

JANUARY 1970

2'6

# TAPE

RECORDING MAGAZINE

THE MAN WHO  
INVENTED  
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CONTEST RESULTS**  
MOVEMENT IN STEREO

Reviews—Uher 714  
and Rotel 120-ST  
etc. etc. etc.

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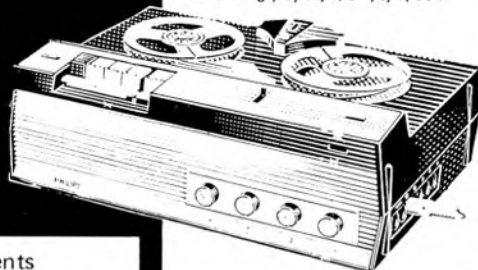
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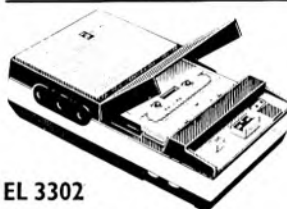
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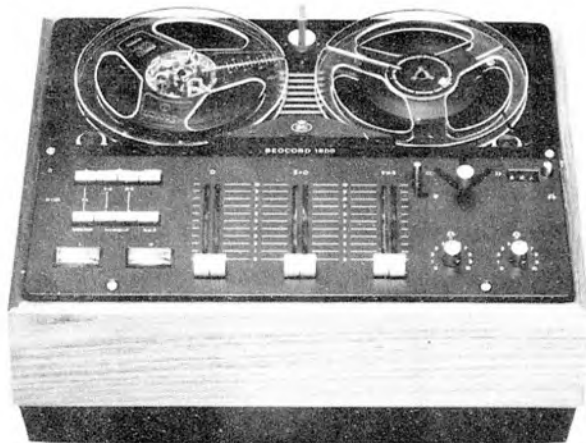
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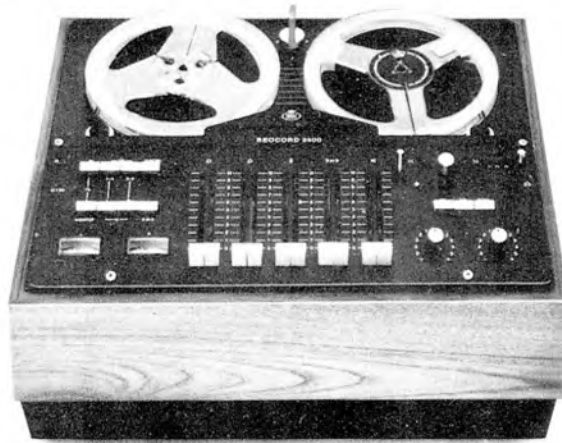




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BEOCORD 1800



BEOCORD 2400

## Made by Bang & Olufsen for those who consider design and quality before price.

Whether you prefer to centre your High Fidelity system around a separate amplifier, or to base it on an amplifier integrated into one of the audio units, your needs for a tape recorder to complete your system can be satisfied by choosing one of these new Beocords. Both machines exceed the minimum requirements for DIN 45.500, and have operational facilities comprehensive enough to attract the semi-professional as well as the domestic user. These include a 3 digit tape counter with push button

**The Beocord 1800** – designed for use with a High Fidelity amplifier such as the Beolab 5000 or Beomaster 1400.

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**The Beocord 2400** – complete with its own stereo amplifier section giving 2 x 10 watts RMS output.  $\frac{1}{4}$  track record and replay. 4 dual channel inputs in mixer section including a magnetic P.U. input. Bass, treble and split channel volume controls. Switched output for 2 pairs of speakers. The amplifier may be operated independent of the motor.

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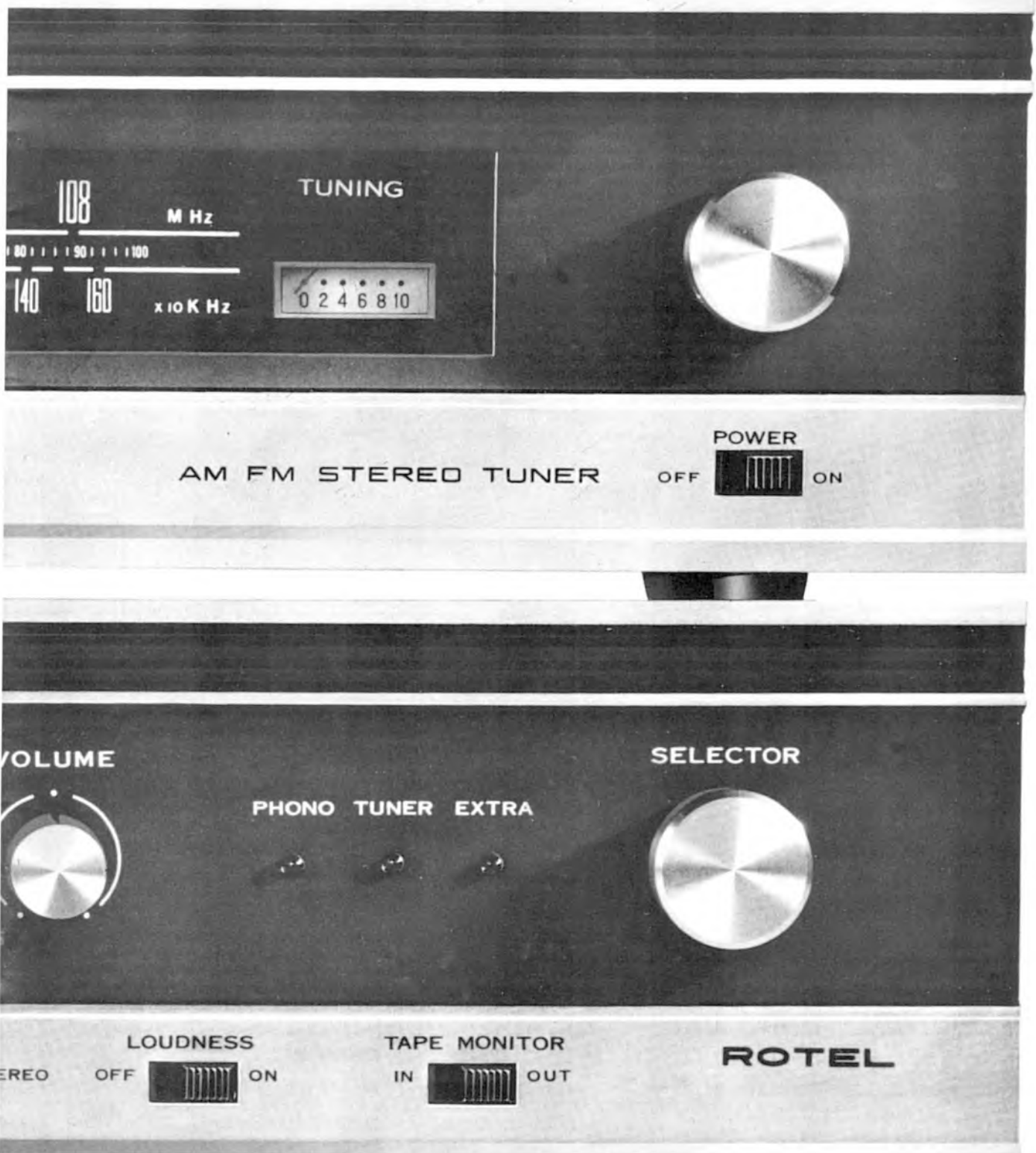


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From a name you've never heard of, comes the best value-for-money equipment in Britain. The 120 ST tuner at £49.10.0 (recommended) and the 100 AMP amplifier at £45.10.0 (recommended) are part of the Rotel range. Take a good look at these

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#### SPECIFICATIONS

##### 120-ST AM FM STEREO TUNER:

Transistor:  
15 Transistors, 11 Diodes,  
2 Power Diodes

Frequency range:

FM; - 108 MHz

AM; 535 - 1605 kHz

Sensitivity:

FM; 2.5 micro volt for  
20 db quieting

AM; 300 micro volt/meter for  
20 db quieting

MPX separation:  
Better than 35 db 1 kHz

100% modulating

FM harmonic distortion:

Less than 1% at 1 kHz

100-AMP STEREO AMPLIFIER:

RMS output power:  
15 watts R.M.S. per channel  
at 8 ohms

Input sensitivity:

MAG; 4mV for maximum output

AUX; 200mV

TUNER; 100mV

Frequency response:

25 - 15,000 Hz + 1.5 db

at maximum output

Harmonic distortion:

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Tamla Motown BX STML 11120

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	Deposit	12 Monthly Instalments	Cash Price
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Ferguson 3232	33 5 0	5 1 10	93 5 0
Sanyo MR929	33 4 9	5 6 10	97 4 9
Philips M4407	35 15 10	5 13 4	103 15 4
Sanyo MR939	38 13 6	6 2 3	112 0 2
Sony TC230	40 11 9	6 15 0	121 11 9
Telefunken 204TS	41 19 0	6 13 4	124 19 0
Sanyo MR990	44 18 0	7 5 0	131 18 1
Philips 4408	46 19 5	7 8 9	136 3 10
Tandberg 1241X	49 0 0	8 6 8	149 0 0
Beocord 2000K	53 5 0	8 17 6	159 15 0
Beocord 2000T	55 5 0	9 4 2	165 15 0
National			
Console-Aire	62 0 0	10 5 0	185 0 0
Ferrograph 724	68 16 9	11 6 8	204 16 9
Akai M9	68 12 4	10 16 8	198 12 4
Revox 1222/4	74 11 0	12 8 6	223 13 0

### 4-TRACK MONAURAL

Fidelity Braemar	11 12 8	1 17 4	34 4 8
Fidelity Studio	15 17 10	2 10 2	46 0 10
Grundig TK144	16 10 1	2 11 11	47 13 1
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Ferguson 3228	16 16 8	2 13 4	48 16 0
Ferguson 3238	20 12 0	3 5 0	59 12 0
Philips 4308	20 14 2	3 5 7	60 0 10
Ferguson 3216	22 16 0	3 12 2	66 2 0
Tandberg 1541	21 0 0	4 10 0	83 0 0
Reps HW10-4T	28 16 9	4 11 2	83 10 1

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	Deposit	12 Monthly Instalments	Cash Price
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Sony TC355	34 2 6	5 10 0	100 2 6
Akai 4000D	29 10 0	4 16 8	89 10 0
Tandberg 62/64X	52 0 0	8 13 4	167 0 0
Ferrograph 702/704	64 15 8	10 16 8	194 15 8
Revox 1102/4	63 19 0	10 6 8	187 19 0

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# Model MR-120

## -a highly versatile portable tape recorder

Operates on six flashlight batteries or regular household current. Develops tremendous output power of 2.5 watt when played on AC. Solid state circuitry. 2-speed, 2-track operation. Spindles accommodate 5-inch reels. 3-position mood switch provides instant tone adjustment for popular and classical music and speech. Twin recording level controls—for speech recordings the automatic level control guarantees a constant recording level, for music, the accurate level meter is used. Two different sources (mike + radio, mike + record player etc.), can be used simultaneously for recording. Light, sturdy plastic cabinet is convenient to carry with slide-out handle that disappears when set is in use.

### SPECIFICATIONS

**Recording System:**  
AC bias, 2 tracks  
**Erasing System:**  
DC erase

### Tape Speeds & Recording Time:

(with 5" reel, 2 track 50 $\mu$  tape)  
3 $\frac{3}{4}$  ips. (9.5 cm/sec) 64 min.  
1 $\frac{7}{8}$  ips. (4.75 cm/sec) 128 min.

### Frequency Response:

70-8,000 c/s at 3 $\frac{3}{4}$  ips.  
70-4,000 c/s at 1 $\frac{7}{8}$  ips.

### Output Power:

Maximum 2.5W (at AC operation)  
1.8W (at DC operation)

### Power Requirement:

AC: 115V/230V 50-60 c/s  
DC: Size-D (UM-1) x 6

### Output Impedance:

Ext. sp: 8 ohm

### Input Impedance:

Mic: 3k ohm  
Radio: 100k ohm

### Loudspeaker:

6 $\frac{3}{8}$ " x 3 $\frac{1}{4}$ " permanent dynamic speaker  
Voice coil impedance 8 ohm

### Power Consumption: 15W

### Dimensions:

12" width x 8 $\frac{1}{4}$ " depth x 4 $\frac{1}{8}$ " height

(305 mm x 209 mm x 105 mm)

### Weight:

9.7 lbs (4.4 kg) approx.

### Accessories:

Microphone; 5" full tape;  
Empty reel; Patch cord;  
Splicing tape

The MR-120 is available from the Sanyo dealer in your area, specially selected for first-class before-and-after-sales service. Or you can write for illustrated leaflet to:

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AKAI M9 (S/4) ... ..	Our price ONLY 115 gns.
SONY TC800 (BP/M/2) ... ..	Our price ONLY 49 gns.
VORTEXION WVB 4 (M/2) ... ..	Our price ONLY 52 gns.
TANDBERG 1241 (S/4) ... ..	Our price ONLY 69 gns.
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(200 YDS. KINGS CROSS)

TERMINUS 8200

(HALF DAY THURSDAY)

# TAPE

RECORDING  
MAGAZINE

Incorporating TAPE RECORDING & HI-FI MAGAZINE  
and STEREO SOUND MAGAZINE

Vol. 14 No. 1 January 1970

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Cover Photograph: There's a feeling of Spring about our cover for the first month of 1970. Two young people take their Uher Report series battery portable out and about on the Embankment in London. Test Bench this issue reviews a new budget-priced Uher mains machine, the 714. See page 22.

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# Tape trends and tape talk

By Douglas Brown

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**HOLD TIGHT AND WAIT FOR EXCITEMENT!** Amateur tape recording, I predict, is shortly to enter its most fascinating phase. Note three significant pointers to the future:

1. A Californian tycoon called Irving Katz, who is turning out four million tape cassettes a month and who looks like doing ten million dollars' worth of cassette business this year, has announced his coming invasion of Britain. Expect a flood of business by the end of next year at prices probably a third below the present level.

2. Philips is manufacturing in Vienna and selling in several European countries a new videotape recorder suitable for amateurs, and I predict we may have it on sale here next year. I have examined the machine on the Continent. It is no bigger and no more complicated in its controls than some present-day sound recorders. In Holland it sells at 1850 guilders (about £215), the half-inch chromium dioxide magnetic tape costs 145 guilders (about £17) for 45 minutes' playing time, and the camera costs 1410 guilders (about £165). Other European manufacturers are hard on Philips' heels with machines suitable for amateurs.

3. Three international giants are engaged in a race to produce cassettes and recorders to handle home recording of colour (or black-and-white) TV programmes, or to play pre-recorded sound-and-vision tapes in the home. A Philips-Grundig-Sony joint team looks like coming up with marketable equipment first, probably within the next two years. The prototype is working well, using a cassette the size of a thick paper-back. For black-and-white recording only a British consortium involving Rank and I.C.I looks like having a £200 machine ready next year.

Will the average recording amateur really be able to afford, or have the inclination, to broaden out his interests with this new generation of equipment?

The manufacturers think so. In Holland Philips have made available to the amateur recording clubs on free loan one of their new videotape recorders. Each club will be able to experiment with it for a couple of months. And next year the Dutch national contest for amateurs will include, for the first time, a video section.

