

MARCH 1969

# TAPE

RECORDING MAGAZINE

2<sup>1</sup>/<sub>2</sub>



## OUR "ACTION" TEAM

DECIDES  
TO GO STEREO

## PROJECT ALPHA

FIRST PART OF AN EXPLORATION  
INTO ELECTRONIC MUSIC

## RECORDING ACOUSTICS—

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MUSIC REVIEWS  
NEW PRODUCTS  
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**and now you can get this superb tape splicer  
for half price when you buy 'Synchronotape'**

It makes such sound sense when you buy SYNCHROTAPE—now more than ever. For not only do you get free insurance up to £25 for your recorder as protection against theft or fire, but each reel of SYNCHROTAPE that you buy, from 5" to 7", contains a special offer coupon towards the purchase of the superb Adastra 'Instant Cut & Trim' tape splicer for only 7/6. (usual price 15/-). *This Offer is restricted to the U.K. and Eire only.*

\*... and yet another SYNCHROTAPE-PLUS feature!

Free booklet with unique Recording Log and Technical data now included in all Synchronotape packs from 4" upwards.

SIZE	STANDARD	LONG	DOUBLE	TRIPLE
BASE	P.V.C.		POLYESTER/P.V.C.	
2½"		200' - 5/9d.	300' - 8/9d.	
3"	150' - 4/9d.	225' - 6/3d.	300' - 8/9d.	450' - 13/9d.
4"		450' - 12/-	600' - 18/-	900' - 27/-
5"	600' - 15/-	900' - 18/6d.	1200' - 28/6d.	1800' - 45/-
5½"	900' - 18/6d.	1200' - 22/6d.	1800' - 36/-	2400' - 57/6d.
7"	1200' - 22/6d.	1800' - 28/6d.	2400' - 48/-	3600' - 75/-

COMPREHENSIVE TAPE-EDITING KIT WITH SPLICER, 29/6d. Plus P.T. 6/6d.



**How to  
get your  
Adastra  
Tape  
Splicer**

Send three of the splicer offer coupons with a postal order for 7/6d, together with your name and address on the order form supplied to: Adastra Electronics Limited. Within 14 days you will receive your tape splicer, postage free, and with full instructions for use.

**'Synchronotape'**  
ADAstra ELECTRONICS LIMITED

A range of 21 top quality, high performance tapes

167 Finchley Road, London, N.W.3 (Tel: MAI 8164/5)



## Hi-fi stereo tape recorders start with the...

No matter what price you pay for an AKAI, the same meticulous care goes into the design and production of every machine. Take the 1710W for example, it gives you excellent performance\*, a robust construction that assures trouble-free operation, and a compact, sleek design with an oil-finish wooden cabinet to blend with your hi-fi equipment or furniture. And you pay no more than you would for an ordinary tape-recorder.

- Frequency response 50-15,000 Hz.  $\pm$  3db.
- Distortion within 2% 1,000 Hz. 0 VU
- 8 watts. total output. (music power)
- 2 - 5" x 7" speakers.
- 8 hrs. mono recording at  $1\frac{1}{2}$  ips —
- 1200 ft. of tape.

# 1710·W

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A Company within the Rank Organisation

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## SPECIAL OFFER! SAVE £100

### 4-TRACK MONAURAL (contd.)

4-TRACK STEREO MONO	Deposit		12 Monthly Payments		Cash Price	
	£	s. d.	£	s. d.	£	s. d.
Philips EL3312	16	19 10	4	3 4	66	19 10
Ferguson 3232	22	18 3	5	14 7	91	13 0
Sony TC200	23	15 0	5	18 9	95	0 0
Sanyo MR929	24	0 0	6	5 0	96	0 0
Philips EL3555	25	19 4	6	5 0	101	19 4
Aiwa TPI012	26	0 0	6	8 2	102	18 0
Akai I710W	27	17 3	6	16 2	109	17 3
Sanyo MR939	28	0 0	6	16 8	110	0 0
Sony TC260	29	5 0	7	5 0	116	5 0
Tandberg 12/21/41	31	10 0	7	17 6	126	0 0
Philips EL4408	33	16 8	8	6 8	133	16 8
Telefunken 204 'E'	34	12 5	8	10 0	136	12 5
Beocord 2000K	39	10 0	9	13 4	155	10 0
Beocord 2000T	40	10 0	10	2 6	162	0 0
Sony TC530	41	10 0	10	6 3	165	0 0
Ferrograph 722/4	46	15 0	11	10 5	185	0 0
Akai M9	49	3 5	12	3 4	195	3 6

