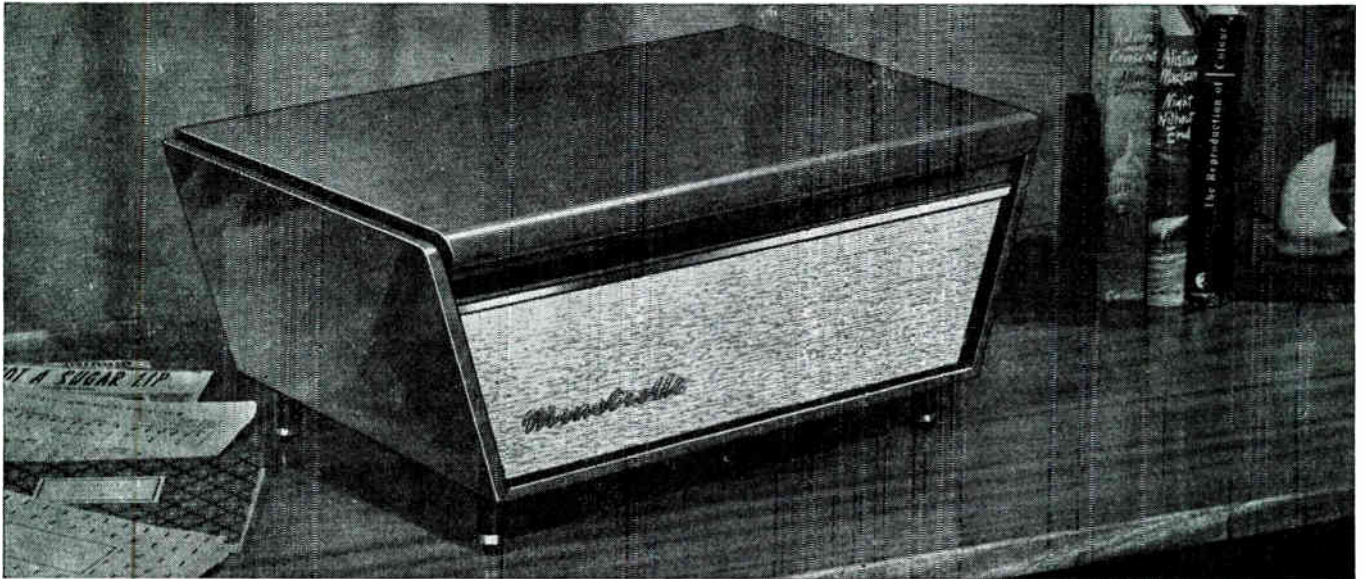


**I like the inside—not that
I'm allowed to touch it—
the amplifier's got a triode
push-pull output and there's
full control for treble and bass.**



**A magazine full of the
latest pops—it's just right for
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The built-in microphone is
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round—you just talk at
it and it records.**

for all the family



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records—no threading or fuss—all the family can use it—even the young and not-so-mechanically-minded members. And inside that handsome cabinet there's a piece of electrical design and workmanship that you can be really proud of—built to ensure that you too, will "Choose Simon for Sound".

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TA 3238

By E. D. H. Johnson

DESIGNING AND USING A REFLECTOR

TWO—SETTING UP AND TESTING

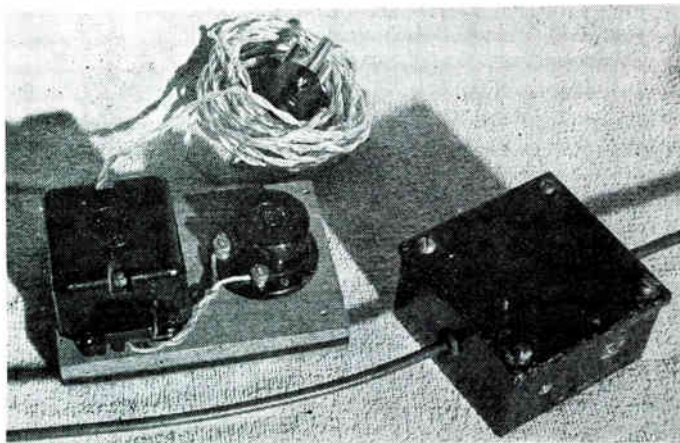
LAST month I described the design and construction of a 20-inch parabolic reflector. No doubt, like myself, some of you who have reached the final stages of assembly will have begun to experience serious misgivings about the whole project, but there is nothing better calculated to restore flagging confidence than a series of carefully conducted tests to discover its performance.

At this stage trials are best carried out with recording equipment already in one's possession. If necessary, more suitable gear can be obtained later, after one's own particular requirements and bird-recording problems have begun to emerge from experience in the field. The one essential is a suitable mounting for the reflector, and this is best provided by a medium-weight ciné tripod with a smooth-running pan-and-tilt head. A second-hand tripod will probably be quite suitable in expense is to be kept to a minimum, but it should be carefully tested before purchase to ensure that there are no squeaks and rattles which might impair the quality of otherwise faultless recordings.

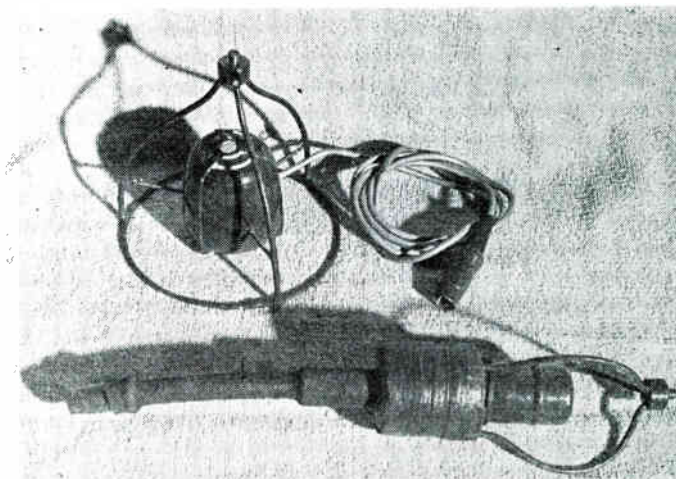
Attaching the microphone

There is such a diversity of shapes amongst microphones that the form of attachment to the reflector is largely a matter of personal preference and ingenuity. Whilst experimenting, however, the most useful mounting I discovered was one consisting of a brass tripod-adaptor bush, with a male $\frac{1}{4}$ -inch Whitworth thread, to which three stout wires were soldered to form a small tripod with legs about five inches long. This would screw into the thread at the end of the focusing tube and it was easy to attach the microphone by means of insulating tape, jubilee clips, etc. Later this design was elaborated into the forms shown in the photograph.

At all costs the temptation to try out the reflector on the first convenient bird should be avoided until it has been properly set up with the aid of a constant and more easily controlled



Showing (left) the buzzer and bell transformer; (Right) the matching transformer built permanently into a steel switch box.



Two Lustraphone microphones on different tripod mounts—a wire spider (above), and a roll of plastic foam (below).

source of sound. A small morse buzzer is ideal for this purpose. It can be run from a torch battery or, better still, from a bell transformer via a long flex from the mains. The tape recorder, on an extension lead if it is a normal domestic model, should be taken outside the house and the parabola on its tripod set up as far from it as the normal microphone lead will permit. The microphone should be adjusted so that it lies, facing inwards, roughly on the flat plane of the reflector, and the buzzer taken to a position in which it can be clearly seen, if possible about a hundred feet away. It is best to avoid carrying out these tests in places enclosed by walls which might cause confusing reflections of sound.

The following procedure will soon reveal the capabilities of the parabolic reflector, and it should be carried out without a tape in the recorder, either monitoring through the loudspeaker or using the recorder as a straight-through amplifier. Switch on the buzzer and train the reflector roughly on to it with the volume control turned up to a position in which the signal is clearly audible without any suggestion of feed-back. Swing the parabola slowly and smoothly from side to side and stop it in the position which gives the maximum signal strength. If the tripod head permits, lock it in this horizontal position and then repeat in the vertical plane, locking likewise.

Focusing

The next step is to focus the microphone, and this is accomplished simply by sliding it back and forth on its focusing tube until the position of maximum signal strength is again reached. It may be necessary to repeat the whole drill in order to satisfy yourself that the line-up is as accurate as it is possible to make it. The sighting tube can now be checked and, if necessary, aligned accurately on to the buzzer, without moving the reflector in the process. This is best accomplished by manipulating it firmly with the fingers.

Unless the soldering of the flange to the tube is very weak, the part of the reflector bowl immediately surrounding the sight should give sufficiently to permit a small adjustment without in any way impairing its general shape. Again, repeat the drill to confirm your settings, locating the buzzer solely by sound and checking the line-up by the sight. Half-an-hour spent in this manner will prevent many frustrations later on, as well as giving you tremendous confidence in your handiwork.

The distance of 100 ft. was chosen as a convenient fixed-focus setting for most of the work that the reflector will be required to tackle. For closer distances, the buzzer can again be used and the settings marked on the focusing-tube with a scribe, where it emerges from the central flange. In practice it will seldom be necessary to re-focus, unless your reflector is particularly large or the microphone unusually small.

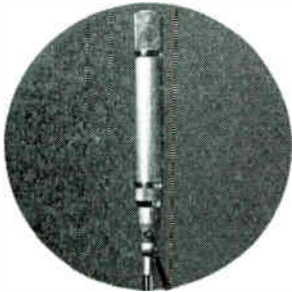
If the lining-up has been carefully carried out you will probably find that your reflector has an angle of acceptance of

AKG

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in the service of sound



World-famous AKG microphones cover a range to meet the needs of those who use tape recorders at home to those whose work is with the world's giant broadcasting, television, film and recording organisations. Models D.11/N and D.9 (Mono) and D.88 (Stereo) are particularly recommended for private as well as professional users.

C.12

Condenser microphone for highest professional requirements. Its pattern may be varied at will during actual use.

D.88 STEREO

High-quality double cardioid microphone unit for stereo recording. Can also be used as a wide angle mono instrument. Frequency range 60-15,000 c/s.

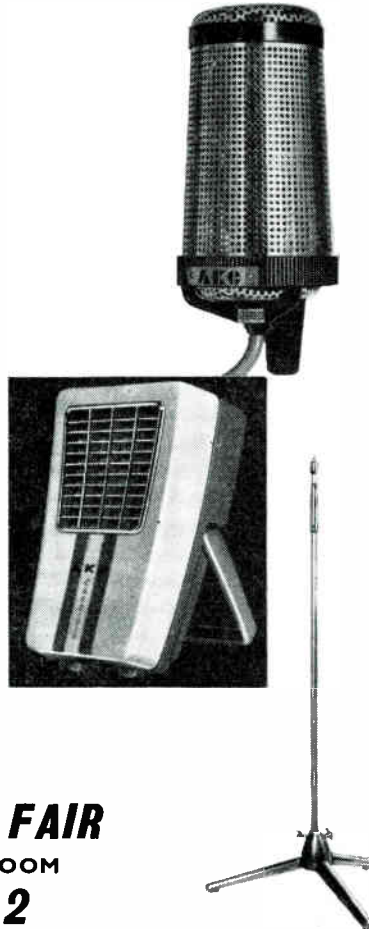
D.11/N

An entirely new dynamic microphone for use specially with modern tape recorders. Cardioid pattern. Frequency range 80-15,000 c/s. 180° discrimination. Sound incidence ratio (front to back) 15 dB. Maintains working conditions over range from -30° to +70°c. In elegantly styled case. High or low imp.