\* \* \*

**BRITISH ENTHUSIASTS MUST NOT lag behind.** The directorate of the International Federation of Sound Hunters discussed the prospect ahead when it met in Copenhagen recently. President Heinz Runge said the time had come to consider carefully how the International Recording Contest might need to be reorganised to include sound-and-picture tapes.

All countries affiliated to FICS, including Britain, have been asked to send in before the end of this year their experience of video and their views on

future possibilities. And Herr Runge suggested that each national delegation going to Lausanne for next year's International Recording Contest should take with it a videotape made by amateurs, so that these could be assessed on an experimental basis.

It is a challenge full of excitement. Long-term readers of *TAPE Recording Magazine* will recall that we organised the first-ever video recording session by amateurs back in the summer of 1966. The equipment we used then cost £2,000 and we concluded that video recording by amateurs was not a practical proposition "in the next few years".

I can assure readers that now it is possible and this magazine will play the leading part in keeping enthusiasts informed on this subject.

\* \* \*

**WE HAVE SEEN A LOT** of changes since February 1957, when this magazine first appeared. For one thing, we have watched the birth of two rival magazines covering the same field. Soon we shall again be the only magazine offering a specialised coverage of tape recording in all its forms specifically for the amateur enthusiast.

We send good wishes to the longest-lived of our competitors, which has just announced that it is changing its title and its editorial emphasis in future, and looking more to the professional than the amateur. As they say, the change will overcome a long-standing and sometimes embarrassing confusion between their title and ours.

We keep our title *TAPE Recording Magazine*. We keep our policy: a comprehensive service of information and advice to amateurs on every form of tape recording and reproduction.

\* \* \*

**HANNE NIELSEN**, aged 13, must be the most successful young recording enthusiast in the world. As reported elsewhere in this issue she took a prize in this year's International Recording Contest — her first international success.

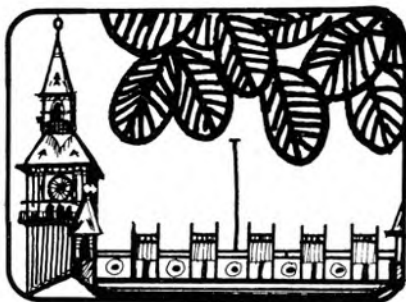
But in the Danish national contest she is a regular winner. She has been recording since she was eight. Her father, Svend Erik Nielsen, is one of Denmark's best-known amateurs, a great music-lover and particularly skilful in recording music.

Hanne entered a music recording in the Danish contest five years ago and won a microphone. She has entered her national contest almost every year since and has won a prize every time. She has won all the equipment she uses — microphone, recorder and tapes.

She is, in the expert view of her father, particularly good at interviewing, cutting and editing.

I should like to hear of any British youngster with a comparable record of achievement.





# INTERNATIONAL RECORDING CONGRESS

Douglas Brown reports on the eighteenth CIMES judging at Copenhagen and describes some of the winning tapes. British tapes were among those sharing £1,000 of prizes.



THE eighteenth International Recording Contest – CIMES – staged in Copenhagen in October marked a high peak in the developing collaboration between amateur recording organisations, professional radio men and the leading firms in the tape industry. The Danish capital lived up to its reputation for providing some of the most wonderful hospitality imaginable.

And the tapes entered in the Contest? There were fifty of them and, if the overall average of quality set no new standards, the best were very good indeed.

Britain entered five tapes and these were placed seventh ("Addington Palace", by Robert Prizeman, of Croydon), fifteenth ("Black Velvet", by Ken McKenzie, of Sunderland), twenty-first ("Have a drink", by Peter Bastin, of Worcester), twenty-eighth ("Shaftiana", by Michael Axtell, of London, S.E.9) and fiftieth ("January Storm", by John and Peter Douglas, of Dumbarton).

As reported last month, Robert Prizeman and Ken McKenzie carried off prizes. Incidentally, over £1,000 was distributed in cash and equipment, quite apart from the silver cups and other trophies, so that the opportunities offered by CIMES ought to attract many more entries in the British contest.

The level of British achievement, compared with that in other European countries, is best measured by giving the average marks scored by each national selection of tapes: France, 19.61; Switzerland, 18.80; Denmark, 18.46; Czechoslovakia, 18.44; Germany, 18.02;

Holland, 17.61; Britain, 17.44; Italy, 16.41; Belgium, 15.44; Sweden, 15.09. The maximum points a tape could score was 30: ten for idea, ten for production and ten for technical quality.

Now for the winning tapes. The Grand Prix was won by Lucien Wasmer, of Geneva, a veteran among CIMES competitors, whose feature about Valdemar Poulsen, the inventor of magnetic recording, scored 24.64 points out of 30. M. Wasmer has been recording since 1956 and has first-class equipment – Revox and Uher recorders, a Sennheiser MD 211 microphone and a mixer he has made himself. In his own home he recorded a ten-minute documentary about Poulsen which matched the standards of a professional radio programme. The facts were conveyed by two narrators, each of whom spoke only a sentence or two at a time, so that there was a lively contrast of voices. Carefully selected music, a few effects and a recording of Poulsen's voice were blended in, and Wasmer achieved a tape of outstanding quality.

The tape which was placed second, the merest fraction of a point behind Lucien Wasmer's, was based upon a much more original – but basically simple – idea. It was called "Words in Fashion" and was submitted by Jean Silvaistre, of Mably, France. M. Silvaistre had noted that some words and phrases move quickly in and out of fashion and he identified the "pop" words of the 1968-9 season as "participation", "dialogue", and "forecast". He then secured recorded extracts from the public pronouncements of ten leading French politicians or commentators and linked them with his own brief but witty narrative. It added up to four and a half minutes of interesting and amusing listening.

Third prize in the Contest went to Wilhelm Gluckert, of Mainz, another veteran competitor. Once again he produced an outstanding music tape: outstanding not only for its recording quality, but also for the ingenuity and the diligence shown in planning and executing the work. It was a recording of part of a concerto played on a clarone. This is an instrument no longer in use, but the predecessor of the clarinet. The music was composed by an unknown master of the age of Mozart, is in private possession and has never been published. Gluckert brought together the instrument and the score, organised a special orchestra of students and others, and then presided over the whole recording proceedings. It was a *tour de force*.

The two prizes from Britain went to competitors in the host country, Denmark. The silver rose bowl given by the Federation of British Tape Recordists and Clubs was won by Erik G. Jorgensen, of Hellerup, for a short actuality recording of a female Sumatran rhinoceros. The *TAPE Recording Magazine* shield went to Mogens A. Gardboe, of Federicia, for a documentary about Copenhagen's Royal Lifeguard.

*Top picture shows Lord Mayor of Copenhagen Urban Hansen welcoming CIMES members to his city. J. van Dam records for Belgian Radio.*

*Centre: Embrace for the youngest – and most attractive – competitor, 13-year-old Hanne Nielsen, of Denmark, whose feature tape won her a prize of 2,500 Belgian francs.*

*Picture below shows officials of the International Federation of Sound Hunters at a meeting of the directorate. Left to right: K. Dannefeldt Bothner (Publicity Officer), Dr. Jan Mees (Secretary-General) and Heinz Runge (President)*



# EDUCATION

## COPYING COMPACT CASSETTES



### A TRM REPORT

The Infonics reel-to-cassette high speed copying machine. This model will accept master tapes recorded at either 3 $\frac{3}{4}$  or 7 $\frac{1}{2}$ ips and is distributed by Fraser-Peacock Associates Ltd of 94 High Street, Wimbledon Village, London, S.W.19.

WITH the increasing popularity of the Compact Cassette system education authorities are beginning to appreciate its advantages over the slightly more difficult to handle open spool medium. In our opinion the difficulties of handling standard width tape on open spools have been grossly exaggerated; nevertheless a fool-proof package such as a cassette is a much safer product to hand to young children and is also more manageable by the teacher when he is having to divide his attention between up to forty persistent enquiring juvenile minds and a tape recorder.

However desirable cassettes might be for educational applications there has been one unfortunate snag: too often the material required is not available in this medium, or, if it is available, it has been difficult to produce a number of copies for general classroom use. Now with the advent of a new service and new equipment the situation has changed.

The machinery used by the record companies for the high speed copying of Musicassettes is highly sophisticated and extremely expensive. It would be quite impractical for any educational establishment to invest in a laboratory ("factory" would be a better term) of this kind. Or indeed anything like it. So to meet the need for more simple and relatively less costly machinery the London firm of Fraser-Peacock Associates Limited are importing and distributing the Infonics range of high speed tape duplicating equipment. This includes a "reel-to-cassette" duplicator which is said to produce four one hour cassettes every four minutes from a master open spool tape which could have been recorded by the teacher at 3 $\frac{3}{4}$

ips.

The copying procedure is simplicity itself. The master tape is laced up on the inclined deck portion of the equipment and four blank cassettes are inserted in the vertical face. After setting the gain controls for mid-scale reading on the VU meters the entire system is ready for duplication. By pressing two interlocked push buttons both the master tape and all four cassettes are put into high speed motion, the master tape at 30 ips. and the cassettes at 15 ips. Thanks to this speed increase a typical C 60 one hour cassette in which both tracks are duplicated simultaneously can be produced in only four minutes. C 120 two hour cassette naturally takes twice as long — eight minutes. The master tape transport senses the end of the master tape and shuts the entire instrument off.

A dual speed model of the same equipment (under reference RCD) is also available giving a choice of 7 $\frac{1}{2}$  or 3 $\frac{3}{4}$  ips. speeds in the original master recording; four track operation for the copying of stereo music requires the use of Model RCD-4.

Thanks to the courtesy of Fraser-Peacock Associates Limited we have been privileged to handle the first of these machines to have been delivered in the U.K. We found it to be ruggedly constructed and as simple to use as any piece of standard recording equipment. The lightning speed with which four Compact Cassette copies of an open spool recording were produced was most impressive. We were able to compare the quality of the copies produced on the Infonics machine with the quality standard achieved in Philips own high

speed copying plant at Walthamstowe. The only possible criticism of the Infonics copy was in the tiniest increase in hiss level, so small as to be practically inaudible.

Equipment of this kind is of course totally unsuited for ordinary domestic use. But the educational establishment will consider the capital expenditure of approximately £2,000 to be more than justified; it will enormously increase the versatility and flexibility of its audio aids department through the use of a high speed reel-to-cassette duplicator. But to cater for organisations who feel that this represents too great an outlay the distributors are offering their own high speed copying service. All that will be necessary will be for the appropriate master tape to be sent to them together with instructions on the number of compact cassette copies required and all the work will be done. As the same organisation also handles tape editing and mixing, tape synchronous pulsing, duplication of transparencies, film strip production and even script writing there is now a ready made self-contained service available to both industry and education that will readily bring all the advantages of audio and audio visual presentation to the classroom, the conference room or the sales room.

Not only are their engineers prepared to undertake development and prototype work on audio visual equipment but the firm also offers most makes of recording equipment — either reel-to-reel or cassette — for sale or hire. We wish them good fortune and congratulate them on their initiative in exploiting the potentialities of both sound and vision to the very full.



# SONY

Model TC-630—the complete stereo sound control centre. Echo and sound-on-sound recording at the flick of a switch. Multiple inputs for stereo tuner, microphone, auxiliary speakers and optional turntable. Further refinements include three heads, three speeds, dual VU meters, retractable pinch roller, noise suppressor, and scrape filter.

Compact and superbly built, the TC-630 has a built-in stereo amplifier delivering a full 15 watts per channel rated output. Two lid-integrated speakers open up a world of stereo sound... **What more can we add?**

Model TC-630, recommended retail price £199:15:0

## Specification

**Recording system** 4-track stereo/mono recording and playback.

**Power requirements** AC 100, 110, 117, 125, 220 or 240V, 50/60 Hz.

**Power consumption** 40 watts.

**Tape speed**  $7\frac{1}{2}$  ips (19 cm/s),  $3\frac{3}{4}$  ips (9.5 cm/s)  $1\frac{7}{8}$  ips (4.8 cm/s).

**Reel capacity** 7 in. (18 cm) or smaller.

**Frequency response** 30 Hz–22 kHz at  $7\frac{1}{2}$  ips; 30 Hz–13 kHz at  $3\frac{3}{4}$  ips; 30 Hz–10kHz at  $1\frac{7}{8}$  ips.

**Bias frequency** 160k Hz.

**Wow and flutter** 0.09% at  $7\frac{1}{2}$  ips; 0.12% at  $3\frac{3}{4}$  ips; 0.16% at  $1\frac{7}{8}$  ips.

**Power output** 15 watts per channel.

**Signal-to-noise ratio** 50 dB.

**Harmonic distortion** 1.2% at rated output (overall); 0.5% at rated output (amplifier).

**Level indication** Two VU meters.

**Inputs** Microphone: sensitivity –72 dB (0.2 mV), impedance 250 ohms.

Tuner: sensitivity –22 dB (0.06V), impedance 100k ohms.

Auxiliary: sensitivity –22 dB (0.06V), impedance 560k ohms,

Phono input (MM or MC cartridge): sensitivity –53 dB (2 mV), impedance 14k ohms.

**Outputs** Line: output level 0 dB (0.775V), impedance 100k ohms. Headphone: output level –28 dB (30 mV), impedance 8 ohms.

External speaker: impedance 8 ohms.

Lid speaker: impedance 8 ohms.