STEREO TAPE UNITS	Deposit		12 Monthly Payments		Cash Price	
	£	s. d.	£	s. d.	£	s. d.
Sanyo MR-801	20	0 0	4	13 4	78	0 0
Sony TC250A	20	10 0	4	18 4	79	10 0
Akai 3000D	26	11 4	6	11 8	105	11 4
Sony TC350	27	5 0	6	16 3	109	0 0
Beocord 1500	31	10 0	7	11 8	122	10 0
Tandberg 62.64X	36	18 0	9	0 0	144	18 0
Ferrograph 702/704	6	18 0 0	6	10 0 0	160	6 8

4-TRACK MONAURAL	Deposit		12 Monthly Payments		Cash Price	
	£	s. d.	£	s. d.	£	s. d.
Fidelity Studio	11	5 9	2	16 6	45	3 0
Philips EL4305	11	17 9	2	16 8	45	17 9
Ferguson 3226	11	10 0	2	16 8	45	10 0
Grundig TK140	11	14 6	2	18 4	46	14 6
Telefunken 201	11	18 9	2	19 7	47	13 9

	Deposit		12 Monthly Payments		Cash Price	
	£	s. d.	£	s. d.	£	s. d.
Ferguson 3228	11	19 0	3	0 2	47	19 0
Philips EL4306	14	1 8	3	10 0	56	1 8
Ferguson 3230	14	13 0	3	13 0	58	11 0
Ferguson 3216	16	19 0	4	0 0	64	19 0
REPS M10	18	18 0	4	14 6	75	12 0
Truvox R54	18	18 3	4	14 11	75	17 3
Wyndor Vanguard	18	18 0	4	14 6	75	12 0
Tandberg 1526	20	19 0	5	3 4	82	19 0
Truvox R204	31	14 2	7	15 0	124	14 2

MAINS TWIN TRACK						
	Deposit		12 Monthly Payments		Cash Price	
	£	s. d.	£	s. d.	£	s. d.
Fidelity Playtime...	7	18 6	1	16 8	29	18 6
Ferguson 3224	8	6 0	2	1 4	33	2 0
Grundig TK120	9	17 6	2	9 2	39	7 6
Philips EL3310	10	5 10	2	11 5	41	2 10
Tandberg 1521	18	19 6	4	10 0	72	19 6
Truvox R52	18	17 3	4	15 0	75	17 3
Beocord 1100	24	10 0	6	2 6	98	0 0
Brenell Mk. V/3 Std.	26	17 9	6	10 0	104	17 9
Brenell MkV/3 Mtr.	28	0 2	7	0 0	112	0 2
Truvox R202	31	14 2	7	15 0	124	14 2
Brenell V/3/M	32	16 8	8	5 0	131	16 8
Ferrograph 713	33	18 4	8	9 7	135	13 4
Ferrograph 713/H	36	16 8	8	16 8	141	16 8

INTEREST FREE H.P. TERMS. OPEN SATURDAY 6 p.m. FRIDAY 6-30 p.m. IF UNABLE TO CALL WRITE FOR BROCHURES. PART EXCHANGES. ALSO 18 and 24 MONTHLY TERMS

### AKAI X-355 Outstanding features:-

- ★ 3 speeds, 3½, 7½ and 15 i.p.s.
  - ★ 4 Heads—Erase, Record, Playback/Monitor plus Crossfield
  - ★ 2 Loudspeakers
  - ★ 3 Motors
  - ★ 40 Watts undistorted all Transistor Amplifier
  - ★ Automatic Reverse. Automatic Repeat
  - ★ Auto Stop/Shutdown. Sound-on-Sound, Reverberation
  - ★ 10½" Reel Adaptable
  - ★ Vertical or Horizontal Operation
- 2 or 4-track models available  
BRAND NEW. MAKERS GUARANTEE.  
Present List Price £331.8.6d. — £231.0.0  
Deposit £58.0.0 and 18 monthly payments £11.4.9.  
(H.P. Price £256.19.0)

### AKAI X-300

- ★ Speeds 3½, 7½ and 15 i.p.s. Optional
  - ★ 4 Heads—Erase, Record, Playback/Monitor plus Crossfield
  - ★ 2 Loudspeakers
  - ★ 40 Watts undistorted all Transistor Amplifier
  - ★ Sound-on-Sound. Auto Stop. Auto Shut-off
  - ★ 10½" Spool capacity. 4 Digit Counter
- BRAND NEW. MAKERS GUARANTEE.  
Present List Price £263.18.3d.—£193.10.0  
2 or 4-track Models available.  
Deposit £48.10.0 and 18 monthly payments £9.5.4.  
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### MP613 MALAR