D.9

Dynamic general purpose microphone of robust design and excellent performance characteristics well suited to tape requirements.

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BOOTH
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SETTING UP THE PARABOLA—(continued)

somewhere between five and ten degrees. This may be increased with a larger microphone, but it must be borne in mind that the whole purpose of the instrument is to give you extra range and the ability to select the required sounds at the expense of others. In terms of recording quality nothing will compensate for accuracy of alignment and focusing, and nothing brings home to one the properties of the reflector better than to discover, when hardly anything is being recorded on the tape, that the sighting tube has been displaced by a mere few degrees. Training the parabola on to the first convenient singing bird will now prove to be an experience worth waiting for. My own first effort produced a perfectly satisfactory recording of a robin—at a range of two hundred yards!

Good recorder desirable

Whilst any tape recorder may be used in conjunction with the parabolic reflector for bird recording, the serious worker who has taken the trouble to build a reflector is unlikely to be satisfied with anything but the best quality. A few of the main requirements for this type of work are:—the best possible recording quality, a speed of at least $7\frac{1}{2}$ i/s, rugged construction of case and deck, simple and positive controls, no unnecessary gadgets, gimmicks or gilt, and absolute reliability. Battery-driven portable recorders are very convenient and may in some cases represent the only answer to a difficult situation, but they are seldom capable of sufficiently high quality to satisfy the perfectionist, which is what every bird-recorder must inevitably become.

Most domestic tape-recorders are supplied with a high impedance crystal microphone, and despite much that has been said to the contrary, this is not necessarily to be despised for the recording of bird sounds. It cannot be used with more than a few feet of cable, and it is likely to be unstable under extreme conditions of temperature and humidity, but if one accepts and understands these limitations it can be very useful on account of the strong signal generated. It is ideal for recording quiet sounds which cannot be approached too closely with the parabola.

Moving-coil

For most work, however, the moving-coil microphone is better suited, being robust and stable under all conditions, and for use in the parabola it is best to obtain one which is omnidirectional. It is as well at the outset to buy a low-impedance instrument and couple it to the high impedance input of the recorder (if only one microphone input is fitted) via a matching transformer. These transformers are usually supplied with jack plugs and sockets, but since it is possible for them to give rise to hum in certain conditions if placed too close to the recorder, I have fitted mine about three feet from the recorder end of a 20-ft. length of twin-feeder cable which constitutes the normal microphone lead. The connections are soldered permanently to the cable and the whole is housed in a rectangular steel switch-box as an integral part of the cable.

Extending one's activities

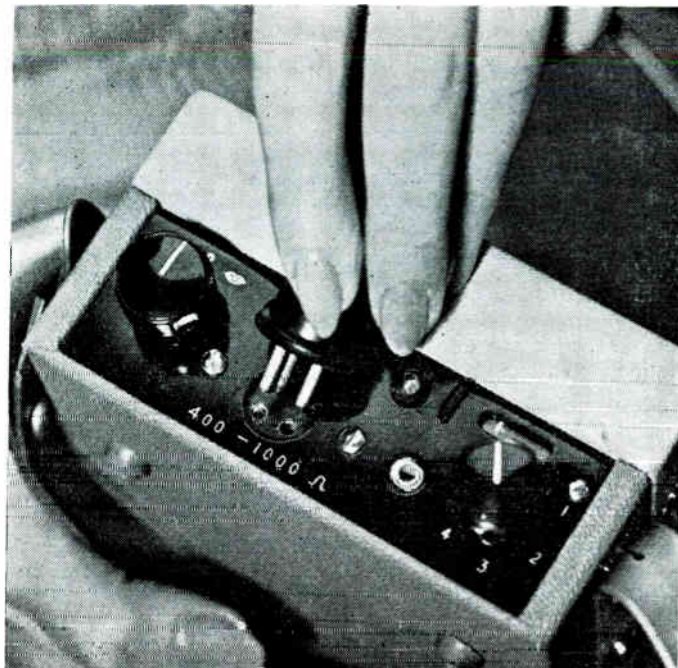
With the low-impedance microphone several hundred feet of cable can be used without appreciable loss of signal or quality and it is this extension of one's activities away from the domestic mains-socket that I shall be discussing in my next article.

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THE Fi-Cord has quickly established itself as an aristocrat amongst battery portable recorders, and is certainly no stranger to readers of *The Tape Recorder*. In June 1959, our feature "A Woman Takes up Tape" gave an account by Nancy Jay of some of the interesting recordings she has made for subsequent synchronising with film, and we have shown a number of photographs of the Fi-Cord in use, in the Swiss Alps (see our January cover picture), and strapped to BBC personality Bob Danvers Walker (see May 1959), who recorded a commentary for the programme "Roundabout" hanging from a crane 100 feet over Notting Hill.

It is obvious from a first glance at the Fi-Cord that a great deal of thought has gone into making it suit ideally the functions for which it is designed. For example, the $7\frac{1}{2}$ i/s speed has been included to enable recordings to be made of sufficiently high quality to permit dubbing on to, or direct playback from, a semi-professional recorder such as the Ferrograph. This application recommends itself particularly to the serious Natural History or Folk Song recordist, or to Cine enthusiasts (into which category can be placed the directors of Fi-Cord Ltd., themselves).

The West End

The provision of a second speed, $1\frac{1}{4}$ i/s, on the other hand, recognises that length of recording time often outweighs quality in importance for many applications, such as note-taking, corresponding by tape, dictating letters or reports.

My first excursion tested the Fi-Cord's ease of operation, and cine usefulness simultaneously. With the shoulder strap suitably adjusted, I set out to record a sound picture of the West End, to



Raising the lid of the Fi-Cord automatically operates the Loudspeaker On Switch (although this may be overridden when required), and gives access to the spools and tape transport components. The small switch to the left is the $7\frac{1}{2}$ / $1\frac{1}{4}$ i/s speed changeover control, and the four rechargeable batteries may be seen to the top of the picture. The operator's hand is shown holding the spring-loaded bar which forms a useful Run/Pause Control for use when transcribing a recording on to the typewriter, etc. Another use of this control is for playing in accurately on a cue, as for example in adding a sound track to cine.

FIELD TRIALS OF BATTERY PORTABLES

No. 5

THE FI-CORD MK.IA

One of the principal features put to the test in these Field Trials is handiness of operation. The close-up (left) shows that the main operational controls are grouped at one end of the Fi-Cord. From left to right, these are Record/Playback switch, Microphone Socket, Battery Neon, Battery Socket, and Volume Control with Tape Position Indicator above. The photograph on the opposite page illustrates the Fi-Cord's small size, and shows too the Grampian DP/4 microphone in use.

accompany a (imaginary) home movie. The tape speed was set at $7\frac{1}{2}$ i/s, and the microphone plugged in and clipped to my lapel. To start and stop recording simply involves throwing the switch on the side of the microphone, and before I had proceeded half way down Regent Street I taped a string of juicy items, including a news vendor shouting "Stahnewsandstandard."

Handy controls

I found that the handy grouping of the controls on top of the Fi-Cord greatly simplified the recording of these comparatively short "takes." These controls, to which one always wants immediate access, are the Record/Off switch, Volume control, Volume indicator (Bar type Magic Eye), and the Tape Position Indicator. The last device is an extremely useful one, the amount of tape expended being shown by the traverse of a white pointer behind a marked glass scale. The pointer itself is motivated by a spring-loaded pressure bar which rests on the tape on the supply spool.

Using the recommended tape, which is "Scotch" Brand, No. 150 Extra Play, I found that I could record 9 minutes all together at $7\frac{1}{2}$ i/s, before the indicator showed that the tape was exhausted. By this time I had recorded myself hailing a taxi, the driver's comments on the Pink Zone, and a lively collection of brake squeals and crashing of gears. This last was easy to record from an island at Hyde Park Corner—the taxi driver's suggestion. For the return journey, I turned over the tape, and realising that I had not yet recorded anything remotely resembling music, I dived down to the "Record Browserie" in HMV's Oxford Street

shop, and discovered enough music going on simultaneously to furnish a crotchety Tower of Babel!

Habitues of modern gramophone stores will know about these listening booths which have no doors but simply a dome over the listener's head. By walking past these I was able to cross-fade very artistically from one Top Pop to another. I played back this tape in what you would expect to be ascending order of quality, and was very favourably impressed. Playing back first of all through the Fi-Cord's tiny built-in loudspeaker gave results not unlike that of a portable radio. Strangely enough, although this knocked the life out of my various traffic noises, the pop records were reproduced with very good effect. This would seem to indicate that "the message" has been recorded on pop discs with portable radios and record players in mind.

The second method of replay was from the Fi-Cord into an external amplifier. A special outlet and lead are provided for this purpose, and it must be said that the results were very good indeed. No material difference was discovered on the third method, viz. running the tape through on a large mains machine. In fact, the quality could be said to be limited only by the characteristics of the microphone itself.

Later recordings, using the Grampian DP/4, and the S.T. & C 4038 microphone confirmed this, and were of excellent frequency range. The first mentioned of these microphones is in fact recommended by Fi-Cord for use with their machine. The speed consistency was commendable too in such a small machine.

Recording for the typewriter

To test the Fi-Cord's handiness as a "notebook" recorder, I recorded some notes—the words you are reading now—and had these transcribed on to a typewriter. For this recording, the machine was placed on a table with the lid open. The loudspeaker ON/OFF switch, which is automatically switched to Off by the action of closing the lid, can also be locked off by means of a sliding catch, and this was done. It was then a simple matter to record—at the $1\frac{1}{4}$ i/s speed this time—and use the switch on the microphone as a "Pause" control, each time inspiration failed.

The typist was able to monitor the recording either on the loudspeaker or—a better arrangement—on headphones plugged into the playback outlet. Again, a thoughtful provision was found to be the spring-loaded bar carrying the pressure roller. With the playback motor running, and the pressure roller turned to the disengaged position, a light finger pressure on this bar causes the tape to be transported past the head a word at a time, or for any period that is found to be convenient. Edging back a few words is simply a matter of turning the spool back by hand, and needs only a little practice.

Two criticisms that could be levelled at the Fi-Cord relate to the absence of a fast rewind facility, and the use of rechargeable batteries. The first of these constitutes a slight nuisance only. The two suggested methods of winding back are (a) by hand, for which a small handle is supplied, and (b) winding forward, using the faster torque which is applied to the take-up spool by an additional band from the motor. This is obviously the method



"They're changing the guards at Buckingham Palace..."

one would use to rewind a complete spool, and takes approximately 2 minutes.

This is the first machine encountered on these Field Trials to employ accumulators—i.e. re-chargeable batteries. Of course this means that you cannot walk into any shop and buy a few flashlight batteries after every 50 hours or so of recording. Nevertheless, it does not provide much of a restriction to anyone capable of removing the 4 plastic-enclosed cells, and clipping in 4 others, for the Fi-Cord's battery-charging unit—of roughly the same dimension as the recorder itself—carries a spare set of batteries.

Spare set of batteries

As long as you have access to a supply of AC mains—say in your hotel bedroom, on holiday—one set of the batteries can always be on charge. There is danger of over-charging, because a cut-out operates on each individual battery as soon as it reaches the correct voltage—2 volts. The charger will operate on all standard AC supplies.

The recording life of the cells is $1\frac{1}{2}$ hours at $7\frac{1}{2}$ i/s, or 3-3 $\frac{1}{2}$ hours at $1\frac{1}{4}$ i/s, and there is a neon lamp, which indicates when replacement is due.