**Rec/PB connector** Input: sensitivity –40 dB (7.75 mV), impedance 10k ohms.

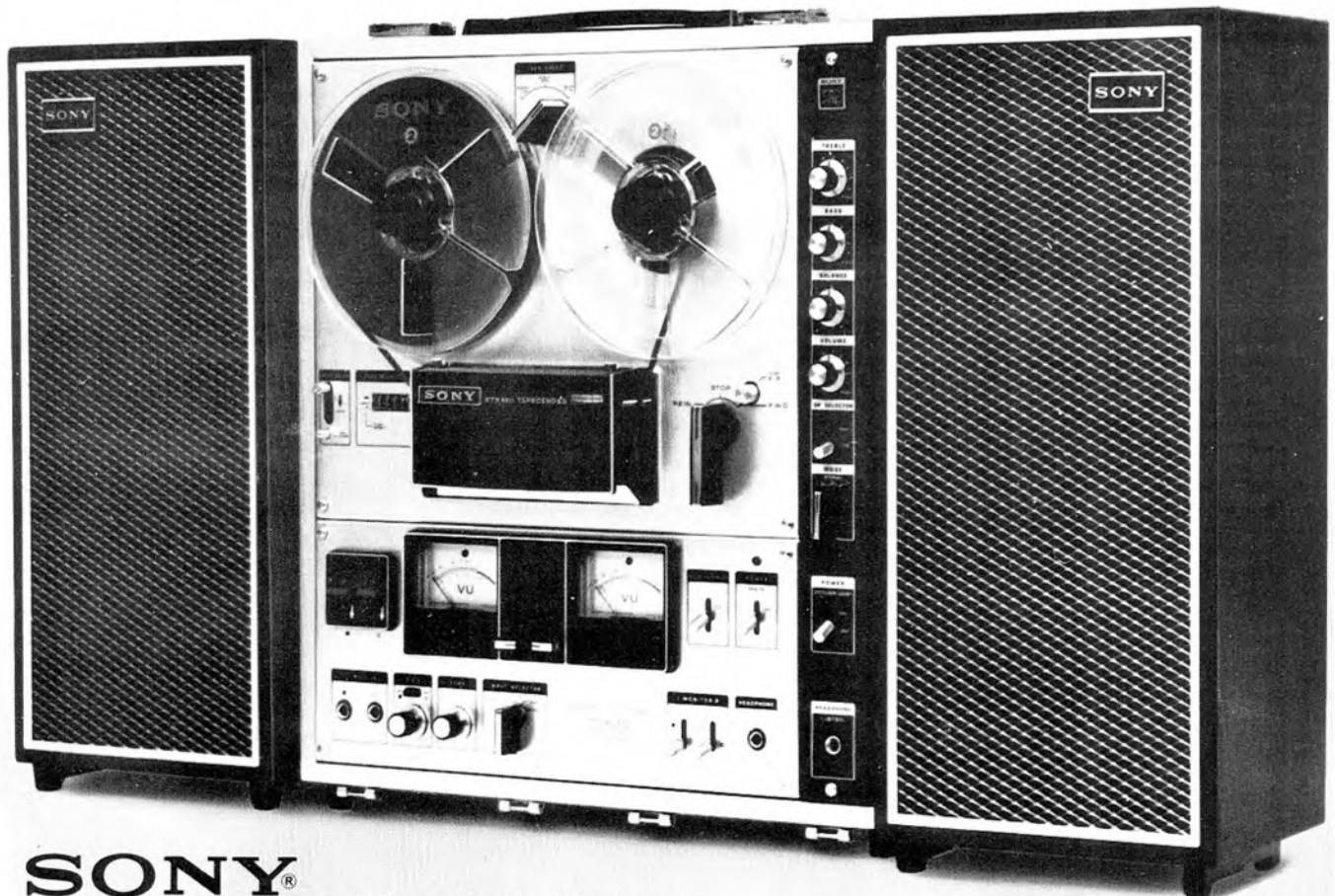
Output: output level 0 dB (0.775V) impedance 100k ohms.

**Dimensions**  $17\frac{7}{8}$  in. (w) x 20 in. (h) x  $11\frac{1}{8}$  in. (d).

**Weight** 46 lb. 3 oz.

**Supplied accessories** Microphone (F-45) (x 2), Sony pre-recorded 5 in. tape, Sony empty reel (R-7A), connection cord (RK-74), head cleaning ribbon, reel cap (x 2).

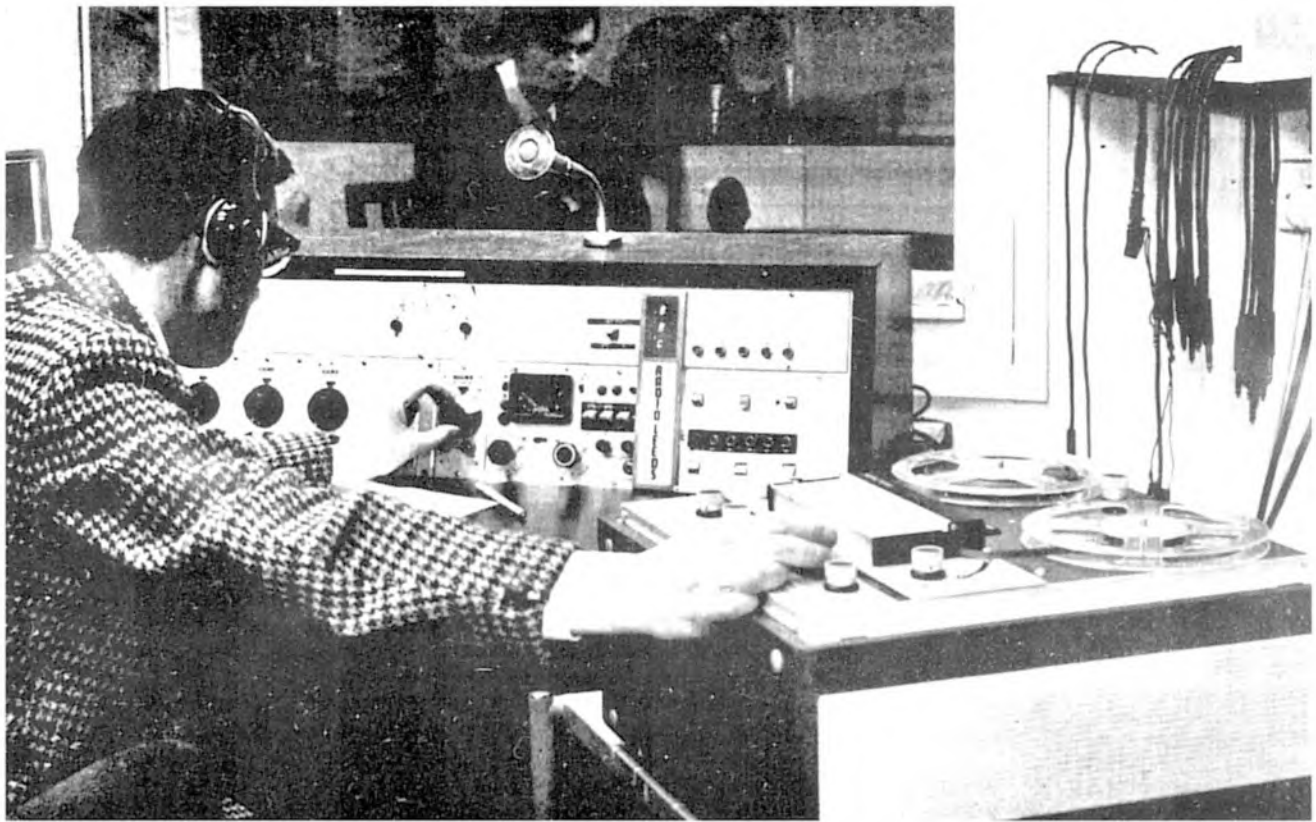
**Optional accessories** Speaker system (SS-3000), telephone pick-up (TP-4), stereo headset (DR-5A) (8 ohms), microphone mixer (MX-6S).



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[www.americanradiohistory.com](http://www.americanradiohistory.com)



# Radio Leeds: Where a tape recorder must be good and reliable you'll find a Ferrograph.

In a radio station, the tape recorder is in constant use. Technical performance is all-important; absolute dependability and split-second control are essential. So Radio Leeds uses the Ferrograph Series 7 tape recorder.

Ferrograph Series 7 recorders are British-made, available in Mono and Stereo, with and without end amplifiers, in two versions: in elegant hardwood case, or in grey vinyl case. All solid state, three speed, two inputs per channel with independent mixing, all incorporate a range of facilities

unparalleled in any other recorder. Retail prices are from £150 incl. P.T.

Follow the professionals; choose the recorder you know will serve you best at home or in your work: Ferrograph—it makes sound sense. See your nearest stockist or send the coupon for details and address of nearest Ferrograph specialist or ring 01-589 4485.

## Ferrograph

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on the Ferrograph Series 7   
or the Ferrograph Manual   
for which I enclose £1.

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Address \_\_\_\_\_  
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TRG

# The man who invented magnetic recording

By DOUGLAS BROWN

Homage at the bust of Valdemar Poulsen, the Danish inventor.



IT SEEMS INCREDIBLE to those of us who have witnessed, over the past 15 years, the development of tape recording as a home activity that the principle of magnetic recording was invented by a Dane born 100 years ago. But there was a big gap between the discovery of the principle and its practical application.

In the foyer of the headquarters of Denmark Radio recently representatives of amateur tape recording enthusiasts of twelve European countries, including Britain, gathered to pay homage to the man who started it all – Valdemar Poulsen. Dr Jan Mees, Secretary-General of the International Federation of Sound Hunters, laid a wreath at the bust of the Dane whose pioneer efforts opened the way for the development of tape recording as we know it today.

Poulsen was born in Copenhagen on November 23, 1869. In December 1898 he patented an apparatus which he called the Telegrafon. An iron wire wound around a cylinder was magnetised and it then acted upon a magnetic head which moved over it. Poulsen's Telegrafon had some visual resemblance to Edison's original Phonograph – the precursor of the gramophone – but the principle of that invention, the vibration of a needle in a wax groove cut around a cylinder, was something quite different.

Poulsen and Edison, however, suffered a limitation in common: there was no electronic means of amplification.

## Fame—and bankruptcy

At the World Exhibition in Paris in 1900 Poulsen was awarded the Grand Prix for his Telegrafon. The Emperor Franz Josef of Austria was fascinated by it and a voice recording he made, honouring the inventor, is available today. So Poulsen achieved fame and went off to the United States to seek a fortune. He offered for sale an office dictating machine which would also record telephone conversations. Astonishingly, considering the nature of the product, he went bankrupt.

Back in Europe, he turned from salesmanship back to invention. He took out patents in Britain for a machine that would record not only on wire but also on steel "tape". His mind roamed over every possible type of material suitable as a recording medium – but the age of plastics lay far ahead. Poulsen was ahead of his time. The principle of magnetic recording was one thing; but the cathode tube as well as the plastic tape were required to achieve a break-through.

In 1902 Poulsen invented the arc generator which, together with the invention of radio telephony in 1907, opened the way for broadcasting in the 1920s.

## Recollections of a pioneer

Poulsen died in 1942. Some of his collaborators are still alive. One of them, Einer Dessau, lives in Copenhagen and he related to CIMES delegates there recently some of his recollections. As a schoolboy of 14 Dessau, with a friend, began to build an arc generator according to Poulsen's formula and Poulsen and his associates met the two schoolboys and gave them advice, detailed sketches and every possible encouragement.

Years later Dessau wanted to broadcast advertising messages from a stand at a commercial exhibition in Copenhagen. He thought he could use the method of Poulsen's Telegrafon. The loudspeaker and the amplifier were by this time available and Dessau had a great success. He invited Poulsen to come to see and the inventor recorded a message, using a carbon microphone.

Dessau recalls: "A few minutes afterwards Poulsen's voice roared out over Tivoli Gardens. There were tears in his eyes as he remarked 'Just imagine that the thing can do that'".

Poulsen, honoured today, seemed almost a misfit when young. To please his parents, he became a medical student, then abandoned his studies. He failed an examination to enter technical school and instead became a factory apprentice. After that, however, nothing could keep him from his research and experiment, particularly concerning electro-magnetism. He was, indeed, the first recording enthusiast.





## Recording studios use it every day.

'Scotch' low noise 'Dynarange' Magnetic Tape is the choice of top recording studios such as CBS, Decca, De Lane Lea, Lansdowne and Pye. Both the tapes and cassettes are now available in smart

new plastic packaging.

Your dealer stocks the complete range.



### Scotch Magnetic Tape

3M 'Scotch' and 'Dynarange' are trademarks

IT had to happen sooner or later. Hints and rumours have been circulating for a long time but now at last we have the first official confirmation. The Philips organisation in Holland finally admit that they are vitally concerned in the development of the world's first colour television cassette recorder.

The news does not surprise me. It has been an open topic of conversation for at least a couple of years. What is surprising is the revelation that this equipment is being developed by Philips in co-operation with Sony and Grundig.

We all know that Philips beat the world with their Compact Cassette system. Early attempts at co-operation in this field failed and as a result there was at one time a competitive cassette system being marketed. This has now quite disappeared in the United Kingdom and the word "cassette" has become synonymous with Philips.

Obviously this firm will be drawing heavily on its past experience when working on the projected colour television cassette machine. So it can only be concluded that this experience indicates the wisdom of co-operating with other large organisations. The choice of Grundig in Germany and Sony in Japan clearly reveals the fact that this new product is being thought of in world-wide terms. It will be noted with regret that with the three legs of the cassette television tripod firmly planted in Holland, Germany and Japan the United Kingdom appears once again to offer itself only as a market for consumer products developed and manufactured elsewhere.

The only other information we have about the new machine is that it is said to be as easy to operate as an ordinary tape recorder and is expected to be available to the public in about two years' time. The cassettes for television will be larger than audio cassettes, measuring very approximately about 7ins x 5ins - in other words about the same size as a small book.

We have already reported on the development of EVR, a totally different system in which there is considerable British interest both in development, manufacture and sales. Rank Bush Murphy have been granted a manufacturing licence for EVR and expect to start production before the end of next year.

Last month we reported on SelectaVision, yet another system developed by RCA of America. Neither EVR nor SelectaVision are using magnetic recording principles: the former depends upon photographic images and the latter is based on the new techniques of holography. It is not yet known whether the Philips cassette

# CROSS

# TALK

## By Audios

machine will employ magnetic tapes. At the present state of the art it seems highly improbable, although if it does it will mean the biggest break-through for magnetic recording for many years.

The imminent arrival of these various new systems for producing television pictures at home have far reaching implications that are not yet generally appreciated. If the ordinary domestic viewer has at his disposal the freedom to choose his own pre-recorded programme - rather as he does a gramophone record today - then much of the power of television as an advertising medium will be lost. We shall no longer be bound by chains of compulsion to sit and watch the endless detergent advertisements. The most important advertising medium in the country will be thrown into confusion. Many well known and well loved publications fundered under the attack of television. Now television is in turn suffering from the attack of the give-away supplements offered with daily and Sunday newspapers. The advent of home television recording and playback could deliver the final death blow to commercial television.

\* \* \*

*WORLDWIDE TAPETALK is claimed to be Britain's largest tape exchange organisation. From them now comes the announcement of the publication of a booklet called "Tips for Tapespondents - International Message-making". It is believed to be the first comprehensive publication of its kind dealing solely with all aspects of this fascinating hobby and there are chapters on the making of your first tape, editing, methods of transmission - packing, postage, phono post, etc., an index system, the problems of half-track/four-track exchanges, maintenance of equipment, etc., etc.*

*This thirty-two page illustrated booklet should prove invaluable to all those engaged in tapespondence but it will be of particular usefulness to newcomers to the hobby.*

*Every new member to Worldwide Tapetalk will receive a copy free on enrolment but it is also available to non-members at 2/6 plus 4d postage on application to Worldwide Tapetalk, 35 The Gardens, Harrow, HA1 4HE.*

ROYAL "confessions" seem to be very much the order of the day. In America Prince Philip with humour in his voice and a wistful twinkle in his eye openly conjectures on the advantages of abdication. Poor chap - his remarks seemed to me to be so natural and so innocent and yet the National Press determined to make a gigantic meal out of it.

The Prince of Wales attracted less publicity when he confessed to spending many weeks crouched over his tape recorder. Prince Charles was speaking at the Council of Repertory Theatres Conference and he was referring to his study of Sir Laurence Olivier's interpretation of Richard III which he hoped to emulate when he played the same part in a preparatory school play.

It is interesting to me to note that his Highness not only has access to recording equipment (and why shouldn't he?) but is also only too well aware of its usefulness within the home as an aid to leisure activities. Certainly when we talk about "home recording" we tend to think of a home in somewhat less pretentious terms than Buckingham Palace. It is amusing to guess at what machine he uses - British it is hoped.

Perhaps I could be permitted to suggest to Prince Charles that his love of acting could perhaps be satisfied more conveniently were he to turn to the art of recorded drama. Freed from the obligations of personal appearance the recorded drama offers a medium ideally suited to all who have great ambitions but little time. With no parts to learn the programme can be slowly built up whenever the opportunity presents itself. With all the dramatic talent displayed by other members of our royal family there should be no shortage of willing actors . . .

