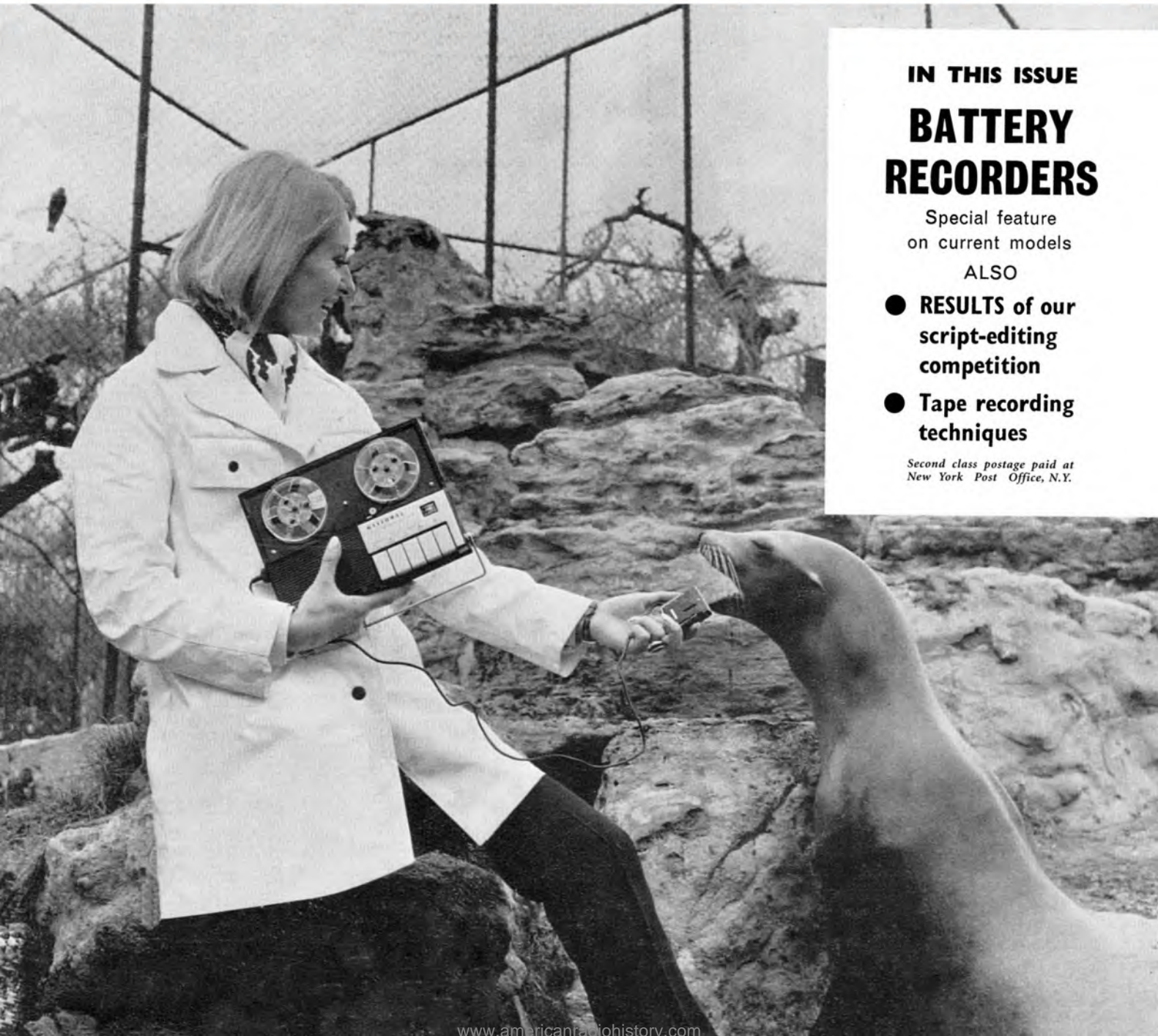


JUNE 1966

# TAPE

RECORDING MAGAZINE



**IN THIS ISSUE**

## **BATTERY RECORDERS**

Special feature  
on current models

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script-editing  
competition**

● **Tape recording  
techniques**

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# UHER

a range of tape  
recorders to satisfy  
every amateur and  
professional  
enthusiast



## 4000 REPORT L

A battery portable that offers you virtually every facility of a mains-operated recorder—with many exceptional new features. Four tape speeds provide an infinite variety of recordings. Price (incl. microphone and tape) 103 GNS.



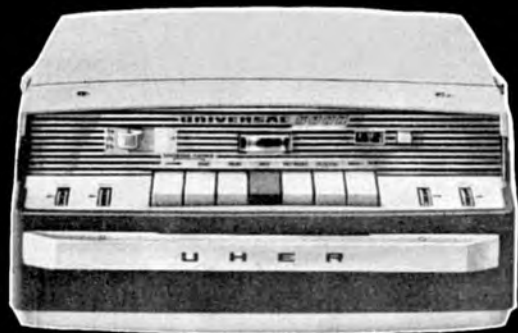
## 22/24 HI-FI SPECIAL

In many ways quite unique, this recorder meets the most exacting demands of a home sound studio. The Hi-Fi Recorder with a Test Certificate and Original Frequency Response Curve sheet for Hi-Fi systems. Price: 129 GNS.



## 724 L STEREO

A new, four track, all mains recorder priced at only 75 gns—and specially designed to meet the demand for an instrument particularly easy to understand and to operate.



## UNIVERSAL 5000

An ideal dictation machine and recorder ensemble for professional and business use. Three tape speeds, exceptional handling comfort and high tonal quality. Price: 95 GNS.



## 784 ROYAL STEREO

One of the most versatile recorders in the world with a fascinating range of recording possibilities. A high-quality stereophonic model featuring a simple knob control with eleven different functions. Four track Price: 129 GNS.

Quality production of tape recorders is the sole manufacturing aim of the UHER works. Specialisation has led to outstanding developments. UHER was the first to apply printed circuit technique to tape recorders and among the first to transistorize its entire range. The simple obsession of UHER manufacture—tape recorders for all purposes and to meet every professional and amateur demand—has won universal recognition for the superb quality of these fine instruments. Write for full information.

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# BRITAIN'S LARGEST SPECIALISTS

As Britain's largest tape recorder specialists we claim to have an unrivalled selection of the most up to date recorders on display in Gt. Britain. The most experienced staff with expert knowledge. Ideal demonstration conditions with every recorder ready for immediate demonstration and comparison. The finest FREE AFTER SALES SERVICING facilities available. The largest, most centrally situated and accessible showrooms in London devoted exclusively to tape recorders. Exaggerated claims? Don't take our word for it, put our claims to the test and visit whichever of our Showrooms is most convenient to you. You won't be disappointed and it's ten to one that if you are interested in buying a tape recorder you'll become one more of our many thousands of satisfied customers.

- HIGHEST PART EXCHANGES
- INTEREST-FREE TERMS

- OVER 100 MODELS ON DISPLAY
- UP TO 2 YEARS' FREE SERVICE

**AKAI 355** The world's finest and most comprehensive recorder. Unique Akai Cross Field record head. Completely automatic track reversal and replay. 20 watts output. All transistorized amplifier. V.U. Meters. Freq. 40-21,000. Has to be heard to be believed.  
**239 gns.**

**TRUVOX R104** A first class quality mono tape recorder. All transistorized amplifier. Freq. 30-17,000. 3 Speeds. 7" Tapes. V.U. Meter. Mixing facilities. Auto tape stops. Locking pause control. 4 Watts. 3 Heads. Before and after record monitoring facilities, etc.  
**79 gns.**

**TELEFUNKEN 300** A truly remarkable battery/mains portable tape recorder. Available in both 2 or 4 track models. Extremely portable and a delight to use. Easy to operate push buttons and controls. High quality dynamic microphone incl. Freq. 40-14,000. Wonderful quality.  
**49gns.**

**REVOX 736** The stereo tape recorder that sells by reputation alone. One of Switzerland's finest products. Full professional record/replay facilities. 4 Preamplifiers. 3 Heads. 2 V.U. Meters. Track to track facilities. Freq. 30-18,000. For the perfectionist.  
**124 gns.**

## SPECIAL OFFERS!

REVOX E36 Stereo As new 75 gns.  
GRUNDIG TK20 (inc. mic.) As new 18 gns.  
BRENNEL STB1 Stereo As new 72 gns.  
UHER 4000s Portable (inc. mic.) As new 69 gns.

**AMPEX 863** This stereo recorder by one of the world's most famous American manufacturers needs no sales talk. For the enthusiast who wishes to obtain a machine that he can rely on to give the finest results possible. 2 Speeds, 2 Drive capstans, 4 Track.  
**£127.10.0**

**UHER 4000L** A superb 4 track all transistorized battery/mains portable. Unbelievable performance. Freq. 40-20,000 1 Watt output. 4 Speeds. 5" Tapes. Ultralight weight only 6 lbs. Capable of recording to the highest standards and used extensively by professionals.  
**103 gns.**


**VORTEXION WV B** One of the most tried and tested models available. This latest model has the new Wright & Weaire 3 speed deck. 3 Motors. 3 Heads. Separate record/replay amplifiers. Before and after record monitoring facilities. 4 Watts. Variable bias. 8 1/2" tapes etc.  
**£115.10.0**

## SHOWROOMS

82 HIGH HOLBORN, W.C.1 (1 minute Holborn Underground)  
242/4 PENTONVILLE ROAD, N.1 (3 minutes from King's Cross Station)  
228 BISHOPSGATE, E.C.2 (1 minute Liverpool Street Station)  
36 LEWISHAM HIGH STREET, S.E.13 (1 minute Lewisham Station)  
2 MARYLAND STATION, STRATFORD, E.15 (adj't Maryland Station)  
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**WYNSOR VANGUARD**

**VORTEXION WV B**

**TRUVOX R104**

**PHILIPS EL3556** All transistorized mains operated mono hi-fidelity recorder. Bass, treble controls. Auto tape stops. 4 speeds. Mixing. Monitoring. 4 watts output. Stereo tape replay facilities. Multiplay. Sound on Sound. A first class recorder for the home.  
**62 gns.**

**TANDBERG 7** A complete stereo/record/replay 2 or 4 track tape recorder. Exceptional quality. Freq. 40-16,000. Auto tape stops. 7" Tapes. 3 Speeds. Ideal basic unit for fitting into cabinet with Hi-fidelity equipment. Quality, reliability and ease of operation are its great assets.  
**93 gns.**

**BRENNEL Mk 5 M** The most comprehensive and finest mono recorder made by this famous British company. 3 heads, 4 speeds. Up to 10 1/2" tapes. Bass, treble controls. Mixing. Before and after record comparison facilities. V.U. Meter. 6 watts output. Separate record/replay amplifiers.  
**93 gns.**

**FERROGRAPH 632** A complete stereo record/replay pre-amplifier unit with inbuilt monitoring amplifier included. For the perfectionist who is only content with the finest possible performance. 3 speeds. 3 Heads. 4 Pre-amplifiers. Auto tape stops. Mixing. V.U. Meter etc.  
**126 gns.**

## SPECIAL OFFERS!

FERROGRAPH 5AN As new 49 gns.  
B & O STEREO MASTER Few only. Brand new 89 gns.  
VORTEXION WV B As new 59 gns.  
BRENNEL MKV M 11 As new 55 gns.

**FERROGRAPH 631** One of the finest mono tape recorders available. 2 Tracks 3 Speeds. V.U. Meter. Monitoring whilst recording. Bass, treble controls. Provision for Stereo replay. 3 Motors. Freq. 30-15,000. A host of technical refinements. Built to a specification not a price.  
**95 gns.**

**AKAI M8** Japan's finest. Complete stereo. 4 speeds. Unique Akai Cross Field recording. Freq. 30-25,000. 2 V.U. Meters. 10 watts output. Auto tape stops. Bass, treble controls. 4 tracks. Including two dynamic microphones. 7" Tapes, etc.  
**136 gns.**

## WYNSOR VANGUARD

The newest model to the famous WYNSOR stable. 3 Heads. Before and after Record/replay facilities. 3 speeds. 4 Tracks. 7" Tapes. Freq. 40-15,000. 6 watts output. Detachable 8" Hi-Fi speaker unit giving superb reproduction. A wonderful value for money recorder at **59 gns.**

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Monday to Saturday 9 a.m. to 6 p.m. Halfday Thursday.

# NUSOUND TAPE RECORDER CENTRES

## Meet the Akai Crossfield Head . . . .



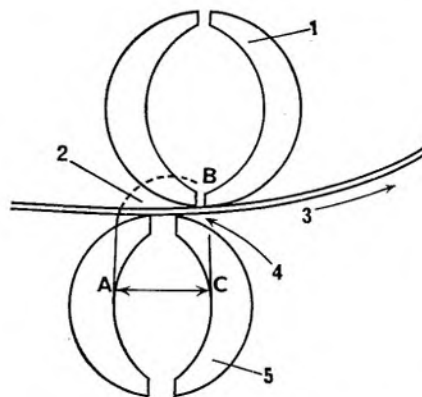
**AKAI X4** 99 gns A.C. Adapter £20  
**AKAI M8** 136 gns  
**AKAI X355** 239 gns

**AKAI ST1** 94 gns  
**AKAI 44S** 82 gns  
**AKAI 910** 62 gns

Shown above Akai X4



# .... the best head for sound in the business



### This is the Crossfield Head — only Akai has it.

1 signal head. 2 bias field. 3 direction of tape travel. 4 signal field. 5 bias head. 6 bias head retracts automatically on playback.

On conventional heads the high frequency components of the signal recorded tend to be attenuated or erased by the effect of bias fields. On the exclusive Akai Crossfield Head the signal head and the bias head are mounted in opposition with their centres slightly off. The tape is pre-magnetized between points A and C and recorded with the signal at point B. The recorded signal is completely free from the effect of prevailing bias fields and can be retained on the tape without loss.

It will be seen from the construction of the Akai Crossfield Head assembly that, as the signal head is arranged obliquely apart from the bias

head, across the tape, the amount of bias may be selected without regard to the functioning of the signal head. This means that the tape can be modulated over the entire frequency spectrum with maximum fidelity since the recorded signal is entirely unaffected by the bias field.

The maximum audio frequency that can be recorded on tape is usually around 790 c/s, at a tape speed of 1 centimetre per second, rising to about 2,000 c/s. at 1 inch per second. For Standard tape speeds: 9.5 cm/s. ( $3\frac{3}{4}$  i.p.s.) —7,500 c/s. and for 19 cm/s. ( $7\frac{1}{2}$  i.p.s.) —15,000 c/s.

The Akai Crossfield Head makes possible the recording of a signal frequency of up to 2,750 c/s. at a tape speed of 1 cm/sec. or 7,000 c/s. per inch. In other words, the Akai Crossfield Head—makes it possible to record 18,000 c/s. at a speed of  $3\frac{3}{4}$  i.p.s. or 21,000 c/s. at  $7\frac{1}{2}$  i.p.s. With the low speed of  $1\frac{1}{2}$  i.p.s. (4.75 cm/sec.) now available on the M8 and X4 models, it is practicable to record up to 11,000 c/s.

Employing this Akai technique, it is now possible to record four continuous hours on a standard 1,200 ft. tape without the need for professional 10½ in. reels.

## Akai X4

Crossfield head. 17 hours of interviews and music on one reel of 5" tape; 20,000 c.p.s. response at  $7\frac{1}{2}$  i.p.s. — 3 db. 30-5500 — 3 db. at 15/16 i.p.s. 2 VU meters. 32 solid state elements; 4 speed; Piano key controls. Light and small enough to fit into a briefcase or shoulder case. 4 watts stereo output.

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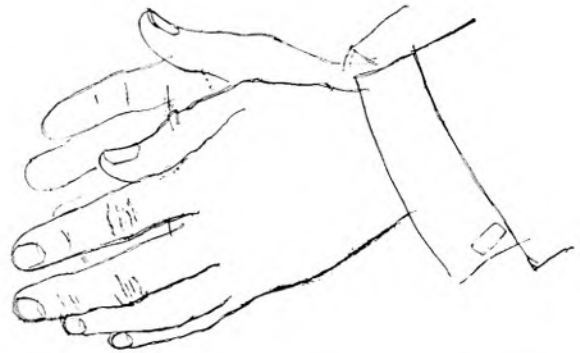
TRM 3

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**PULLIN**  
PHOTOGRAPHIC  
(A Company within The Rank Organisation)



**you've  
got to  
hand it to  
them**



hand what to whom? The Grampian DP4 microphone to its users and to Grampian. This outstandingly light-weight mike has achieved world-wide success both with amateurs and professionals in public speaking, recording and broadcasting studios. This medium-priced all-rounder is remarkably reliable and sensitive to a wide range

of sounds—uniform frequency response to all sounds between 50-15,000 c/s. The DP4 complete with connectors and 18 ft. screened lead:—low impedance model £8. 5. 0., medium and high impedance model £9. 5. 0. A complete range of stands, swivel-holders, reflectors and other accessories is available.