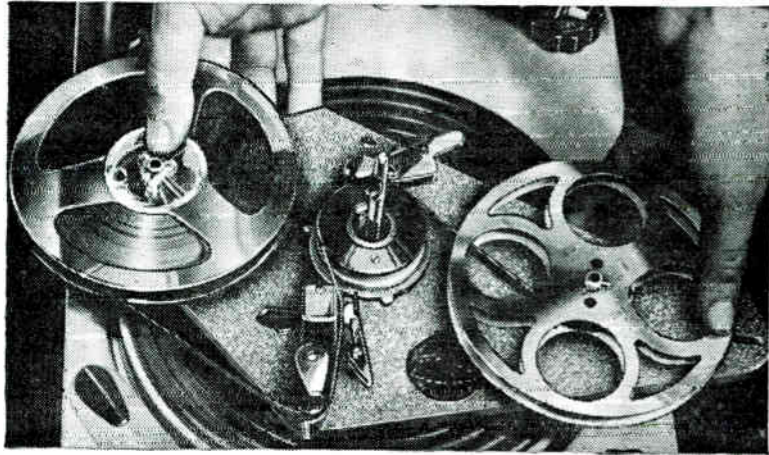
To sum up, the Fi-Cord accommodates in small bulk (it is the tiniest machine so far tested) the operational facilities required for a wide range of applications; and its technical performance, particularly at the $7\frac{1}{2}$ i/s speed and using a microphone such as the Grampian DP/4, fully justifies its use for collecting outdoor or "Safari" material to be added to a studio recordings, or film.

Technical Specification

Power supplies: Four 2-volt accumulator batteries, weighing 5 oz., rechargeable with special Fi-Cord charger from A.C. Mains 110-240 volts. **Battery life:** Recording time $1\frac{1}{2}$ to 2 hours at $7\frac{1}{2}$ i/s, 3 to 3 $\frac{1}{2}$ hours at $1\frac{1}{4}$ i/s. **Motor:** 3 volt D.C. **Transistors:** 7 General Electric types GET 3 and ET4G. **Magic Eye Indicator.** **Tape Speeds:** $7\frac{1}{2}$ i/s and $1\frac{1}{4}$ i/s. **Frequency response:** At $7\frac{1}{2}$ i/s 50-12,000 c/s \pm 3 dB. **Recording sense:** Top track, left to right. **Signal to Noise ratio:** Better than 35 dB. **Wow and flutter:** 0.4%. **Remote Control:** Motor switch on microphone. **Loudspeaker:** Built in. **Input:** 400-1,000 ohms, 0.4 mV. **Output:** Socket from playback head. **Size:** $9\frac{1}{2}$ x 5 x 2 $\frac{1}{2}$ in. **Weight:** 4 $\frac{1}{2}$ lb. **Price:** With tape, batteries and microphone, £61 19s.

Manufactured by Fi-Cord Ltd., 40a, Dover Street, London, W.1.

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GRAMDECK TURNS A TURNTABLE INTO A TAPE-RECORDER

HEIGH-HO! TAPE AT THE FAIR

● Readers of our sister publication "Hi-Fi News" will be making their annual pilgrimage to the London Audio Fair—Mecca of High Fidelity—from 21st to 25th April. The venue is the Russell Hotel, Russell Square, London, W.C.1., and altogether 74 exhibitors are scheduled, plus a number of "fringe" exhibitors in nearby locations. Tape recording in all its aspects, has a bigger representation this year than ever before, and we would recommend readers to visit the Fair, if they have not already arranged to do so. It should be explained that very many of the firms exhibiting occupy, in addition to the usual display stand and enquiry counter, one or more of the Hotel bedrooms in which they are able to demonstrate their equipment. This feature alone repays a visit, and is much to be preferred to buying "off the peg". For the convenience of readers, we give below a brief directory of tape exhibitors, but you must add to this list practically every well-known name in the Audio business. Stand and Demonstration Room numbers are given in brackets.

Acos.—Cosmocord Ltd., Eleanor Cross Road, Waltham Cross, Herts. A selection of microphones and accessories. (65:111.)

AKG.—Akustische u. Kinogeräte G.m.b.H., Nobilgasse 50, Vienna 15. U.K. agents are Politechna (London) Ltd., 357 Euston Road, London, N.W.1. A selection of microphones and accessories. Of special note is the range of professional microphones. (34:312.)

Ampex.—This name covers two exhibits. First Professional Equipment, under the agency of Rank Cintel Ltd., Worsley Bridge Road, London, S.E.26. Tape recorders, mixers. (27:252.) Second, Domestic equipment, under the agency of Ampex International S.A., 1 Rue des Pilettes, Fribourg, Switzerland. Tape recorders, recorded tapes, reproducers. (28:314.)

Audiomaster.—W. & N. Electronics, 80/82 Uxbridge Road, London, W.5. Mixers, tape recorders professional and domestic. (19:317.)

BASF.—Badische Anilin & Soda-Fabrik A.G., Ludwigshafen am Rhein, Germany U.K. agents are F. A. Hughes & Co. Ltd., 4 Stanhope Gate, London, W.1. Magnetic recording tape. (2:115.)

Brenell.—Brenell Engineering Co. Ltd., 1a Doughty Street, London, W.C.1. Tape decks, recorders, mixers, amplifiers and pre-amplifiers. Special note—the Mark 5 stereo domestic recorder. (8:117.)

Butoba.—Butoba K. G., Schonach, Schwarzwald, Germany, U.K. agents are Denham & Morley Ltd., Denmore House, 173/5 Cleveland Street, London, W.1. A battery portable. (40:356.)

Chitnis.—Chitnis Electronics, 1 Long Acre, London, W.C.2. Microphones and accessories, domestic tape recorders. (11:113.)

Elizabethan.—E.A.P. (Tape Recorders) Ltd., Bridge Close, Oldchurch Road, Romford, Essex. Microphones and tape recorders. (17:348.)

E.M.I.—E.M.I. Sales & Service Ltd., Hayes, Middlesex, Magnetic recording tape, professional tape recorders. Special note—new TR 52 portable. (59:313.)

Ferroglyph.—British Ferroglyph Recorder Co. Ltd., 131 Sloane Street, London, S.W.1. Tape-decks, tape recorders (domestic and semi-professional). Special note—the 808 stereo recorder. (29:234.)

Fi-Cord.—Fi-Cord Ltd., 40A Dover Street, London, W.1. Battery tape recorder. (9:254.)

Garrard.—The Garrard Engineering & Manufacturing Co. Ltd., Newcastle Street, Swindon, Wilts. Special note—the magazine loading deck. (7:218.)

G.E.C.—General Electric Co., Magnet House, Kingsway, London, W.C.2. Microphones and accessories, mixers. (25:355.)

Grampian.—Grampian Reproducers Ltd., Hanworth Trading Estate, Feltham, Middlesex. Disc recorder amplifiers, microphones and accessories, mixers, recording cutters. (16:161.)

Grundig.—Grundig (Great Britain) Ltd., Newlands Park, Sydenham, London, S.E.26. Magnetic recording tape, microphones and accessories, tape decks, domestic tape recorders. (46:202.)

HMV.—The Gramophone Co. Ltd., Hayes, Middlesex. Domestic tape recorder. (56:342.)

Irish Brand.—Orr Industries Inc., Opelika, Alabama, U.S.A. The U.K. agents are Wilmet Ltd., 131 Sloane Street, London, S.W.1. Magnetic recording tape. (3:—)

Lustraphone.—Lustraphone Ltd., St. George's Works, Regent's Park Road, London, N.W.1. Microphones and accessories, mixers. (24:—)

Minivox.—Challen Instrument Co., 2 St. Michael's Road, London, S.W.9. Disc recorders, tape recorders. (6:212.)

MSS.—MSS Recording Co. Ltd., 21 Bloomsbury Street, London, W.C.1. Magnetic recording tape, mixers, tape recorders. (10:359.)

Reflectograph.—Multimusic Ltd., Maylands Avenue, Hemel Hempstead, Herts. Tape decks, tape recorders. (42:236.)

Reslo.—Reslosound Ltd., London Road, Romford, Essex. Speakers, microphones and accessories. (33:221.)

Scotch Brand.—Minnesota Mining & Manufacturing Co. Ltd., 3M House, Wigmore Street, London, W.1. Magnetic recording tape. (23:259.)

Shure.—Shure Brothers Inc., 222 Hartrey Avenue, Evanston, Illinois, U.S.A. The U.K. agents are J. W. Maunder, 95 Hayes Lane, Beckenham, Kent. Microphones and accessories. (43:322.)

Simon.—Simon Equipment Ltd., 48 George Street, London, W.1. Microphones, tape recorders (domestic and semi-professional). Special note—the new "Minstrelle" recorder. (36:255.)

Spectone.—Specto Ltd., Vale Road, Windsor, Berks. Domestic tape recorders. (21:114.)

STC.—Standard Telephones & Cables Ltd., Connaught House, 63 Aldwych, London, W.C.2. Microphones and accessories, mixers. (35:—)

Steelman.—Redifon Ltd., Broomhill Road, London, S.W.18. Domestic tape recorders. Special note—a small battery portable. (44:311.)

Stuzzi.—Recording Devices Ltd., 44 Southern Row, Kensington, London, W.11. Microphones, mixers, domestic tape recorders. (39:361.)

Telefunken.—Telefunken G.m.b.H., Gottinger Chaussee 76 Hanover, Germany. The U.K. Agents are Welme Corporation Ltd., 147 Strand, London, W.C.2. Magnetic recording tape, microphones and accessories, mixers, tape recorders. (50:315.)

Trix.—Trix Electrical Co. Ltd., 1-5 Maple Place, London, W.1. Microphones and accessories, mixers, domestic tape recorders. (49:261.)

Truvox.—Truvox Ltd., Neasden Lane, London, N.W.10. Recording heads, tape decks, domestic tape recorders. (57:334.)

TSL.—Technical Suppliers Ltd., 63 Goldhawk Road, London, W.12. Microphones, mixers, recorded tapes, domestic tape recorders. (48:247.)

Veritone.—Veritone Ltd., 16 Station Close, Potters Bar, Middlesex. Mixers, domestic tape recorders. (58:354.)

Vortexion.—Vortexion Ltd., 257/263 The Broadway, London, S.W.19. Mixers, tape recorders (domestic and professional). (54:147.)

Walter.—Walter Instruments Ltd., Garth Road, Morden, Surrey. Domestic tape recorders. (5:122.)

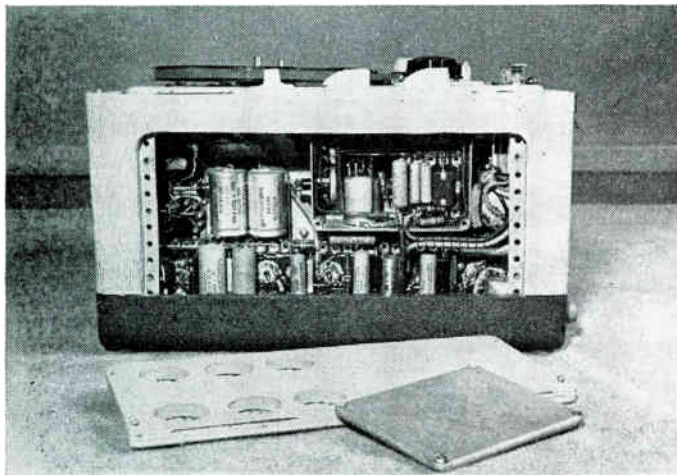
BUILDING MY OWN TAPE RECORDER

ONE MAN'S APPROACH DESCRIBED
BY A. G. WATLING

THIS is not a step-by-step set of instructions for the amateur constructor. It is an account of methods used and experienced gained in applying various techniques, and may give ideas—or germs of ideas—to those of you who “find out by building”.