\* \* \*

THE other day I spent a pleasant couple of hours chatting to Richard Margoschis, author of our monthly Nature Notes series. He was telling me how delighted he is with the progress that has been made by the Wildlife Sound Recording Society. Membership strength is excellent and even more important the Society is very active in a number of fields. But like most organisations the Wildlife Sound Recording Society is always only too pleased to welcome enquiries from prospective members and any readers interested are invited to address their letters in the first instance to him c/o *TAPE Recording Magazine*.

Richard does stress the fact that ownership of costly recording equipment is not a requirement for membership. Many active natural history recordists own equipment no more costly or sophisticated than the simplest of cassette machines - enthusiasm is what makes the wheels of an organisation like this turn round. So any reader having an interest in wild life is cordially invited to drop a note to Richard Margoschis. In reply he will receive full details of membership and the advantages it will confer. Write now; you won't regret it.

\* \* \*

THE Dairy Show was held at Olympia at the same time as the combined Audio and Photo-Cine Fairs.

The lone rustic figure struggling through the mass of audiophiles in the gallery on the Saturday afternoon looked utterly and hopelessly lost. Gently I enquired of him what interested him most?

In a superlative Oxbridge voice he answered, "Actually, old man, I was looking for an eight channel stereo set-up for the cow shed . . . !"

OUR "ACTION" TEAM FACE THEIR  
GREATEST CHALLENGE YET

# MOVEMENT IN STEREO

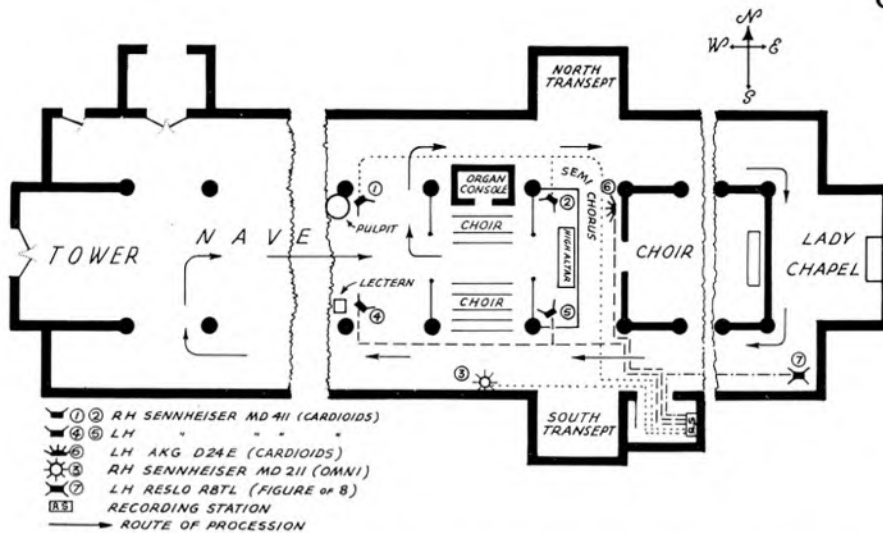


Fig. 1: Schematic layout of the Priory showing microphone positions and cable runs.

By Basil Dawson and John Claxton

THE thrill and excitement of live recording has to be experienced to be believed. After a great deal of preparatory work, after all the effort of transporting and setting up the equipment, one watches the spools turn and the record level indicators flicker with bated breath. This is the moment of truth. If successful it will have been so very worth while; if failure is the result then one has learned what not to do next time. And when working in stereo all the tensions are increased, as is the satisfaction. There's just nothing to be compared to the pleasure to be obtained from sitting back and listening to the playback of a really good stereo tape — when one has the knowledge that it is all one's own work. That is one of the facts of life that we have learned since we switched from mono to stereo. But up to now we have been striving all the time for that breath-taking quality and sense of reality that is so elusive. With our latest project we felt sure we had a good chance to achieve our aim.

One factor in our favour was our past experience. Several times in previous years we had recorded the Gregorian Association's Festival Evensong in mono. The service is sung three times a year during the late summer and early autumn. The first is usually at St. Paul's Cathedral, the second at one of the other cathedrals or larger churches in the Home Counties and the third in Southwark Cathedral. This year the second service was to be held at Christchurch Priory on a Saturday with the first at St. Paul's on the previous Wednesday. Christchurch Priory was the event on which we were fixing our sights and our plans were laid many weeks in advance.

The success of a project of this kind depends so much on the preliminary arrangements, so it will be worth while to follow them through in some detail. The first step was to obtain copies of the service book with music, and to get these application had to be made to the Festival Secretary. Next we had to write to the Vicar of Christchurch to obtain permission to record in the Priory and at the same time ask politely if we might have the essential co-operation of the Head Verger. Replies to these letters not only gave us the verger's name and address but also the organist's name and address as well. It transpired that he was the gentleman responsible for organisation at the Priory.

So far so good. Next obvious move was to write to both the verger and the organist and suggest a meeting, and this was finally agreed for the Sunday preceding the event at Christchurch. These are the lengths to which one must be prepared to go. It meant a one hundred mile journey for us from London — just to talk about what we wanted to do. But that discussion was vital to the ultimate success of our work.

We set off under cloudy, overcast skies. This bad weather proved to be a blessing in disguise for the traffic was unusually light. Nevertheless we had to travel through some very heavy storms before arriving in Christchurch well ahead of schedule.

One of the features of this Evensong service is the division of the singers into two parts, the choir and the semi-choir. At one point the main choir processes around the church as they sing alternate verses with the stationary semi-choir. It was the effect of this

"moving sound source" that we wanted so badly to capture on tape. The organist was most helpful in indicating the probable seating arrangements for the two choirs and also showing us the route that the procession would take round the church. The Head Verger showed a lively interest in our requirements and kindly gave us permission to use a small vestry just off the south choir aisle as our recording station. In here we could house all our recording and monitoring equipment. It was ideal; not only did it reduce to the minimum our runs of microphone leads but the step to the door was so well worn it left a comfortable gap for the cables.

Some time was spent deciding exactly how we should place all our available microphones and which way we should route our cable runs to avoid any risk of obstruction or hazard. The thoughtful verger also showed us a door near the tower which provided an extremely useful entrance at a very convenient point for the equipment with the added advantage that our car could be parked immediately outside. A minor detail? Not when one has a great deal of heavy gear to carry. But then our very good friend the Head Verger told us he would arrange for a trolley to be available to us so that the machine, mixers, speakers, cables and stands could be loaded up and wheeled to the recording station. This was constructive help indeed and was deeply appreciated.

Having now pressed forward with our plans as far as we possibly could we left the Priory to see what had happened to the weather outside. To our delight the sky had cleared, the sun was shining and it was a really beautiful day. So down to the river to enjoy our



# MOVEMENT IN STEREO



Christchurch Priory, Hampshire.

lunch by the peaceful waterside and to dream of the recording that was still to come. After lunch we drove to the sea at Milford where we lazed away an hour or two on the beach before setting off on a leisurely run through the New Forest to arrive back home around eight o'clock. At that moment we felt quite sure that our care would be rewarded with the best recording yet.

The next Wednesday we went to the service at St. Paul's Cathedral and carefully timed all the items. This was very necessary because we had to know at what point we should change tape spools; we had no wish to be caught out with an empty spool at a vital point. It was our intention to record both the music and the essential parts of the liturgical service but not the lesson or the sermon. There were two possible points at which to change spools — either during the sermon or the intercessions which followed the anthem and preceded the hymn before the sermon. After some thought we decided that the latter would be the best course to adopt as it would leave us with the greatest safety margin on both spools. In the event it proved to be our one real mistake.

On the Friday night we carefully checked over all our equipment to make sure there were no hidden "bugs." Particular attention was paid to

microphone plugs and sockets — a single tiny whisker of wire shorting out between braiding and conductor could ruin the entire project. As we could not start our preparation at the Priory before 2.30 p.m. we did not set out from London as early as we had done the previous Sunday. Unfortunately the traffic was very much heavier than it had been then and by lunch-time we were only approaching the outskirts of Guildford. Ahead the jams on the by-pass were solid with frustrated drivers fuming in their stationary vehicles. One glance was enough to send us through the town instead. There we discovered the cause of the trouble — a carnival procession. And we were stuck behind it.

At such a time there is only one sensible thing to do, and that is to stop worrying and have something to eat. An interesting "olde worlde" cafe attracted us. In we went and enjoyed a very pleasant meal at exceptionally reasonable cost. And when we came out of the restaurant the traffic jams had disappeared as if by magic. Our arrival at Christchurch was precisely on schedule at just 2.30 p.m.

But now there was work to be done and we set to with a will using heavy adhesive carpet-binding tape to anchor and cover microphone leads where they crossed gangways. The main

choir was to be situated in the choir stalls at the eastern end of the nave and to cover this we first used a pair of Sennheiser MD 411s (Numbers 1 and 2 in the diagram No. 1). These microphones were mounted on tall stands and wired in parallel, one near the pulpit on the north side and the other in the Sanctuary on the same side of the church. They were angled inwards, one south-easterly and the other south-westerly, to cover one half of the seated choir (in their stalls on the south side) and the outputs were fed into the right-hand stereo channel.

A second pair of Sennheiser MD 411s (Numbers 4 and 5 in diagram No. 1) were wired in the same way and placed one near the lectern and one in the south side of the Sanctuary. These were angled in a north-easterly and north-westerly direction respectively to cover the choir stalls on the north side. The outputs were fed to the left-hand stereo channel.

We were not able to place a microphone in a really suitable position to cover the semi-chorus, so we mounted an AKG DE24E (Number 6 in diagram 1) on a low stand placed in a high niche in the screen separating the nave from the choir (we use the term "choir" here to define the physical part of the building in the architectural sense, not the singers). This microphone was angled steeply downwards. Because of its rather wide cardioid pattern it also served to pick up part of the procession as it passed the north transept crossing. Its output was fed to the left-hand stereo channel.

The procession of men's voices was to follow the route indicated by the arrows in diagram No. 1, and as it processed it would sing verses alternately with the stationary semi-choir, each alternation being interspersed with improvisations on the organ. To cover this and to create the effect of both movement and space we placed a Sennheiser MD 211 (omni-directional) in the south aisle (microphone Number 3 in diagram No. 1) and fed it to the right-hand channel. In this position it was virtually below the organ but shielded from it by the stone vaulting of the aisle roof. The organ itself is partly built into the triforium on the south side. We also placed a Reslo RBTL (microphone Number 7 in diagram No. 1) in the south-eastern corner of the processional way. The output from this was split and fed equally into both channels.

With this arrangement the levels of microphones Numbers 1, 2, 4, 5, and 6 were left strictly alone once they had

been set, and the levels on microphones Numbers 3 and 7 were only brought up for the procession. All microphones were low impedance which permitted the use of long leads and for mixing and matching to the Truvox PD 202 deck we used the following equipment:

- (i) A mains powered valved mixer with two low impedance microphone inputs and one high level input, each being independantly controllable.
- (ii) A mains powered transistorised amplifier with a low impedance microphone input and a high level input, both of which are independantly controllable.
- (iii) A battery powered low impedance microphone pre-amplifier with a single gain control and equally split output.
- (iv) A low impedance to HI Z line transformer.

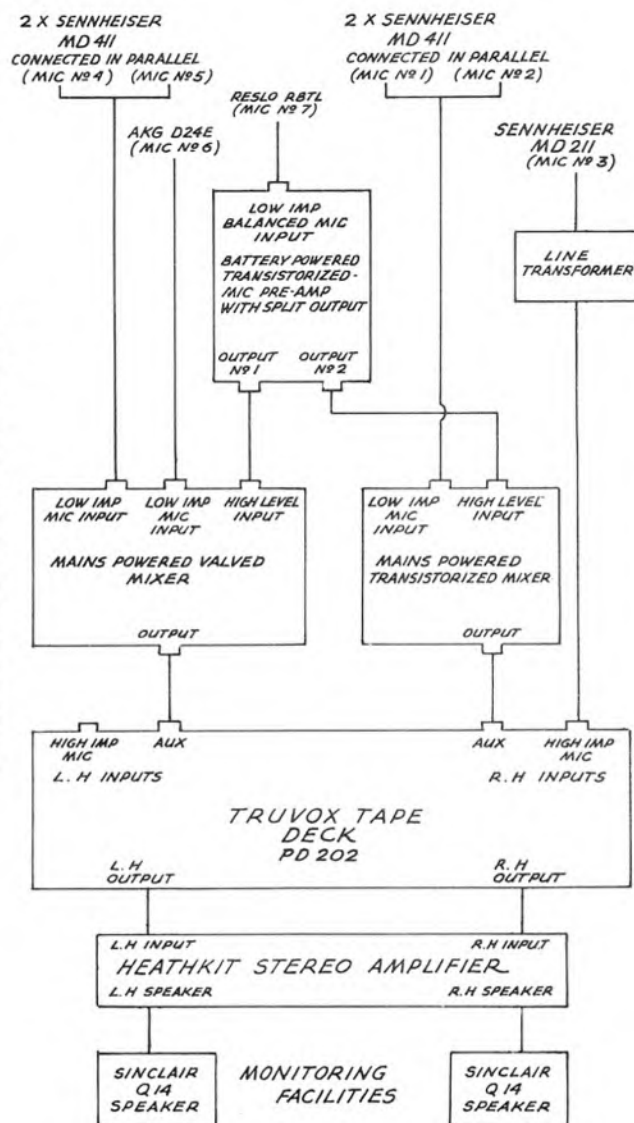
All connections via this equipment to the Truvox deck are shown in our diagram No. 2. The output of the Truvox PD 202 deck was taken via a Heathkit stereo amplifier to a pair of Sinclair Q 14 speakers, thus giving us "before" and "after" record monitoring facilities.

As there was no rehearsal the levels of microphones 1, 2, 4, 5 and 6 had to be set approximately by reference to the introductory organ music before the service; final adjustments were made as quickly as possible once it had begun.

In fact only the tiniest alteration to levels was necessary and everything went smoothly until the time came for our spool change. As the last chords of the anthem died away we switched to before record monitoring, dropped the levels, stopped the deck, restored the levels and began to remove the spools. To our horror as we lifted the tape and spools clear ready to drop the new one on we heard over our monitoring speakers not the expected sound of prayers but the notes of the organ. As we looked at each other in perplexed amazement the choir and congregation began to sing. All that preparation – and now this!

We discovered later that the service had been shortened to suit the requirements of some of the choir members who had rather a long way to travel home. This decision had been taken so late that even the conductor did not know about it until the singers were taking their places at the beginning of the service, and he had to discreetly slip out to the organist and warn him. Unfortunately no-one thought to render

Fig. 2: A block diagram showing how microphones, mixers, tape deck and monitoring facilities were interconnected. Sufficient time must be allowed before recording starts to position microphones and hook up all the gear in the recording station – and then test for possible faults. This could easily entail a couple of hours' work. To scimp any of the vital checks before recording could be disastrous; a single undetected whisker of wire shorting across a lead might ruin the whole programme.



the same service to us so we were left in blissful ignorance. Actually it was only a two-verse hymn and it was all that we lost. But it just goes to show . . .