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| <b>4-TRACK STEREO/MONO</b> |                    |                                   |                       |
| Sony TC200 ...             | 18 18 0            | 4 14 6                            | 72                    |
| Philips EL3534 ...         | 24 3 0             | 6 0 9                             | 92                    |
| Tandberg 74 ...            | 24 8 3             | 6 7 1                             | 93                    |
| Sony TC500 ...             | 27 11 3            | 6 17 10                           | 105                   |
| Grundig TK46 ...           | 28 1 9             | 7 0 6                             | 107                   |
| Beocord 2000K ...          | 31 4 9             | 7 16 3                            | 119                   |
| Beocord 2000SC ...         | 32 5 9             | 8 1 6                             | 123                   |
| Akai M8 ...                | 38 6 6             | 9 11 8                            | 146                   |
| <b>MAINS 2-TRACK</b>       |                    |                                   |                       |
| Fidelity Playmatic 2 ...   | 7 7 0              | 1 16 9                            | 28                    |
| Grundig TK120 ...          | 7 15 0             | 1 18 9                            | 29                    |
| Grundig TK18L ...          | 10 15 3            | 2 13 10                           | 41                    |
| Tandberg 823 ...           | 14 3 6             | 3 10 11                           | 54                    |
| Reps. R10 Mk. 11 ...       | 15 9 9             | 3 17 6                            | 59                    |
| Tandberg 92 ...            | 18 2 3             | 4 10 7                            | 69                    |
| Brenell V Series 3 ...     | 19 8 6             | 4 17 2                            | 74                    |
| Truvox R102 ...            | 19 19 0            | 4 19 9                            | 76                    |
| Brenell 53 Mtr. ...        | 20 14 9            | 5 3 9                             | 79                    |
| Brenell 53 'M' ...         | 24 8 3             | 6 2 1                             | 93                    |
| Ferrograph 631 ...         | 24 18 9            | 6 4 9                             | 95                    |
| Ferrograph 631H ...        | 26 5 0             | 6 12 11                           | 100                   |
| Revox 736 ...              | 32 11 0            | 8 2 9                             | 124                   |

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| <b>STEREO TAPE UNITS</b> |                    |                                   |                       |
| Beocord 1500 Teak ...    | 23 7 3             | 5 16 10                           | 89                    |
| Truvox PD 104 ...        | 23 7 3             | 5 16 10                           | 89                    |
| Ferrograph 632 2-T ...   | 33 1 6             | 8 5 5                             | 126                   |
| Ferrograph 634 ...       | 34 12 6            | 8 13 4                            | 132                   |

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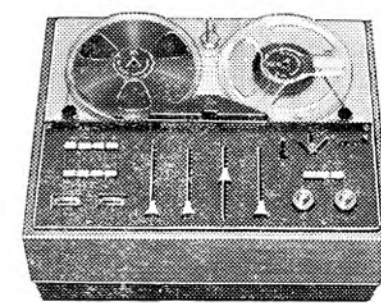
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| <b>MAINS 4-TRACK</b>     |                    |                                   |                       |
| Fidelity Playmatic 4 ... | 8 2 9              | 2 0 9                             | 31                    |
| Ferguson 3212 ...        | 8 13 3             | 2 3 4                             | 33                    |
| Philips EL3558 Teak ...  | 11 0 6             | 2 15 2                            | 42                    |
| Grundig TK17L ...        | 11 5 9             | 2 16 6                            | 43                    |
| Ferguson 3214 ...        | 11 11 0            | 2 17 9                            | 44                    |
| Grundig TK400 ...        | 12 6 9             | 3 1 9                             | 47                    |
| Grundig TK23L ...        | 12 17 3            | 3 4 4                             | 49                    |
| Tandberg 843 ...         | 15 9 9             | 3 17 6                            | 59                    |
| Philips EL3556 Teak ...  | 16 5 6             | 4 1 5                             | 62                    |
| Truvox R104 ...          | 20 14 9            | 5 3 9                             | 79                    |
| Grundig TK40 ...         | 22 16 9            | 5 14 3                            | 87                    |

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| <b>BATTERY</b>         |                    |                                   |                       |
| Philips 'Pocket' ...   | 6 16 6             | 1 14 2                            | 26                    |
| Philips EL3586 ...     | 6 16 6             | 1 14 2                            | 26                    |
| Optacord 408 Bat/Mains | 10 4 9             | 2 11 3                            | 39                    |
| Telefunken 300 2-Track | 12 17 3            | 3 4 4                             | 49                    |
| Telefunken 301 4-Track | 14 3 6             | 3 10 11                           | 54                    |
| Ficord 202A ...        | 17 6 6             | 4 6 8                             | 66                    |
| Grundig TK6 Bat/Mains  | 18 2 3             | 4 10 7                            | 69                    |
| Uher 4000L Report ...  | 27 0 9             | 6 15 3                            | 103                   |
| Akai X4 Stereo 4-T ... | 34 7 9             | 8 12 0                            | 131                   |



**BEOCORD 2000 K**  
2 or 4 TRACK STEREO—8 WATTS PER CHANNEL  
—TEAK or ROSEWOOD  
**119 gns.** Deposit £31.4.9 12 M'thly p'mts. £7.16.3

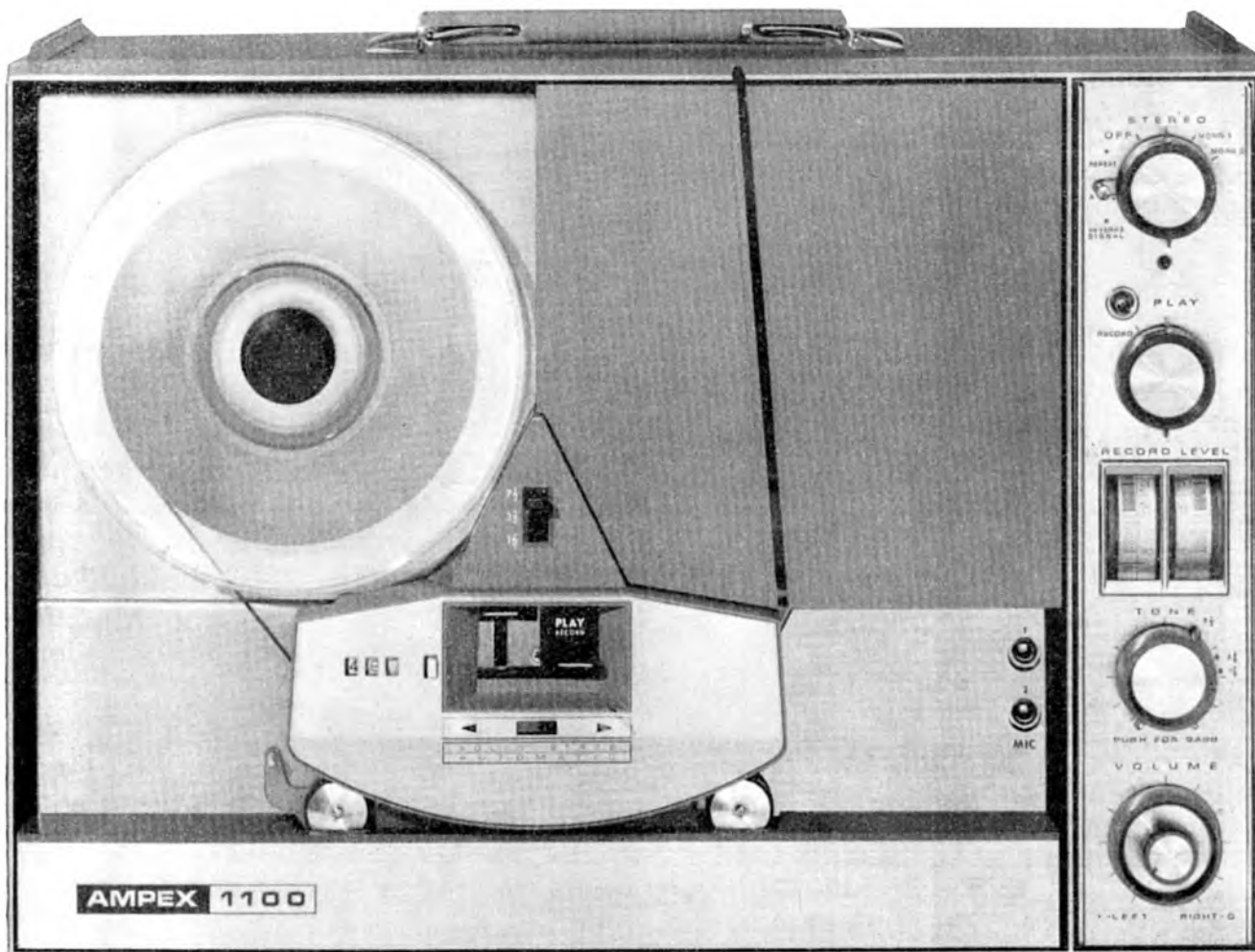
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2 or 4 TRACK STEREO—8 WATTS PER CHANNEL  
**123 gns.** Deposit £32.5.9. 12 M'thly p'mts. £8.1.6

**BEOGRAM 1000**  
4-SPEED STEREO/MONO RECORD PLAYER.  
B & O DIAMOND STYLUS and BALANCED TONE  
ARM. TEAK or ROSEWOOD.  
**34 gns.** Deposit £8.18.6. 12 M'thly p'mts. £2.4.8

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# THE RECORDER CO.



## There's something special about the new Ampex 1100

### Listen

It's sound. Pure sound. The reproduction you'd expect from the world's leading makers of recording equipment. Just play the Ampex 1100 up against any other recorder in the same price range, and listen to the difference. Ampex 1100 variants are available as a deck version with pre-amplifiers (1153), as a portable deck with pre-amplifiers and power amplifiers (1163) or in a walnut cabinet (1165-3). Ampex 1100

has an automatic reverse (plays unattended for 9 hours) □ automatic tape threading □ 3 speeds □ accurate VU meters □ interlocked tape controls □ precise dual capstan drive □ life-long Ampex deep-cut heads and solid state electronics □ No head-wearing pressure pads are used in any Ampex recorder. Full warranty—of course.

**AMPEX**

If you want something extra from a tape recorder, you'll find it in Ampex.

Ampex sales and service facilities are conveniently located throughout Europe and the Middle East. For more information write to: Ampex Great Britain Ltd., Acre Road, Reading, Berkshire, England. Telephone Reading 84411 • Ampex S.A. Via Berna 2, Lugano, Switzerland. Telephone 091/3.81.12 • Ampex Europa G.m.b.H. 6 Frankfurt Main, Düsseldorf Strasse 24, Germany. Telephone 252001-5 • Ampex, 41 Avenue Bosquet, Paris 7e, France. Telephone 705.38.10.



# FRANCIS OF STREATHAM

## MAINS TAPE RECORDERS

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|---------------------------|----------|
| *Akai 44s                 | 82 gns.  |
| Akai M8 Stereo            | 146 gns. |
| Akai ST1 Stereo           | 105 gns. |
| Akai 355 Stereo           | 250 gns. |
| *Beocord 2000             | 119 gns. |
| *Beocord 1500             | 89 gns.  |
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| *Brenell Mk. 5/M Series 3 | 93 gns.  |
| *Brenell Mk. V Series 3   | 74 gns.  |
| Cosor 4 Tr. Stereo 1607   | 57 gns.  |
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| Elizabethan LZ32          | 32 gns.  |
| Elizabethan LZ34          | 34 gns.  |
| Elizabethan LZ102         | 49 gns.  |
| *Ferroglyph 631           | 88 gns.  |
| *Ferroglyph 632 Stereo    | 115 gns. |
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| Fidelity Playmaster 2 Tr. | 21 gns.  |
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| Grundig TK14L             | 37 gns.  |
| Grundig TK17L             | 43 gns.  |
| Grundig TK18L             | 41 gns.  |
| Grundig 23L Auto          | 49 gns.  |
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| Grundig TK41 2 Tr.        | 83 gns.  |
| *Grundig TK46 4 Tr. St.   | 107 gns. |
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| Sony 600                  | 127 gns. |
| Stella 4 Tr. 458          | 39 gns.  |
| Stella 4 Tr. 459          | 62 gns.  |
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| *Tandberg Series 8, 2 Tr. | 54 gns.   |
| *Tandberg Series 8, 4 Tr. | 59 gns.   |
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| Telefunken 203            | 69 gns.   |
| Telefunken 201            | 44 gns.   |
| *Telefunken 85 de luxe    | 83 gns.   |
| *Telefunken 96, 4 Tr.     | 69 gns.   |
| *Telefunken 98, ½ Tr. St. | 95 gns.   |
| *Truvox R.102             | 76 gns.   |
| *Truvox R.104             | 79 gns.   |
| *Truvox PD102 St.         | 93 gns.   |
| *Truvox PD104 St.         | 89 gns.   |
| *Vortexion WVA, 3 speed   | £96.7.0   |
| *Vortexion WVB, 3 speed   | £115.10.0 |
| *Vortexion CBL Stereo     | £172.0.0  |
| Wyndor 2 Tr. 707          | 29 gns.   |

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|-------------------------|----------|
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| Cosor 1621              | 26 gns.  |
| *Fi-Cord 202/A          | 66 gns.  |
| Grundig EN3 Notebook    | 23 gns.  |
| Grundig TK6             | 69 gns.  |
| Loewe Opta 408          | 39 gns.  |
| Loewe Opta 416          | 51 gns.  |
| Philips EL3301          | 26 gns.  |
| Philips 3586            | 26 gns.  |
| Stella 471              | 26 gns.  |
| Stella 472              | 26 gns.  |
| Telefunken 300          | 49 gns.  |
| Uher 4000L              | 103 gns. |
| Telefunken 301 4 Tr.    | 54 gns.  |

\*Microphone extra

## MAINS POWER PACKS

|                           |          |
|---------------------------|----------|
| Fi-Cord                   | £7.10.0  |
| Philips, Stella or Cosor  | £5.12.0  |
| Uher 4000, with cell      | 18 gns.  |
| Telefunken 300, with cell | £19.10.0 |

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| Eagle Mixer             | £3.3.0   |
| Fi-Cord TM-II Mixer     | £11.5.0  |
| Grampian Reflector      | £6.15.0  |
| Grampian DP4 Dynamic    | £8.5.0   |
| Grampian Ribbon         | £11.10.0 |
| Grampian Mixer (Stereo) | 18 gns.  |
| Philips Preamp          | £6.10.0  |
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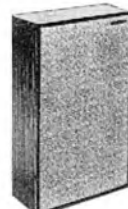


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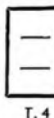
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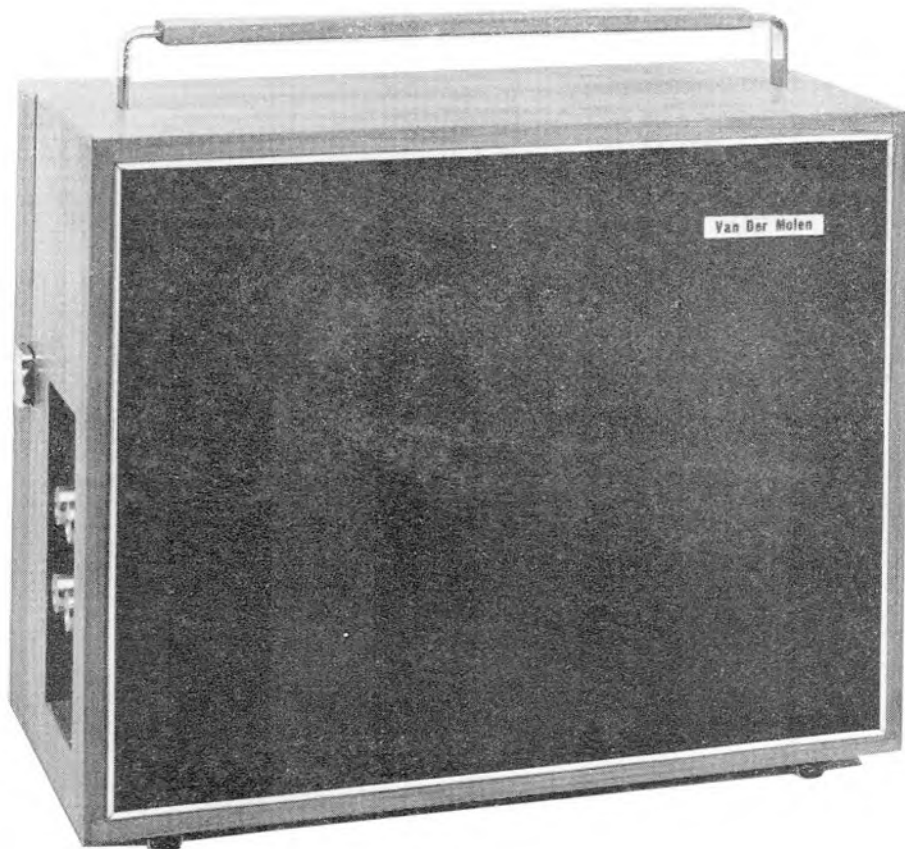
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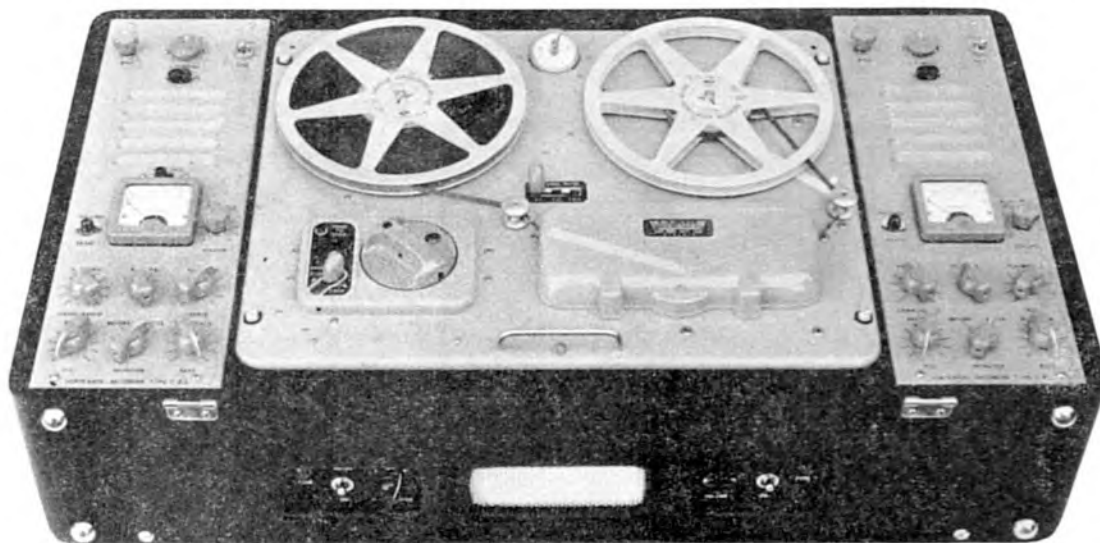
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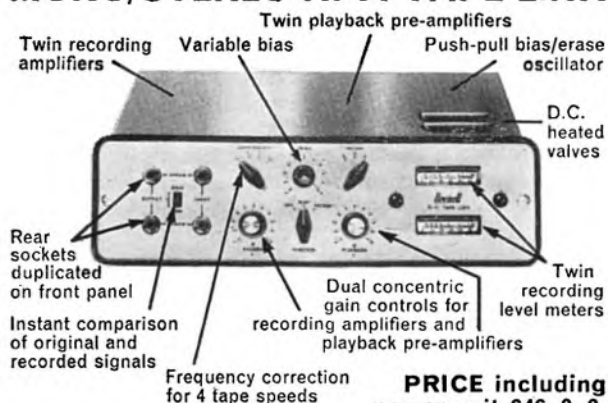
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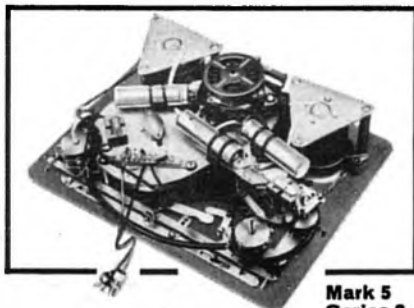
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# TAPE RECORDING MAGAZINE

Vol. 10

No. 6

June 1966

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**COVER PHOTOGRAPH:** *Summer days at the Zoo—and a rich album of sound recordings collected without difficulty. The enthusiast with the battery portable is capturing the bark of a sea-lion who appears quite willing to assist: or does he think the microphone is edible? The recorder is the recently introduced National RQ105S which is reviewed in "Test Bench" on page 209.*

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**EDITORIAL**

**ADVERTISING**

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LUDgate 9088

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**R. DOUGLAS BROWN**

Assistant Editor,  
**FRED CHANDLER**

# Tape trends and tape talk

By the Editor

FACTORY OUTPUT of some electronic equipment, notably TV sets and radios, tailed off dramatically earlier this year, mainly due to the credit squeeze. Further restrictions in the Budget would be catastrophic, the manufacturers were saying. Well, any such fears have been dispelled and in the autumn the ten per cent import surcharge will come off.