The enthusiast wishing to build a high quality tape recorder can buy a kit; he can buy ready-made units and wire them together in a case of his own choosing; he can even start from scratch and design every single part himself. Or he can buy the tape-deck and follow a well-tryed design for the electronic section, which is what I decided to do five years ago. The deck I chose was the “Wearite” which had the advantages of proven reliability and a reasonably simple layout combined with built-in switching. The design followed for the circuit was that outlined by J. M. Carter (*Wireless World*, May 1953)—a diagram of which is supplied with every Wearite deck.

I purchased all the recommended iron-cored components with the deck—not a cheap procedure, perhaps—but economy on trans-



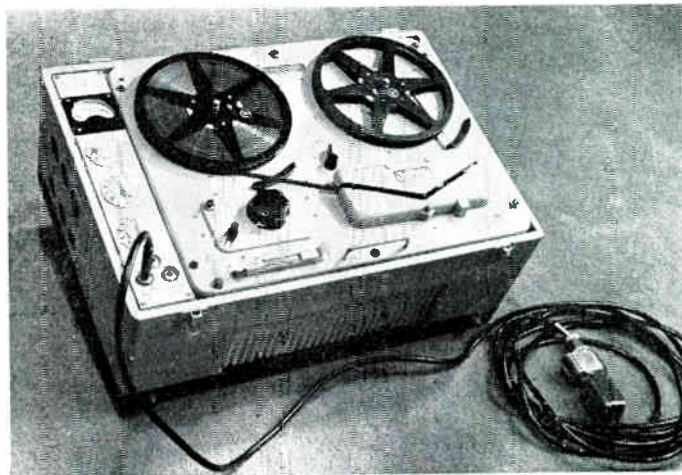
View with access panel and equaliser box lid removed.

formers and chokes is never worthwhile. This is especially true in a portable recorder where stray hum fields can cause havoc and overall frequency response is the really tough problem. Besides, the biggest advantage the amateur has is that he does not pay for his time, so a little extra can be allowed for materials!

Layout a problem

The case I had was smaller than I would have liked, so layout became a major problem. I resorted to a full-scale drawing to decide where valveholders, transformers and plugs should go. It was immediately obvious that conventional assembly would not do, and the “tagboard chassis” was evolved. This comes from fitting the valveholders directly to a standard paxolin tagboard and mounting components around them. Capacitors and load resistors mount across the board each side of the valveholder, and “dropping” resistors are fitted along the edges of the board from tag to tag. Wiring is thus reduced to “straps” between tags, and flying leads to potentiometers.

Connections to HT and earth are so arranged (preferably using a scale drawing again) that earths for each stage are grouped to the same tag, and HT tags can be joined directly to dropping resistors and electrolytic capacitors. A development of this system used in later years utilises both sides of the tagboard—one for



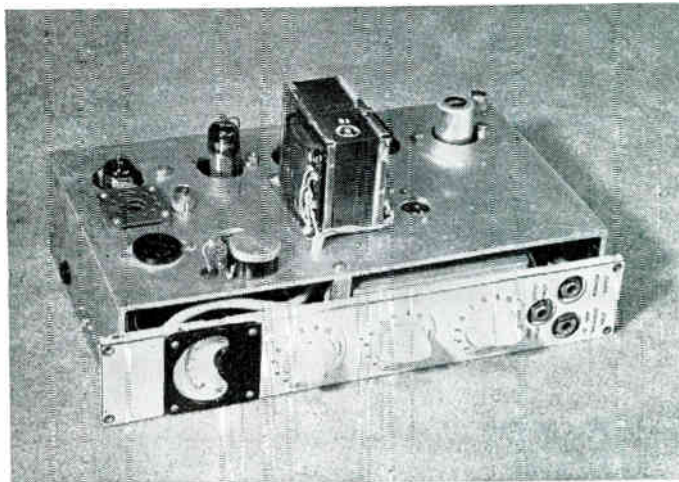
The recorder shown completely assembled.

resistors and one for capacitors. The valves sit in between (if you're lucky) in much the same manner as those on a printed circuit.

The completed “tagboard chassis” was mounted on two-inch stand-off pillars in a cast alloy chassis, the tips of the valves protruding through holes cut in the top. You will see how the full depth of the chassis is thus used to the best advantage. The equaliser “box”, level meter and potentiometers were mounted on a Formica panel fastened to the top edge of the chassis. This insulated panel ensured that jacks, potentiometers, etc., could be mounted together without the danger of earth loops. Multi-way plugs and sockets took care of the many connections to the deck switching, power pack, oscillator and tape-heads. It is really essential at the planning stage to write down every wire, its colour and where it terminates on the plug or socket concerned. (If it is a screened wire, note at which end the screen is joined to chassis.) One can easily apply erase volts to the capstan motor and this does not work very well!

The power pack (not shown in the photographs) comprised the conventional rectifier, choke and capacitors, together with the HF oscillator valve and coil. The mains transformer was mounted separately up one corner of the case, as far as possible from the input transformer and tape-heads, with enough room to swing it for final hum adjustment. The items left over—voltage selector, switch, pilot light, fuses, etc.—were grouped on a paxolin panel near the mains transformer.

The tape-deck was first mounted temporarily to ensure that the motors and tags were clear of the chassis and valves. The plugs and sockets were all connected and a quick check made of HT and heater lines to prove them clear of superfluous earths. The mains connections to the three motors were checked against the diagram for all positions of the deck selector switch.



Showing the “sunken” valves and the output transformer.

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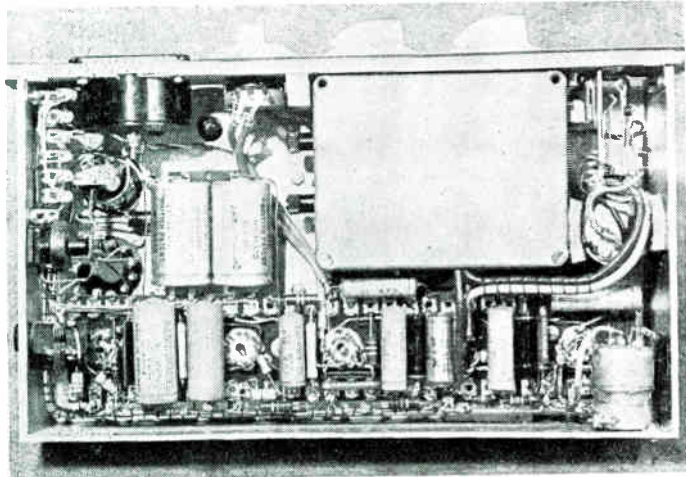
Quad II Amplifier	22-10-0	Two	22-10-0
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BUILDING A TAPE RECORDER—(continued)

As space was at a premium, ventilation was important. The capstan motor has a small fan fitted which can help to draw in cool air through holes in the bottom of the case. Additional inlets are provided at the back of the box and in the removable side-panel, while a gap is left under the deck rim to allow hot air to escape.

The removable side-panel was provided so that equaliser adjustments and component checks could be done with the deck in



The tagboard carries practically all the components.

working position. Just how valuable this is can only be judged by those who have tried holding up the deck with one hand, wiggling a wire with the other and switching on the mains with the left foot.

Came the time for the first switch-on—and who has not felt a quickening of the pulse at this ghastly moment! Armed with the knowledge that wiring was checked to all valve-bases and the mains switch was not *across* the mains (anyone blushing?) the deadly switch was pressed. A faint hum, which died away to be replaced by a gentle hiss from the first valve. Then an attempt to raise the gain brought on a fair hum, with some instability.

Hum can be a big problem on playback, depending on how lucky you are. In a small space, there are three motors, a mains transformer, and a choke near a tape head feeding an amplifier which may have a gain of 100 dB at 50 c/s from end-to-end! The mains transformer is the chief villain, and swinging it in all directions will usually find a "minimum hum" point. From there on it is a process of nibbling at the residual hum by experimenting with positions of iron-cored components and checking that all normal anti-hum precautions have been taken in the circuit. (If you have no oscilloscope, listen on a loud-speaker with a really good bass response.) Here are some of the precautions—most of which have appeared in Mr. Bartlett Still's *Wow* kbench articles.

1. Adequate HT smoothing.
2. Tuning the smoothing choke to 100 c/s.
3. Equal resistances of the secondary halves of the mains transformer—equalise with wirewound resistors.
4. Centre-tapped heater winding to earth or to a point of small positive potential.
5. Earth "bus-bar" running from stage to stage, connected to chassis at only one point, preferably input.
6. Area enclosed by the grid and cathode wiring of high-gain stages to be a minimum.
7. Grid leads short. If screened, only connect one end to earth.
8. Remember that the earth bar is carrying the "return" current to the power pack. If you tap across it at two points there is bound to be a very small potential difference which can easily be injected into the signal path. *Keep stage earths together.*

9. Examine the input stage layout until you know it like a brother. 100 microvolts of hum here will deafen you! If hum harmonics appear, the fault may lie in the smoothing filter—cure them at the source.
10. Use the recommended valves and keep them working to recommended limits. Low heater volts may improve hum but may also cause grid-current. DC heater

supply was tried, but proved no better than centre-tapped AC and was more trouble to apply. 11. Hum-bucking coils in the input earth leads are sometimes useful in the last resort. They were not necessary with this deck, however. 12. Small pieces of mu-metal at judicious angles near the head are often successful in removing the last twinges—notably those that only appear when the motors are switched on. The Wearite deck has a piece fitted to the pressure-pad and is worth its weight in gold.

Curing the hum left a little instability—only noticeable when maximum top equalisation was applied on the lower speed. It was finally cured by re-screening the leads to the equaliser switch.

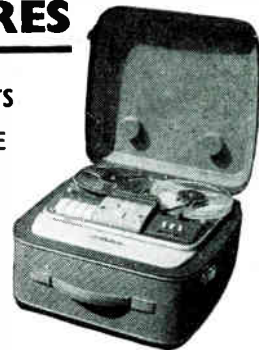
Equalising the playback response can be a lengthy business even with a calibrated test-tape, valve voltmeter and the first-class instructions which were given in the original article. I found that a rough line-up could be obtained by recording "white noise" (from an FM tuner "off-station") under recommended bias conditions, and playing it back with A-B comparison of the recording and original noise. Changes in equaliser settings show up immediately and I claim (despite protests from some people) to detect 2 dB variations in the overall curve with a good loud-speaker. This method shows very dramatically the difference between tapes of different makes with the same bias. Choose your tape and stick to it.

The completed recorder is shown with a Reslo microphone, which feeds into a 30 ohm balanced input. The other jacks are for radio input, equalised output and monitoring. A 10 in. x 6 in. speaker with an electrostatic tweeter makes adequate use of the 3 watt output when the recorder is used on its own. For everyday use the equalised output jack gives about ½ volt input into a hi-fi system to provide results which stand up well to the scrutiny of a QUAD speaker.

There have been no faults *at all* on the circuit since it was built five years ago, and the 12 Kc/s response is within 2 dB of the original line-up. This speaks well for British tape-heads and the practice of keeping tape-heads clean and demagnetised. The mechanism still works smoothly and quietly, with negligible "wow" on 7½ i/s.

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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.

Induction coil for radio recording

Dear Sir: I have followed with interest the various schools of thought on recording from Radio and TV (L.S. leads versus diode connection).