With the exception of this slip, an event quite outside our control, we obtained what proved to be the most uniformly successful stereo recording we have made so far. Overall quality was exceptionally good and the sense of spaciousness was effectively captured. On playback we were a little disappointed with the lack of dramatic movement from the singing procession. By chance they happened to be fairly close to one or other of our microphone installations each time they sang a verse and the sound of their voices tended to come across at about the same level as that of the stationary choir with the organ producing an "average" level between and so helping to destroy the illusion.

But that was a small criticism and we are now waiting for the next meeting of the Gregorian Association to arrange a playback session for the members. Mono dubbings have already been requested and made for the Festival Secretary, Assistant Musical Director and one of the Committee Members. These have just been despatched and their reactions are awaited with interest.

We have the same grumble to make that we always have on these occasions; the marring of the organ music after the service by members of the congregation who wander around chattering – usually choosing a spot near one of our microphones to talk to their friends. But it was a bright and sunny evening as we left the Priory. It didn't take long to find a delightful country pub where over a mightily refreshing drink we decided it had been a most successful and enjoyable day.



# NATURE NOTES FOR JANUARY

BY RICHARD MARGOSCHIS

TO mention "The Council of Europe" might make you ask: "What on earth has that body to do with nature?" In the broadest sense the work of the Council is concerned with the conservation of man's natural environment *as a whole*. The brief answer to the question, therefore, is "Conservation"; and conservation must, undoubtedly, include natural habitats.

I mention this because the Council has named 1970 as "European Conservation Year", and by so doing it hopes to stimulate activity which will result in man more fully understanding and appreciating his environment. All sorts of organisations are planning special activities, such as conferences and exhibitions covering a wide variety of subjects and a number of competitions directly concerned with nature have already been announced. One of special interest to readers of *TAPE Recording Magazine* has been announced by the B.B.C. Its Natural History Unit is organising a competition in which entrants from any Western European country, including the UK and Eire, will be invited to submit tapes of animal voices - birds, insects, amphibians or mammals. The winner will receive a Golden Nightingale award when the results are announced in November. Entry forms will be available in February and I will try to keep you informed of any further details.

In past years the accent in this field of man's environment has been on preservation, often carried out by fencing off areas to preserve animals and plants within and by taking steps to protect them from predators. I believe that in some cases it has been carried too far with the result that certain of our wild animals have become rare because, although they lived together for thousands of years before man intervened, they have been killed off by this attempt to protect other animals. In turn it has allowed the proliferation of many pests which would otherwise have been naturally controlled by these now missing predators. Notwithstanding these views I am only too conscious of the fact that in some circumstances a measure of control is necessary.

One of the species which has suffered badly in this persecution has been the fox, scientific name *vulpes vulpes*, Charlie or Freddie, call him what you will. To me he is still one of the most fascinating of our wild animals, an animal of lovely shape and proportion and one of graceful movement; sly and cunning perhaps, but he has to be and that is one of his fascinations. Right now he, the dog, should be in full voice, for the rutting, or mating, season runs from November to February, varying somewhat from south to north of the country. The typical call is a triple *wo-wo-wo*, but this too can vary from a single bark to a series of four or five. It also varies from animal to animal and is sometimes sufficiently distinctive for an observer to eventually recognise individuals. The general opinion seems to be that this is the only vocalisation of the dog, but others have said that he also makes other calls and at different times of the year.

The vixen, female, will also be calling at this time and regarding her there are two points which are in little doubt. Firstly, she will go on barking well into the summer and, secondly, she has a very wide vocabulary which ranges from barks to screams and often includes long howling calls. There is great difficulty in interpreting these calls because in the dark it is difficult, usually impossible, to see what is going on. When you are sitting alone in a dark wood a long way from anywhere these sounds, when they first pierce the silence of the night, can make your hair stand on end - even if only for a moment!

I think there are two ways of approaching this subject from the sound angle. If you know the area in which foxes are running you can walk quietly around it, covering as large an area as possible and gradually working up-wind. Alternatively, if you can reduce the area by previous observation (see my notes for last January), then stay put in one spot, but whichever way you work always be prepared - the calls come without any warning of time or direction. My experience is that to collect on tape the entire call of a vixen you need to have the *tape* running all the time. With the dog it can be different, you might be able to keep the *machine* running and the tape held on pause because it you are lucky you will hear him in the distance first and he will continue with his barks as he passes through his territory calling for a mate; if you hear him just stay put and hope that he will pass near to you. If he does this at a certain time one night he will quite likely repeat it at the same time for several evenings running.

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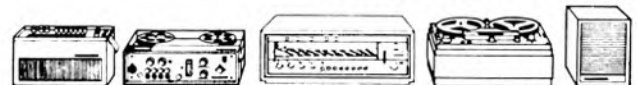
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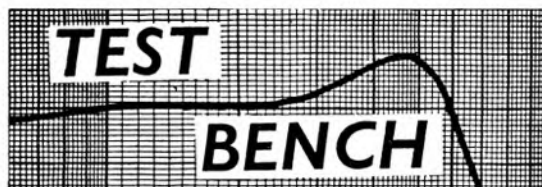
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INVESTIGATED BY  
R. HIRST AND D. KILLICK

UHER 714 TEST CHART

# UHER 714 illustrated on page 25

## MANUFACTURER'S SPECIFICATION

Recording: Four-track  
Tape Speed: 3 3/4 ips  
Frequency Range: 40 to 15,000 Hertz.  
Max. Reel Diameter: 7 inches.  
Wow and Flutter: 0.3%  
Signal to Noise, Weighted: 48 dB.  
Recording: Mono.  
Playback: Mono.  
Mains Voltage: 110/130, 220/240 V AC.  
Power Consumption: approx 25 watts.

Output Power: 2 watts.  
Inputs: Microphone 0.15mV. Radio 1.5mV. Phono 30mV.  
Outputs: Radio/amplifier 0.8V.  
External Speaker 4 Ohms. Monitoring: Headphones or internal speaker.  
Tape-end Cutout: Automatic.  
Tape Counter: Four digit.  
Dimensions: 38.8 x 17 x 34.9 cms.  
Weight: 8 kg.  
Recommended Retail Price: £52.7s 7d including purchase tax.  
Distributors: Bosch Ltd., Watford, Herts.

Frequency Hz  
40 . . . . .  
50 . . . . .  
60 . . . . .  
100 . . . . .  
250 . . . . .  
500 . . . . .  
1000 . . . . .  
2000 . . . . .  
4000 . . . . .  
6000 . . . . .  
8000 . . . . .  
10000 . . . . .  
12000 . . . . .  
14000 . . . . .  
16000 . . . . .  
Wow & Flutter

Overall Response dB 3 3/4 ips	Playback Only dB 3 3/4 ips	Signal/Noise Ratio dB	Distortion %
-6.0		51	2.6
-5.0	-4.0		
-3.2	-3.5		
-2.1	-2.5		
-0.6	-1.0		
-0.3	-1.0		
0	0		
+2.1	+1.2		
+3.0	+2.4		
+2.6	+1.8		
+2.1	+1.0		
+1.6	-0.3		
0	-2.0		
-2.4	-3.0		
-5.6			
0.2%			

DESCRIBED in its literature as a top-flight instrument "in its price range" we are looking this month at the Uher 714. A four-track mono machine operating at the single speed of 3 3/4 ips it represents a radical departure for this famous German manufacturer. Renowned for their high quality equipment which has been rightly but firmly placed at the upper end of the price bracket, they have now with the 714 produced a machine that is equally firmly pegged at an extremely competitive level.

Our recent reviews have, by chance, concentrated on machines costing around the £100 mark so it will be of interest to many readers to consider just what value one can get by spending half that sum. First it will be noted that this is a monophonic recorder. Presumably the market research people have decided that there is a demand and will continue to be a demand for single channel operation. With gramophone companies moving rapidly towards the total abandonment of mono and with stereo being virtually taken for granted by most recorder manufacturers it is not surprising that we have been preoccupied with stereophonic systems.

As soon as we come to consider "low-cost" open spool machines we must relate them to the cost, quality, performance and convenience of Compact Cassette. The 714 is an ideal machine to use for such a comparison and so we shall attempt to demonstrate the differences - both for and against - during the course of this review.

Turning first to our tabulated laboratory figures it will at once be seen

that our chart is very much smaller than usual. As the equipment operates at the single speed of 3 3/4 ips its performance in terms of frequency response can only be dealt with by considering the replay of a standard calibration tape at that speed, plus, of course, the single list of overall response figures. The specification refers to a frequency range of from 40 to 15,000 Hertz without quoting any tolerances, but a foot-note adds that measurements are in accordance with German Standards (DIN). Since this is an English language leaflet obviously intended for use outside Germany it would have been appreciated if the relative DIN standards had been quoted in detail. As it is we are left to guess.

Reproduction of a DIN tape reveals a commendably flat curve with something of an incline at either end as might be expected. Not quite flat to within plus or minus 3 dB over the entire range, but very nearly so; the greatest deviation occurs only around 50 and 60 Hertz and so is not of significance unless the output is going to be fed to a really good speaker enclosure, the cost of which would be disproportionate to that of the machine.

When looking at lower cost equipment one must expect to be rather more tolerant about tolerances. With the Uher 714 a first check with the calibration tape indicates that its designers have taken the greatest care to maintain better audio standards than one could reasonably expect at the price. This is confirmed by the overall response curve which is again sensibly flat to within plus or minus 3 dB within the range 60 to 14,000 Hertz. Here,

however, we must voice a complaint. The machine was supplied without tape (which can hardly be objected to) but nowhere was there any indication of the kind of tape for which bias had been set. A telephone call resolved the problem and we were told that BASF LGS 35 is recommended. It is also said that steps are being taken to make this clear in the instruction booklets so that purchasers will know what kind of tape is best suited to their equipment. The use of a tape of different coercivity would have given us a very different response curve.

Signal-to-noise, measured in relation to a 1,000 Hertz tone recorded at 0 VU on the built-in meter, was shown to be 51 dB unweighted, very much better than the weighted 48 dB claimed. Distortion at the same recording level was found to be 2.6% and wow and flutter 0.2% RMS. These figures are all better than specification.

Output power is claimed as 2 watts; we measured 1.6 watts at 3% distortion so if 5% distortion is accepted then the 2 watts is probably justified. It was found that the single tone control functions as a "top cut" giving a maximum reduction in output of 11 dB at 10,000 Hertz when turned fully clockwise.

We can summarise the technical part of our enquiry by saying that the Uher 714 is operating to a standard very closely associated to that to be found in much more expensive machines. And here too we can begin to see the advantages of open spool operation at 3 3/4 ips over cassette at 1 7/8 ips. All the figures so far quoted have been as

good as or better than we might find in a cassette machine of comparable price. At the present state of the art there is no doubt that standard tape running at 3¾ ips has the technical edge on the other system, *provided the machine is a good one*, as the 714 obviously is. By contrast we can see no future for low-grade low-cost open spool machines – these will inevitably disappear before the cassette onslaught. And a very good thing it is too.

Coming to the user section of our review we must first comment very favourably on the design and styling of the 714. Its clean, functional lines make such a refreshing change from the over-cluttered, over-controlled appearance of some machines. The 714 is essentially a simple mechanism; its appearance rightly reflects this basic simplicity.

The “hardwood” case is in fact plastic, but one has to look hard to realise it. The deck plate is a large, clean expanse of brushed aluminium plate free from encumbrances. On the left of the sound channel is a large, internally lit, edge-type meter calibrated in dBs. Since the microswitch cuts the main power supply tape must be in position before the machine can be switched on, but when power is applied a brilliant bulb beneath the semi-transparent meter scale not only announces the fact but also makes meter reading a real joy.

For some reason the gain control knob (sensibly large but lacking a numeric scale) is on the other side of the deck plate; the knob nearest the meter controls mains On/Off, monitor level and tone on playback. Tape transport control follows the usual Uher pattern with an outside Stop bar between a Start and a Pause key. In front of this assembly is the Fastwind slide switch – push to the left or push to the right to select which direction of travel is required. A massive, red-topped button controls the Record function and also serves the purpose of a safety lock. A four-digit rev counter with re-set key is mounted on the main deck plate.

The mains cable is a permanent fixture; it is stored in a compartment beneath the base and exits through a slot in the side of a hinged cover. At the rear are found the input and output sockets – all strictly DIN. External speaker is the usual bar and pin DIN connection; microphone and radio/phono are five-pin DIN sockets. Unfortunately there is no indication in the handbook of the wiring to these sockets – alternative sensitivities are in fact provided in the single radio/phono record/playback receptacle but no proper information is given as to how to tap which. Best approach is to use a

five-pin DIN plug wired to either bare wires or to phono plugs and then sort out the connection by trial and error.

As mentioned earlier, the micro-switch also cuts mains power, so the equipment cannot be switched on unless tape is in position in the sound channel. Once tape has been laced up, (assuming the mains plug has been connected to the household supply) the mains switch combined with monitor/tone control is operative; as soon as current is applied the meter is lit and the motor turns.

We must remark on the silence of the mechanical parts of this machine. The mechanism really does whisper although the noise level increases appreciably when spools are in place. Strange how one begins to notice the noise of the tape passing through the sound channel when there is little other sound to obscure it.

Our usual user tests confirmed the fact that the 714 is a basically simple machine which is equally simple to operate. With only a single level control to worry about in conjunction with the run key and record function button we were happily recording within seconds of wiring up the equipment. Setting levels presents no difficulty at all – the meter can be easily read and the record gain control is large enough to adjust to fine limits without discomfort.

For playback we can consider the sound produced by the internal speaker as well as the quality that might be obtained if the output were to be fed via a main amplifier to a large loudspeaker enclosure.

First the internal speaker obviously has its limitations. For what it is it is very good indeed. Of course there is little or no real low frequency sound audible from what must be a rather primitive arrangement. No loudspeaker built into a tape recorder cabinet can possibly be anything more than a monitoring facility to give the user the convenience of immediate playback without the use of additional equipment. On the other hand it is likely that purchasers of machines at this price level might be content with the sound that the internal speaker gives without wishing to bother further. In such cases, although nothing like the quality that the machine is capable of producing will be heard, the user can be confident that he will get the best that can be expected under the circumstances. Audio output is reasonably clean, free from bumps and rattles, and offers quite a “listenable” sound.

As soon as an acoustically designed enclosure is driven from the output, either direct from the extension speaker

socket or via a main amplifier, the full benefit of the audio quality inherent in the machine is realised. The general impression is of a standard of reproduction which is in every way comparable to that obtained from more expensive tape recorders.

The manufacturer’s literature refers to the possibility of reproducing a genuine (combined) mono signal from a four-track stereo pre-recorded tape, but the handbook gives no guidance on the procedure to adopt. In fact such a situation is completely ignored. To reproduce a mono signal from a stereo (four-track) tape it is, of course, necessary to depress the two track selector keys simultaneously, thus giving the outputs from tracks one and three at the same time.

Investigation of the head cover assemblies shows that these two plastic fittings are merely held in place by friction pegs and so can be easily pulled off to completely reveal the heads for cleaning. If the user watches the movement of the pinch wheel lever carefully he will find that there is no safety mechanism to withdraw it from the capstan either when power is switched off or when the auto-stop operates. Please remember to actuate the stop bar to prevent making indentations in the surface of the pressure roller – these would cause deterioration in the speed stability figures.