But, one way and another, the economic climate has been pretty tough ever since tape recording became a popular amateur hobby; but we've all survived. When someone goes to the wall, there's usually some very good reason over and above the general state of the economy.

Prosperity for tape recorder manufacturers, however, is undoubtedly going to depend more in the future on successful exporting. And British manufacturers are going to have to be competitive with those in Western Europe when, as seems increasingly certain, Britain eventually becomes a member of the European Economic Community.

So we are going to have to adapt, to improve efficiency and productivity, and to sell more aggressively. But that is the prospect for all British industry and the electronics firms should be able to show themselves pace-setters.

At any rate, they all looked confident and happy at this year's Audio Festival last month.

\* \* \*

THE FESTIVAL was as big a success as ever, attracting capacity crowds throughout. Our impression in the *Tape Recording Magazine* room was that there were more visitors who were comparatively new to the hobby and in quest of basic knowledge than is usually the case. The dedicated clubman was less dominant.

Increasingly, the Audio Festival becomes an opportunity when enthusiasts meet to talk together and old friends have an annual exchange of views. But there was interesting new equipment this year, and naturally the video machines attracted a lot of attention.

## LAUGH WITH JEEVES



"Where can I record this 'boom' in gardening I keep hearing about?"

I predict that next year's Audio Festival will be even more interesting, with many more video items, and a big boost for stereo because, in the interval (unless I am very much mistaken), regular BBC stereo broadcasting will have been inaugurated.

Talking of video, in the United States Sony quickly followed up the introduction of their first domestic video recorder with a demonstration of a prototype colour video recorder. They talk about marketing it in the Autumn of next year at a price of about £650.

How much longer before the first machine for the domestic video enthusiast is offered for sale in Britain?

\* \* \*

DON'T LET'S OVERLOOK the fact, however, that there is still a great deal to do to educate the public in sound recording as a hobby. The idea of making a feature tape still strikes the average recorder owner as something far too ambitious to be attempted.

For this reason there is a lot to be said for offering the amateur ready-made scripts and Scotch have had a brain wave with their new booklet *Comedy Scripts for Tape Recording*, on sale at 3s. 6d. (copies available by post from *Tape Recording Magazine* office).

Peter Cagney, a script writer who has served a large number of the nation's professional comics, has prepared about a dozen short scripts for amateur use. The longest is for a ten-minute feature. Scotch have added some encouraging words about how one goes about recording a comedy tape, using these scripts, and about the way in which music and effects may be added. And the back cover gives a simple guide to splicing.

I can well believe that this brightly-illustrated little booklet will tempt a lot of recorder owners to try an exercise in creative recording for the first time in their lives.

For the more ambitious, the BBC has just published two volumes containing the scripts of several successful BBC plays. Many will probably consider the material "high-brow", but the serious recording enthusiast will learn a great deal from a study of these scripts.

Each of the BBC volumes costs 15s. The first, *New Radio Drama*, prints the scripts of six plays—by Colin Finbow, Ian Rodger, Rhys Adrian, Stephen Grenfell, Joe Orton and Simon Raven. The other concentrates on the work of one man: *Giles Cooper—six Plays for Radio*.

\* \* \*

FINALLY, A BRIEF and immodest reference to the biggest educational campaign in tape recording to date—nearly ten years' publication of *Tape Recording Magazine*.

To mark the tenth anniversary of the moment at which the idea of a tape magazine for the amateur first entered my mind, we have printed a facsimile of our first issue, which was dated February 1957. Over the years we have received countless requests for this issue; only 4,000 were printed originally and they were snapped up. Now we shall be happy to supply anyone who lacks a copy in their file. The cost is half-crown per copy.





THERE has been very little change in the portable scene since I wrote this introduction to our portable feature last year. Most of the models available then are still current, some forty or so different choices being presently available.

The price range is wide, from under £20 for a simple machine to almost £400 for a professional model, but the average amateur recordist should be able to get very satisfactory results from almost any of the machines in the £50 to £100 range. Of course the very best quality is obtainable from the most expensive equipment: as with most audio equipment, once the price is above £25 to £30 you get what you pay for. That is not to say that there are not some very useful machines below this price, but it is much more necessary to give a machine careful preliminary tests in the lower price range to ensure that the particular instrument you are buying is a good one; there is likely to be a wider spread of the tolerances in lower priced equipment.

There have been a few new arrivals this year, and a few more promised. A most interesting prospect is the Butoba M225, which is a further development of the MT22, announced at the 1964 Audio Fair, but which did not materialise. I hope the new model will be available soon. It is interesting because, so far as I am aware, it is the only machine in the domestic class, albeit in the top price range, that has a separate head and replay amplifier to allow monitoring off the tape whilst recording. The next machine in the price range to have this facility is the Nagra at £317. I certainly look forward to reviewing this machine.

Another machine that is awaited with some interest is the Grundig cassette portable. Some of these have been sent to dealers for their tests and comments, but it is not yet available for general sale. It is a pity that it operates at the non-standard speed of 2 ips, but we hope that this may yet be rectified. It would be a shame if we had several different speeds for cassette machines in Europe as is the case in the USA.

Another prototype shown at the Audio Fair is the Akai Crossfield X-PK 1, a small pocket-sized machine weighing only just over 3 lbs. The Crossfield head system makes a better frequency response possible at slower tape speeds, so if this machine is in fact put into production it should be capable of some interesting results.

# BATTERY PORTABLES

H. Burrell Hadden

reviews the scene regarding battery-operated recorders

Telefunken have also announced a new cassette machine (described in "New Products," May issue), and this one will be available shortly. This also runs at the new speed of 2 ips. The claimed frequency range of 40-10,000 cps is very good, and the signal-to-noise ratio and wow and flutter figures are reasonable. The machine has a number of interesting features, and incorporates a 6 x 3½-inch elliptical loudspeaker which is fed with a two-watt push-pull output from a twelve transistor amplifier. It should therefore be capable of giving a very good account of itself in terms of reproduced quality. Another machine I shall look forward to reviewing in these columns.

A by-product of the development of small recorders, some of them using cassettes, is the activity that is at present going on in the laboratories of the tape manufacturers to produce better tapes, so as to give good performance with longer playing time in a small space. Although the "007" microscopic tape recorder is not yet a commercial possibility, it cannot be very far distant, and then we really will have a truly portable machine!

## THE CURRENT MODELS

IN the following list, only brief specifications are provided. Full details of all these units plus photographs are provided in the catalogue section of the 1966 edition of the "Tape Recording Yearbook" (see page 226).

| Name of Recorder and Manufacturer  | Speeds and Number of Tracks         | Weight (lbs.) | Size (inches)         | Power Supply  | Price £ s. d.      |
|--|-------------------------------------|---------------|-----------------------|---|--------------------|
| ●AKAI X4.....  | 7½, 3½, 1½, 10 (4 tracks)           | 11.2          | 10×9¼×4 (case closed) | 5 U2 cells and AC mains   | 103 19 0           |
| AKAI X-PK1.....  | 1½, 10 (2 tracks)                   | 3½            | 9¼×4¾×2½              | 4 1½V cells (UM-2)  | 29 8 0             |
| <i>(Pallin Photographic, Ellis House, 11, Aintree Road, Perivale, Greenford, Middlesex.)</i> |                                     |               |                       |   |                    |
| BUTOBA MT5.....  | 3½, 1½ (2 tracks)                   | 12            | 12×9×6                | 8 U2 cells; AC mains 6V battery                                   | 61 19 0            |
| BUTOBA MT22.....   | 7½, 3½, 1½ (2 tracks)               | 12            | 12½×10×5              | 8 U2 batteries; AC mains; rechargeable batteries; 12V car battery | 133 7 0            |
| <i>(Denham &amp; Morley Ltd., Denmore House, 173, Cleveland Street, London, W.1.)</i>        |                                     |               |                       |   |                    |
| COSSOR CR1621....  | 1½ (2 tracks)                       | 8             | 12½×9×4½              | Six 1½V U2 cells  | 27 6 0             |
| <i>(Philips Electrical Ltd., Century House, Shaftesbury Avenue, London, W.C. 2)</i>          |                                     |               |                       |   |                    |
| EAGLE TP703.....   | 3½, 1½ (2 tracks)                   | —             | 9×8½×3½               | —   | 19 19 0            |
| <i>(B. Adler &amp; Sons Ltd., 32a, Coptic Street, London, W.C.1)</i>                         |                                     |               |                       |   |                    |
| E.M.I. L4/A.....   | 7½, 3½ (2 tracks) L4/B (Full track) | 10¼           | 7×11½×5½              | Rechargeable battery (L4/L with sync. attachment)                 | 120 0 0<br>180 0 0 |
| <i>(E.M.I. Electronics Ltd., Hayes, Middlesex.)</i>  |                                     |               |                       |   |                    |

| Name of Recorder and Manufacturer   | Speeds and Number of Tracks | Weight (lbs.) | Size (inches) | Power Supply  | Price £ s. d. |
|---|-----------------------------|---------------|---------------|---|---------------|
| FL-CORD 202A.....   | 7½, 3½ (2 tracks)           | 6½            | 9×6½×4½       | Mallory ZM12 Mercury cells, 12V car battery, AC mains, rechargeable battery | 69 6 0        |
| <i>(Fi-Cord International, Charlwoods Road, East Grinstead, Sussex.)</i>            |                             |               |               |   |               |
| GRUNDIG TK6.....  | 3½, 1½ (2 tracks)           | 13½           | 12½×5½×9½     | 6 U2 cells or AC mains  | 72 9 0        |
| <i>(Grundig (Great Britain) Ltd., 40, Newlands Park, Sydenham, London, S.E.26.)</i> |                             |               |               |   |               |
| MEMO-CORDER TMG-405.....  | Variable 2½-6½              | 2             | 5½×3½×2       | Two U7; one PP3   | 23 12 6       |
| MEMO-CALL.....  | 2½                          | 1½            | 5½×3×1½       | Four U7; one PP3  | 13 2 6        |
| <i>(Felcort Ltd., 251, Edgwarebury Lane, Edgware, Middlesex.)</i>                   |                             |               |               |   |               |
| NAGRA III B.....  | 15, 7½, 3½ (Full track)     | approx. 15    | 12½×8½×4½     | 12 1½V flashlight batteries   | 317 0 0       |
| <i>(Livingston Laboratories Ltd., 31, Camden Road, London, N.W.1.)</i>              |                             |               |               |   |               |
| NATIONAL RQ1015....   | 3½, 1½ (2)                  | 4½            | 8×8×3         | 6 dry cells (UM-1)  | 19 19 0       |
| NATIONAL RQ116....  | 3½, 1½ (4)                  | 6             | 7½×7½×2½      | 12 pen-light cells  | 43 1 0        |
| NATIONAL RQ115....  | 3½, 1½ (2)                  | 4             | 7½×7½×2½      | 12 pen-light cells  | 38 17 0       |
| NATIONAL RQ150....  | 3½, 1½ (2)                  | 6             | 12½×9×3½      | 6 dry cells (UM-1)  | 48 6 0        |
| <i>(UNAMEC Ltd., United Africa House, Blackfriars Road, London, S.E.1.)</i>         |                             |               |               |   |               |
| OPTACORD 408.....   | 3½ (2 tracks)               | 6½            | 9½×7½×3½      | 5 1½V (U2), 110-240V AC mains, or 6-12V car battery                         | 40 19 0       |
| OPTACORD 416.....   | 3½, 1½ (2 tracks)           | 9             | 15×9¼×4½      | 5 1½V (U2), 110-240V AC mains, or 6-12V car battery                         | 53 11 0       |
| <i>(Highgate Acoustics, 71-73, Great Portland Street, London, W.1.)</i>             |                             |               |               |   |               |

(Continued on page 213)

# BATTERY PORTABLES

Alan Edward Beeby describes rules to be followed when taping interviews



Opportunities are endless for location interviews, holidays, travels, or sporting occasions such as above where a Philips cassette is seen in charming company

**A**RE you one of those characters who genuinely enjoy meeting and talking to people? If so, why not try your hand at interviewing? Recordings of this kind by amateurs are frequently used for "broadcasting" in hospitals or for circulation with one or other of the various Tape Services for the Blind.

But before you begin there are a few important basic rules. Let's take a look at some of them.

The chief thing to bear in mind is that you, the interviewer, represent the audience who will eventually listen to the recording, so it is up to you to ask the sort of questions which might be expected to interest that audience.

Choose the quietest spot possible for taping an interview. Background noises are apt to sound far more intrusive on playback than they sounded originally. Avoid large, empty rooms, though. Echoes can play havoc with speech-quality.

People who are unaccustomed to being interviewed often tend to address remarks direct to the microphone instead of the questioner, which gives an odd sort of "speech-making" effect to their delivery, causing it to sound stilted and false. Responsibility for avoiding this lies entirely with the interviewer. Look your subject straight in the face, as you would when carrying on a perfectly normal conversation. Hold the microphone perfectly still and ignore it completely, and you'll find he will do the same.

It's also a vital point of an interviewer's job to try and prevent a speaker from wandering off into irrelevant side-issues. It does no harm, of course, to permit some small measure of digression, so long as the subject isn't allowed to stray *too* far from the point. In my early days, I once interviewed a well-known Q.C. on the business of jury practise . . . and allowed *myself* to be side-tracked into a lively fifteen-minute discussion on cricket. The producer was not terribly impressed!

Try to avoid questions which can be answered with a brief "Yes" or "No." It makes for a "jumpy" technique and wastes time. Don't for example, ask: "Do you enjoy your work?" Instead ask:

"What do you enjoy most about your work?"

Ignore any temptation to ask "loaded" questions. Many people resent this sort of thing, and immediately jump to the conclusion that you're trying to trap them into saying something against their will. Frame your questions clearly and put them in a straightforward manner. Then, if your subject doesn't wish to commit himself on a certain issue, he'll tell you so, and the "dead" question can be edited out of the tape afterwards. Remember, a good interviewer doesn't need to use tricks of any kind.

Another bad habit is to keep on saying things like "Yes, I see" or "Is it really?" after a question's been answered. This sort of response, whilst perfectly acceptable in normal conversation, is extremely irritating to listen to on playback of a tape-interview. Try it and see for yourself.

Knowing that their voices are being recorded, some people tend automatically to adopt a "cultured" accent which is entirely foreign to them. In short, they "talk posh." Try, as tactfully as you can, to dissuade them from doing this. Local dialects can often sound quite pleasantly distinctive, adding colour to a person's speech. As star TV broadcaster, Lieutenant-General Sir Brian Horrocks once remarked to me during an interview: "I can think of nothing more ghastly than the so-called 'Oxford' accent—assumed or otherwise."

In the event of a visit by a celebrity to your home-town, it's often possible to obtain an interview by prior arrangement and without payment—providing, of course, that the recording isn't used for profit.

Having first obtained clearance for an interview from the celebrity's agent or manager, you may be invited to submit a sample-list of the type of questions you intend putting to the subject. I've known amateur interviewers to become downright indignant about this small formality, but there's really no need to be. After all, you have your questions prepared in advance, so why shouldn't the subject be given the chance to prepare his answers? That's only fair, surely.

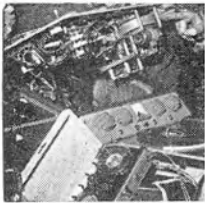
An important point: Don't leave everything until the last minute. There are two places where celebrity-interviews are usually conducted: in the dressing room of a theatre, or at an hotel. If you haven't a battery-operated portable recorder, and intend using a "mains" machine, pop along beforehand and check up on things like sockets, voltages, acoustics and the amount of room that's available for your equipment. Celebrities (particularly someone like a pop-singer on a one-night stand) invariably have pretty tight schedules to contend with, and won't thank you for wasting their time unnecessarily.

Don't launch a celebrity interview on first-name terms without first making quite sure that the subject has no objection. Most haven't, but it's best to be certain.

Another tip: However cosily a celebrity-interview appears to be progressing, steer clear of questions concerning the subject's home or family life. A great many stage and television personalities (film stars, I admit, are something of a general exception!) prefer to keep their public life and their private affairs entirely separate, which is as it should be. On the other hand, if you should find yourself interviewing, say, a man-and-wife-team, then it's usually in order to gently fire one or two "rib" questions at one concerning the other, but tread carefully all the same.

Lastly, how to close an interview. Many amateur recordists sail quite effortlessly through the most exacting encounters with an ease of style and technique that would put many a professional to shame—only to flounder helplessly when it comes to the business of winding up. Some cut the interview off dead practically in mid-sentence, which sounds terrible on playback. Others babble desperately on and on, dragging the unfortunate subject along with them, which if anything, sounds even worse. Winding up an interview is quite a simple matter really. All that's needed is: "Mr. So-and-so, on behalf of our listeners, thank you for talking to us." To which the subject will usually reply: "It's been a pleasure." Like I said—simple!

Interviewing can be fun. Why not have a go?



# TEST BENCH

## STANDARD SR250

By H. B. Hadden

**T**HE Standard SR250—the smallest tape recorder yet to be reviewed in these pages—is a transistorised battery-operated model which carries its own mains unit. Manufactured in Japan, it can be operated from the mains as well as the five standard 1½ volt dry cells.

Supplied complete with a dynamic microphone and AC power lead, it features two tape speeds, 3½ and 1½ ips, speed change being effected by electrical circuit operated from the front panel.