Stereo Tape Recorder—4 track, 3 speed. Frequency response: 7½ i.p.s. 50-19,000 c/s., 3½ i.p.s. 50-12,000 c/s., 1½ i.p.s. 80-6,000 c/s. Output 4 watts mono, 2 x 2 watts r.m.s. stereo. Automatic stop, two position speaker switch. Dual volume control. Four push buttons: recording (special lock prevents accidental erasing), radio, gramophone, and microphone. Three position channel selector. High-speed rewind. Instant stop. Pause control. Multi playback, synchro playback. Combination head, fine laminated Fe-Ni-core, range 50dB. Max. 7" reel. Available in teak or rosewood with transparent dust cover. Size 15½" x 12½" x 7".



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# Vortexion

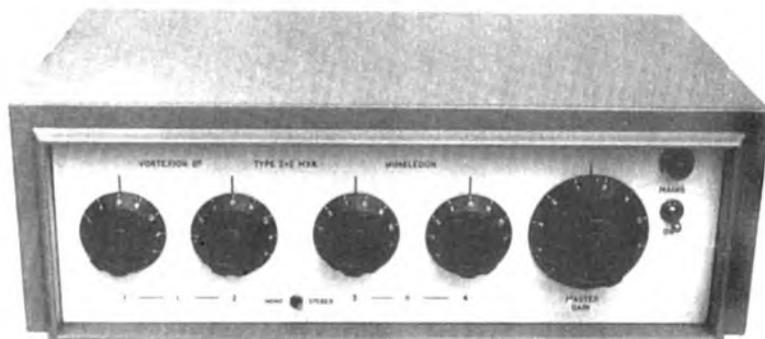
## STEREO MIXERS

These electronic Stereo Mixers range from 2+2 to 5+5 input channels, with left and right outputs at 500 millivolts into 20K ohms up to infinity.

Separate control knobs are provided for L & R signals on each stereo channel so that a Mono/Stereo changeover switch provided can give from four to ten channels for monaural operation, in which state the L & R outputs provide identical signals.

A single knob ganged Master Volume control is fitted, plus a pilot indicator.

The units are mains powered and have the same overall dimensions as monaural mixers.



Also available Monaural Electronic Mixers:—

- |                        |                                   |
|------------------------|-----------------------------------|
| 4 Way Monaural Mixers  | 3 Way Monaural Mixers with P.P.M. |
| 6 Way Monaural Mixers  | 4 Way Monaural Mixers with P.P.M. |
| 8 Way Monaural Mixers  | 6 Way Monaural Mixers with P.P.M. |
| 10 Way Monaural Mixers | 8 Way Monaural Mixers with P.P.M. |

**200 WATT AMPLIFIER.** Can deliver its full audio power at any frequency in the range of 30 c/s—20 Kc/s  $\pm 1$  db. Less than 0.2% distortion at 1 Kc/s. Can be used to drive mechanical devices for which power is over 120 watt on continuous sine wave. Input 1 m W 600 ohms. Output 100-120 v or 200-240 v. Additional matching transformers for other impedances are available.

**30/50 WATT AMPLIFIER.** With 4 mixed inputs, and bass and treble tone controls. Can deliver 50 watts of speech and music or over 30 watts on continuous sine wave. Main amplifier has a response of 30 c/s—20 Kc/s  $\pm 1$ db. 0.15% distortion. Outputs 4, 7.5, 15 ohms and 100 volt line. Models are available with two, three or four mixed inputs for low impedance balanced line microphones, pick-up or guitar.

**CP50 AMPLIFIER.** An all silicon transistor 50 watt amplifier for mains and 12 volt battery operation, charging its own battery and automatically going to battery if mains fail. Protected inputs, and overload and short circuit protected outputs for 8 ohms—15 ohms and 100 volt line. Bass and treble controls fitted. Models available with 1 gram and 2 low mic. inputs. 1 gram and 3 low mic. inputs or 4 low mic. inputs.

**100 WATT ALL SILICON AMPLIFIER.** A high quality amplifier with 8 ohms—15 ohms and 100 volt line output for A.C. Mains. Protection is given for short and open circuit output over driving and over temperature. Input 0.4 v on 100K ohms.