Some of your readers may be interested to know that I have recorded with very good results by means of a telephone inductance coil which for best results is held on the output transformer, but my own recordings were made by putting the coil on the outside of the radio or TV set close to the output transformer, there then being no need to touch the inside of the sets at all.

Secondly, my own recorder is a Geloso 255 (English TR 175) and my one passion is to get the most playing time out of the maximum 3½ in. spools. I find the Geloso L.P. tape is excellent value giving 430 ft. of tape and I have experimented with various spools and Double play tapes but have not achieved my ambition to get 500 or 600 ft. of tape on to a spool. I find the biggest snag is the size of the hub, some makes of spool being completely wasteful of space. I am considering trying to make a spool with just enough centre for the spindle which on some spools would double the tape capacity. Would this be practical? Or perhaps there is such a spool on the market of which I am unaware.

If the plastic were of sufficient thickness the spindle "notches" would not foul the turns of tape. I think most users of small recorders giving maximum spool size of 3 in. or 3½ in. would welcome any device to allow extra tape length.

Thirdly, can I use one of the various Transistor Midget Radio kits on the market, as a Tuner unit for Tape recording? I am not sure of the question on impedances, etc.

Thank you, A. S., Netherfield, Notts.

A limit is set to reducing the hub diameter by mechanical considerations and the large ratio of outside to inside torque imposed on take-up and rewind. A transistor radio will operate satisfactorily into the high impedance input of most tape recorders.

Two-way loudspeakers

Dear Sirs: I am contemplating improving the ext. speaker side of my tape recorder set-up. The present box is 13 × 13 in, with 7 in. sides with an old Goodmans 10 in.

I'm considering housing a Stentorian 10 in. (HF 1012), Bass Resonance 35 c/s, with T.359 tweeter and recommended crossover, in box about 24 × 16 × 8 in.; open back because present speaker is restricted in bass, besides being boomy with back on.

Here, really, is the question. Why have a tweeter when the 10 in. goes up to 15,000? Secondly, what is the purpose of the crossover? Makers say it should be made at 3,000 c/s. Please pull me clear of the fog.

Thank you for the fine answer on mic. leads and pre-amps. I think *Readers' Problems*, *Readers Write* and *Equipment Reviewed* are most interesting. Also the new tests of battery T/Rs; I think there should be many more of these thorough, therefore useful, equipment reviews.

Yours faithfully, R. E. G., Newark.

The new cabinet you are proposing to use—24 × 16 × 8 in. will have the effect of only slightly extending the overall bass response. You would be well advised to consult Messrs. Whiteley Electrical Radio Co. Ltd., Victoria Street, Mansfield, Notts., who manufacture the Stentorian loudspeakers, and who will probably suggest a suitable cabinet design.

Although loudspeakers such as the one you mention are rated to cover frequencies from their bass resonance up to 12,000-15,000 c/s, it is a fact that a large cone is liable to behave erratically at very high frequencies. The various areas of the cone are not radiating strictly in phase—due to the finite time it takes the

vibrations to travel out from the centre—and moreover the large cone tends to focus high frequencies into a narrow beam. In ordinary domestic reproduction, these factors are not often considered important, but to get fidelity results something has to be done.

One solution is to leave the large cone to handle low frequencies, and connect a small unit—i.e., tweeter—in such a way that it smooths out the high frequency response, and radiates it equally over a wider angle. A crossover, as its name suggests, is a network which accepts the full output from the amplifier and apporitions highs to the tweeter and lows to the main unit. The frequency at which the division is made is not particularly critical, and indeed many "two-way" loudspeaker systems work happily with the simple insertion of a capacitor (in the region of 4 microfarads) in the tweeter lead.

Getting back to your proposed open-back cabinet, we feel that the bass response may only just be sufficient to justify adding a tweeter. It is a "law of nature" that you should extend one end of the frequency band only if the opposite end is good enough. The usual figure is taken to be equal octaves on either side of 800 c/s. Four octaves above and below 800 c/s means that the response at 50 c/s should equal that at 12,800 c/s. (Calculated as follows: downwards—800, 400, 200, 100, 50; upwards—800, 1,600, 3,200, 6,400, 12,800). Failure to maintain this balance generally gives a quality that is either top heavy or bass heavy.

Radio Microphones

Dear Sir: Although quite satisfied with my mains supplied tape recorder, I have always been aware of the advantages of complete portability. But the main trouble with the battery portable tape recorder is its very limited playing time and, in some cases, the fact that the recorded tapes cannot be played back on other tape recorders.

I believe, however, that all this can be overcome by purchasing a portable transmitter which, in conjunction with an FM receiver, could transmit messages over a radius of miles, have them "picked up" by the FM receiver and fed into the input on the mains supplied tape recorder. By using a time switch the tape recorder could be switched on and off at the required times or better still, a friend could operate the recorder and the receiver, seeing that the message was not being over-recorded. Would this be practical or not? Yours faithfully, K. S., Stockport.

You can obtain portable transmitters, of course, either one specially designed for radio amateurs or an ex-W.D. "Walkie-Talkie" etc. Operating at very low power indeed, you can transmit and be recorded over distances of a mile or so without difficulty. In professional broadcasting, and television, for example, miniature "radio microphones" are frequently worn—visibly or invisibly—to allow singers or interviewers complete freedom from trailing wires etc. Even the TV floor manager will often be equipped with one of these vest pocket transmitter/receivers to keep him in touch with the producer.

Before making plans to use this idea for amateur recording, however, it is absolutely essential to find out the G.P.O. regulations on obtaining a licence to operate transmitting equipment. Where operation on the amateur wavebands is contemplated, we would urge you to write first to the Radio Society of Great Britain, New Ruskin House, Little Russell Street, London, W.C.1.

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PLANNING AND WRITING A COMMENTARY

THE first article in this series described a method of making a "Cue Tape". This tape holds a running record—from the start to the finish of a film—of all the important items, together with their times of occurrence, measured in minutes and seconds from a zero point at the beginning. This zero point is also a co-relating link between film and tape. Further, the "Cue Tape" carries a running commentary of what is happening on the film. As a working outline—a framework for the development of the complete sound pattern—there is also a set of point-by-point notes on paper, which tie up with the tape.

A few words in advance of future articles will be in place here. Last month, emphasis was laid on the importance of "running-in" both the projector and the recorder; and this has brought letters from readers who have already experienced difficulties with the synchronisation of the two media. The implication in the letters is: "Where is all this leading to?" And the answer is that these articles hope to show other amateurs how they can obtain a very good marriage of sound and film without the complications of synchronisation that can be such awkward bogies. Such refinements as "Lip Synchronisation" are obviously out of court here, and those who want them must go the difficult and sometimes costly way to get them.

Keep The Timing Flexible

The whole theme of this technique is "*Flexibility of Material achieved through sensible planning*". One of the best ways of overcoming difficulties is to avoid creating them. Even in professional presentations via TV there have been many examples of bad synchronisation which were quite unnecessary. For example, why create a situation in which a slammed car door has to tie-up with its sound? Or why focus camera and microphone upon the whistle of a locomotive and its sound? Similarly, the amateur can avoid pinning himself down to half-a-dozen words which cover a critical short shot on film. The average shot in the amateur's film will usually last for several seconds. He can therefore allow himself that tolerance, and plan for it.

These articles are based upon experiences gained from work done with a high quality recorder and projector. The aim, from the beginning, was to prepare a sound track on tape for the ultimate dubbing on to magnetically striped film; but not all cine readers have projectors equipped for magnetic sound, and many will require to use recorder and projector side-by-side. In any case, cutting down the margin for error by every possible trick and device is the only sensible approach. Hence the extreme importance of knowing the degree of accuracy to which projector and recorder will run. Snags which can arise will be dealt with later. In the meantime, however, give the machine a fair chance. Get it running at a standard temperature before using it. Let it run for 30 mins. and settle down. The same applies in effect to the stock being used. A spool of tape from a "fridge" would show an alarmingly different playing time from the same spool stored in a warm room!

The Commentary

Depending upon the nature of the subject on film, the commentary can be almost continuous from start to finish or, by contrast, it can be no more than a series of explanatory notes. From experience in commentary writing I can say that the latter is far more difficult to "put over" successfully. Long periods of silence, suddenly shattered by a string of words, can be dreadful! Indeed, it needs very careful handling of musical background and effects to make such treatment seem naturally in place. The ideal to aim for is a rhythm in the length of commentary:—*Speech—Background—Speech—Background*—so that the audience accept it as part of the whole and do not, on the one hand, subconsciously wait to be interrupted; or on the other hand get jolted out of their visual enjoyment by the unexpected. And with this point in mind, refer to the notes

that you have made on the Cue Sheet. Read them through. Consider each item as a possible talking point. Then sit back quietly and review the whole film in your mind, thinking out the skeleton of a story. Referring to the film around which I have framed these articles, here is a practical example.

The film itself was supposed to end up as a record of a Summer holiday which would be pleasing to *other people*. With

Cues	Spot Time	Commentary Plan	Time
Title Beg.:	0 00	Fairly continuous for 1' 40".	
End:		Speak of customs at Aachen shot.	
Car Ferry etc., etc.	0		
Aachen.	40	(1) 10 secs. ending with ref: to motorways.	1 . 40
Autobahn	50	(2) 1' 22" to complete travel discussion, ending with words "level crossing"	1 . 10
In Car etc., etc.	15	(3) 3 secs. pause. Then discuss Freiburg available time is	1 . 22
Level Cross:	12	(4) 1' 45"	3
Arr. Freiburg	15	(5)	1 . 45
Dep. Freiburg	00		5 . 00

that end in view I shot as many scenes as possible of beauty spots, items of unusual interest in the Black Forest, castles, etc. To link them up I also shot road scenes, villages, signposts and the like. But the unexpected (as usual) took charge by demanding to be filmed; so I ended up with such sequences as piles of logs, hewn trees, even the combs of bees, and close-ups of ants at work on huge anthills built from bits of bark, pine needles, etc., to say nothing of colourful flowers. All this *had* to take a place in the story! So, having edited them into place, the commentary had to cement them in *naturally*—as though they were essentials.

The theme chosen, after the study of the notes and the mental review and reflection recommended above, was a "Travel Agency" approach to anyone with an open mind for the next holiday. Starting at Dover, emphasis was laid on the advantages of a motor tour, the ease of passing frontiers, and the ability to get about quickly from A to the desired B. The town eventually stayed at was made the focal point for trips to C, D, and E. Castles and the like could then be discussed. The story of the pine trees, from seed to the woodman's axe, thus fitted in. And from there it was natural to show and talk of the village houses built from the timber—plus the flowers and bees in the garden, and so on.

Next, back to the notes on the Cue Sheet, and a rough time pattern could be worked out. A preliminary description of the journey could be made during the sea crossing, and dispensed with, so that the descriptive themes of later and topical subjects need not be interrupted by irritating travel detail. It was seen that some mention of the big motor roads would have to come in, so the initial pattern was tailored to end at the time of arrival at the first big town, after the motor road sequence.