The maximum spool size it will accommodate is 2½ inches, and using the half-track system this provides a total recording time of 32 minutes at the higher speed. Fast forward and rewind facilities are incorporated; the rewind time for the reel of tape supplied with the machine was two minutes.

The machine is housed in an attractive black plastic case with silver panel and

trimmings, the dimensions being 9¾ x 3¾ x 6½ inches. This machine is another lightweight, the weight, including batteries, being only 5½ lb.

Following the design of the successful Philips battery model, the Standard SR250 is designed for vertical operation. The tape deck is mounted on the top of the case and the space provided beneath accommodates a larger loudspeaker than could otherwise be incorporated in such a small recorder. The loudspeaker is a four-inch round unit which handles a power output of 1½ watts.

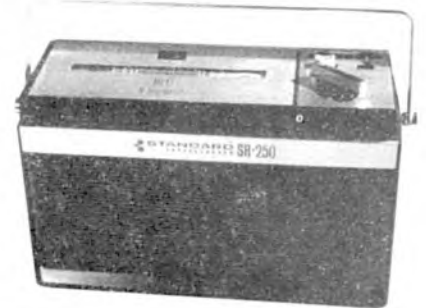
Operating controls are all grouped on a small panel alongside the tape transport. Five controls are provided. A single sturdy rotary knob controls all tape movement for fast forward, rewind and play. Interesting, and practical innovation is a "stop" position between "play" and the "fast wind" positions. To move between any of these positions, the control must pass the "stop" point. This is an ideal situation that reduces the likelihood of tape stretch when using the thinner tape designed for battery recorders. This single knob also switches on the amplifier.

To select the "record" mode, and providing the usual safeguard against accidental erasure, a red button must be depressed and held in position until "play" is selected.

The volume/record gain control, and the replay tone control are of the edge mounted,

thumbwheel type, and the only other control is the slide switch giving the choice of speed. Record level indication is by means of a VU type meter which also gives a measure of the condition of the batteries when the machine is switched to "play" or fast wind. A rough indication of tape position is given by a scale on the transparent tape compartment cover.

The input and output sockets are all on the sides of the recorder. The mains input socket is situated on the right-hand side and all others on the left. The microphone socket, and the plug on the lead of the



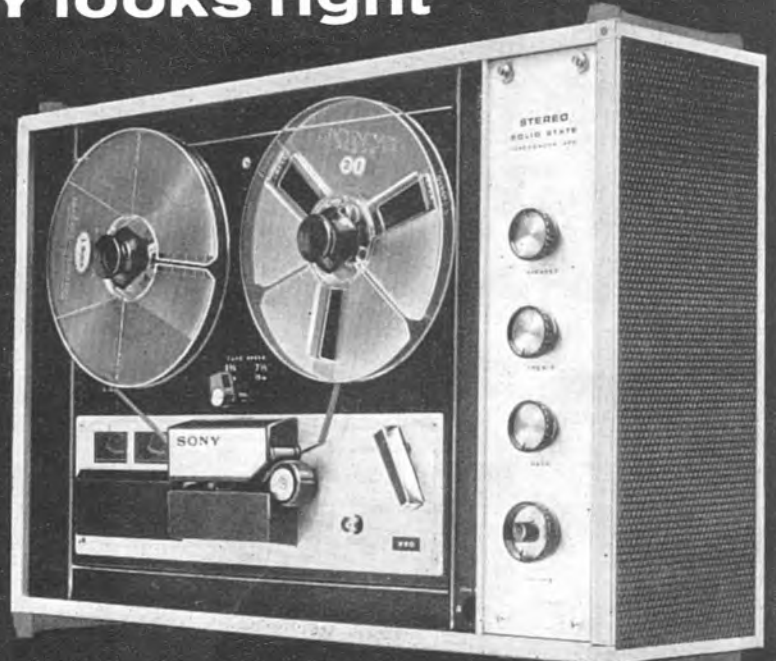
microphone provided feature two pins; one of these—for the audio connection—is a miniature jack plug. The second pin connects a remote control switch situated on the microphone case. This switch controls the tape transport, leaving the amplifier switched on, so that tape can be used economically, say, during an interview. The pinch-wheel is left in contact with the capstan in this condition, so the machine should not be left stopped for long periods. The alternative is development of a "flat" on the rubber wheel, with audible results.

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The delay when the remote control button is released is in the order of  $1\frac{1}{2}$  seconds, so allowance must be made for this before recording, or the "run-up" will be audible.

The other two sockets—also miniature jack types—are for radio input and extension loudspeaker output. No jack is provided to feed external amplifying equipment.

The external loudspeaker jack requires a load of 8 ohms, but the manufacturers do not specify impedances for the microphone or the radio input. Neither do they give any indication of the sensitivities of these two inputs.

The amplifier contains nine transistors and provides a maximum output of  $1\frac{1}{2}$  watts. The tape speed is governed by a system of electronic regulation.

The internal construction is good, and all the "works" are easily accessible on removing the case. This operation is simplified by the fact that all the connections to components mounted in the case are on plugs.

The manufacturers give no specifications as to performance, and so it was a little difficult to make assessments for this machine. The usual electrical and practical tests were made, but the results rather disappointed my expectations. However, to be fair, performance must be measured against price, which, in this case, is a modest 28 guineas.

#### MANUFACTURER'S SPECIFICATIONS

Power source:  $7\frac{1}{2}$  volts: five "D" size flashlight batteries, or AC mains.

Inputs: Microphone, radio, AC power source.

Outputs: Extension loudspeaker (8 ohms).

Accessories: Recording tape, spare spool, dynamic microphone, mains lead.

**U.K. Agents: Denham & Morley Limited, Denmore House, 173, Cleveland Street, London, W.1.**

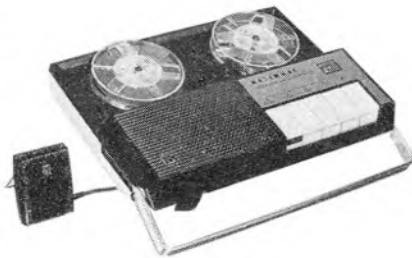
**MANUFACTURER'S COMMENT.**—*The model tested was an advanced sample that had been dismantled several times before and so may not have been up to specification. No new sample was available at the time. Supplies of the 250 are not due in the UK until June.*

*From curves supplied by the manufacturers, the overall response within 3 dB limits should be 200-3,500 cps. The response rises to 10,000 cps within wider limits and the bass response can be extended by means of the tone control. This performance compares favourably with other machines in the same price bracket which do not incorporate many of the facilities listed by Mr. Hadden.*

## NATIONAL RQ105S

By H. Burrell Hadden

**T**HE National RQ105S is a small transistorised, battery-operated portable tape recorder manufactured in Japan. It accommodates reels of up to three inches in diameter, and operates at tape speeds of  $3\frac{1}{2}$  and  $1\frac{1}{2}$  ips. The speed change is effected by removing a sleeve from the capstan—a post being provided to receive this loose sleeve so that it will not be lost. The total available recording time is forty minutes per track using double-play tape at the slower speed. Fast forward and rewind are provided, and the rewind time for the reel of standard-play tape (150 ft.) sent with the machine was 1 minute 20 seconds.



The recorder is housed in a black and white plastic case, with a removable cover to the tape compartment. The recorder can be operated with this lid in position. The overall dimensions are

$2\frac{1}{2} \times 10\frac{1}{4} \times 7\frac{1}{4}$  inches, and the weight, including batteries is about 5 lb. so this machine is really portable.

All movements of the tape are controlled by five sturdy piano-type keys, which are also used to switch on the amplifier. The "record" function is selected by depressing both the record and play keys together providing a safety measure to prevent accidental erasure of the tape. The only other control is a thumb-wheel type volume control, which also doubles in the customary manner, as "record" gain control. Record level indication is by means of a VU type meter, and this meter also gives an indication of battery life when the machine is switched to the "play" mode. No tape position indicator is provided.

(Continued on page 219)

## An alternative power supply for the Fi-Cord battery recorder

**M**ODIFICATIONS which I have made to my Fi-Cord 1A were described in the June 1965 issue of *TAPE*. The main feature of the article was the provision of an extra set of batteries to provide separate supplies to motor and amplifier.

From other users of this wonderful little machine I have often heard talk of trouble from the re-chargeable batteries. Over a period of some five years I had not experienced such trouble, though I admit that I had, during that time, purchased a couple of new sets. Then suddenly, when on holiday this year, two sets of batteries gave out on me.

Under normal conditions a set of cells which have been run down by use will take some twelve hours to fully re-charge, but eventually this re-charging time becomes erratic. It appears to me that the re-charging time gradually reduces, and so does the power held by the cells. Mine got to the state where they would re-charge in one to two hours and then drive the machine for only a few minutes. The obvious remedy is a new set of cells, but there is little that you can do about this when you are out in the wilds of the Welsh mountains on holiday. I had to grin and bear it but determined to go into the question of an alternative source of batteries obtainable at any electrical shop.

Even in this deteriorated condition the standard cells will drive the amplifier alone for a long time; it is the motor which takes the power. Therefore, if my modification has been carried out it is only necessary to replace the additional set of batteries with an alternative.

A fully-charged set of brand new cells will give approximately  $8\frac{1}{2}$  volts; six new U2 batteries give a little over nine volts. Having been assured that this initial difference in voltage would not be harmful, I carried out some tests.

So far as the round type of dry cell is concerned, there is considerable choice.

Whilst half a dozen U2s would have quite a long life, they were rather bulky and heavy and eventually my choice fell on the smaller U11s. Six of these connected in series provide the necessary nine volts and their life is quite reasonable against their cost of 26s. 6d.; having due consideration to the fact that they are to be regarded as a stand-by supply.

By R. A. MARGOSCHIS

After eight ten-minute runs with a five-minute pause between each, the cells were giving  $7\frac{1}{2}$  volts when under load. After an eighteen-hour pause and a further four ten-minute runs, the indicator light on the machine was still on and the tape speed was still rock steady and correct at  $7\frac{1}{2}$  ips (all the tests were carried out at this speed). I believe the indicator light goes off when the voltage drops to 7.

There is therefore at least two to two-and-a-half hours constant running on these dry cells, and longer when used intermittently.

The difficulty I found with the round-type cells was producing—from odd bits and pieces—a suitable container, for it is necessary for them to be spring-loaded in order to maintain contact between the cells.

I then discovered the flat type F40 dry cell giving  $4\frac{1}{2}$  volts and decided that two of these were really the answer. Their shape is more suitable, but their main advantage is that they have spring contacts which overcome the difficulty experienced with the round cells.

A container  $7 \times 2\frac{1}{2} \times 1$  inch can accommodate the two batteries required and a switch. This container is constructed along similar lines to the one described in my previous article; it is rather larger but can still be arranged to fit the same clips on the bottom of the recorder. Care must be taken when fitting in the batteries to see that the polarity is correct, and remember, if the modifications have been carried out as previously described, positive is to the shaft of the plug and negative to the tip.

My experience with batteries has by no means shaken my faith in the 1A, but I know that I have an added safeguard if I ever let myself get caught in a similar position.

**M**ANY years ago I was shown by some American friends the instruction booklet that had been issued with the recorder they had just bought. On the last page, in capital letters, were the words: "The uses to which this equipment may be put are limited only by your own imagination." An exaggeration? Perhaps. But there is so much basic truth in them if you really think about it. Tape recording techniques is truly a vast subject, covering an enormously wide field of interests.

A lack of imagination will certainly limit any owner's use of his equipment, but another equally important factor—ignored by the Americans in this case—is lack of *knowledge*. It's one thing to *want* to do something, it's quite another to know *how* to do it. It's the how-to-do-it we shall be talking about in these articles.

The newcomer to the subject must have a thorough grounding in the basic techniques. But it's our intention to deal with these in such a way that even the most experienced amateur will also find plenty to interest him. We will proceed logically from fundamental principles to the most complex techniques. Amongst other things, we shall deal with microphone positioning and balancing; there will be guidance on interviewing and there will be instruction on editing.

Do these headings seem to be all too familiar to any old hands? Yes? Then please try a very brief experiment. Record yourself reading a short script. Any script will do; a page from a book, a few paragraphs from the leader in today's newspaper. Play back the recording. Listen to it. Criticise it *honestly*. If the quality of either the recording or the performance leaves something to be desired, then you are the person these articles are designed to help.

## Programme production

We shan't only be dealing with the technicalities of recording, which I regard as no more than one part of recording techniques. To cover the subject adequately a great deal of attention must be given to the production of the programme to which the recording process is incidental. It must be remembered that any recorded material is, from this point of view, your programme, just as your studio is the place where you are recording. When you live in your living-room, it's a living-room; when you record in it, it's a studio.

We shall refer to outdoor recording techniques and discuss the uses and limitations of battery equipment. We shall deal with recording the sounds of nature and consider the psychological basis of the recorded drama. And, if anyone was really happy with the playback of their script-reading tape, we shall try to learn how to criticise. Is this recording good, or is it bad? How can we tell? Are there any rules by which we can measure the worth of what we have done? Of course there are, and a knowledge of them is invaluable. But we shall start at the very beginning.

What is the beginning of any sound recording? Surely it is the sound itself. So

# TAPE RECORDING TECHNIQUES

**F**IVE years ago the London County Council launched an entirely new project. The first of its Evening Institute Classes under the title "Tape Recording Techniques" was opened to the public. The instructor who had been given the task of organising this pilot scheme and who has been conducting classes in this subject ever since is our popular contributor, DENYS KILLICK.

His lively series, "Special Assignment," will be remembered by many of our readers, but his many commitments have prevented him from writing as much as we would have liked. However, we have now persuaded him to undertake a completely new series for us—a series as broad in its scope as it will be imaginative in its presentation. But let's leave it to the author to explain what it's all about.

let's think for a few minutes about what sound is and what it does.

Every schoolchild knows that sound travels in the form of "waves." This is illustrated in school text books by a boy throwing a pebble into a still pond. Waves, or undulations are shown moving away from the point where the stone dropped in.

## Three-dimensional

This, we are told, is what happens when a sound is made. The undulations, or waves, irradiate from the source of the sound in the same way as they did on the surface of the pond. This, however, is not quite true. On the water we saw waves in the single plane of the flat surface of the pond, whereas sound travels three-dimensionally through the air. This is a very important difference because it means that a sound is not merely travelling forwards in a straight line, but it is also going upwards and downwards, and indeed backwards as well. Tap two pieces of metal together when standing in the centre of a room. The sound will be heard at any point in that room.

Sound needs a medium through which to travel, and this is very often the air we breathe. This can be proved by an interesting experiment. In London's Science Museum at South Kensington there is an electric bell totally enclosed in a sealed glass jar. The bell can be seen and heard to ring when a button on the front of the case is pressed. Press a second button and a pump begins to evacuate the air from the jar. Immediately the sound of the bell diminishes as the atmosphere within the jar becomes rarer. With the approach of a state of vacuum the sound disappears. You can see the hammer striking the bell, and yet there is no sound. As air is allowed to re-enter, the sound returns.

A fascinating thought for science-fiction enthusiasts; what happens when astronauts leave their craft for the near-vacuum of outer space? Work it out for yourselves, and remember this is not fiction but fact.

Sound doesn't only travel through air. It will travel through water, although more slowly, and it will also travel through solid materials such as timber, brick and glass.

We all know what is meant by the pitch of a musical note. This pitch, or relative

position on the musical scale, is determined by the frequency of the sound waves which go to make it. The frequency is the number of full cycles or undulations that occur in every second of time. And so we get the first technical term which is "cycles per second," normally abbreviated to cps. The lower the pitch of the note the fewer cycles or vibrations there will be in every second of time—the higher the note the greater will be the number of cycles per second. And so we have two more terms; a low frequency note meaning a note that is low in the musical scale, and a high frequency note meaning one at the other end of the scale.

## Human hearing

Since we are concerned with the recording and playing back of sound, it would obviously be of some interest to consider the range of a symphony orchestra, in terms of frequency, and to relate this to the range of human hearing.

Let's take human hearing first. People tend to differ in the functioning of their natural senses. Eye-sight is better in some people than others; some wear glasses and some don't. Similarly some people can hear better than others, but this relates only to their sense of hearing and has nothing whatever to do with their personalities. I make this point because there is a tendency among the lunatic fringe of the so-called hi-fi enthusiasts to treat those with rather less acute hearing than they like to think they have themselves as almost sub-human. This is absolute nonsense.

The truth is that most people, when young, are endowed with good perception in all their senses. But as one gets older hearing will inevitably deteriorate along with the other senses and physical attributes. So we cannot lay down any hard and fast rules for the limits of hearing as they may vary considerably from one person to another, and they will be imperceptibly changing as each individual gets older.

Young people, who are likely to hear the best, may hear a sound as low as about 20 cps. Sounds lower than this in pitch can be felt as physical vibrations but will not be heard. At the other end of the scale, a sound of 20,000 cps—or 20 Kilocycles per second (20 K/cs) as it is some-



# TAPE RECORDING TECHNIQUES

times expressed—may just be heard by the very sharpest ears. These, however, are the two extremes. About 15,000 cps or 15 K/cs might be regarded as an average upper limit, but many people cannot hear sounds of more than 12 K/cs. Usually the individual concerned is quite unaware of his limitation because it doesn't matter. He would deny, quite rightly, that he is "hard of hearing." Ordinary, everyday sounds are heard perfectly clearly; it's only the tones of the very highest pitch that are missed. But in recording these frequencies are important as we shall see in a moment.

In any case, all human beings are rather ill-equipped with natural senses. As a matter of interest, dogs are said to hear sounds of up to 40 K/cs, whilst the bat is able to produce and hear up to an upper quoted figure of 175 Kcs. By these standards, none of us can hear very much at all.

## The sound of music

How do these figures relate to the sound of music? The lowest note from piano or harp has a frequency of a little less than 30 cps. The piccolo is the highest pitched instrument in the orchestra, and its top C has a frequency of 4,186 cps. It would therefore seem that if we could record within the range quoted, that is from under 30 to a little over 4,000 cps we should be reproducing the full range of the orchestra and have achieved top quality.

Alas, this is not so. Consider for a moment three instruments: the piano, the violin and the clarinet. Let us assume they all three sound the same note in the musical scale. From what we have seen this will be a note of identical frequency in each case. And yet there is something distinctive that enables us to recognise the difference between the kind of sound that is heard from each instrument. No-one could hear a note struck on a piano and confuse it with the sound of a violin. Neither would a clarinet be confused with either. How does this come about?