**20/30 WATT MIXER AMPLIFIER.** High fidelity all silicon model with F.E.T. input stages to reduce intermodulation distortion to a fraction of normal transistor input circuits. The response is level 20 to 20,000 cps within 2 db and over 30 times damping factor. At 20 watts output there is less than 0.2% intermodulation even over the microphone stage at full gain with the treble and bass controls set level. Standard model 1-low mic. balanced input and Hi Z gram.

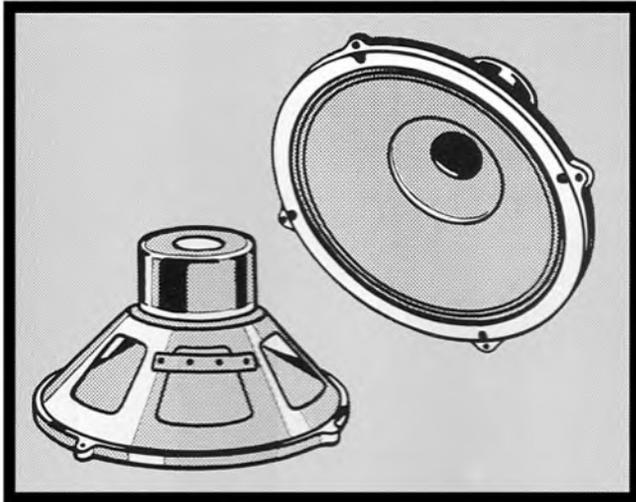
Visit our Demonstration Room No. 150 at the SONEX 70 Hi-Fi Exhibition  
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## with the Grampian TC12 loudspeaker

The Grampian TC12 loudspeaker is a high quality twin cone unit at a reasonable price. The loudspeaker is built of high quality materials to a rigid specification and is eminently suitable for good quality sound reproduction. Let us send you full details or better still go and hear one at your local dealers now.

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## What's so special about this Tape Recorder?

Not only is it a complete **STEREO System** in a stylish, compact cabinet.



### IT IS AN EASY-TO-BUILD KIT

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We don't ask you to build the cabinet, this is supplied completely finished.

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The results of your labours will be a 1/4-track stereo tape recorder with a latest 18 transistor circuit. Built-in stereo amplifiers giving 4 watts output per channel and incorporating two high efficiency loudspeakers.

**THE PRICE £58 KIT** POST & PACKING 10/6

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Further details of Tape Recorder .....

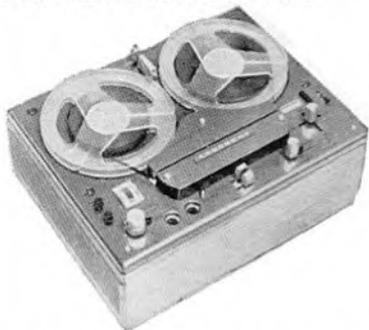
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Prices and specifications subject to change without prior notice.

## EXCLUSIVE T.R.C. OFFERS!

Only at the Tape Recorder Centre and branches can you buy the exceptional TANDBERG 12X and take your pick of one of the two amazing Money Saving Offers detailed below!



## Tandberg

SERIES 12X STEREO TAPE RECORDER

A completely self-contained 3-speed stereo record and play-back tape recorder with the revolutionary Bias Head which has made possible improved frequency response figures at all speeds. Completely transistorised incorporating two 10 watt amplifiers with independent volume control on each channel.

Sound on Sound. Bass and Treble controls. Two recording level meters. Inputs for magnetic pickups. Teak finished case. Vertical or horizontal operation. Price £143.7.0.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★  
OFFER ONE **50% OFF!!**

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PAIR OF A.K.G. D9D—HL High quality Dynamic Microphones.

For hand or table use. Frequency response 50-15,000 Hz. Complete with elegant anodised aluminium detachable stands in presentation boxes. List Price £12.10.0 pair.



A.K.G. Dynamic Stereo Headphones. Model K50.

Enjoy the thrill of stereo with these superb headphones. Elegant and lightweight with crystal clear reproduction. Frequency response 20-20,000 Hz. Impedance matches Tandberg 12X. Brand New. List Price £9.10.0.

The above items (total list price £22.0.0) can be yours for only £11.0.0 when purchased with the Tandberg 12X.