Lastly we come to our final comparison between this machine and cassette equipment. We have already mentioned that technically the performance specification of the 714 is better. Against this we have the increased size and bulk – plus the “inconvenience” of handling standard width tape on open spools. This latter is, we feel, somewhat debatable. Open spool tape is quite suitable for ordinary domestic use, although it must be admitted that the self-contained cassette has advantages where young children are concerned.

More important, the 714 is a purely mono machine, whereas in cassette equipment one can “go stereo” at about the same cost. But not with the same audio quality . . .

So the argument goes on. And on. One fact is inescapable – at its cost the Uher 714 offers outstanding value for the user who requires a four-track mono machine with its own built-in speaker. Its design, its styling and its performance all betray its antecedents. Coming as it does from one of the leading West German manufacturers of top-flight recording machines it represents a worthy addition to his range. It is a recorder that anyone could be proud to own and to use.

OUR New Products section in November announced the arrival of a range of Audio equipment under the name Rotel to be distributed in the UK by the Audio Products Department of the Rank Audio Visual Division. Now we are pleased to report on the practical performance of one of the lower cost items, a self-powered AM/FM tuner, Model 120-ST, costing a fraction under £50.

This is not a technical investigation but purely a subjective opinion. Before unpacking the equipment I asked myself what are the real requirements of a modern tuner? The more I thought about it the more I came to realise that in practical terms they are pretty basic. For maximum versatility it should be self-powered. This simply means that it can be connected directly to the AC mains supply instead of depending on a particular make of amplifier for its rectified and smoothed power source. Next it should give a good, strong, clean signal free from distortion, interference, or station drift, without the need for expensive roof aerials. In my opinion the ideal tuner should give good FM reception on an aerial which might be as primitive as the proverbial few feet of damp string. Lastly – and most important in this age of stereo – my ideal tuner should be capable of receiving multiplex stereo transmissions (using the aerial equipment already specified!) with such a high standard of efficiency that the programme is not marred by unwanted background noise. This latter is not easy to achieve because the noise level on stereo is *always* higher than in monophonic reception.

That then is the ideal. It will be noted that there was no reference to the many controls that are to be found on modern tuning units. There was nothing about inter-station muting switches, nor mono/stereo switches, nor ACF switches, nor the host of other gadgets that

#### MANUFACTURER'S SPECIFICATION

##### Rotel AM/FM Stereo Tuner 120-ST

Frequency Range: FM: 88-108 MHz. AM: 535-1605 kHz.

Sensitivity: FM: 2.5 micro volt for 20 dB quieting; 3 micro volt for IHF. AM: 300 micro volt/meter for 20 dB quieting.

MPX Separation: Better than 35 dB 1 kHz. 100% modulation.

FM Harmonic Distortion: Less than 1.5% at 1kHz.

Output: FM: 1200 mV 100% modulation 1kHz. AM: 400 mV 30% modulation 1 kHz.

Power Consumption: AC 230V/117V, 50/60 Hz., 15 watt.

Dimensions: 12 in wide x 3 3/4 in high x 10 in deep

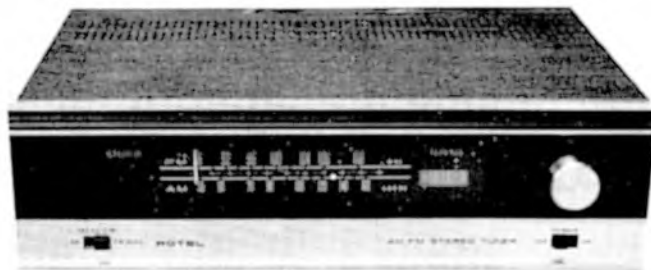
Weight: 6 lb 6 oz.

Control & Switch: Tuning, Power AFC.

Recommended Retail Price: £49 10s 0d including purchase tax.

Distributors: Audio Products, Pullin Photographic-Rank-Aldis, PO Box 70, Great West Road, Brentford, Middx.

# ROTEL 120-ST AM/FM STEREO TUNER



currently appear on expensive equipment. These omissions are deliberate; the more gimmickery that is incorporated the more it will cost. My final overriding requirement is for good sound at a reasonably low price level.

When unpacking the Rotel 120-ST I was first struck by its unpretentious appearance. Here we do not have a luxurious teak cabinet – instead the tuner is enclosed in a frankly metal casing with a “simulated” wood finish. I cannot imagine who would be deceived by the simulation. The front panel is much more presentable being finished in black and dark grey with the inevitable brushed aluminium trim.

A 3-core mains lead (using the new international colour coding for the conductors; remember the striped one is the earth connection) exits from the rear. Also on the rear is a pair of phono sockets to take the output to a main audio amplifier, a screw terminal strip for aerial connections and a hinged AM ferrite loopstick antenna.

When using a strange tuner for the first time one wants to know what aerial equipment should be connected for FM reception. Although living in London I have regarded my flat as being in a “difficult” reception area; experience with other tuners has indicated the necessity for a roof aerial to achieve an acceptable standard of stereo. It was therefore with some cynicism that the instructions in the accompanying leaflet were noted. Quoting verbatim it says: “Because of the excellent sensitivity of the 120-ST an ordinary piece of wire, 48 in. in length, will act as a suitable FM antenna in most locations . . .” and, lo and behold, included in the package with the tuner was a single strand of wire 48 in long and fitted with a spade terminal at one end.

Hopefully this simple length of wire was connected and the tuner was hooked up to an amplifier and mains supply. The reassuring hiss from the speakers confirmed that we were in business, as did the brightly lit meter-type station strength indicator recessed on the right of the tuning scale. There are just two slide switches on the front panel. The one on the right below the tuning knob is for Mains On/Off, the one on the left for AM/FM-Automatic. That is all – no other controls or gadgetery.

Sweeping the scale for the first time Radio 3 was quickly located as the signal strength

needle swung from zero to the opposite end of its dial. The sound at the speakers had a crisp brilliance as an orchestral concert was received. I was amazed to find the red stereo beacon also brilliantly lit, thus showing that a stereo broadcast was being picked up. In spite of the *very* rudimentary aerial background noise was *almost* inaudible. It was certainly less – very much less – than one is accustomed to hearing from many discs and pre-recorded tapes. In fact it was so good I could hardly believe my ears. The point was proved when the programme finished and was followed by the usual loud *click* as Wrotham switched from stereo to mono. It was only then, when one could contrast the slight hiss on stereo with the dead silence of mono, that the true efficiency of the equipment could be properly appreciated.

After having suffered a great deal of frustration in stereo reception ever since these broadcasts first began it was really most exciting for me. So much so that I have listened to almost every stereo broadcast since, to the detriment of the many jobs I should have been doing.

And that is all I have to say or need to say about the 120-ST. It fulfils the requirements of my “ideal tuner” more closely than any other piece of equipment I have examined. It gives me all I demand at reasonable cost, although it must be confessed that I have not yet had time to experiment by replacing the 48 inch strand of wire with a piece of string of the same length!

My only criticism is of the inclusion of an AM stage which I personally shall never use. I would have preferred this to be omitted and the price reduced still further. That comment reflects my own preoccupation with so-called fidelity and is rather selfish; after all the equipment was made for others besides me.

One hesitates to use superlatives in a review so I will just conclude by again pointing out that the 120-ST, although unpretentious in appearance and facilities, provides the one basic service that is sometimes forgotten as the user is mesmerized by imposing control panels and arrays of push-buttons. It gives the best possible reception on the most primitive aerial equipment at the most reasonable price. Congratulations to The Rank Organisation for making such a fine piece of equipment available to us.

D.G.K.



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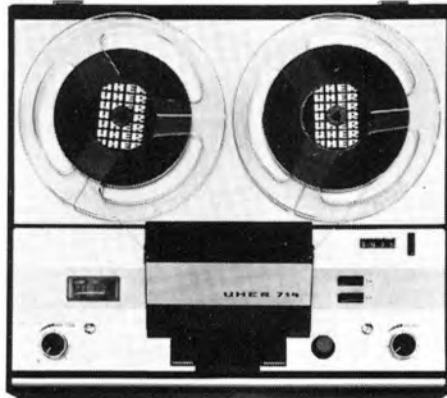
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**NEW PRODUCTS**

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SIGNIFICANT design features are to be found in two new tape recorders from Uher. Model 714 represents this well-known firm's first excursion into "budget" equipment whilst the Variocord 243 stereo machine offers a degree of versatility hitherto found only in professional equipment.

With a recommended retail price of just over £50 the Uher 714 (also reported on in detail in our Test Bench Review on page 22 this month) is a monophonic four-track machine running at a single speed of 3 3/4 ips. Frequency range is claimed to be 40-15,000 Hertz, wow and flutter better than 0.3% and weighted signal-to-noise ratio better than 48 dB.



Maximum reel size is the standard 7 inch and output power is claimed to be 2 watts.

The manufacturer claims that the same care and quality that goes into his higher priced equipment is also built into the more modest 714. The frame, for instance, is pressure cast to give maximum rigidity and simple servicing. Although a monophonic machine it is said that both channels of stereo tapes can be reproduced via the mono output.

The name "Variocord" owes its origin to the interchangeable head mount facility available with this series. By using the professional interchangeable head block assembly system the Variocord 243 stereo machine can be easily converted from two track stereo to four track or vice versa. All that is required is to slacken two screws on the head mount, remove it and plug in a new assembly with the required system in place. It is claimed that no further adjustment is necessary.



Another important feature of the Variocord is the Uher tape tension comparator designed to contro. the correct tape tension during re-spooling or running and when braking. This mechanism operates in either the horizontal or vertical positions and its purpose is to avoid stretching or breaking even the thinnest tapes. An automatic gain control is incorporated although it can be switched to manual override as required.

Tapes speeds are 7 1/2, 3 3/4 and 1 7/8ths ips and the claimed frequency ranges for each speed are 30-20,000 Hertz, 30-15,000 Hertz and 30-8,000 Hertz respectively. Wow and flutter at the same speeds are said to be 0.05%, 0.10% and 0.20%. Signal-to-noise ratio is claimed as 53 dB in half track operation and 50 dB four track when running at 7 1/2 ips. Audio power to the built-in loudspeakers (which can be disconnected) is said to be 2 x 4 watts sinusoidal. Mixing facilities are also incorporated.

Recommended retail price of the Variocord 243 stereo will depend upon the head assemblies supplied but as an indication the four track model less automatic control (reference 2845) costs £156 11s 3d including purchase tax.

Bosch Limited, Rhodes Way, Radlett Road, Watford, Hertfordshire.

**DYNARANGE  
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SCOTCH Dynarange tape already available as standard play (reference 202) and long play (reference 203) is now also available in a double play version under the reference number 204. In addition all domestic Dynarange tapes will in future be marketed in a new plastic library case except the 8 1/4 inch 203 and the 3 inch and 4 inch 204.



Prices of the new double play Dynarange 204 are:

- 3 inch spool in cardboard box 400 feet 19/2d plus 1d purchase tax
- 4 inch spool in cardboard box 600 feet 29/- plus 3d purchase tax.
- 5 inch spool in library case 1200 feet 46/9d plus 1/1d purchase tax
- 5 1/4 inch spool in library case 1800 feet 61/9d plus 1/4d purchase tax
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3M Company Limited, 3M House, Wigmore Street, London, W1A 1ET.

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By means of the "pan" controls the two single microphones can be made to appear anywhere in the stereo image by simple adjustment of the rotary knobs.

The unit is battery powered and so can be used with other battery operated equipment away from a mains source. The battery state is positively indicated by means of a meter on the front fascia; at the rear a socket is provided to enable an external 18 volt supply to be used. Above the individual gain controls is a name plate holder so that a slip of paper can be inserted to indicate the function of each control. The master gain controls the level of the microphones from all the individual inputs.

Any good quality moving coil or ribbon microphone is recommended and the sensitivity of the input stage is such that low output microphones can be used without introducing appreciable noise. Output is rated at 250 mV sufficient to load fully the radio/line input stage of any tape recorder; maximum output before overload is said to be more than 4 volts.



The Unimixer 4S is provided with a carrying handle and supporting leg to raise the front of the unit by about 20 degrees. It is fully guaranteed against defective workmanship and parts for a period of twelve months and this guarantee covers both labour charges and replacement parts during that period. The recommended price is £45 and full details and specification can be obtained from:

Sounds News Productions, 18 Blenheim Road, London, W.4.

## BEGRAM 1800 A "FUTURISTIC" RECORD PLAYER

RELEASED for the first time at the Audio Fair, the Beogram 1800 is described as "futuristic". It comprises a semi-automatic record player unit and is supplied in a choice of teak or rosewood base with satin steel and Plexiglass cover (illustrated left).

The equipment features a new design of pick-up arm with built-in bias compensation and uses the new SP 10A cartridge, (plug-in version of the SP 10 with the same specification). The arm operates automatically at the touch of a tiny button — it moves across from its rest and then gently lowers itself on to the record. At the end of the record the arm lifts and the motor is automatically switched off. Provision has been made for a pre-amplifier which is simply pushed into a slot in the base and is retained by spring clips. This provides equalisation and boost when the player is used with amplifiers not having input sockets for magnetic cartridges.

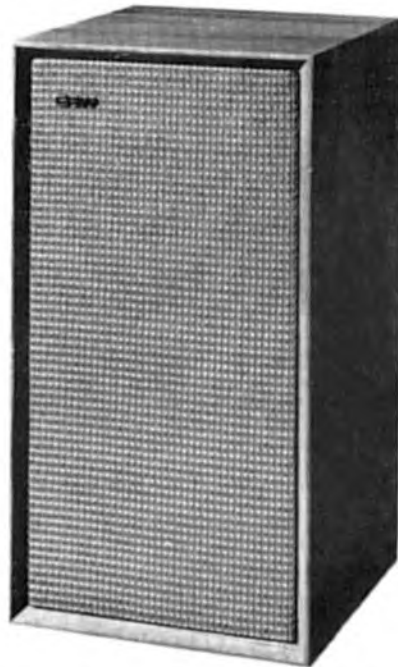
Recommended retail prices are 57 guineas in teak or 58 guineas in rosewood,  
Bang & Olufsen U.K. Limited, Eastbrook Road, Gloucester.

## A "BOOKSHELF" SPEAKER FROM BOWERS & WILKINS

SEEN and heard for the first time at the Audio Fair the Bowers and Wilkins DM1 monitor loudspeaker is a "bookshelf" size enclosure (16½ inches high x 8 inches wide x 8 1/8 inches deep) with a claimed frequency response of better than plus or minus 5 dB within the range 100-25,000 Hertz.

Design of this unit was said to have been conceived through the need to strike an appropriate size/performance balance in quality loudspeaker equipment. With a capacity of only 0.65 cubic feet and a choice of teak, walnut or rosewood finishes it will fit neatly and unobtrusively into any home whilst at the same time offering a practical performance not normally associated with such tiny enclosures.

The system comprises three units plus cross-over and filter network. The bass radiator is a 10 inches x 6 inches elliptical laminated glass/metal cone manufactured in the U.K. by EMI Limited for B & W Electronics. The upper mid-frequency range is covered by a wide dispersion pressure unit and



ultra high frequency by a low diaphragm mass direct radiator which is said to extend response smoothly into the supersonic region.