The answer lies in the overtones or harmonics that are produced by musical instruments. The note sounded is said to be the *fundamental* tone. At the same time it produces other sounds known as *harmonics* which give the characteristic quality or timbre to the instrument and thus enable us to distinguish the piano from the violin. These additional frequencies or harmonics are also known as *overtones*. The word overtones is expressive because the frequency of a harmonic is always greater than that of the fundamental to which it relates; they are therefore higher up the musical scale or "over" the fundamental in terms of pitch.

Because the harmonics or overtones endow the sound of musical instruments with their quality and distinctive characteristics it is essential that we record them if we wish to convey any sense of realism or presence in the reproduced sound. If music is recorded and reproduced to the limited frequency response of the fundamental notes of each instrument we shall hear the music and recognise the tune but it will be difficult to distinguish between the different groups of the orchestra. The wind instruments will tend to sound similar to the strings and vice versa. It is only by recording and reproducing on an extended frequency range that we can appreciate the realism of the sound and gain a feeling of the presence of the instrumental groups.

Another surprising thing happens when two sounds of different pitch are made at the same time. What is known as a "*difference tone*" occurs. If two tuning forks of different frequencies are struck we shall hear not only the tones produced by each individual tuning fork but also a third tone which in frequency will be exactly equal to the arithmetic difference between the frequencies of the two forks.

One of the fascinating things about sound is that it is always mathematically precise. A difference of tone will always be exactly and precisely the difference between the two tones from which it originates. It follows that it must always be lower in pitch—have fewer frequencies per second—than the sounds which produced it. So these sounds are the opposite of harmonics in that they are always "under" the original sound, whereas harmonics are "over."

If we now consider the performing orchestra with a large number of instruments all producing their fundamental tones and their associated harmonics at one and the same time, and then in addition the difference tones, we shall have some appreciation of the complexity of the sound that is produced.

## Sound equipment

So much for sound. What about the equipment that records it? The story of sound recording is as exciting as any who-dunnit. The first date is 1859, only a little more than one hundred years ago. A man named Charles Cross then registered sound vibrations in graphite. He was frustrated, poor fellow, for although he could see the vibrations in his recording medium he had no means of reproducing or playing back.

It took nearly twenty years for Edison's Phonograph to record and playback the sound of the human voice. I have a recording of this first phonograph and the tinny sound of the voice is all but drowned by the crackle and hiss of the primitive equipment. The year was 1877, and what a thrill that sound must have been to Edison. By tradition the words used are said to have been "Mary had a little lamb . . ." These same words are still used today by sound engineers and amateurs when testing a hook-up—and that's the reason why.

Did you know that a man with a good old British name of Smith was the first to

define the principles of magnetic recording as long ago as 1888? He, like Cross some thirty years earlier, was doomed to frustration. Although he knew, in theory, that magnetic recording should work, he lacked both the apparatus and the medium. The extent of his desperation might be judged from his proposal to use a thread of cotton soaked in a suspension of iron filings and dragged manually across a magnetic head to reproduce sound. Needless to say, it didn't work. It was ten years later, in 1898 that Valdemar Poulsen of Denmark produced the first successful magnetic recording apparatus. By today's standards its quality would be considered appalling, yet his invention won the Grand Prix at the Paris Exhibition of 1900.

Nothing very significant happened in the development of magnetic recording for nearly thirty years. In 1927 a couple of young scientists achieved what we would today call a "breakthrough." They were playing around with a magnetic recorder when to their delight it suddenly began to produce better quality sound than they had expected. The story is that they had got their connections muddled and had accidentally applied a very high frequency signal to the record head in addition to the tones they were trying to record. Fortunately their scientific training enabled them to thoroughly check the apparatus and enabled them to establish for the first time the principle of high frequency bias at the record head as employed in all magnetic recorders today.

I'm not going to vouch for the truth of the story, but it's a jolly good yarn. If I muddle my connections all that happens is that the house is plunged into darkness and an irate voice makes unkind comments from the kitchen. We shall have a lot more to say about high frequency bias in subsequent articles.

## The 'breakthrough'

The earliest machines recorded on wire as a medium. This had grave disadvantages. Later a paper tape with a metallic coating was used, but this, too, has snags. Tape recording as we know it today was made possible only through the development of the plastics industry. It wasn't so terribly difficult to design and make recorders, but the production of satisfactory media on which to record was a problem to which there was no solution for a long time.

During the last war our sound reporters went out into the battlefield with hefty great disc recorders to lug around. Just think of it—dodging the shot and shell while trying to keep the cutter on the disc.

It was only after the war that the tape we know today was produced, and almost at once there appeared the first British domestic recorders. Since then a large number of firms have specialised in the design and manufacture of this equipment. Great progress has been made in the development of better and more efficient apparatus at progressively less cost. As a result, the amateur is today offered a range of equipment and facilities that would not have been dreamed possible as recently as 1939. If there is a fault it is that we, as recording enthusiasts, are offered too much quality too easily attained.

This series of articles is to help you, as an individual, to make the most of the exciting potentials you have at your disposal.

**NEXT MONTH:**

**WHAT IS A TAPE RECORDER?**



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We're having a hard time trying to meet demands from happy dealers who are asking for more and more SUNWAVE portable tape recorders. These SUNWAVE items are immensely popular among the younger set because of their high quality, small size, light weight and convenient portability. SUNWAVE tape recorders can be seen almost anywhere where young people are—at picnics, barbecues, camps, and when they are studying in their rooms or on the schoolgrounds. All SUNWAVE products are backed by our long experience, advanced research, great technical resources and the most modern facilities. You can't miss if you stock up on SUNWAVE tape recorders.



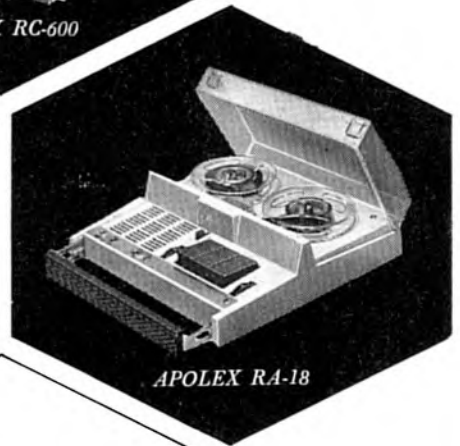
*APOLEX RA-68*



*APOLEX RC-600*

**APOLEX RC-600**  
 • Capstan drive • 6 transistors • 3-3/4" and 1-7/8" speeds • Dynamic microphone with remote start/stop switch • Positive speed change lever • Simple push button controls • Flat, light weight design • Optional equipment includes 4" reels, adaptors for AC and telephone recording • Size: 9-1/4" x 9-3/32" x 2-1/2" • Weight: 6 lbs. 10 ozs.

**APOLEX RA-68**  
 • Reel drive • 4 transistors • Piano type push buttons • 2-1/4" dynamic speaker • Crystal microphone • Power source: UM-2 (1.5V) x 2 • Size: 8-5/8" x 7" x 2-1/4" • Weight: 2 lbs. 10 ozs.



*APOLEX RA-18*



*APOLEX RA-65*

**APOLEX RA-18**  
 • Reel drive • 5 transistors • Push button controls • Remote controlled crystal microphone • Weight: 3 lbs. 5 ozs. • Optional equipment includes adaptor for AC, foot control start/stop & quick rewind switch • Size: 7-5/8" x 8" x 2-5/8".

**APOLEX RA-65**  
 • Reel drive • 4 transistors • Crystal microphone • 2-1/4" Dynamic speaker • Size: 8-5/8" x 7" x 2-1/4" • Weight: 2 lbs. 10 ozs.

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# SCRIPT-EDITING CONTEST

(Continued from page 205)

He then gave a full two minutes to historical material before coming to the first of the contemporary interviews. At the heart of his script he proposed a sound montage—"a poetically treated sequence of effects". Using the steam exhaust, the piston beat, the clank of coupling rods and the train noises offered in the basic material.

Here was a difficulty for the judge. Obviously this is a splendid idea; everything must depend upon the ability to translate such an idea into practice. Mr. Albert Pengelly, of Plymouth, proposed something very similar—a montage using the same effects "cross-faded to main theme of Chopin's Funeral March, to match as far as possible the beat of the music."

Competitors found a surprising variety of music suitable for incorporation in a tape on the given theme. It ranged from "Oh, Mr. Porter" and "Thanks for the Memory", over The Eagles playing "Bristol Express" and Donovan singing "Times, they are a' changing", to the Honnegger composition already mentioned.

Some entrants, it seemed to me, overdid the opening music and effects before getting down to the spoken interviews. Mrs. Audrey Davidge, of Vancouver, for example, proposed a full two minutes of introduction before the interviews; and several other competitors spread their music and effects over about one minute.

And there was not as wide an appreciation as I had expected of the value of recording speech over effects and of cross-fading.

Some of the scripts were very methodically prepared, with editing instructions in one column, FX in another, speech in another, and time elapsed in yet another. John B. Robinson, of London, S.W.1, and K. A. Sidford, of London, N.12, both showed this systematic approach; but the most ambitious script of all came from F. K. Fulstow, of the Hull Tape Recording Club, who began by listing the equipment he would use—including four recorders—and the personnel, then detailing the pre-editing to be done and the initial cueing preparations.

I was happy to find a number of entries from women readers and to be able to place one of them in the top seven—that from

Mrs. Joan Shovelton, of Chipping Campden. Mrs. Shovelton, who attended the presentation of the first prize to Mr. Kurkowski at the Audio Festival, is a real enthusiast. I particularly liked the way she included clear cueing instructions—underlining the words at which fades started—and her careful instructions about pauses.

D. J. Allen, of Buckingham, used FX of a passing train very effectively by breaking into the lady traveller's reminiscence of watching trains pass her garden when she was a child. A. D. Farr, of Cults, Aberdeen, blended contributions from several interviews, to form a consecutive narrative, without bothering to identify who was contributing each sentence; I thought it worked out very well. R. J. Lee, of Reading, did something similar to provide an effective ending to his script, but used only a brief phrase from each voice to highlight the points made earlier in the fuller text.

Other scripts which impressed me came from R. E. Butterworth, of Halifax, Philip Towell, of Boston, P. A. Koh, of Sunbury, Wilfred Duffy, of Sunderland, R. Cleverly, of Wallington and Richard Margoschis, of Atherstone.

## Battery portable recorders

(Continued from page 206)

| Name of Recorder and Manufacturer  | Speeds and Number of Tracks          | Weight (lbs.) | Size (inches) | Power Supply  | Price £ s. d. |
|--|--------------------------------------|---------------|---------------|---|---------------|
| PHILIPS EL3586.....  | 1½<br>(2 tracks)                     | 8             | 8½ × 3½ × 1½  | 6 1.5V (U2)   | 27 6 0        |
| ★PHILIPS EL3301....  | 1½<br>(2 tracks)                     | 4             | 4½ × 7½ × 2½  | 5 1.5V (U11)  | 27 6 0        |
| <i>(Philips Electrical Ltd., Century House, Shaftesbury Avenue, London, W.C.2.)</i>            |                                      |               |               |   |               |
| "Q"-CORD TYPE 203  | 3½<br>(2 tracks)                     | 5             | 10 × 4 × 10½  | 4 1.5V; 110-240V<br>6V rechargeable<br>accumulator  | 35 14 0       |
| "Q"-CORD TYPE<br>R119K   | 3½<br>(2 tracks)                     | 5             | 9½ × 4 × 9½   | 4 1.5V; 110-240V<br>AC mains  | 33 12 0       |
| <i>(C. Braddock (Blackpool) Ltd., 266, Waterloo Road, Blackpool, Lancashire.)</i>              |                                      |               |               |   |               |
| SHARP TRC-1004 ...   | 1½                                   | —             | 3½ × 7½ × 2½  | 4 U7 cells  | 37 10 0       |
| <i>(Wholesale Supplies (Swinton) Ltd., 16-18, Worsley Road, Swinton, Manchester.)</i>          |                                      |               |               |   |               |
| SHIRA-CORDER<br>A7700.   | 3½, 1½                               | 8½            | 11 × 10½ × 3½ | 6 (UM-2A) or<br>AC mains  | —             |
| <i>(Winter Trading Co. Ltd., 95-99, Ladbroke Grove, London, W.11.)</i>                         |                                      |               |               |   |               |
| SONY 801 .....   | 3½, 1½<br>(2 tracks)                 | 13            | 12½ × 10½ × 4 | 6 1½V flashlight<br>cells or mains<br>110-220V  | 93 9 0        |
| <i>(Sony U.K. Sales Division, Mercia Road, Gloucester.)</i>                                    |                                      |               |               |   |               |
| STANDARD SR-F2IT   | 1½<br>(2 tracks)                     | 2             | 7 × 6 × 3     | 4 U11 cells   | 15 15 0       |
| STANDARD SR200...  | 1½<br>(2 tracks)                     | 1½            | 7½ × 4½ × 2½  | 6 U7 cells or<br>AC mains   | 18 18 0       |
| STANDARD SR250...  | 3½, 1½<br>(2 tracks)                 | 5½            | 9½ × 3½ × 6½  | 5 cells (7½V) or<br>AC mains  | 29 8 0        |
| <i>(Denham &amp; Morley Ltd., Denmore House, 173, Cleveland Street, London, W.1.)</i>          |                                      |               |               |   |               |
| STELLA ST471.....  | 1½<br>(2 tracks)                     | 8             | 12½ × 9 × 4½  | 6 1½V (U2) cells  | 27 6 0        |
| STELLA ST472.....  | 1½<br>(2 tracks)                     | 3             | 8 × 4½ × 2½   | 5 cells (U11)   | 27 6 0        |
| <i>(Philips Electrical Ltd., Century House, Shaftesbury Avenue, London, W.C.2.)</i>            |                                      |               |               |   |               |
| ●STELLAVOX SM5.  | 7½<br>(Full track)                   | 6             | 10 × 5½ × 2½  | 8V DC 4 "Dry-<br>fit" 1 Ax 2 cells  | 247 0 0       |
| ●STELLAVOX ST5...  | 7½<br>(2 tracks)                     | 6             | 10 × 5½ × 2½  | 8V DC 4 "Dry-<br>fit" 1 Ax 2 cells  | 399 0 0       |
| <i>(F.W.O. Bauch Ltd., Chaddlewood, Cockfosters Road, Cockfosters, Barnet, Hertfordshire.)</i> |                                      |               |               |   |               |
| ★TELEFUNKEN<br>M401.   | 2<br>(2 tracks)                      | 7½            | 11½ × 8 × 3½  | 6 U2 cells or<br>AC mains   | 48 6 0        |
| TELEFUNKEN M300  | 3½<br>(2 tracks)                     | 7             | 10½ × 10½ × 3 | 5 1½V cells;<br>Rechargeable<br>accumulator;  | 51 9 0        |
| TELEFUNKEN M301  | 3½<br>(4 tracks)                     | 7             | 10½ × 10½ × 3 | 5 1½V cells;<br>Rechargeable<br>accumulator;<br>AC mains                                    | 51 9 0        |
| <i>(A.E.G. (Great Britain) Ltd., 27, Chancery Lane, London, W.C.2.)</i>                        |                                      |               |               |   |               |
| TRANSCORDER<br>TR100.  | 3½, 1½<br>(2 tracks)                 | 4             | 6½ × 6½ × 1½  | 6 penlight cells<br>and PP3 or<br>equivalent<br>Mallory cells.<br>Separate AC DC<br>adaptor | 51 9 0        |
| TRANSCORDER<br>TR300.  | Rim-driven<br>Variable<br>(2 tracks) | 4             | 8 × 7½ × 2½   | 6 penlight and<br>3 UM2s  | 24 3 0        |
| <i>(Fonadek International Ltd., Vivian Road., Harborne, Birmingham.)</i>                       |                                      |               |               |   |               |
| ●UHER 4000<br>REPORT "S."  | 7½, 3½, 1½<br>(2 tracks)             | 7             | 11 × 8 × 3    | Five 1½V (LPU2)<br>cells or<br>rechargeable<br>accumulator,<br>mains unit, car<br>battery   | 108 3 0       |
| <i>(Bosch Ltd., 205, Great Portland Street, London, W.1.)</i>                                  |                                      |               |               |   |               |

● denotes stereo model. ★ denotes special cassette.

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| " EL3541/15 ...                                | ... | ... | ... | 57/6    |
| " 3541H ...                                    | ... | ... | ... | 72/-    |
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| Stella ST455 ...                               | ... | ... | ... | 63/-    |
| " ST454 ...                                    | ... | ... | ... | 57/6    |
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| Saba 2305 ...                                  | ... | ... | ... | 79/6    |
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ONE of our visitors to the Audio Fair, on learning the identity of the inoffensive character hiding in the corner of Room 153 at the Russell Hotel, was kind enough to make a few gracious remarks about this column. But he concluded with the inevitable parting shot: "This isn't a *service* spot any more. What about the clutch adjustment on the what's it?" Bear with your scribe a little longer; we are nearing the end of the tape alphabet and can then revert to more mundane matters.

In the meantime, it is felt that a glossary of this kind, especially when augmented by such eminently practical articles as those by L. Reid, and the authoritative Test Bench contributions by H. Burrell Hadden, assists the newcomer and the tape recording enthusiast of long standing, who may each have had little opportunity (or, indeed, cause) to consider the deeper aspects of the art.

For art it is, without any question. Too many tape recorders are temporary toys, used for a brief spell of parties and novelty demonstrations, then condemned to gathering dust beneath the second-best bed. *TAPE Recording Magazine* has been in the forefront of the campaign to keep tape recording alive. If the comments overheard at this year's jamboree were any criterion, the art is not only alive, but kicking vigorously.

\* \* \*

**MONAURAL.** Although the term means strictly, "listening with one ear," and is thus held by many purists to be incorrect, it is used to denote a single channel of amplification and reproduction—as opposed to the double channel system of stereophony. *Monophonic* is a better term, and may be used alternatively.

\* \* \*

**MOTORS.** This should be a short and simple section. Any tape recorder needs a motor to transport the tape in its progress from the supply reel to the take-up reel, via the head channel, and some form of mechanical linkage is also necessary to make the capstan turn, and drive the tape at the right speed. There are thus three-motor machines, with one for each spool and one for the capstan; two-motor machines, where the capstan is driven by belt or idler system; and single motor machines where all the functions are carried out by such linkage.

## SERVICE BUREAU

# A glossary of tape terms—part 5

BY HARRY MACK

Some of the cheaper "toys" and earlier dictating machines employed no capstan drive, relying only on the pull of the take-up spool, but as speed is then determined by the amount of tape spooled, and cannot be constant, we are not concerned with these.