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OFFER TWO **50% OFF!!**

PAIR OF D.N.H. HIGH FIDELITY SPEAKER ENCLOSURES by Norway's Largest Speaker Manufacturers

The ideal loudspeakers for use with the Tandberg 12X matched in appearance and performance. Enjoy to the full the true stereo quality that the 12X is capable of. Each fitted high quality twin cone 8½" speaker 10 watt handling capacity. Not mini speakers—size 11" x 7" x 15½" high. Teak finished on all sides with cloth fronts for vertical or horizontal use. Normally sold at £33.12.0 These superb speakers can be yours for only 16 gns. when purchased with the Tandberg 12X.



THE LARGEST SHOWROOMS IN GREAT BRITAIN  
DEVOTED EXCLUSIVELY TO TAPE RECORDERS &  
TAPE RECORDING EQUIPMENT

# SCCH!!

YOU KNOW WHO TAPE  
UP TO **60% OFF!!**

We are not allowed as a condition of our bulk purchase of this tape to state the manufacturers, as we are able to sell at such a ridiculously low price that it makes the official price list seem astronomical!! Suffice it to say that this superb polyester based low noise tape is manufactured by one of the world's leading British/American based companies and cannot be bettered in quality or price.

Supplied on reels, without leaders in plain white boxes under the NuSound brand name we are able to offer these at the ridiculously low prices below.

		BRANDED PRICE	OUR PRICE
5"	STANDARD	600 ft. 22/2 ...	15/-
5½"	STANDARD	900 ft. 29/5 ...	18/6
7"	STANDARD	1200 ft. 36/7 ...	22/6
5"	LONG PLAY	900 ft. 29/2 ...	18/6
5½"	LONG PLAY	1200 ft. 36/5 ...	22/6
	LONG PLAY	1800 ft. 51/7 ...	28/6

Please add P. & P. 2/6d. extra.

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FOR EXPRESS SERVICE SEND YOUR ORDERS TO  
THE TAPE RECORDER CENTRE LIMITED  
MAIL ORDER DEPT. TRM/MAR  
MAGNATAPE HOUSE,  
191/193, PLASHET ROAD, UPTON PARK,  
LONDON, E.13  
GIRO ACCOUNT No. 58-271-0006

## SAVE ON STELLA!



STELLA CASSETTE RECORDER MODEL ST.9112  
AC/DC MAINS AND BATTERY PORTABLE  
LIST PRICE OUR PRICE **29½ GNS.** P. & P. 10/6

Features include Automatic record level volume control. Separate tone and volume controls with large upward facing loudspeaker giving high quality reproduction. Outlet socket for extension loudspeaker and connection to Hi-Fi amplifier. Ideal for home or outdoor use. Operates from AC 200/240v. or six U11 batteries. Complete with dynamic microphone, remote control switch, demonstration cassette, cassette holder, rack, recording lead, instruction book and makers guarantee.

# THE TAPE RECORDER CENTRE

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82 HIGH HOLBORN, W.C.1. Tel. 01-242 7401 • 242/4 PENTONVILLE RD., N.1. Tel. 01-837 8200 • 36 LEWISHAM HIGH ST., S.E.13. Tel. 01-852 2399  
228 BISHOPSGATE, E.C.2. Tel. 01-247 2609 • 360 KILBURN HIGH RD., N.W.4. Tel. 01-624 1656 • 87/100 ILFORD LANE, ILFORD. Tel. 01-478 2291

# now... **fabulous** FREE OFFERS

with superb

## AKAI

Tape Recorders  
from  
**R.E.W**

All available on Interest-Free Terms, one third cash price deposit, balance over 12 months.



**FREE!** SPECIAL OFFER with each machine —FREE ACCESSORY KIT (value £12 18s.) PLUS FREE pair of Stereo Headphones, value £6 10s.0d.!

**AKAI 1710W Stereo Tape Recorder (left).** The Shield Type Head for High S/N Ratio. 4-track stereo/monaural recording and playback. 3-speeds 1½, 3¾ and 7½ ips (15 ips optional). Automatic shut off. Pause lever. Tape cleaner. Tape shifter in fast forward/rewind operation. 4 hours maximum stereo recording capacity with a 1,200 feet tape. DIN jack. Stereo headphone jack. 3-digit index counter with reset button VU meters. Finely oil-finished wooden cabinet £109.



**FREE!**

SPECIAL OFFER with every deck FREE pair of Stereo Headphones listed at £6 10s. PLUS FREE COVER—PLUS TWO FREE MICRO-PHONES listed at 6 gns.!