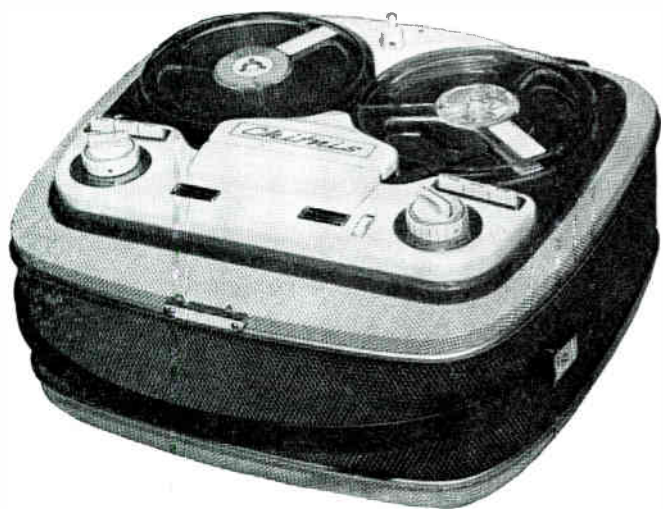
A glance at the Cue Sheet showed that, from the first shots of Dover Harbour to the arrival at Freiburg, there were exactly 3 minutes and 15 seconds to play with. During that time, as a second glance at the Cue Sheet showed, there were three useful points which could be discussed, in order to appear to make the commentary help to carry the film—a shot of cars passing the customs barrier at Aachen (at 1 minute 40 secs)—an opening shot of cars speeding along the Autobahn (at 1 minute 50 secs.)—a pause at a level crossing, seen through the windscreen of the car (at 3 minutes 12 sec.) then the arrival at Freiburg (at 3 minutes 15 secs.).

A similar planning of narrative was worked out for the full length of the film, as seen on paper from the Cue Sheet. A

(continued overleaf)

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SOUND and CINE—(continued)

line was then drawn down the page, vertically, leaving the right-hand side free for a set of notes for commentary, as below:

I found it a useful reference idea to extend red lines across the page, from the left to the centre line, to indicate the *exact minutes elapsed* in bold figures; and also to write down the available times for commentary in the form of a sum, at the right of the page, thus giving a double check to everything.

From then on it became a relatively simple matter to break up the narrative into short paragraphs—to write them down clearly, and to time them. And here I advise the commentary writer/reader to adopt the following procedure very strictly. First, make sure of complete, undisturbed privacy. Lock the door. Next, take any book or paper, and read aloud from it at a natural, unhurried pace for a few minutes. Better still, write a letter to someone, and then read it aloud several times. Next, mark off 50, 75, and 100 words, and time yourself as you read them. This will be the basis for you to work on for the whole job. If you find you are reading clearly and with proper punctuation pauses, at the rate of 100 words in from 35 to 40 seconds, you are doing very well.

Prepare The Reading Script

Next, frame the first piece of commentary. Write it down very legibly. Put a dash where you want a pause of emphasis. Read it aloud and time it. Then bring out the recorder and read it again into the microphone. Pause for a few seconds and read it again. Rewind and replay—timing it and criticising it. When you are satisfied (a) that your writing is as easy to listen to as it was to read, and (b) that you are free and easy at that speed, and (c) that your timing is comfortably as planned, put away the recorder and work out, and write, the complete commentary without any further rehearsals. This can be a long job, but it is well worthwhile, and here are a few tips:

First, always *under-write* rather than *over-write*. Second, try to end a section with a final sentence, delivered after a short pause, if there is any danger of running long. You can then cut it out altogether if necessary; or even space it out. This will be dealt with in a later article.

Record the lot at one Session

Third, having written *all* your commentary, record it *all* at one session. Do not write and record one section at a time. What you read will be heard by others in a total time of, say, ten minutes. Your voice must be the same throughout—and it will not be if you record at different times. The volume must be the same—microphone placing the same, and so on.

Fourth, do not be put off if you stumble. Stop reading. Allow a few seconds' pause. Read again. It is even a good idea to read each section a second time, anyway—leaving a pause between each. For the first two or three sections, until your voice is free, and your confidence is there, read each one three or four times. Don't stop the machine. Just read. You can cut out whatever you like afterwards. You are the boss—not the tape recorder.

When you have completely finished, replay the lot—first of all timing each section, and scribbling down the times against the written notes as you listen. Listen again and put a tick against the best readings.

A few final tips may come in useful. Don't turn the volume up and down between readings. Write your sections with a good space and a red line beneath each: then you will not end up with a wrong voice inflection! Have something soft on the floor, so that you can slide each sheet of text away as you finish it. Get your voice good and clear before you begin. A swill of water is a good thing. And don't be depressed if the total playback sounds scrappy, on account of numerous mistakes and false starts in some of the readings. Tape is like film. It is only when you have acquired the courage to edit ruthlessly that you will appreciate how very much better even the very best bits appear to be, when the dowdy bits are cut away. Later, when the time comes to cut the commentary tape, this will be most noticeable.

Next Month: Editing with a stop watch and tape measure!

... tape recorder workbench

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

No. 11. WOW AND FLUTTER

IMMEDIATELY the performance of any tape recorder comes under discussion the two words "Wow" and "Flutter" are bound to crop up. I have a feeling however, that to many they are words without much meaning. "Wow and Flutter not greater than 0.15 per cent." what exactly is that supposed to convey?

The tape on a machine is supposed to be conveyed past the heads at a uniform speed. Whether the speed is exactly $7\frac{1}{2}$ i/s, or which ever standard is quoted, is not so important as the maintenance of a constant speed. Suppose a signal of constant frequency, 1000 c/s, is recorded on a perfect machine, and then replayed on one that is not so good as regards tape speed. With a speed 1 per cent. below nominal the signal would play back as a steady 990 c/s tone, a difference of about $\frac{1}{4}$ of a tone, unnoticeable to the average person except by comparison. If the steady tone were replaced by normal programme material the relationship would hold for all the frequencies included and everything would seem to be perfectly in order.

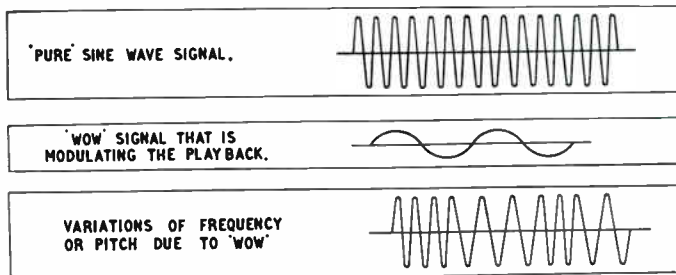
We now suppose, however, that the speed of the playback machine is *not* constant. Let us say that, due to some mechanical defect, the speed is 1 per cent. low for one moment, and 1 per cent. high the next. The tone is no longer steady, but wavering from 990 c/s to 1010 c/s (a difference of 20 c/s, or 2 per cent.). Many people could not discern this—if it were not for the fact that both notes are produced in sequence to make the comparison obvious, if not odious! Incidentally a 2 per cent. variation would correspond to an unbearably high level, but it makes the principal easier to understand.

Which is Which?

The question that now seems to arise is—"How does one distinguish between the two?" What I have tried to describe so far is "Wow", without any argument. "Flutter" will normally be more complex, and there is often disagreement as to where one ends and the other begins. First I would say that it is produced by similar variations in the tape speed of the machine, but at a much faster rate. It also happens that flutter variations are generally less regular, but more of that in a moment.

Given, then, that we have a regular speed variation, it will have its own frequency of operation, so to speak. This may be seconds per cycle in the case of wow, or a couple of hundred cycles per second for flutter. The precise frequency at which wow becomes flutter is a rather academic point, but at the risk of argument I would pick about 5 c/s. Below this frequency one tends to recognise the change of pitch of the signal, whereas at higher frequencies the ear is more conscious of the fact that the pitch is changing without being aware of the degree of the change. At higher figures still, the flutter frequency itself assumes importance. This is understandable if you consider our original 1,000 c/s signal as a frequency modulated carrier. The amount of the change of pitch represents the "Depth of Modulation" and governs the loudness of the flutter note, but does not affect it in any other way.

In the case of "Wow", the magnitude of the speed change of the tape will determine the amount by which the musical pitch changes and, because the change is slow, the way in which the



change occurs will not worry the ear unduly. But I have tried to show that in "flutter" one tends to listen more to the flutter signal itself than its effect on the programme frequency. This is where this question of waveform or shape comes in. The flutter signal may have a waveform that is not sinusoidal, but rich in harmonics, giving a sound with a distinct "edge" to it.

Peak-to-Peak and RMS

Unfortunately, one can only discuss these points one at a time to maintain any degree of clarity. Just as "Noise" in "Signal/Noise Ratio" may be hum or hiss or any combination of frequencies, so there can be, on one machine, a number of fundamental wow and flutter components. The typical specification in my opening paragraph implies that the combined signal will have a speed variation not greater than 0.15 per cent. of the mean tape speed. One thing is not usually said, whether the signal is taken at its RMS or Peak to Peak value, whether it is averaged, or taken at its maximum points. Obviously, the former will give a lower figure and is consequently more usual. The manufacturer who uses the peak to peak figure, and says so, is, in my opinion, more honest.

I shall have to leave till next month the more practical aspect of this problem, getting an idea of the level on your machine, and looking for possible causes.

Our readers write . . . (cont.)

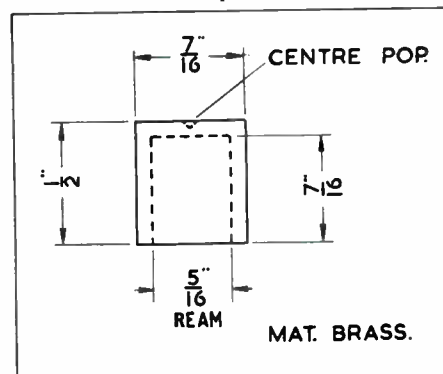
From:—R. J. Crome, 13 Pear Tree Hill, Salfords, Nr. Redhill, Surrey.

Dear Sir:—As my recorder is not fitted with a footage or time indicator, I made the little centring bush (drawn here), to help me mark out my reels in playing time sections, so that I can ascertain fairly accurately the amount of recording time left on the feed spool.

To use the bush, you set the recorder to playback, and run for the desired time you wish to mark, i.e. 5-10-15-20 mins. etc. Then place the bush over the take-up spool spindle, and with a pair of dividers set to the radius of the tape now on the take-up spool. Mark all your spools (both sides) with the dividers placed in the centre of the bush.

I have even found it quite useful in marking the beginning of a special piece of music, etc. I hope this will help some of your readers who have to use the cheaper type of machine.

Yours truly



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These are some of the comments which have all been received in the last month or so, and the originals can be seen in our files:—

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"Thank you very much for such speedy delivery."—M.B. of Atherstone.
"I have seldom experienced such good and Courteous service."—K.R. of Shrewsbury.
"I must thank you for your splendid effort to get the recorder to me for Xmas."—R.R. of Skegness.
"I will certainly purchase again from your shop."—M.C. of Kent.
"I am amazed at your good service."—V.B. of Barnsley.
"Am delighted with the recorder which arrived in perfect condition."—I.S. of Salisbury.
"I have never met anything as good as your service before."—A.B. of Ripon.
"Your terms are by far the fairest I have ever met."—R.B. of Glasgow.
"Thank you for excellent service, which I would recommend to anybody."—R.H. of Cowes.
"I am highly delighted . . . thank you for very prompt and efficient attention."—E.H. of Wirral.
"I shall certainly recommend you to my friends."—R.H. of Oxford.

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NEW PRODUCTS

THE E.M.I. TR 52 RECORDER

THE TR 52, first exhibited last summer, is now available. It is the latest instrument in the Professional range to be marketed by E.M.I.,

and it promises to be every bit as successful in its own class as the BTR 2, the TR 90 and the L2. However, the TR 52 breaks new ground on two counts. First, at an all-up weight of about 80 lbs it is portable. Second, it is within the price range of the private user who wants a really top-flight instrument, and who is prepared to pay for quality. Its price is £245. A full report will be published in an early issue of this magazine. In the meantime, here are some details of the facilities offered.