The motorised machines must have drive systems which fulfil certain tasks and motors are of special designs. There are four main types: shaded-pole, Synchronous, Asynchronous and D.C. with certain subdivisions.

The shaded-pole motor is not expensive, and is widely used. The effect of changed loading upon its speed renders it comparatively inefficient. It is an induction motor, with, usually, a four-pole stator, notched with a copper ring to provide magnetic flux movement across the pole faces and ensures starting action. The speed is determined both by main frequency and phase and the number of poles. It is very suitable as a spooling motor, where the load/speed relationship can be used to some advantage.

The synchronous motor requires capacitor starting and has a constant speed with varying load, dependent only on main frequency. This type is often used as a basis of the "outer rotating cage" design, with a fixed armature, providing automatic flywheel action and very regular running.

Also of the hysteresis type, the asynchronous motor requires a capacitor start, can be made quite powerful, and has a varying load/speed relationship, making it more suitable as a spooling motor. Both this type, and the synchronous motor, can be

reversed by switching the field coils, and coarse speed variation can also be employed by this method.

The D.C. motor is used in battery operated machines, and has undergone some drastic changes in design during the past few years, mainly because of the development in certain magnets. To obtain a high starting torque, the DC motor is usually series wound and some form of governor or regulator is inevitably required. This, of course, leads to interference problems due to the constantly sparking contacts, and much design work has gone into the eradication of the fault.

Methods of using transistor control are now popular, the switching taking place in the low-current transistor circuits instead of the high-current motor supply. Lately there has been an even more radical development. This is a brushless commutator—or electronic commutator motor, announced by Grundig—not without some pride—which uses four transistors, one of which is in an oscillator circuit to provide a sensing signal. This holds great promise for the future.

\* \* \*

**NOISE.** In technical terms, this is not just the hullabaloo that Junior makes on bathnight. It is a well-defined and measurable quantity. Briefly, it is the unwanted signal that is amplified by the tape recorder playback circuits and reproduced with the signal. It can have its origin at practically any point in the recording chain, and we thus break down the definition to allow for this.

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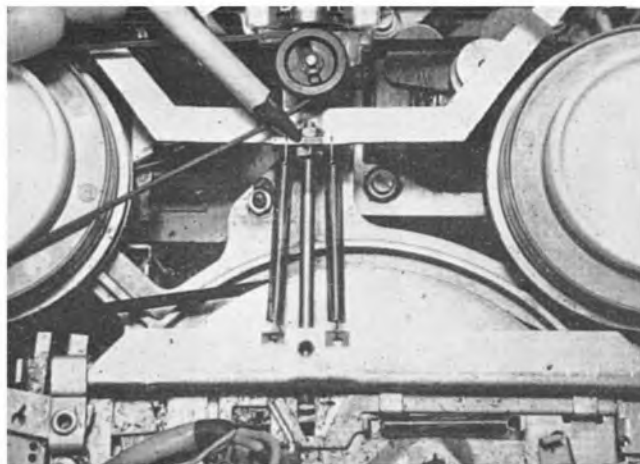
Purely mechanical noises are obvious, and need not concern us here, except to state that motor noise, especially on battery-driven machines, can be electro-mechanical (dependent upon load, drive systems, etc.). Many a "noisy" motor has been changed simply because the idler or belt pressure was too great!

Tape noise can be caused by impurities or irregular surface of the tape, and is usually heard as a hiss. Head noise, due to magnetisation, also gives a pronounced hiss. Modulation noise we have already mentioned. Noises in the amplifier can have several sources; from shot-noise, caused by irregular emission from a hot valve cathode, varying the anode electron flow (which is one reason a low-noise input stage uses a triode valve, as pentodes are more noisy) through thermal noises with non-linear components changing their characteristics as the machine warms up, to the various inter-modulation noises that are better classed as distortion, and are the result of incorrect operating conditions—or, regrettably, downright bad design. Hum is not the least of these, and has already been dealt with in a previous contribution.

The noise spectrum is generally wider than the pass-band of the amplifier, but its energy is greatest in the mid-range, between 1,000 and 5,000 cps, just where it proves most troublesome. To try and filter system noise away is to rob the output of the most informative parts of the required signal. Noise must be reduced at the source—hence the vital need for good design, correct operating conditions and an avoidance of that enemy of tapes and heads—old-fashioned dirt. We cannot operate our precious machines in a vacuum, but at least we can avoid fingering the tape more than necessary, and keep heads, guides and the complete transport channel scrupulously clean.

Measurement of noise is made by comparing a standard output with an output

**Fig. 1. A single motor machine will have all functions operated by idler wheels or, as illustrated, by a common belt. The pointer indicates the brake adjusting nut mentioned in previous articles, and underlines the importance of correct brake and clutch adjustment on machines of this nature**



**N.A.R.T.B.** (abbreviated to **NAB**). The initials stand for National Association of Radio & Television Broadcasters. This is the body whose recommendations on characteristics and standards apply in the USA. In Europe, the **C.C.I.R.** standards apply. There are slight differences, which must be taken into account by the tape recording enthusiast. Some of these details have been mentioned under **C.C.I.R.** and **Equalisation**, but a fuller account, dealing also with the later alterations to standards, will be given in the section headed **Standards**. (Watch this space!).

**OUTPUT.** That which is given off by an amplifier, and fed either to "another amplifier," headphones or loudspeaker. The definition "another amplifier" must be mentioned, for most good-quality machines have "hi-level" output, and so a "Line" output. The former is at a medium to high impedance and is used to power an external amplifier, thus giving wider facilities, plus the oppor-

copywriters would have us believe, though it has its undoubted advantages. Line output, as provided with semi-professional machines, may have an output from 0.1 to 1 volt and may be at about 100 K ohms, requiring transforming to load a number of loudspeakers, or impedance matching to power external loudspeakers.

#### **PARALLEL TRACK RECORDING.**

As the name indicates, two parallel tracks are recorded simultaneously, and played back with outputs mixed, or separated for special effects. This is not the same as—nor any substitute for—stereo recording. A machine that simply advertises "parallel track facility" could have no more than a parallel switch combining the outputs from a quarter track head. Also referred to as "Duoplay."

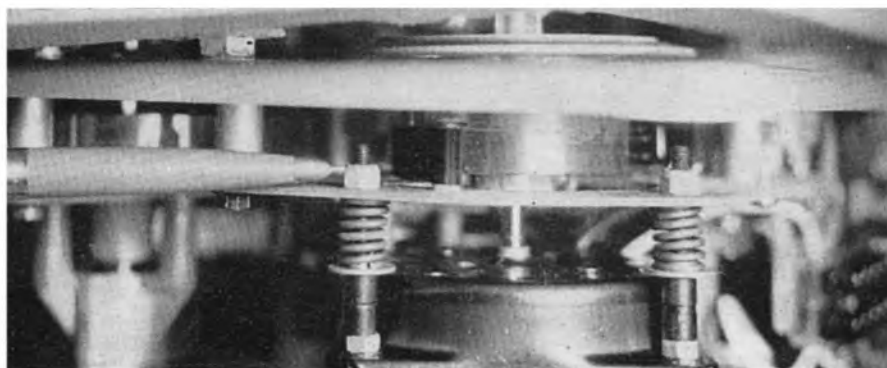
**P.A.** Accepted abbreviation for "Public Address." Equipment used for high powered distribution of audio signals. An output marked in this way is intended to load an external amplifier—not necessarily to enable the user to harangue a political meeting! For that matter, any hi-level output could be similarly labelled. The PA field is extremely wide, and well beyond the scope of these articles, perhaps fortunately, as the Editor would not allow us the space to digress on this very interesting subject.

**PINCH WHEEL.** The drive pulley, free-running, which holds the tape in contact with the capstan pulley to obtain constant speed of tape transport. It is generally made of rubber or composition, though some earlier machines employed a metallic pinch roller.

Exact pinch pressure is necessary to avoid wow. The face of the roller should be vertical to the capstan and should exert an even pressure on the tape. The usual procedure is for the pinch wheel to roll against the shiny—i.e., not activated—side of the tape. The diameter of the pinch wheel, given constant pressure, does not affect the tape speed, which is determined by diameter and speed of the capstan pulley. On the majority of machines, the latter is an extension of a flywheel spindle, thus helping iron out small variations of running speed. There are exceptions.

**PAUSE CONTROL.** A method of temporarily stopping tape transport. Generally, this consists of a simple device to hold off the pinch wheel. In some machines, auxiliary braking also comes into play.

**TO BE CONTINUED**

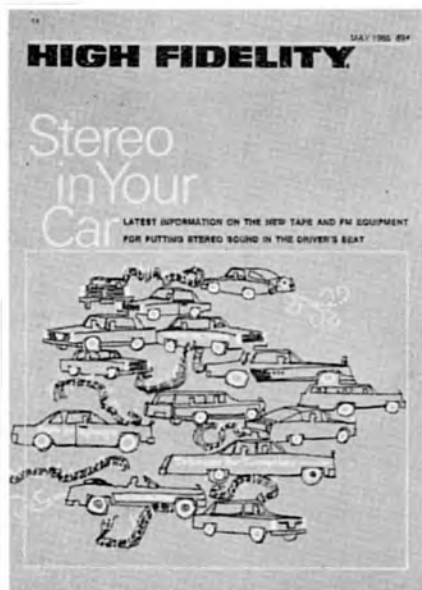


**Fig. 2. Spooling motor of three-motor tape recorder (Collaro Studio), showing method of spring mounting to isolate motor vibrations from main deck and reduce acoustic feedback**

obtained with no signal. The latter is then so many decibels "down" on the standard; hence the specification —X dB. A specification that omits the minus sign means the same thing, and is understandable, if not accurate. But, to be correct, the specified signal level should be given, so that —45 dB is meaningful. This is about the most acceptable noise level stated in the "signal-to-noise ratio" part of a tape recorder specification. More will be said about this when we come to the end of the alphabet and deal with the term "weighted".

tunity of greater power. The latter is a standard impedance, standard voltage output, for connection to public address equipment.

Very often, a cathode follower output is supplied, giving a low impedance source for coupling to external amplifiers via long lines. However, some care must be exercised, because capacitor coupling is often employed, and the lower frequencies, at the low impedances, may be somewhat attenuated. Low impedance coupling is not the ultimate answer to all problems that some



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**T**HE last visitor to leave the 1966 Audio Fair stepped out into the chilly evening air; and there began a flurry of activity in the demonstration rooms as exhausted staff dismantled set pieces and began to load costly equipment into an endless stream of vans and lorries. The evacuation of the Hotel Russell is swift and dramatic. The Fair is over.

Back at home on that Sunday evening, I had been listening to a broadcast of Mahler's 8th Symphony. The finale to this work is, in my opinion, musical sound at its greatest, so I did what numberless visitors to the Fair must have done that night—I turned up the volume on my elderly Leak amplifier, squarely faced my even more elderly Goodman infinite baffle unit, sat back and really listened.

"There!", I said triumphantly to my wife. "You didn't hear better than that at the Fair, did you?"

Comparisons, we are told, are odious, but in the world of sound they are essential if a proper judgment is to be made. Many of the exhibitors arranged their demonstrations to show just how difficult judgment can be even after direct comparison. Lowther always have an impressive array of speakers on view and the sound is switched from one to the other around the room. Two facts are at once obvious—they are all good, but they all sound different.

Two floors below, the STC people had given a great deal of thought to the preparation of their demonstration based on the playback of a recording of string quartet. Four microphones had been used, one at a time, to span the price range of about £11 to £100. Bob Fisher explained in his preparatory talk that he had deliberately used one microphone which had been designed for speech, not music, and he warned that the musical quality produced by this instrument would be almost "nasty". This was very interesting in itself, but he went on to make what I thought was the most important statement of the whole Fair.

"Please note", he said, "that although the sound from this microphone will at once strike you as unpleasant your ear will very quickly become accustomed to it and after a very short time, thirty seconds or a minute, you will cease to consider the sound objectionable. It will remain acceptable to you until I fade in the next microphone, a ribbon 4038, when you will at once realise how poor was the sound you had just heard".

He was right, absolutely right. I was chatting to Bob Booth, also of STC immediately afterwards, and he summed it up

**CROSS**

**TALK**

### By Audios

rather well. "The ear", he said, "is a very funny animal".

**D**ID you see the impressive display of professional mixing and recording equipment by Elcom? The Manager of their equipment division, Mr. D. G. Warby, is a very good friend to all amateur enthusiasts and he spent many a long hour patiently answering questions and explaining the whys and wherefores. . . . So, too, did other gallant gentlemen from other frankly professional firms. They knew quite well that neither you nor I were going to order hundreds or thousands of pounds' worth of equipment but we couldn't have been treated better if we were their most valued customers. To all the professionals, our sincerest thanks—we shan't forget you, and if ever we have the money . . .

**T**HE Audio Fair had opened its doors on the Thursday to a blizzard. The snow, swirling across Russell Square, turned to slush on the pavements. Suddenly the electric power to some of the first floor rooms in the hotel failed. Lights went out and music stopped. Silence. I was in Vortexion's room at the time, talk-

### NEWS IN BRIEF

**A**GFA and Gevaert, two of Britain's leading photographic companies have merged to form Agfa-Gevaert Ltd.

Headquarters of the new company are in the Great West Road, Brentford, Middlesex, and their London showrooms will be at 20, Piccadilly, the former Gevaert showroom.

**T**HE Association of Professional Recording Studios Ltd. announce that Lord Harewood has consented to be their first Patron and Mr. A. C. Haddy of the Decca Record Co. has accepted an invitation to be Honorary President.

The retirement of secretary, F. Miles, Coventry, is also announced. New secretary is John Borwick. Information about the Association, conditions of membership and recording services offered by member studios are available from the new secretary at 47, Wotton Road, Kenley, Surrey.

ing to Mr. and Mrs. Brown, one of the most charming couples in the business. The fault, a blown fuse probably, was soon mended and the lights came up again, but we all realised rather foolishly how helpless we had felt without electric power.

The cold outside was soon dispelled by the warmth of the enthusiasm within. Mr. Ken Brown was demonstrating the new Dual transcription unit to me. After explaining the original design features he produced a cigarette and slipped it beneath a record on the turntable. As the disc wobbled its way around he lowered the stylus to the groove and triumphantly asked us to listen to the perfect quality of the sound produced. "We're thinking of cornering the market in twisted gramophone records" he grinned. He's a big man and was affected by the heat but he obviously enjoyed every minute of it. That's my idea of enthusiasm.

**M**Y impression of the Fair in general is of a genuine striving on the part of our designers and manufacturers for better quality and better value. This they must offer to survive, and well they know it. Competition is fierce and those who can't meet it fall by the wayside. Which is a very good thing indeed so far as we, the public, are concerned—it's also a good thing for the industry as a whole.

The principal of one well-known company whose excellent range of machines is familiar to every reader of this magazine proudly showed me a letter referring to an export of tape recorders to Japan. Congratulations!

Goodmans started something with their miniature speaker, the Maxim, when they showed it two years ago for the first time. There is a definite trend towards bookshelf speakers now and the quality they produce at very low cost is really good. But they must by their limitations of size be lacking in low frequency response. Of course they do and their makers readily admit it—if they didn't there would be no need to offer bigger and more expensive units. Let's keep our feet firmly on the ground and face the fact that with this snag these little 'uns are offering more quality for less money than we've ever had before. To the purist this may not be progress—to the poor man it's progress with a capital "P" and I'm going to buy one.

**T**HIS is not a review of the Fair—just a random collection of thoughts and impressions, all that any of us are left with when it's over. I did a lot of listening and even more talking. I hope I learned a little; I certainly enjoyed myself enormously.

Not like the couple I overheard as I was leaving on the final night. "I suppose it was all right", she said, "but the trouble is I don't really like music!"

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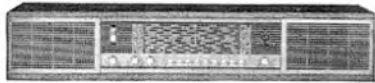
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**Tape records  
reviewed**

**CLASSICS These are**



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for  
the  
purist**

**RICHARD STRAUSS MEMORIAL  
ALBUMS, Volume 1. Violin Concerto  
Opus 8; Carroll Glenn, Vienna Volk-  
soper Orchestra conducted by Kurt  
List; Metamorphosen Banberg SO  
conducted by Clemens Krauss. WRC  
(TCM 73), 3½ ips, mono, 29s. 6d.  
Volume 2. Divertimento Opus 86 on  
pieces by Couperin; Extracte from  
"Capriccio"; Waltz Suite No. 2 from  
"Der Rosenkavalier." Bamberg SO  
and Bavarian Radio Orchestra con-  
ducted by Clemens Krauss. WRC  
(TCM 74), 3½ ips, mono, 29s. 6d.**

This is an offbeat collection of music by  
Richard Strauss taken mainly from broad-  
casts given in the early 1950s. Clemens  
Krauss was one of Strauss's closest friends  
and an incomparable Strauss interpreter,  
which means that for all their incidental  
faults and the limited range recording these  
are valuable interpretations.

In particular it is good to have Krauss's  
view of the elaborate study for 23 solo string  
instruments, Metamorphosen, which was  
one of the last works Strauss ever wrote,  
a mature reflective piece that culminates in  
a quotation from the funeral march of  
Beethoven's "Eroica" Symphony. There  
is little of Strauss's earlier brilliance, but  
in such an understanding performance as  
this, the lengthy argument is most com-  
pelling.

On the reverse is an even more neglected  
piece, Strauss's Violin Concerto, so early  
a work that some of the sketches for it  
have been found in the composer's school  
exercise books. The Vienna recording is  
much more modern than the rest, but List  
is not so understanding as Clemens Krauss  
and there is a disastrously long cut in the  
first movement—from the end of the expo-  
sition to the coda. True, this is a compar-  
atively repetitious work, and it is good to  
have it available in recorded form at all.  
Carroll Glenn proves a lively violin soloist.

The items on the second tape are alto-  
gether lighter and less ambitious. The Diver-  
timento provides a brilliant orchestration of  
a collection of Couperin's harpsichord  
pieces, and characteristically Strauss did not  
limit himself to using the pieces as Couperin  
left them but developed the ideas in his  
own style. Not for purists of course, but  
delightful for anyone else. The "Rosen-  
kavalier" Waltz Suite No. 2 brings a col-  
lection which Strauss made in 1944. He was  
for ever rearranging this charming music  
in various forms, and though those who  
know and love the original opera may

object to Strauss's cavalier treatment of  
some of his own ideas, there have been no  
more delightful waltzes written this century.