Great care is taken in manufacture and testing, each loudspeaker being individually adjusted on final test and supplied complete with its own calibration certificate from a pen test from B & K laboratory test gear.

Power handling capacity is said to be 10 watts RMS input and impedance 8 ohms nominal not falling below 7 ohms. Recommended price of the DM 1 complete with calibration certificate is £32.

B & W Electronics, Littlehampton Road, Worthing, Sussex.

# Music

## Musicassette Reviews

### Consultant Critic Katinka Seiner

MOZART. Piano Concerto in C Major, K 467, and Piano Concerto in F Major, K 459. Ingrid Haebler with The London Symphony Orchestra conducted by Witold Rowicki. Philips CPC 0063 49s. 11d. including purchase tax.

The year 1784 was an important one in the life of Mozart. In the course of its twelve months he wrote no fewer than six piano concertos. Between the years 1784 and 1786 he wrote a total of twelve such works. The feat is truly staggering. Many attribute his enormous output to the fact that he was going through one of the happiest periods in his life. With public acclaim and plenty of commissions he must have felt that his cup was indeed running over. But only two years later, in 1788, he was heavily in debt, his wife seriously ill and his young daughter dead. Such misfortune was to plague him to the grave at the age of 35 three years later, when it is said that only a mongrel dog saw his remains consigned to a common pit.

One of the characteristics of genius is the ability to overcome even the greatest personal tragedy. None had that ability more than Mozart. The musical outpourings of that inspired soul would not be quenched.

Both the works presented here clearly demonstrate the composer's skill in handling the essential form of the piano concerto. The sleeve notes quote Mozart's own words about the finale of the F Major. He wrote: "Here and there are passages from which connoisseurs alone can derive satisfaction, but these are so written that the less learned cannot fail to be pleased without knowing why."

Surely those words adequately summarise all his works. One cannot fail to be pleased even if one doesn't know why.

Performance and recorded quality are good without being dramatic. The piano sound is not quite up to the very best standard, just as the orchestral accompaniment could have rather more presence and reality about it. None-the-less it's a pretty fair average, so with the outstanding programme it makes quite reasonable value. For these reasons my recommendation has, regretfully, to be qualified by slight technical limitations.

J. STRAUSS JNR. Waltzes and Polkas. Wiener Symphoniker conducted by Wolfgang Sawallisch. Philips CPC 0061. 49s 11d including purchase tax.

How difficult it is to say something new about the great Strauss family. Recently we reviewed the DGG cassette Karajan in Wien (DGG 623 025) when we commented at some length on the family history. Now we have another orchestra and another conductor performing yet another Viennese selection; the only item common to both is the *Tritsch-Tratsch-Polka*.

The comparison is interesting. There can be no doubt that Karajan has the edge on the Sawallisch interpretation, and yet - let us be fair - without direct comparison one could find little fault with this Philips cassette.

Performance is full of zest with a rich tonal quality from the string section. The orchestra is to be complimented, and the conductor as well not to mention the engineers, on producing a really fine album for our enjoyment.

Having heard Boskovsky and the Vienna Philharmonic at their New Year's Strauss concerts - performances that are known and acknowledged throughout the world - I find that the standard of this album is no less high. All the pleasure and enjoyment that the Strauss family can give us is here in the music of Johann Junior.

It is not my wish to rhapsodise once again on the beauties of the music. These things have been said so many, many times. Let us accept the melodies of Vienna without question; accept and enjoy.

And for our enjoyment we have: *Tritsch-Tratsch Polka, Wiener Bonbons Waltz, Neue Pizzikato-Polka, Accelerationen Waltz, Tik Tak Polka, Unter Donner und Blitz Polka, Morgenblätter Waltz, Perpetuum mobile Polka, Wo die Zitronen blüh'n Waltz* and *Auf der Jagd Polka*.

As we listen to the final notes from this collection we feel sad; sad to think of those days long since gone when all life was grace and elegance. However, now at least we can re-create the feeling and atmosphere of an era that will, alas, never return. And the quality of this cassette helped me to do just that.

Here we have pleasant listening of the best possible kind. As such recommended to all who appreciate the finer things of life.

BEETHOVEN. "Fidelio" Overture, Opus 72b, "Leonore" Overture III Opus 72a and Symphony No 5 in C minor, Opus 67. The Berlin Philharmonic Orchestra conducted by Herbert von Karajan. DGG 923 011. 49s 6d including purchase tax.

Once again we find ourselves dealing with this giant of composers. Once again we have a version of the Fifth to review, but now it is coupled with two overtures. *Fidelio*, Beethoven's only opera, was not successful at its first performance in Vienna in 1805. At that time the opera consisted of three acts; later he shortened it and it was performed in London in its two-act version in 1832, but Beethoven had already seen this work acknowledged and acclaimed before his death in 1827.

The Overture opus 72b was written in 1814 for the revised version of the opera to the first scenes of which it is thematically connected. *Leonore*, written some eight years earlier, more closely depicts the moods and emotions of the opera. It is unusual for an opera to boast no fewer than four overtures: the three *Leonores* plus the opus 72b. At performances there is a certain freedom of choice; I have heard the latter used in the conventional way (at the beginning) with one of the *Leonores* being performed after the interval.

One reason for the confusion about these



To help us with our extended music reviews we are pleased to welcome the services of Katinka Seiner as consultant critic. Miss Seiner, who won the highest award for admission to the Franz Liszt Academy in Budapest, left Hungary in 1957. Since then she has sung at Glyndebourne, has appeared in concerts and opera both in this country and on the Continent and has broadcast many times. She also took part in the prize-winning B.B.C. film on the life of Bartok.

titles originates from the story itself. *Leonore* - a lady - assumes male dress and identity - as *Fidelio* - in order to assist her husband. He, incarcerated in the most dismal of dungeons, is ultimately rescued with great courage by *Fidelio* - who is *Leonore*.

The operatic action symbolises the struggle between good and evil, as does much of this composer's work during all his life. We have already referred to the exposition of such a conflict when discussing Wagner's work in a recent review (Wagner Overtures Columbia TA-33CX 1697 3/4 ips half-track mono reviewed December 1969). There is, however, an essential difference between these two men. Whereas Wagner's preoccupation with concepts of right and wrong bordered on a pathological mania Beethoven was concerned with nobler, more healthy ideas.

Nowhere is this nobility of mind and purpose more clearly expressed than in the *Fifth Symphony*. This work was composed during the same period in which *Fidelio* was also written - a time of contentment and tranquility for the great man. His hearing was not yet critically affected and his music was receiving popular acclaim.

Known as the "Destiny", the *Fifth*



*Symphony* is a jubilant example of strength, bravery and joy conquering evil in a tremendous final victory. This victorious outburst peals out in "orchestral" terms for the first time in any symphony through the use of an augmented orchestra.

Recorded quality is very good. It needs to be to cope with music such as this; music which encompasses all human emotions – despair, happiness; weakness, strength; shame, pride; and when he, like a master craftsman, plays with you and your feelings, you find yourself elated and uplifted.

The Karajan performances of the Beethoven symphonies are generally agreed to be amongst the finest. Certainly there is much to commend his interpretation of the Fifth, but I found the first movement to be too rushed in parts. Whilst conveying the urgency of the message there is a lack of clarity in some of the passages.

But this is a minor criticism; the album itself offers great music well played and well recorded. As such it has my strongest recommendation.

SCOTT WALKER *Sings Songs* from his TV Series Philips CPP 1084 47s. 6d. including purchase tax

Scott Walker has had to take quite a pasting from some of the critics lately. Not too long ago I had to suggest myself that he would be well advised to learn his craft before going into the record business. The trouble is he has a remarkable lack of consistency together with a too obvious difficulty in hitting the right note. All of which makes life for a singer extremely precarious.

The present album shows signs of greater accomplishment, probably because he is singing the very familiar numbers from his (American) TV series. If he were to fail with these then he really should pack up and go home. My own verdict is that although he cannot be said to fail, yet at the same time he shows no signs of the brilliant success that such an album should bring him. There's confidence – as there should be – but little else, as he gives us: *Will you still be mine, I have dreamed, When the world was young, Someone to light up my life, If she walked into my life* (from the musical production of *Mame*), *The impossible dream, The song is you, The look of love, Country girl, Who (will take my place), Only the young and Lost in the stars.*

Those of us who demand something more than good looks from a male vocalist will not be pleased with this collection. It lacks colour and personality, although recorded quality is reasonably good. And when Scott searches hopefully for the right note it can be quite painful. Definitely not one of my favourites.

What makes any one piece in any form of art popular? What makes the angelic faces in a Botticelli painting appeal to so many, just as a

familiar, beautiful tune by Tchaikovsky or Greig makes us listen with a quiet contentment? Surely it must be the universal love of things of beauty – a love that embraces all mankind breaking down barriers between different cultures, nationalities and age groups. One hopes to hear the really popular classical tunes well played; such performance can produce deepest satisfaction and pleasure.

When listening to this album those hopes are realised as we hear: *Humoresque, Solveig's song, Pizzicato, Narcissus, Minuet* (Paderewski) *Hindu song* from "Sadko", *Poeme, Gavotte* from "Mignon", *Serenade* from "Les Millions d'Arlequin", *Barcarole* from "Tales of Hoffmann", *Berceuse* from "Jocelyn" and *Waltz* from "Serenade for Strings".

All these well-loved melodies evoke pictures in my mind, pictures so personal that they perhaps only make sense to me. When listening to this tape they all come alive for me – if not in front of my eyes then certainly in the front of my mind. And what higher praise can I bestow than that? To create such illusions the tape must have no technical flaws to distract and the performance must reach an equally high standard. Here, happily, we have both.

Balance is excellent, as is the rich, round tonal quality. And the strings really do sing as they should in *Barcarole*, the *Hindu song* and *Serenade for strings*. The nostalgic atmosphere of *Solveig's song* is equalled in musical phrasing and understanding by the rendering of *Humoresque*. I felt that whether it was Dvorak, Greig, Offenbach or Rimsky-Korsakov both conductor and players do justice to their composers.

This approach to music gives me great hope that here we might find a common meeting ground where lovers of the classics and pop could come together and admit that their differences are not so great as some would pretend.

This cassette is strongly recommended for those who feel the need for good, tuneful music well played.

Why, oh why, this high-falutin' title? Whilst asking the question the answer has occurred to me: salesmanship. I would not have anything to say against this, since, having produced a commercial product an endeavour must be made to market it. But to whom? Not to me, although the standard of playing is generally good with plenty of enjoyment and zest coming across to the listener.

But, oh dear oh dear, the treatment – or rather the ill-treatment – of what should be a delightful repertoire! There is a monotonous uniformity, a viscous treacle of sameness poured over the tape to cloy the musical palate. The whole could easily be one single number, and an uninteresting one at that. James Last seems to have taken the line of least resistance by using the simplest and

most primitive forms of orchestration, accompaniment and rhythmic patterns.

When listening to *Plaisir d'amour* my emotion was one of desperation. Within it I could find no pleasure at all. This is one of the most beautiful of songs (Martini); its sweetness turns sour, contaminated by its poor rhythm and worse arrangement. I cannot help contrasting this amateurish approach with the kind of professionalism brought to classical arrangements by, say, the Swingle Singers. No, the James Last versions are just not good enough – not for me at least.

Another number sadly mishandled is *Around the world*. The rest of the album is made up of: *Secret love, Perfidia, Malaguena, Memories of Rubinstein, O cangaceiro, Kiss me honey honey kiss me, Adalita, Drina-Marsch, The touch of your lips and Espana cani.*

It has to be admitted that the recorded quality is good; better than the programme deserves. Not an album I would recommend, unless of course you prefer your plaisir on the sour side.

GOLDEN HAMMOND HITS D. W. Ardy Polydor 918 415 47s. 6d including purchase tax

I have never considered the Hammond organ to be a "real" musical instrument in the true sense of the word. Too often the sounds produced lack character giving the listener a wholly mechanical and totally unmusical experience. So what a pleasure it has been to hear the artistic brilliance of this charming collection.

Delightfully arranged with the "bite" of instrumental accompaniment we have a selection of numbers that provides us with both interesting blends of sound and what can only be described as "rattling good tunes". The programme comprises: *America*, from "West Side Story", *Tico tico, The look of love, Wunderbar*, from "Kiss me Kate", *You are not alone, I love Paris*, from "Can-Can", *Mack the Knife*, from "The Threepenny Opera", *Lara's theme* from "Dr Zhivago", *Ramona, Rowbottom Square, Always and Goodnight Sweetheart.*

Recorded quality is excellent; the balance between instrumentalists and organ is just right. Unfortunately once again Polydor give us no information at all about either the repertoire or the artistes. It really is infuriating; it is also rather insulting to the listener (purchaser) to say, in effect: "Here is the music but don't bother to enquire about it because we shan't bother to tell you". Please give us sleeve notes in future.

Equipment used for Musicassette reviews: Philips 2500 playback machine and Philips EL 3312 record/playback machine. Leak and Ferrograph amplifiers. Wharfedale and Jordan-Watts loudspeaker enclosures.

# Music

## Open Spool Reviews

Consultant Critic Katinka Seiner

3 $\frac{3}{4}$  ips STEREO

Equipment used for review tapes: Amplifiers—Quad valved and Ferrograph F307, Loudspeakers—Celestion and Jordan-Watts. Tape Recorders—Akai 3000D and Tandberg 64X

TCHAIKOVSKY. Piano Concerto No. 1 in B Flat Minor Opus 23. FRANCK Variations Symphoniques. The Philharmonia orchestra conducted by Sir John Barbirolli with John Ogden, piano. HMV TD ASD542 3 $\frac{3}{4}$  ips 4-track stereo. 47s 4d including purchase tax.

How can one fail to rise to that famous old war-horse, the Tchaikovsky No. 1? Personally I always associate it with wartime because the first performance I really heard was during the war. So this association of ideas never fails to bring back to me those years of long ago with all their terrors and their happiness. In particular it reminds me of a peculiarly Bohemian set with whom I mixed whenever I could. By today's standards they would be regarded as less than ordinary. How times change!

And times have changed for the Tchaikovsky No. 1. Now a new generation has grown up to appreciate it, and in many cases passed on to deeper things. At this moment it is making the deepest possible impression on a fifteen-year-old girl of my acquaintance. So it goes on, and so it will go on, to be loved by generation after generation.

Having passed through that phase myself I must admit that my chief enjoyment on hearing the work again is the memory of youth that it evokes. So, I am sure, it is for many others. That, then, is one value of the album to me. It brings me back with a jolt to remind me of the idealism of a bygone age. And I do not care to question the value in purely musical terms of a work which can consistently have such a powerful effect. Against this very personal reaction there could be levelled the charge that having been performed so frequently it's time it was given a rest — for a while at least. Sorry, but I don't agree. This is a typical "old 'un's" comment, selfishly ignoring the needs of today's youngsters. They will be coming to this work with fresh, unjaded ears. To them it will be one of the most moving experiences of their lives. They should not be deprived of it.

So far as the quality of the present album is concerned, I was a little put out at first by a few obtrusive drop-outs at the beginning. Fortunately they did not persist and might well be peculiar to my copy. Apart from this one flaw the recording is excellent. Rendering of the solo piano is particularly commendable; that elusive tonal quality that makes the

instrument one of the most difficult to reproduce satisfactorily. With the low back-ground noise we have come to associate with these E.M.I. 3 $\frac{3}{4}$  ips tapes the quieter orchestral passages have a delicacy that delights the ear.