Stereo Recording. Two separate "record" amplifiers are included. Two input points for each amplifier provide for 600 ohm lines or 30 ohms for microphone.

Twin Channel recording. Of particular use to cine workers is the facility for recording the two tracks separately, and in the same direction.

Mono Recording. The lower track is recorded. Thus switched, both tracks are erased by a full track head. A second, half-track erase head is used when recording the upper track.

Stereo Playback. A pre-amplified output from both tracks is available (via two separate replay pre-amps) for a stereo amplifier.

Mono Playbacks. Either top or bottom track can be played, as with stereo; but a separate monitor amplifier and built-in 5-inch speaker enable conventional playbacks to be made from either track by switching.

Monitoring. The monitor amplifier can be switched to all circuits (1) to check the incoming signal to either track (2) to check the signal as it is being recorded (3) to check what is coming off the tape.

Metering. A VU (Volume Unit) meter is fitted, and can be switched to check all facilities, as with monitoring.

General. Five separate amplifiers provide the above facilities. Each can be withdrawn and replaced by removing the back of the set and two screws. Each output has its gain control. Each input has a gain control, plus a bass cut switch for "0:-5:-10dB". On "Monitor", both channels can be listened to together. Maximum spool size is 8½ inch, giving 50 minutes per track at 7½ i/s on Standard tape, or 2½ hours at 3½ i/s on Long Play tape. Two versions are available, with speeds of 15 and 7½ i/s or 7½ and 3½ i/s. Full details from The Gramophone Company Ltd., Recording and Relay Equipment Division, Hayes, Middlesex.

A WHITE NOISE TEST TAPE

Specification: 25 one-third octave bands of filtered White Noise. CCIR characteristic. 7½ i/s on 3½-inch reel. Price 39s. 6d. from Tutchings Electronics Ltd., 14 Rook Hill Road, Friars Cliff, Christchurch, Hants.

MEANINGFUL measurements of the performance of such acoustic elements as loudspeakers and microphones are notoriously difficult to obtain for it is almost impossible to separate the performance of the room in which these are measured from that of the device under test. Thus if one attempts to measure the performance of a loudspeaker in an ordinary living room, it is found that, though highly accurate and repeatable response curves can be obtained using sinusoidal test tones, the actual curve obtained is a function of the relative position of the loudspeaker, microphone and room walls. The

(Continued on page 145)



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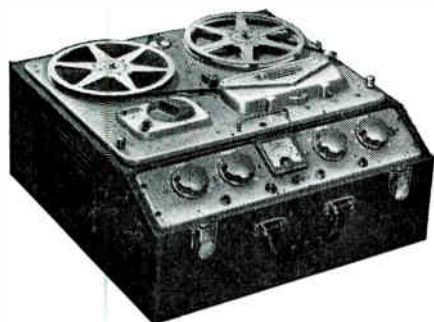
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TEST TAPE REVIEW—(continued)

loudspeaker, the item that is being tested, has relatively little effect on the response curve.

This is due to the presence of standing waves inside the test room, the result of repeated reflections between the walls of the room. At those frequencies at which any of the room dimensions are one half wavelength, resonance takes place, and the sound pressure may rise to ten times its normal value. It is a common fallacy to believe that as you listen to speech and music in the same room these room effects should be included in the measurements as giving a true indication of the actual listening conditions, but for some rather complex reasons this easy and apparently logical assumption is incorrect. A better indication of the performance of a loudspeaker in a room is obtained by testing it either in the open air or in an enclosure specially designed to eliminate all reflections from the walls.

The trouble due to standing waves can be reduced, but not eliminated, by abandoning the single sinusoidal test tone technique in favour of a multiple tone procedure, a particularly attractive solution to the amateur. The simplest way of generating the test signal is to use "white noise", the name given to the random combination of the components of all frequencies that exist, for instance, in the voltage across any resistance due to the thermal agitation of the electrons within the conductor.

If a multiple frequency signal of this type is used for speaker testing, it is necessary either to apply the wide band (say, 20 to 10,000 c/s) signal to the loudspeaker, and use some form of band pass filter in the microphone circuit to separate the signal out into narrow bands, or alternately to apply narrow bands of the signal frequencies to the loudspeaker and measure the resultant output from the microphone. Whichever way is decided on, and there is not much to choose between them, some relatively expensive filters are required to divide the wide frequency band noise signal into separate bands.

The problem of acquiring the filters has been solved in a neat and simple way by Mr. Tutchings who has recorded twenty-five one third octave bands of noise, the mid frequencies being the series suggested by B.S.I. and I.S.O. for acoustic tests. The centre-of-band frequencies are listed at the end of this report. A tape recorder having a replay response to the C.C.I.R. standards is all that is required to provide the experimenter with most of the facilities that are only achieved by the possession of a white noise generator and a set of filters costing several hundred pounds.

Mr. Tutchings has improved on virgin white noise in a simple manner that makes it more useful. It is a characteristic of white noise that the power per cycle is constant, and thus the total power per octave increases at a uniform rate; for each octave has twice the bandwidth of the one below it. Thus a device that has a flat frequency response when tested in the usual way with single frequency test tones, has a response that rises uniformly at a rate of 3 dB per octave tested with white noise.

When using a white noise generator, this rising response is troublesome to equalise but it presents no problem at all when the one third octave bands are being recorded on tape. This has been done, with the result that the RMS output voltage per band is reasonably constant throughout the whole audio range.

A white noise signal is the random combination of an infinite number of separate frequencies, but when filtered into discrete bands there are a finite number of components. At the low frequencies, a one third octave band will contain fewer component frequencies and there will be a greater chance of peaks occurring due to an appreciable number of components having the same instantaneous phase. When using a lightly damped valve voltmeter for measurement, the bands below about 500 c/s show fluctuations of up to two to one during the running of each band.

This is a tape that the professional engineer and the serious amateur will find of great value, particularly if he attempts to measure the performance of microphones, loudspeakers or rooms. For the less serious amateur, interested only in the measurement of the performance of his amplifier or tape recorder one of the single tone test tapes, such as the E.M.I. TBT1 will prove more useful.

J. Moir

MUSIC MUSIC MUSIC

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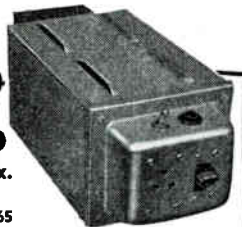
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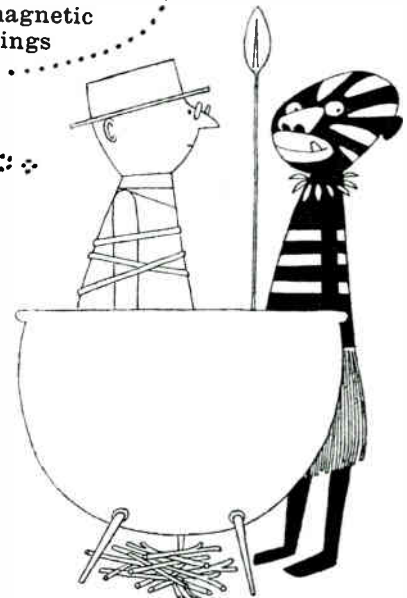


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5"	600	32 "	1 0 0	850	45½ "	1 8 0	
5½"	850	45½ "	1 7 6	1200	1 HR 4 MINS	1 15 0	
7"	1200	1 HR 4 MINS	1 15 0	1800	1.36 "	2 10 0	
8½"	1750	1.33 "	2 10 0	2400	2. 8 "	3 10 0	
		DOUBLE PLAY		SUPERGRADE			
3"	300	16 MINS	10 6				
5"	1200	1 HR 4 "	2 5 0				
5½"	1800	1.36 "	3 10 0				
7"	2400	2. 8 "	4 0 0	1200	1 HR 4 MINS	2 18 6	

mss Mastertape

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our readers write . . .

. . . about an extra tape guide

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

Dear Sir:—On some types of tape recorders, the spools are situated quite near to the recording/playback head cover and it is difficult to see leader and editing tapes coming off the supply spool, when you are cueing a certain piece of material.

A semi-permanent tape guide can be made extremely cheaply and it works! First obtain a rubber suction cup such as the type that sticks on the bottom of a sink bowl. This has a hole in the top. Next, a 2-3 inch brass rod which is inserted in the hole of the suction cup. Finally, a rubber tap washer placed on the brass rod.

The whole unit can now be placed anywhere on the deck, in the best position, so that more tape can be seen before it reaches the head cover and consequently the arrival of cueing tapes can be seen in good time.

Yours Sincerely

. . . about amateurs etc.

From:—A. J. Bryan, 50 Clevedon Gardens, Cranford, Hounslow, Middlesex.

Dear Sir: With ref. hub diameters. Agreed that manufacturers have differing hub diameters on spools. This need not be a problem any longer. If Mr. Herbert (and many others) uses the same spool (preferably marked) all the time on the take up side and winds back all tapes to their original spool, the problem disappears. All serious amateurs number their spools, so this re-winding is done in the normal course of events.

In my many conversations with amateurs, (what is an amateur?) I am constantly amazed by the lack of information they possess. Much of this required information is commonsense, but unless they have kindred spirits with TR's among their friends, this commonsense does not show.

I have heard just this week of a young man (18 years old) the proud possessor of a Spectone, who takes 3 hours to erase a tape. ($3\frac{1}{2}$ i/s for 1800 feet \times two tracks). Nobody has told him that he can erase at 15 i/s, his fastest playing speed, when it will take only 30 mins; or that he can erase by holding the weakest magnet he can find against the tape at spooling speed when it will take at the most 3 or 4 mins.

This last will amuse many readers, because being readers they are already informed about things that others are woefully ignorant of. (Preaching to the converted).

This true tale reminds me of a small grouse. Among the radio hobby trade are literally hundreds of kits, tuners, amplifiers, test equipment, etc. I have yet to see a kit for a bulk eraser at any price and I want one for about 30s. to £2. I have access to three different commercial types, one of which is constructed by my employers, and with simple hand tools a simplified version should not be difficult to build. What about it, designers?

Many recorders use the Collaro deck Mark III and IV. $3\frac{3}{4}/7\frac{1}{2}/15$ i/s. What about a semi-technical article on the conversion to $1\frac{7}{8}/3\frac{3}{4}/7\frac{1}{2}$ i/s.

Yours faithfully

You will find instructions for adapting a spare mains transformer into a bulk eraser in the *Our Readers Write Section in the March, 1960 issue*. On converting the Collaro deck to $1\frac{7}{8}$ i/s, we believe this can be done fairly simply, and are looking into the possibility of publishing an article on the subject. (Editor).

. . . about playback only

From:—H. J. Anstey, 188 Weir Road, London, S.W.12.

Dear Sir:—Every month, almost, we read in *The Tape Recorder* of the advent of a new machine; lately new machines have been becoming available at an incredible rate. The manufacturers are busy and their ranks are growing. This is good news for those who have yet to learn the pleasure and satisfaction to be enjoyed by the possessor of a tape recorder.

There must be many though, who, like me, having stretched (even over-stretched) their resources in acquiring their machines find the acquisition of a second machine beyond them. And

(continued on page 148)

Pops for pennies

FOR YOU!

How would you like to be able to collect *all* the 'pops' you want? *Every single one* for only a fraction of the normal cost!

You can, you know—with a Grundig Tape Recorder. Just think; any music you like and as much as you like. On tapes that will never wear out and yet can

be changed as often as you wish.