**MAHLER. Symphony No. 2 in C minor  
"Resurrection." Mimi Coertse,  
Lucretia West, Vienna Academy Chorus,  
Vienna State Opera Orchestra con-  
ducted by Hermann Scherchen. WRC  
(TCM 75/6), 3½ ips, mono, 59s.**

This is a double tape on a single spool,  
and the benefit is enormous with over 45  
minutes music on each track, for the second  
of Mahler's nine symphonies is one of his  
longest and most ambitious. He set out to  
convey in music the atmosphere of Judg-  
ment Day itself with the last trump and a  
celestial choir finally preaching triumph  
over death.

But before we reach that sublime con-  
clusion Mahler, himself a deeply introspec-  
tive man, finds inspiration in tragic themes,  
and though he completed the work when  
he was only 34 (having taken in all seven  
years in the composition) this is a fully  
mature example of his genius. It is good that  
judging by recent concerts in London Mah-  
ler's greatness is at last being appreciated,  
and this first Mahler symphony to be issued  
here on tape, marks another step in a wel-  
come trend.

Scherchen is a severe rather than an  
emotional Mahler interpreter but in so ex-  
pansive a work as this, that is to the good.  
The gentle and often charming middle  
movements could be more engagingly done,  
but the first movement at once assumes a  
heroic stature and allowing for the rather  
close and unatmospheric quality of the re-  
cording, the performance of the finale is  
massive and dramatic. Both the soloists  
sing well, if not with the last degree of  
imagination. Those who tend to think of  
Mahler and Richard Strauss as contrasted  
and even antipathetic contemporaries (see  
my Strauss review) may be interested to find  
that Strauss conducted the first perform-  
ance of this symphony in Berlin, and years  
after claimed that he always kept a copy  
of the score on his piano. A well deserved  
tribute from one genius to another.

**Shearing  
shines  
with  
lyrical  
virtuosity**

**JAZZ**



By **Mike  
J. Gale**

**THE SHEARING TOUCH. The George  
Shearing Quintet. WRC (TT 466), 3½  
ips, mono, 29s. 6d.**

George Shearing is not the greatest pianist  
in the world, but he is streets ahead of those  
well-known characters who smile their way  
through a two-minute solo spot on television  
and pray that a musician is never put in  
charge of the contracts department. He is  
also a composer of stature ("Lullaby of  
Birdland") and to his eternal credit he left  
Britain for America before it became  
fashionable to conquer the States and built  
up a tremendous following.

His success has, in many respects, been  
responsible for artistic impasse: by trying  
anything new his following clamoured for

the familiar and eventually he reluctantly accepted their demands.

At any rate on this album he takes half of the twelve items without accompaniment and the excellent programming strategically disperses them through both sides forcing the listener to at least hear them once. No doubt some of his following will now regret that the over familiar quintet sound has not been dropped more frequently.

For if it had been, then both would be more appreciated.

The quintet sound commercially synthetic manufacturing the same old pre-digested noise quite obviously automatically produced without any surprises at all. Shearing also imposes limitations—the occasional hint of what lies below the surface is quickly and effectively submerged. Nevertheless, there is no getting away from his technical perfection and abundant sensitivity. *Guilty* in particular, shines with lyrical virtuosity.

The quintet of Emil Richards, Jean Thielmans, Al McKibbin, Percy Brice and Armando Peraza, could have taken the day off for once.

The set consists of *Guilty*, *Friendly Persuasion*, *It Might as well be Spring*, *If, A Tune for Humming* and *Sigh No More* all Shearing solos and, with the quintet, *From Rags to Richards*, *Pawn Ticket*, *Easy*, *Senior Blues*, *Splittin'*, and *The Late Late Show*.

#### THE GENIUS OF COLEMAN HAWKINS.

Personnel: Oscar Peterson, pno; Herb Ellis, gtr; Ray Brown, bass; and Alvin Stoller, dms. WRC (TT 509), 3½ ips, mono, 29s. 6d.

Coleman Hawkins, once the undisputed master of the tenor saxophone in the 'thirties and early 'forties, is accompanied at this 1958 session by the then Oscar Peterson Trio plus drummer Alvin Stoller.

His playing is both warm (on *I'll Never be the Same* for example) and aggressive (*The World is Waiting for the Sunrise*), controlled yet flexible.

The accompaniment is subtle, magnificently responsive and well short of the obvious clichés it could have so easily fallen for.

The collection covers *You're Blase*, *I wished on the Moon*, *How Long has this been going On*, *Like Someone in Love*, *My Melancholy Baby*, *I'll Wind*, *In a Mellow Tone*, *There's No You*, *Somebody Loves Me* and *Blues for Rene*.

#### THE GREATEST TRUMPET OF THEM ALL. Dizzy Gillespie. WRC (TT 505), 3½ ips, mono, 29s. 6d.

The great Gillespie with a smaller outfit than usual with two trumpets, one trombone, one alto saxophone, one tenor saxophone, one baritone saxophone, string bass, piano and drums.

He is also much more restrained than usual and not very adventurous. The album has little to relate it with bop, big bands and showmanship—the predictable labels when Gillespie's name crops up.

But after a lifetime's production—he started in 1935 with Frank Fairfax's orchestra in Philadelphia—his massive contribution to the jazz world is that much richer for not being predictable.

Ray Bryant on piano deserves a special mention with some buoyant and attractive solos.

Best of the eight selections are *Out of the Past* and *Smoke Signals*.

The tapes reviewed this month are issued by: World Record Club, Box 11, Parkbridge House, The Little Green, Richmond, Surrey.

## TEST BENCH

(Continued from page 209)

All the input and output sockets are on the left-hand side of the recorder. There are four of these. Two accept the double plug from the dynamic microphone provided: one part of this double-plug being the remote control connection, and the other the miniature jack plug carrying the microphone connections. The remote control switch on the microphone stops the tape transport and on releasing the switch the tape takes about a second to reach a steady recording speed. Allowance must be made for this delay when recording.

The third socket is for the connection of the mains unit, available as an accessory. This socket also doubles as a connection from an external six-volt supply if required. The fourth socket is for an external loudspeaker or earphone. An earphone is supplied with the recorder. Inserting a plug into this socket mutes the internal loudspeaker, so the earphone can be used for monitoring purposes.

No separate socket is provided for connection to an external amplifier, nor for the connection of a radio input. A radio input can, however, be connected to the microphone socket. The input impedance at this socket is 2.7 K ohms, and the impedance at the monitor socket is 8 ohms. No sensitivity is quoted for the input socket.

The amplifier, built on a printed circuit incorporates six transistors and the power output is 700 milliwatts maximum. The internal construction is good, with all parts accessible on removal of the deck plate.

The manufacturers provide only a very sketchy specification, with no tolerances, and so a proper evaluation of this machine is rather difficult. It was given the usual practical and technical tests.

Recordings from the microphone supplied showed adequate sensitivity and the reproduction was fair. On the particular model tested—which had only arrived in this country ten days earlier—I detected some distortion and wow and flutter. But the price of this machine is only twenty guineas. At this figure obviously one cannot expect the earth!

Available as an accessory is the National RP22 footswitch (£3 13s. 6d.) which provides an additional feature for the recorder which can be used as a playback unit for dictation transcription. In this respect, the National is the cheapest available battery recorder and dictation machine.

#### MANUFACTURER'S SPECIFICATION

Power source: Four cells, 6 volts DC.

Rated output: 500 mW (700 mW max.).

Transistors: 2SB173, two 2SB175, two 2SB178, 2SB172.

Recording time: 20 mins. (3½ ips); 40 mins. (1½ ips) using standard-play tape; 40 mins. (3½ ips); 80 mins (1½ ips) using double-play tape.

Frequency range: 100-7,000 cps at 3½ ips; 100-4,000 cps at 1½ ips.

Input impedance: Microphone input jack (2.7 K ohms).

Output impedance: Ext. speaker jack (8 ohms).

Recording system: AV bias 30,000 cps.

Battery life: About ten hours.

Loudspeaker: Three-inch dynamic.

Weight: Approx. 4 lb. without batteries.

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(SEE PAGE 111)

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**NEW PRODUCTS**

**MARCONIPHONE  
ANNOUNCE  
THREE MODELS**

THREE additions to their range of tape recorders are announced by Marconiphone.

First of the new models is the 4210 (illustrated right), a three-speed four-track recorder priced at 45 guineas. Operating at  $7\frac{1}{2}$ ,  $3\frac{1}{2}$  and  $1\frac{1}{2}$  ips, it is the first of their range to accommodate seven-inch spools. The playing time available using standard-play tape (1,200 ft.) at  $3\frac{1}{2}$  ips is 64 minutes per track. The quoted frequency range is 40-18,000 cps at the top speed and wow and flutter are given as better than 0.15, 0.2 and 0.25 per cent at the three speeds.

Among the features are facilities for mixing and straight-through amplification, meter recording level indicator, pause control, automatic tape end stop, and tone control. An accessory socket allows a wide selection of ancillary equipment to be connected.

Their second four-track model is the 4208 running at  $3\frac{1}{2}$  and  $1\frac{1}{2}$  ips. The 4208 (illustrated below) accommodates  $5\frac{1}{2}$ -inch reels and provides a playing time of 45 minutes per track using standard-play tape (850 ft.) at the top speed.



Inputs are provided for microphone (1.5 mV into 10 M ohms), radio (1.5 mV into 68 K ohms) and pick-up (75 mV into 3.3 M ohms). Other sockets for high impedance output (500 mV into 22 K ohms) extension speaker (3 ohms).

The 4208 measures  $14\frac{1}{2}$  x  $12\frac{1}{4}$  x  $7\frac{1}{2}$  and costs 34 guineas.

Third new model is the 4206 a two-track recorder running at  $3\frac{1}{2}$  ips. Spool accommodation and playing time is as for the 4208, as are its dimensions, inputs and outputs, and controls.

Features for this 27-guinea model are limited to pause control, tone control, rev. counter, safety erase lock and a  $7$  x  $3\frac{1}{2}$  inch loudspeaker handling the three watts power output.

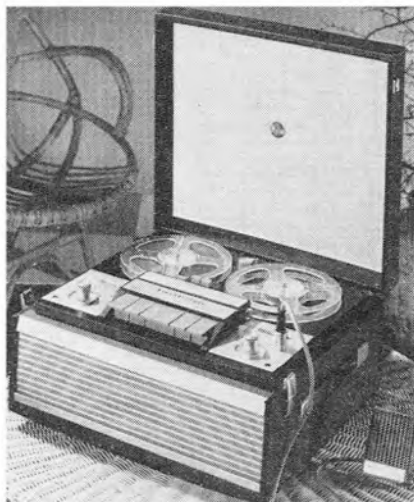
British Radio Corporation Ltd., 284, Southbury Road, Enfield, Middlesex.

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The recordings, available on tape only, run at  $7\frac{1}{2}$  and  $3\frac{1}{2}$  ips. Compiled into three tapes, they sell at 30s. each (post free within the UK). Recorded half-track, the tapes are designated FX1 (11 effects), FX2 (12 effects) and FX3 (14 effects), each tape running for approx.  $6\frac{1}{2}$  minutes. Effects on FX1 include street-market sounds, hydraulic drills, STD telephone box effects, London underground railway sounds, suburban electric train, and horse riders passing on road.

FX2 includes heavy traffic, tube station booking hall, airport reception lounge, building site, jet airliner, cocktail party; and FX3 includes airport exterior, sub-



The quoted frequency range is 60-10,000 cps at  $3\frac{1}{2}$  ips, and 60-6,000 cps at  $1\frac{1}{2}$  ips. Wow and flutter are given as better than 0.2 per cent (RMS) at  $3\frac{1}{2}$  ips, and signal-to-noise ratio as 40 dB.

Features include facilities for monitoring, straight-through amplification, superimposition, playback of stereo tapes, parallel-track playback, synchronisation of automatic slide projector, remote automatic tape end stop, pause control for footswitch or microphone, magic eye recording level indicator, three digit rev. counter with zero reset, safety erase lock to prevent accidental erasure, piano-key controls and rotary tone and volume controls.

The built-in  $7$  x  $3\frac{1}{2}$ -inch loudspeaker handles the power output of three watts.



scriber's telephone dialling routine, ducks, children's playground and suburban park with birds and distant traffic.

All audibly identified by their numbers, the effects are also available individually at 15, 7½ or 3½ ips, for any specified running time. Charge for this special service is approx. 7s. 6d. per minute for first five minutes and 5s. per minute thereafter (minimum order 30s.).

KLP's charges include amateur usage rights which are extended to the purchaser only for non-commercial purposes.

*KLP Film Services, 3, Queen's Crescent, Richmond, Surrey.*

## BUTOBA INTRODUCE NEW BATTERY RECORDER

**L**AATEST of the Butoba battery-operated tape recorders is announced by Denham & Morley who showed a prototype at the recent Audio Fair.

The new model, MT225 (illustrated below), is a two-track, three-speed recorder operating at 7½, 3½ and 1½ ips from battery or mains supply, and features relay push-button switches with feather-light operation.

The frequency range is given as 30-18,000 cps at 7½ ips, 30-15,000 cps at 3½ ips, and 30-8,000 cps at 1½ ips. Wow and flutter are rated as less than 0.1, 0.2 and 0.3 per cent respectively, and signal-to-noise ratio as better than 55 dB at 7½ ips and 50 dB at the other speeds. It will accommodate 5½-inch spools with the lid closed, providing a playing time of 45 minutes per track using standard-play tape (850 ft.) at 3½ ips.



Among the many features of this studio quality recorder are separate record and replay heads and amplifiers providing facilities for monitoring whilst recording (A-B test). Other features include facilities for mixing, echo and reverberation, automatic tape end stop, VU type recording level indicator which also doubles as a battery life indicator during replay, safety erase lock mechanism to prevent accidental erasure, digital rev. counter with zero reset, tone control and powered rewind with remote control switching.

Inputs are provided for dynamic microphone (0.15 mV at 10 K ohms), radio (6 mV at 500 K ohms) and pick-up (500 mV at 1 M ohm). Outputs (500 mV at 10 K ohms) are for extension loudspeaker (4-16 ohms) and dynamic earphones (8-400 ohms). The built-in loudspeaker is a seven-inch round unit handling the power output of two watts. The amplifier includes 21 transistors, ten diodes and zener diodes, and one silicon detector.

Power supply can be obtained from eight 1½ volt U2 cells, from two 6 volt "Dryfit" re-chargeable dry cells, a 12-volt car battery, or via the mains converter (110-260 volts, 50-60 cycles, AC mains).

The MT225 weighs 11 lb. (without batteries) and its dimensions are 12 x 10 x 5 inches. The cabinet is moulded die-cast,

silver finish, with grey leatherette covered parts and plastic battery housing.

Available in June, the new model will cost 127 guineas.

*Denham & Morley Ltd., Denmore House, 173-175, Cleveland Street, London, W.1.*

## SANYO INCREASE THEIR BATTERY RANGE

**N**EW addition to their range of battery-operated models is announced by Sanyo who have introduced their MR110 Batmain recorder.

The new model, illustrated below, is a 36-guinea half-track, two-speed recorder operating at 3½ and 1½ ips. The quoted frequency response is 100-7,000 cps at 3½ ips, and 100-4,000 cps at 1½ ips.

With accommodation for five-inch spools, the Batmain provides a total playing time of 32 minutes per track using standard-play tape (600 ft.) at the top speed.

Among the features are automatic recording level control and remote control on



microphone. The power output is rated at 0.8 watts undistorted from the amplifier which features eight transistors and four diodes.

Measuring 11½ x 10½ x 3½ inches, the Batmain will operate from six U2 cells or via an adaptor from 110-240 volts AC mains supply.

*Sanyo Service and Sales, 23, Savage Gardens, Trinity Square, London, E.C.3.*

## LONDON MICROPHONE ANNOUNCE THEIR NEW UNITS

**L**ONDON Microphone Co. announce the availability, ex-stock, of their LM100 dynamic omni-directional microphone.

The microphone, an advance review appeared in our March issue, is available in standard impedances (200 or 500 ohms) for £2 19s. 6d. Other versions will retail at £3 2s. 6d. (50/60 ohms) and £3 14s. 6d. (high impedance). Optional extras will include keyhole stands (1s. 6d.), wire desk stand (3s. 9d.) and a lavalier attachment (7s. 6d.).

With the announcement London Microphone forecast the arrival of dynamic cardioid microphones during the summer.

*London Microphone Co. Limited, Eardley House, 182-184, Campden Hill Road, Kensington, London, W.8.*

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4. **Audio and Acoustics** by Gilbert A. Briggs (1963). 168 pages, 140 illustrations. **12s. 6d.**  
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5. **Audio Biographies** by Gilbert A. Briggs and 64 collaborations (1961). 344 pages, 112 photographs and illustrations. **19s. 6d.**
7. **Cabinet Handbook** by Gilbert A. Briggs (1963). 112 pages, 90 illustrations. **7s. 6d.**  
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41. **Hi-Fi and Audio** by A. T. Collins. Useful introductory paperback. **3s. 6d.**
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*Sections on its uses in business, education and pleasure, how it works, etc.*
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*Deals in simple terms with the origin and generation of alternating current, construction of coils and capacitors. The second part deals with the nature of acoustics and construction and operation of devices used for sound recording and reproduction.*
21. **Practical Hi-Fi Handbook** by Gordon J. King. 224 pages. **25s.**  
*A guide to choice, installation and servicing of equipment, for dealer, engineer, and amateur enthusiast.*
22. **Practical Stereophony** by H. Burrell Hadden (1964). 159 pages. **37s. 6d.**  
*The author, an instructor at the BBC, has been actively engaged for many years in research in this field, as a result the book is mainly directed towards those who make this art their profession, but there is much for the amateur enthusiast.*
35. **Tape Recording Yearbook 1965.** **7s. 6d.**  
*The 1965 edition contains all the well-known facts and figures of earlier editions, revised to date, as well as important contents vital to all interested in this field. Compiled by the staff of "TAPE Recording Magazine" this Yearbook is a must.*

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no newcomer to the hobby, or enthusiast, should be without!

**Advice on Buying a Tape Recorder** by J. F. Ling.

**2s. 6d. (U.S.A. \$0.65) post free.**

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# News from the Clubs

## BEDFORD

Members of the Bedford tape club are planning to record all the principal events of Bedford's charter year celebrations.

The tapes, when completed, will be offered to any association or group of people unable to attend the celebrations through ill-health or infirmity.

Alan Hawkins, 15 Gloucester Road, Bedford, Bedfordshire.