Under Barbirolli's baton the Philharmonia Orchestra gives us a polished rendering. Ogden has, of course, played this piece very many times; I always get the feeling that his performance lacks nothing of the inspiration that others have found. A case of familiarity not breeding contempt — and contempt is a word that should never be used in connection with this magnificent work. To my ear Ogden has both accuracy and imagination.

The coupling with Franck's *Symphonic Variations* gives us a contrast nicely balanced against the Concerto. A breathing space, so to speak, which allows the mind to work once more after the larger emotional drain. With the same high technical standard the whole provides a sense of completeness — from beginning to finality.

Apart from the single reservation about recorded quality, the few drop-outs at the opening which were not repeated, this tape represents the finest possible value for money. Here we have memorable music that will be treasured for a life-time. As such it can be strongly recommended.

A WORLD OF SONG. Victoria De Los Angeles and The Sinfonia of London conducted by Rafael Frühbeck De Burgos. H.M.M. TD ASD 651 3 $\frac{3}{4}$  ips four-track stereo 47s 4d including purchase tax.

Having listened to Callas (Puccini Operatic Arias, Columbia TA-33CX 1204) it was interesting to compare her performance with that of Angeles in this album. And what a contrast it is!

First we have a very much better recorded quality. Not a trace of the under-recording from which Callas suffered, and the treatment is altogether more sympathetic. Distortion? Yes, slightly now and again on some of the most difficult peaks but it really is minimal — certainly not enough to spoil enjoyment.

And what about the voice itself? A reviewer should always admit his bias. Let me now confess that I do not just admire the Angeles voice — I love it. And her.

Her selection of repertoire is a little strange. Many of the items are usually sung with piano accompaniment, whereas here we have The Sinfonia of London. Orchestrations are by Douglas Gamely who is to be congratulated for the delicacy of his handling of some tricky problems. The overall effect is wholly successful. Victoria sings for us: *Auf Flügeln des Gesanges* (On wings of song), *Ich liebe dich*, (I love thee), *Wiegenlied* (Cradle song), *Als die alte Mutter* (Songs my mother taught me), *Plaisir d'amour*, *L'enamouree*, *Les filles de Cadix*, *Irish Lullaby*, *Era la vo* (Sicilian

*lullaby*) *La paloma*, *Azulão*, *De España vengo* and *Carceleras*.

There is so much beauty in this album it is difficult to know which items should be specially mentioned. In *Wiegenlied* one can visualise the cradle — here is a mother of flesh and blood singing to her equally human baby. The *Irish lullaby* too is equally sincere. Items such as these sound awful when given the superficiality of cold professionalism; here the professionalism is devoted to pure sincerity and the result is exquisite.

On wings of song, I love thee. But there must be just one criticism. Very occasionally she fails to hit the note. At times this singing off pitch can be disturbing, and that is a pity because there is so much here that is so good.

We can summarise this album by saying that it gives us a delightful collection of well-known songs performed by one of our best sopranos. The only blemish is occasional inaccuracies of pitch. Apart from this it is an album that will give pleasure to thousands — as it did to me. Very strongly recommended.

ABBEY ROAD. The Beatles. EMI ID PCS7088 3 $\frac{3}{4}$  ips four-track stereo. 41s including purchase tax.

Abbey Road. The Beatles. Inexplicable. That's my reaction to this album. A depressive attempt to perpetuate a cult. An expression of negation. A ghastly amateur failure. Those are my feelings. Are you shocked?

Unfortunately for the Beatles they are not demi-gods standing apart and immune from criticism; they are part of the great entertainment industry and their primary function is to entertain. They have done so in the past — with perhaps too many successes too easily gained. Now they seem to believe that the magic of their name is all that is needed. But the substitution of a name for hard work and thought will only lead to disaster. For them.

After listening carefully to Abbey Road and after trying very hard indeed to enjoy it I had to admit defeat. Instead of entertaining it left me depressed and irritated.

Perhaps the fault was mine? I discussed the record with teen-age friends. They, too, had reached the same conclusion. The album was as meaningless for them as it was for me. However it was interesting to note that many of them had bought it out of curiosity. It will take more than curiosity to put their next record at the top of the charts.

The Abbey Road excursion comprises: *Come together*, *Something*, *Maxwell's silver hammer*, *Oh darling*, *Octopus's garden*, *I want you* (she's so heavy), *Here comes the sun*, *Because*, *You never give me your money*, *Sun king*, *Mean Mr Mustard*, *Polythene Pam*, *She came in through the bathroom window*, *Golden slumbers*, *Carry that weight* and *The end*.

Everything is wrong with it. All too often voices are drowned by crude instrumental balancing; when they can be heard their sense

is elusive to say the least. Tunes are unimaginative and dull. Rhythms are repetitive and boring. *Oh darling* is just about the worst of a poor bunch with screaming hysteria masquerading as entertainment. Don't the Beatles know that this rather sick phase of pop is as out-dated as last month's newspapers? It's sad, isn't it?

**SINCERELY CLIFF RICHARD.** Cliff Richard. Columbia TD-SCX 6357. 3 $\frac{3}{4}$  ips four-track stereo. 41s including purchase tax.

Hardly the most popular of our male vocalists, Cliff Richard here gives us a typically uninspired series of performances of numbers that are not likely to send many of us into transports of delight. But then, either in spite of or because of the "sincerity" implied in the title, that is Cliff Richard. No doubt his bank manager would be only too pleased to testify to the commercial success of his formula, a success which for me has always been slightly mysterious.

Here, then, is the offering: *In the past, Always, Will you love me tomorrow, You'll want me, I'm not getting married* (careful, Cliff – you might lose that freshly washed, whiter-than-white image if you fool around with titles like that), *Time, For Emily whenever I may find her, Baby I could be so good at loving you, Sam, London's not too far, Take action, Take good care of her, When I find you and Punch and Judy.*

Recorded quality is good whilst the internal balance leaves something to be desired. The voice is just one stage removed from the foreground so we do not have the realism that this kind of programme demands.

On the whole the album leaves me quite cold. But then if Cliff had depended on me for his income he would have been bankrupt long ago. His many fans will delight in both listening to the tape and treating my opinions with derision. I wish them the greatest joy in both their pursuits.

**OH! WHAT A LOVELY WAR.** Original Soundtrack Recording. Paramount TD-SPFL 251 3 $\frac{3}{4}$  ips 4-track Stereo. 41s including purchase tax.

Few films have had such a publicity blast as *Oh! What a lovely war*. Perhaps few have deserved it so much. There can be no greater or more holy cause than that of peace, and no movement can ensure that end so effectively as that which satirises war. Laughter is a powerful weapon. Could Hitler have survived in power if the German nation had had the courage to laugh at him? Can war survive if it is subjected to ridicule? Let us hope and pray not.

It is worth listing the proliferation of items that go to make up this collection. They are: *Overture, Boys and girls come out to play, Oh! It's a lovely war, Are we down hearted? No-o-o, The bells of Hell and Far far from Wipers, Belgium put the kaibosh on the Kaiser, We don't want to lose you, I'll make a*

*nan of you, Good-bye-ee, Silent night, Oh! It's a lovely war, Hush! Here comes a whizzbang, Adieu la vie, They were only playing leapfrog, When this lousy war is over, I want to go home, The bells of Hell, Far, far from Wipers, Pack up your troubles, Keep the home fires burning, Over there and And when they ask us.*

Recorded quality and stereophonic effects are excellent. The whole goes with a real swing to bring the show right into the living room. With some surprising gimmicks, too. I shan't name the number where it happens, but if at any time you think your machine is giving up the ghost – you would be quite wrong. An excellent tape, which like the film, deserves support for more than one reason.

## 3 $\frac{3}{4}$ ips MONO

**PUCCHINI OPERATIC ARIAS.** Maria Callas and the Philharmonia Orchestra conducted by Tullio Serafin. Columbia TA-33CX 1204 3 $\frac{3}{4}$  ips half-track mono. 41s including purchase tax.

For more than a decade the name of Maria Callas has been something like magic. It was sufficient to announce a personal appearance of the *prima donna* for people to flock to see and hear her. And understandably so. Listening to this tape, which consists of some of the best loved Puccini arias, I once again found myself surrendering to her artistry.

The Callas selection comprises: "Manon Lescaut" *In quelle trine morbide* (In these soft silken curtains), *Sola perduta abbandonata* (Alone and abandoned), "Madame Butterfly" *Un bel di vedremo* (One fine day), *Con onor muore* (Death with honour); "La Bohème" *Si, mi chiamano Mimi* (Yes, they call me Mimi) *Donde lieta usci* (To the home that she left); "Suor Angelica" *Senza Mamma* (Without mama); "Gianni Schicchi" *O mio babbino caro* (Oh! my beloved daddy); "Turandot" *Signore ascolta!* (Listen, my lord); *In questa reggia* (From this palace) and *Tu che di gel sei cinta* (You who with ice are girdled).

She is like a juggler, but instead of coloured balls and sticks she plays with our emotions, expressing joy and sorrow as if she were to be more an actress rather than singer. Even if you don't understand a single word (incidentally, it is often very difficult to distinguish the words) her rendering of the various parts and unique dramatic quality makes the meaning of each item transparently clear. In this she is well aided by Tullio Serafin and the Philharmonia orchestra.

It is true her voice often has a harsh, unpleasant edge coupled with a strong vibrato but her sense of drama and first-rate performance overrides these criticisms. I was disappointed in only two of the arias where I found the interpretation to be artificial and false. These were *Un bel di* (One fine day) and *O mio babbino caro* (Oh! my beloved daddy). I found these to be coy and full of affectation instead of innocent, young and

loving. Clearly dramatic music is more Madame Callas's own which is proven by her magnificent rendering of the three arias from "Turandot".

After such praise it is disappointing to have to comment adversely on the recorded quality. The tape has been generally under-recorded. To achieve a reasonable listening level the volume at the amplifier has to be increased with the inevitable raising of background noise and hiss. This is at times quite unpleasant and does much to destroy the presence and reality of the recording. Add to this some most unpleasant distortion (the soprano voice is very difficult to record but that is no excuse) and some equally unpleasant peaking and we have a fair description of this album.

So there we have it. Superb dramatic interpretations, a voice quality that is not helped by poor recorded quality and the magic of Callas. A mixture that both pleases and annoys at one and the same time.

On balance the tape is well worth investing in. What is good is so very good as to leave one quite breathless; for the sake of the pleasure I was happy to endure the annoyance. I must therefore recommend the album to music lovers but not necessarily to hi-fi fiends.

**MRS. MILLS.** Back to the Roaring Twenties. EMI Parlophone TA-PMC 7080. 3 $\frac{3}{4}$  ips half-track mono. 41s. including purchase tax.

The incomparable Mrs Mills tinkles her way relentlessly through sixteen numbers from an age that most of us now seem to look back on with envy. Do you remember the twenties? I certainly don't. Which is perhaps why we all think everyone had such a good time in those good old days. Truth is, it wasn't such great fun for everyone, although it might have been for a few. And those who are keenest to look back to that era were not alive at the time!

Still, there's always something about the past that makes it seem better than the present, and the tunes of the twenties were certainly real melodies that will endure for a very long time yet. In this album Mrs Mills renders on her famous honky-tonk piano: *The best things in life are free, It had to be you, Ain't we got fun, Limehouse blues, Sometimes I'm happy, You brought a new kind of love to me, There's blue ridge 'round my heart Virginia, Kiss curl caper, Ma (he's making eyes at me), My sweetie went away, 'S wonderful, Ukulele lady, Brown eyes (why are you blue), Thoroughly modern Millie, Mountain greenery and Charleston.*

One thing I missed in this collection is the sound of Mrs Mills' voice with her happy, giggling laughter. She plays this repertoire "straight", which is rather a pity. It's an obvious party tape and a few laughs from her ladyship would have helped things to go with a swing. Apart from that one criticism recording is fine and as for the performance – well, it's Mrs Mills and there's no more to be said. All good, clean fun and very enjoyable.



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Ferguson 3232 Stereo 4 Tr.  
Ferguson 3226 Mono  
Ferguson 3224 Mono  
Ferguson 3216 Mono  
Ferrograph 713  
Ferrograph 702.4  
Ferrograph 722.4  
Fidelity Studio 4 Track Mono  
Fidelity Braemar '2 or 4 Tr. Mono  
Grundig TK320 2/4 Tr. 3 sp. Stereo  
Grundig TK140 DL 4 Track Mono  
Grundig TK120 DL 2 Track Mono  
G-undig TK245 DL Stereo Mono  
G-undig TR247 DL 4 Tr. Stereo  
Grundig 145 DL 4 Tr. Auto Mono  
Grundig TK340 DL 4 Tr. Stereo 3 sp.

\*Microphone extra

Philips 4307 4 Tr. Single speed Mono  
Philips 4308 4 Tr. 2 sp. Mono  
Philips Professional PRO.12  
Philips Stereo 4404 2 sp. 4 Tr.  
Philips Stereo Cassette 3312 with 2 sp.  
Philips 4407 Stereo 3 sp. 4 Tr.  
Philips 4408 Prof. 3 sp. 3 Tr. Stereo  
Pye 9106 Auto Mono  
Revox 77 Stereo 2 or 4 Tr.  
Sanyo 801 St. Pre-amp.  
Sanyo 929 4 Tr. 2 sp. Stereo  
Sanyo 939 4 Tr. 2 sp. Stereo  
Sanyo 990 3 sp. 4 Tr. Stereo  
Sharp RD.706 2 sp./2 Tr./Batt. Mains  
Sony TC230W  
Tandberg 15 2 or 4 Tr. 3 sp./M.  
Tandberg Series 12X 3 sp. 2/4 Tr. St.  
Telefunken M207 2 sp. 4 Tr. Stereo  
Telefunken 204 T.S. 4 Tr./St.  
Telefunken 501 4 Tr./M.  
Telefunken 203 Stereo/Mono 4 Tr. 2 sp.  
Telefunken 201 Mono 4 Tr.  
Uher 7/4 4 Tr. Mono  
Wyndors Vanguard 3 sp. 4 Tr. Mono

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Philips RR290 Cassette/AM radio  
Philips 2205 Batt./Mains Cassette  
Philips EL3302 Cassette  
Akai 10 V 4 Tr. St./BM  
Tandberg Cassette Series II 2  
Ferguson Cassette 3240  
Grundig Cassette C200  
Aiwa Cassette/Batt. Mains  
Pye Cassette  
Sharp 505 2 Tr. 2 sp./Batt. Mains  
National 4 Tr. 2 sp./Batt. Mains  
Telefunken 302 2 sp. 4 Tr. Mono  
Uher 4200/4400 2/4 Tr. 4 sp. Stereo

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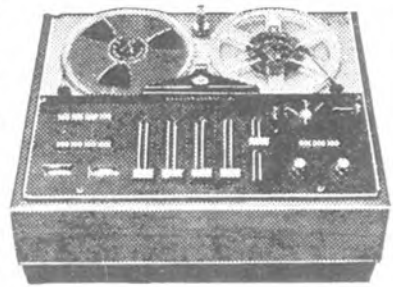
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