There simply isn't room here to tell how easy and inexpensive it is to own a Grundig or of the thousands of ways in which these wonderful tape recorders can give you pleasure but your local Grundig Approved Dealer will be delighted to tell you the rest. Go and see him as soon as you can.



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*Those who sell
recommend . . .*

TRADE MARK
SCOTCH
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recording tape



WORLD'S LARGEST SALES OF MAGNETIC TAPE

OUR READERS WRITE—(continued)

yet, having become enthusiasts, they are (again like me) acutely aware of the handicap they are under in not having a second machine readily available. For us, the advent of new machines is not exciting.

One may desire a second machine for one or other of a number of reasons, the most likely ones of which are, (a) to get out into the open where mains electricity is not available, and (b) dubbing.

To those who pauperised themselves to buy their first machine and to keep themselves supplied with tape the delights of (a) must remain unattainable, but the pleasures of (b)—far more subtle and extensive I submit—could still be attained if the manufacturers would only recognise the existence of this market.

Dubbing provides one with a means of editing without having to mutilate the master-tape, thus saving expenditure on tape (or, as an alternative, enables one to transfer the "bits" after editing to a new uncut length of tape which can be played back without any risk of breakage at the joins); it enables one to manufacture effects and to include in the tapes one sends to ones "tapesponding" friends excerpts from other tapes. It is in these fields that the enthusiast finds the greatest pleasure and satisfaction.

Could not someone provide a machine capable only of playing back? It could be designed to provide an output suitable for picking up in the gram/radio socket with which all but the most domestic of domestic tape recorders are provided, or in the gramophone pickup socket of a radio set. A market for such a machine exists already among those of us who have a tape recorder and could be created among those with radios who would like to be able to enjoy pre-recorded tapes without going to the expense of a complete tape recorder.

With the limited mechanics and circuitry that such a machine would require it should be possible to produce one, of a quality which would match that of the better class domestic recorders, at a price comparable with that now being asked for their very lowest priced brethren. Or am I being unrealistic?

Yours truly

* * *

. . . about reel lengths

From:—P. H. Hopper, 23 Gloucester Avenue, Chelmsford.

Dear Sir:—I was interested in Mr. Fowler's letter in the January issue of *The Tape Recorder*. When I am unsure whether there is enough on a reel, I adopt the following procedure; record track one from reel one to reel two, cut the tape, rewind the recorded tape from reel two to reel three, join it to the unused tape on reel one, and rewind the whole back to reel one, ready to record track two. Should track two be shorter than track one, then I undo the joint and the spare is at the end of track two. Should track two turn out longer, then the recording is taken safely on the spare unused tape, and the blank section will then be at the beginning of track one.

I have also used the following for about a year to play larger reels than my machine will take, and I think it may be more permanent than Mr. Towes' suggestion in the December issue.

Using Meccano strips (12 inch) and flat angle plates I made a frame which dropped comfortably over the recorder. This is held in place by a rubber band to the carrying handle to counteract the weight of the reels, and by $\frac{1}{2}$ inch angle brackets at suitable points to stop any sideways or backwards and forwards movement. Two wheels are bolted to the back strip level with the original spindles and short lengths of axle fastened in the hubs. Two large pulleys, $1\frac{1}{2}$ or 3 inch., are allowed to spin on the axles to carry the reels. In my case the insulating sleeves from banana plugs were just the right size to jam on the upper part of the axles, packed with sellotape, and formed axles just the right size for the tape reels. Drive is by means of a rubber belt round one or other of the large pulleys, and the tape spindles on the machine. A piece of wire, suitably bent, makes a peg to engage the slots on the reels.

In my case, 12 inch strips, and a square shape were best, but various lengths are available and other shapes may be more suitable to other machines.

Yours truly

TAPE RECORDS

★**MOZART.** Overtures to *Magic Flute*, *Il Seraglio*, *Don Giovanni*, *Marriage of Figaro*, *Idomeneo*, *Impresario*, *Titus*, *Così fan Tutte*. The Hamburg Pro Musica Orchestra, conducted by Harry Newstone. Sage STF 4001. 7½ i/s. 55s.

Comparisons are odious, but sometimes useful. The disc "version" of these overtures not only gives them in a different order, but plays a full tone lower, and until I realised this I was quite unable to understand my colleague's lack of enthusiasm when writing about the disc. In simple terms, what this means is that the *Magic Flute*, instead of bursting forth in the key of E flat, arrives in D major on the record, and very nearly F major on the tape. Given this information, it is easy to appreciate that of the two "versions", the tape is infinitely preferable, assuming your turntable cannot be screwed up a semitone, since one flat is better than two sharps when you are hunting for three flats. If you don't believe me, try it out on the piano—the relation between E flat major and F major is less antisocial than that between E flat major and D major.

So much for that. The tape itself is in many ways most remarkable, combining a really spirited performance from Newstone and the Hamburg Pro Musica with a widely spread is somewhat rumbustious recording. On the debit side, the strings are decidedly edgy at times and pre-echo is only too evident, but on the credit, the phrasing and ensemble are both delightful—especially considering the tempi adopted. The two highlights are the C minor section of *Il Seraglio* and *Der Schauspieldirector*.

It is difficult, to say the least, to gauge the appeal of eight Mozart overtures in a row—the order above, incidentally, is that in which they arrived on tape, regardless of what the box may say. However an eminent, if slightly eccentric authority was once heard to remark: "My boy, of the great composers Handel is by far the best for writing letters, and Mozart for a good dinner". It's a thought, anyway.

STRAUSS. *Die Fledermaus*, complete, in German. Elisabeth Schwarzkopf (*Rosalinda*), Nicolai Gedda (*Eisenstein*), Helmut Krebs (*Alfred*), Rita Streich (*Adèle*), Karl Dönch (*Frank*), Erich Kunz (*Falke*), Rudolf Christ (*Orlofsky*), with the Philharmonia Orchestra and Chorus, conducted by Herbert von Karajan. Columbia CAT 286-7. 7½ i/s. £8 8s. Libretto available.

For most people, I suppose, the question of ever buying a complete opera, or operetta from E.M.I. on tape remains an academic point. Facing it fairly and squarely, eight guineas for one work is fabulous, and is it worth it? The reviewer can but throw out the odd impression, and leave it at that.

Under these circumstances, one can afford and indeed must be acutely critical. The performance is all that one might expect from such a galaxy of stars—scintillating, brilliant and including some really fabulous singing. Karajan is most sensitive in his handling of the orchestra, and carries the whole work through a flourish worthy of an RSM. Full marks also to the engineers for the recording, which though slightly lacking in top by more modern standards, has but one weak patch, at the end of Act 2.

So far, so good. Any disappointments that I felt were merely minor irritations. Quite apart from E.M.I.'s habit of giving "spare" lengths in time as opposed to feet, there is the thorny question of the dialogue. The Decca set, which was one of the first major triumphs of frrr, includes a certain amount, but not enough to lose any musical momentum, if it can be so named. This Columbia recording includes the lot, for better or worse, and though this is undoubtedly a triumph to those who claim that art is slowly being emasculated, I cannot help feeling that this will deter many potential purchasers. "The Man on the Clapham Omnibus", has a longer purse today than yesterday, a fact that record companies know as well as anybody; but however vivid the presentation, and however fluent his German, is he really prepared to stomach these enormous stretches of tittle-tattle? Put into different words, how many of us are genuine opera lovers, as opposed to music lovers?

The present set is for the former category; but roll out the Videotape, and I will eat my words.



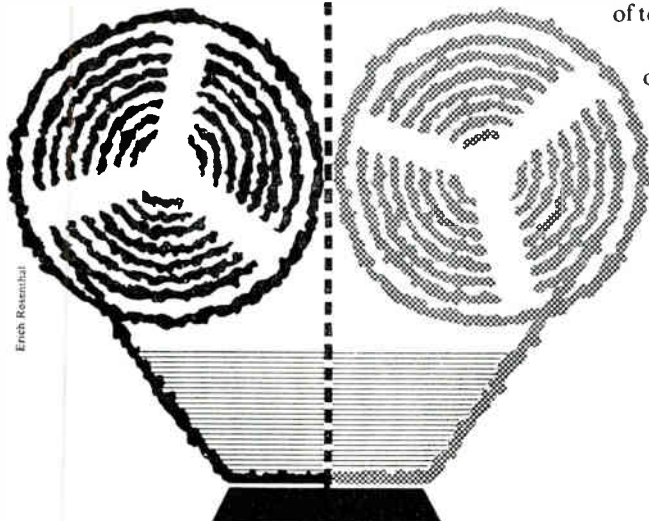
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THE MUSIC OF STRAUSS, No. 2 *Tic-Tac Polka, Acceleration, Quick Silver Polka, Annen Polka.* Adolphe Sibert and his Viennese Orchestra. Music on Tape (French) Yellow Leader No. S237. 7½ i/s. 17s. (3¼ i/s S213. 13s.)

The Strauss in question is, of course, Johann Jnr. Three out of a total of eight "numbers" are quite excellent, the remaining five adequate if unexceptional. The three in question are *La Nouvelle Vienne, Acceleration* and *Annen Polka*, and each one imparts a genuine radiance and air of enjoyment that is essential to such music. Whether this is the intended effect or not is open to question perhaps, but *La Nouvelle Vienne* is remarkable enough to warrant a special mention, with just the right combination of attack and flexibility, not to mention precision.

The remainder are little more than adequate, and two are murdered by what sounds like an electronic zither.

LEO CHAULIAC PLAYS EVERGREENS, No. 4 Leo Chauliac (piano), with rhythm accomplishment, from Maxims of Paris. 14 numbers. Music on Tape (French) Blue leader No. 34-35127. 7½ i/s mono 69s. (3¼ i/s 34-3563. 49s.)

M. Chauliac gives the impression of being only too happy to sit down at the piano for any period of time, and to play, in the most casual, lush and relaxing manner, more or less anything that comes to hand. And indeed that is not meant in the least bit unkindly—merely an observation. The facts of the case are few: 58 minutes, and 14 numbers ranging from *Man I Love to Ol' Man River* and *Malaguena*.

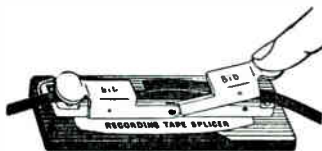
It takes a man of iron will to listen attentively under these conditions; in any case, should one really listen? Quite a point. Pondering these mighty problems, the reviewer sinks deeper and deeper into the armchair until quite overcome...

***MUSIC OF ERIC COATES, Vol. 1.** *The Three Bears Fantasy; By the Sleepy Lagoon; Queen Elizabeth March* (from the *Three Elizabeths Suite*). The London Symphony Orchestra, conducted by Charles Mackerras. Columbia BTD 705. 7½ i/s. 42s.

Recordings of this music have ranged from the luscious to the fiery. Mackerras steers the middle course, and whilst drawing some tantalising effects from the LSO (e.g. the bassooning bear) leaves the notes alone. The *Sleepy Lagoon* is taken at a gentle, firm pace, and the *Queen Elizabeth March* brings the whole to a rousing finish. The final section of the last mentioned may well be a shade too respectable for some, especially as rhythm suggests, with all respect, "Splice the Mainbrace". My one and only complaint that 16 minutes of music of 42s. is rather short commons.

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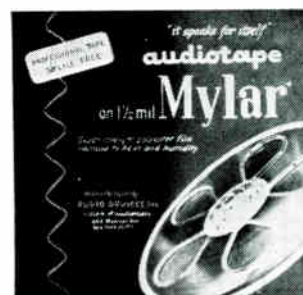
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