## COTSWOLD

Mono and stereo recordings of a recital given by club member W. T. Martin were made by members of the Cotswold tape society during April. The members visited All Saint's Church in Gloucester to record their colleague who is organist and choirmaster of the church.

Several visitors were welcomed to the recital which was recorded on seven machines. Two Tandbergs were used for the stereo tapes, mono recordings being made using two Ferrographs, two Truvox models, and the Countess stacked spool recorder formerly known as the Timbra.

Secretary: Peter D. Turner, Pike Cottage, Frampton Mansell, Stroud, Gloucestershire.

## ESPERANTO

Just over a year ago we published a short note regarding the establishment of the British Esperanto Tape Friends' Society. Latest report shows that the venture has been very successful, there now being some 53 members from 15 different countries only two of which use the English language.

Feature of the club is the Correspondence Course produced by its members. K. O. Warne of Sweden, Mrs. I. Stephenson of England and Petro Poliscuk from Tashkent in Russia read the text from "Esperanto for Beginners" on to tape after permission to do this had been given by author M. C. Butler. On completion of this course, members of the club receive a full list of club members and facilities.

Secretary and founder G. Stephenson uses the language to correspond by tape, postcards and letters with enthusiasts in seventeen countries.

Secretary: G. Stephenson, "Hazelwood," Langshott, Horley, Surrey.

## F.B.T.R.C.

A survey of the progress of the Federation of British Tape Recording Clubs is made by Chairman Alan Stableford in the Spring issue of the Federation Bulletin.

June this year marks the Federation's eighth year in existence, and Alan describes its current healthy financial position despite some early apathy from clubs, indifference from the industry and lack of funds.

The chairman also mentions the Federation's part organising the 1965 meeting of the International Federation of Sound Hunters; their hopes for the organisation of Regional Groups; the encouraging growth in the number of Associate Members; and their nomination of the Editor of *TAPE Recording Magazine* as President to the Federation.

Other items in the bulletin include the secretary's report which mentions their AGM to be held on May 21 at the Hotel Russell in London (2.30 p.m.) and their desire to establish a list of lecturers on tape recording subjects.

Included in the package being sent to Federation members with the Bulletin are a copy of their 18-page Sound Archives catalogue which also lists British and International contest winning tapes, BATRC forms, a copy of the GPO Airmail list which details their Phonopost system for mailing tapes, and details regarding their forthcoming AGM. A hefty package weighing some 15 ounces.

Secretary: Arnold Highcazony, 101 Roseville Road, Hayes, Middlesex.

## FRIERN BARNET

A change of secretary is announced for the Friern Barnet society who held their AGM at the end of February. The post is now held by Roderick Longhurst of 72 Grasvenor Avenue, Barnet, Hertfordshire.

## LEICESTER (1)

A demonstration and discussion on microphones was the subject for one of the latest meetings of the Leicester society. Various types were shown and a lot of questions asked bringing to light many difficulties encountered by members.

At the following meeting Alan Heywood gave a talk on tape and film synchronisation. His programme concluded with a film with taped commentary of holidays in the Isle of Man and London.

Talks and demonstrations on basic operating procedure and equipment was given by John Buckler and John Moule at a meeting set aside for beginners. This was followed by final details for the club's stand at the "Leisure 66" exhibition held at the Granby Halls at the end of April.

Chairman Howard Dutton represented the club at the recent AGM of the Association of Midland Tape Recording Clubs, and about ten members visited the Audio Fair. Other activities have included visits to the recording of a television show "Going for a Song" during the BBC week recently held in Leicester.

Secretary: P. Warrington, 20 Langham Drive, Narborough, Leicestershire.

## LEICESTER (2)

The formation of a second tape club in Leicester is announced. Meetings are being held on the 1st and 3rd Thursday of each month.

Catering for a strictly limited membership, the new club is reportedly making good progress and already has two recording projects under way. One of these is intended to be their entry in this year's British Amateur Tape Recording Contest.

Among their initial ventures has been attendance at BBC week in Leicester. Members availed themselves of many opportunities to find out "what goes on."

Secretary: Dennis E. Buckley, 155 Broad Avenue, Leicester, Leicestershire.

## MERSEYSIDE

Another new club announced this month is the Merseyside society which has its headquarters in Liverpool.

Meetings are being held every Friday at Brockman Hall, Snaefell Avenue, Tuebrook, Liverpool 13.

Formed as an organised but not too formal group of amateurs, the members look forward to hearing from any local enthusiasts of either novice or experienced status. "Whether you own the simplest machine on the market, or a careful of stereophonic equipment, if it is used creatively we would like to hear from you," says secretary Ted Elcock.

Latest reported venture of the club was their attendance at the recent Audio Fair. Ted Elcock operated his Stella cassette-loaded battery recorder to good effect collecting interviews and opinions. I found myself on the wrong end of his microphone at one stage

sending a message to the new members. I understand it came out "quite well" (1).

Secretary: E. J. Elcock, 37 Rockbank Road, Stoneycroft, Liverpool.

## OLDHAM

News of the intended formation of a club in the Oldham area is received from Jeffrey Garner of 77 St. George's Square, Chadderton, Lancashire. Interested readers are invited to contact Mr. Garner direct.

## OVERSEAS STUDENTS

A course on the educational uses of tape recorders is being run by the Overseas Students' tape recording group. Eighteen two-hour periods are involved and leading names in the tape industry have been invited to cover the various aspects of the subject.

Frank Parrington of BASF Chemicals Ltd. lectured on the history of tape; George Pontzen of Lustraphone talked about microphones and Ken Smith of Truvox covered tape recorders. On May 6 the Editor of *TAPE* visited the group to talk about the tape recording journals and the part they play encouraging the hobby. Future programmes are to include language laboratories, audio-visual aids, and using a single machine.

The series is part of a break-down of the club's activities into three main groups: talks, practical sessions and education. In section 2 they have held three two-hour sessions on editing. This proved to be a very popular subject and a high degree of skill has been achieved. Jeffrey Rawle of Trinidad became involved in this section, producing another of his tape/slide shows "Islands in the Sun." Next involved were sound effects and the group welcomed Gordon Bowen of the BBC as their guest.

Their talks have included an account of the activities of tape recording clubs, presented by members of the Thornton Heath society; "Introduction to tape recording"; and "Out and About" presented by Peter Orr of the British Council's Recorded Sound department.

The group is also engaged preparing their entry into the 1966 British Amateur Tape Recording Contest.

Secretary: Derek Chatterton, The British Council, 11 Portland Place, London, W.1.

## SOUTH REACH

Technical details of a tape recorder and its functions together with a practical session on tape splicing was given at one of the latest reported meetings of the South Reach tape club. Denis Burrige used a Truvox recorder to illustrate editing techniques, and he was followed by chairman Tom Butler who used a Stella machine to demonstrate the use of a battery portable tape recorder for interviewing.

At Christmas, the group's Hospital Programme was given a local flavour with the inclusion of programmes recorded at two nearby schools. At the first the members recorded a carol service and then went on to record a school's brass band playing carols.

The programme was completed by recording an interview on board the Mission to Seaman boat, *John Ashley*, which called in at Erith to collect over 2,000 books and magazines collected by the club members.

Secretary: T. C. Butler, South Reach County Youth Centre, Manor Road, Erith, Kent.

## STEREO TAPE CLUB

The mating call of wild animals is the subject for the latest production of the members of the Stereo Tape Club. Our front cover girl this month would possibly be interested in this project, although it would appear her recording session was slightly less terrifying than that of one of the South African members. He was chased by a wild elephant

during the course of his search for suitable material. Perhaps he should have read Alan Beeby's article (page 207).

When not being chased around the Bush, members tackle equally tricky but less damaging projects. Two of their latest ventures have included the construction of a twenty-four-inch parabolic reflector and a reverberation unit. Details of their reflector have been requested, and these will be published in a future issue of *TAPE*.

Secretary: A. H. Williams, 3 Clan Buildings, 181 Main Road, Diep River, Cape Town, South Africa.

## TAPE EXCHANGES

**T**APE recorder owners who wish to contact others with similar interests, to exchange news and views by tape are invited to fill in and return the form on page 224 giving their name, age, address, special hobby or interest for this free service.

Details given here also include speeds to be used, spool size, name of recorder, and special area to be contacted.

**Griffiths, Derrick** (52). 121, Parkston Crescent, Kingstanding, Birmingham 22C, Warwickshire. Short-wave radio. 3½ ips. 5½-inch spool. Defiant tape recorder.

**Harding, Anthony** (25). The Bungalow, Dragons Cross, Bilbrook, Minehead, Somerset. Photography, cars, speedway, most music. 3½, 1½ ips. 5½-inch spool. HMV, four-track recorder. Male contacts only.

**Harris, Stanley** (36). 5, Carlton Road, Boston, Lincolnshire. Trad. jazz and swing music. 3½ ips. 5½-inch spool. Westminster recorder. **Holland, Sweden, Denmark, Switzerland.**

**Hawkins, Leslie** (41). 3, Smallmead, Horley, Surrey. Aircraft, motoring, most music. 7½, 3½ ips. 7-inch spool. Grundig TK30. **USA, Canada.**

**Hill, Dennis Frederick** (39). 12, Hook Lane, Welling, Kent. Photography, travel, light classical music. 3½ ips. 5½-inch spool. Grundig TK24, four-track. Female contacts preferred in **UK, USA, Canada, Australia, New Zealand, Ireland.**

**Hookham, F. J.** (21). 10, Lower Street, Caellepa, Bangor, Caernarvonshire, Wales. Pop music. 3½ ips. 5-inch spool. Westminster recorder. Female contacts only.

**Hudson, George** (27). 1657, Pershire Road, Kines Norton, Birmingham 30. Cine, photography, hi-fi, pop music. 7½, 3½, 1½ ips. 7-inch spool. Caroussel Mk IV. Letters not required.

**Jenner, G. Alarie** (33). 60, Jennings Street, Swindon, Wiltshire. Psychology, German language, reading, TV and cinema. 15, 7½, 3½, 1½, 15/16 ips. 7-inch spool. Brenell, Philips, Dansette recorders and Philips Cassette portable. Female contacts only.

**Kennedy, Brian** (24). c/o Old Swinford Hospital, Stourbridge, Worcestershire. French language, golf, cars, modern jazz music. 3½, 1½ ips. 5½-inch spool. Ultra 6202. **USA, France, Australia.**

**Lowe, Kenneth** (26). Sunfold, Aston Hill, Hawarden, near Chester, Cheshire. 8mm cine photography, rambling, sport, humour. 7½, 3½, 1½ ips. 7-inch spool. Truvox R94, Philips four-track.

**Kirkpatrick, M. George** (21). 35, Eversley Crescent, Ruislip, Middlesex. Photography, motoring, all music. 3½, 1½ ips. 7-inch spool. Philips EL3558, four-track. Female contacts only in **UK, South Africa, France.** Letters not necessary.

**Larty, Arthur** (29). 93, Marlborough Drive, Fallsforth, near Manchester, Lancashire. Organ music. 7½, 3½ ips. 8½-inch spool. Ferrograph 5A/N. Female contacts preferred.

(Continued on page 224)



# CLASSIFIED ADVERTISEMENTS

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**AGENTS** required sell high-quality British Recording Tape. Clubs or individuals **WRITE FOR DETAILS** to: Box 464, TRM.

## TAPE EXCHANGES

(Continued from page 223)

**Richardson, Alan** (31). 85, Forest Road, Romford, Essex. Comedy. 3½ ips. 7-inch spool. Philips EL3541 and EL3549, four-track. **UK, USA.**

**Rimington, John** (48). 39, Elmstone Road, Rainham, Kent. 35mm and cine photography, all music. 7½, 3½ ips, 8½-inch spool. Ferrograph 4A.

**Roberts, Eric** (30). 3, Ravensbourne Court, Ravensbourne Park, London, S.E.6. Travel, photography, swimming, classical music. 15, 7½, 3½ ips. 10-inch spool. Revox recorder. Male contacts only in **London, Home Counties, Holland.**

**Rogers, Pete** (26). 4, Fury Lane, Manby, Louth, Lincolnshire. Stereo hi-fi recording, most music. 7½, 3½, 1½ ips. 7-inch spool. Tandberg 64 and 62. Overseas only, letters not required.

**Rolle, Len** (40). 54, Silver Road, Norwich, Norfolk 43R. Family, c & w music. 3½ ips. 5½-inch spool. Grundig, four-track and Elizabethan. **UK, France.**

Tape recorder owners wishing to make contact with others of similar interests are invited to complete and return this form. (BLOCK LETTERS PLEASE)

Name ..... Age .....

Address .....

Special interests .....

Speeds to be used ..... Maximum spool size .....

Recorder owned .....

Special areas to be contacted .....  
(Unless otherwise stated, I am prepared to accept tapes from any part of the world)

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TAPE EQUIPMENT supplied at special prices. Send requirements: Audio Enterprises, 49, Hendham Road, LONDON, S.W.17.

YOU OUGHT to send for a copy of "Psychology and Whisper Teaching" to York House, New North Road, Huddersfield. (5s. 9d. post free).

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**Rookard, Dennis** (23). 8, Railway Square, Brentwood, Essex. Photography, humour. 7½, 3½, 1½ ips. 7-inch spool. Akai M69, Philips EL3542 and EL3585, battery portable.

## OVERSEAS READERS

**Kremensky, George** (28). 13600, Tesson Ferry Road, St. Louis, Missouri 63128, USA. Opera music. 7½, 3½ ips. 7-inch spool. Ampex 890 recorder. **Italy, Germany, UK.**

**Nash, Ron** (17). 26, Bruce Street, Kogarah Bay, Sydney, New South Wales, Australia. Skin-diving, pop music. 7½, 3½ ips. 7-inch spool. National RQ705. Female contacts preferred in **UK, USA, Germany.** Letters first please.

**Pais, Antonio Carlos** (30). Dundo, Lunda, Angola, Africa. Photography, most music. 7½, 3½ ips. 7-inch spool. Akai recorder. Female contacts preferred in **USA, Canada, Brazil.**

**Verguts, Frank** (37). 7, Florisstraat, Antwerp, Belgium. Photography, 43R music. 7½, 3½, 1½ ips. 7-inch spool. Acec and Novak recorder, four-track. Male contacts only.

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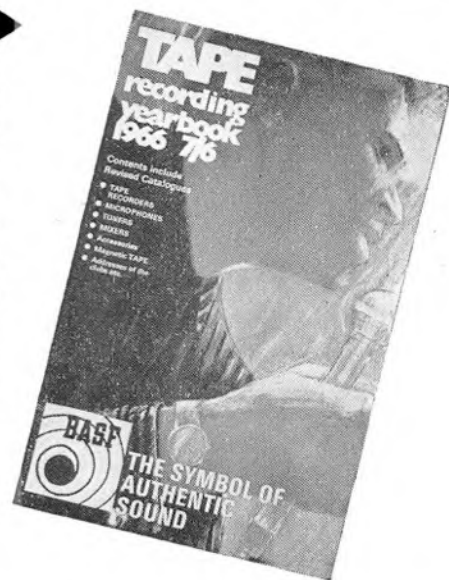
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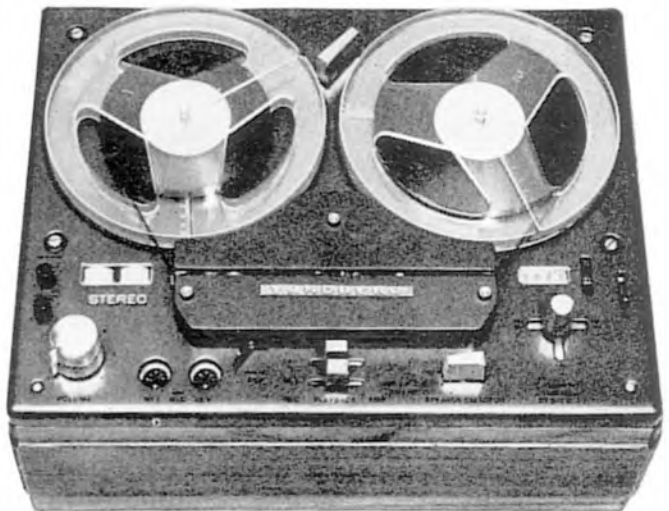
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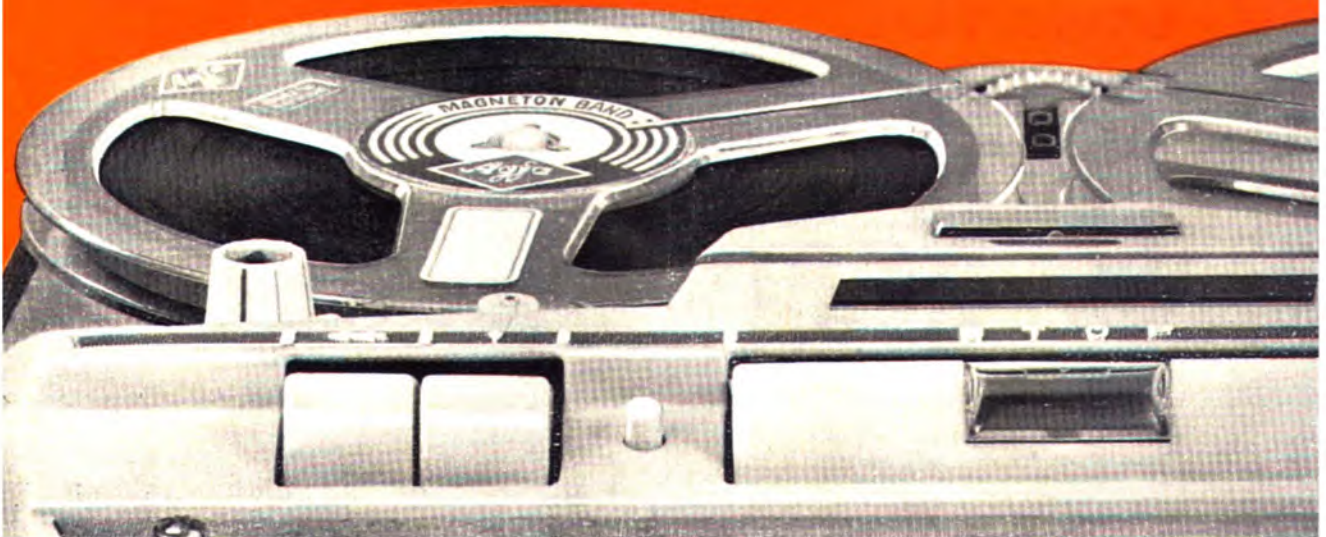
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