**AKAI 3000D 4-Track Stereo Tape Deck (above)** High Quality Three Heads System. 4-track stereo/monaural recording and playback. For playback, the 3000D requires external power amplifier and speakers. 2-speeds (3¾ and 7½ ips). Three heads (Erase, recording and playback heads). All silicon transistor pre-amplifier. Automatic shut off. Pause lever. Tape cleaner. DIN jack. Stereo headphone jack. 3-digit index counter with reset button. VU meters. Beautifully grained wooden cabinet. £99 10s.

Also the following superb Akai machines at opportunity prices—

**X355 CROSSFIELD HEAD RECORDER**, our price £270 (List £331). Few left only.

**1800 8 TRACK CARTRIDGE/REEL TO REEL STEREO RECORDER** £158.

**X1800 S.D. CROSS FIELD HEAD 8 TRACK CARTRIDGE/REEL TO REEL STEREO RECORDER** £201.

**X150D CROSSFIELD HEAD HI FI TAPE UNIT**, our price £106 (List £130).

**XV PORTABLE AC/DC CROSSFIELD HEAD STEREO RECORDER** £180.

**FREE!** SENSATIONAL OFFER to every purchaser of the M9, a FREE pair of Wharfedale Super Lynton Speakers currently valued at no less than £41 4s.0d.!

**AKAI M9 High Fidelity Stereo Tape Recorder (right)** Crossfield Head. All Silicon Transistor Amplifier. 4-track stereo/monaural recording and playback. 3 speeds (1½, 3¾ and 7½ ips) plus 15 ips with 15 ips adaptor kit. Hysteresis synchronous 2-speed motor. Wide Crossfield frequency response. All silicon transistor amplifier. Sound on sound. Automatic shut off. Automatic stop. Recording mode switch. Bass switch. VU meters. Finely oil-finished wooden cabinet or vinyl leather wooden cabinet. £195.



**AKAI X-300—(List price £263 18 3.)  
OUR PRICE ONLY 179 gns.**

**AKAI X-300.** 10½" Reel Studio Type Stereo Tape Recorder (left) (No Belts . . . Direct Driven Capstan). Crossfield Head. Solid State Amplifier. 4-track stereo/monaural recording and playback. 2 speeds 3¾, 7½ (and 15 ips optional). 4 heads (erase, recording, playback/monitor plus bias heads). 3 outer rotor motors (Hysteresis synchronous 2-speed motor for direct driven capstan, two torque motors for fast forward and rewind). 50 watts solid state amplifier. Sound over sound Automatic stop, Automatic shut off. Specially 90 kc Biased for recording of FM multiplex.

**rew R·E·W (EARLSFIELD) LTD.** ★ LEADERS IN MAIL ORDER HI-FI

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# NuSound

THE FERROGRAPH SPECIALISTS

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# Ferrograph

STOCKISTS

We at Nusound have been associated with Ferrograph Tape Recorders for well over ten years and our proud boast is that no one knows Ferrograph better than we do! If you value honest advice, many years experience plus personal attention, join our many hundreds of regular customers and buy your Ferrograph from Nusound.

WE ARE AUTHORISED SUPPLIERS TO EDUCATIONAL AUTHORITIES, INDUSTRIAL CONCERNS, RECORDING COMPANIES, PROFESSIONAL MUSICIANS, ETC.

### NEW SERIES 7

This fabulous new Ferrograph range heralds a new era in tape recording—an entirely new design—all silicon solid state electronics with FET input stages—3 motors—3 tape speeds—8½" reel capacity—vertical or horizontal operation—two internal speakers—10 watts output—plus many other unique features and facilities for which Ferrograph users have asked.

MONO & STEREO versions available priced from £153 to £201.



### ALL NEW MODELS STOCKED

plus a good selection of high quality, mint condition **Secondhand Ferrographs**. Part Exchanges welcome.

### FERROGRAPH ACCESSORIES

We stock all Ferrograph accessories including Microphones, Defluxers, Tape spools, Splicers etc., together with spares for old and current models.

### FERROGRAPH TAPE

Always in stock. Supplied on Hublok grey anodised spools.

1,200 ft. on 7" reel £2.5.0  
1,800 ft. on 7" reel £3.2.0  
1,800 ft. on 8" reel £3.3.0  
2,400 ft. on 8" reel £4.0.0  
P. & P. 2/6 extra.

### FERROGRAPH SERVICING

The Nusound service technicians are fully experienced in servicing all Ferrograph models. Should your machine need servicing entrust it to the Nusound experts, you'll be delighted with the results. Officially appointed Ferrograph London area service agents.



Who better to talk Ferrograph than a Ferrograph enthusiast? **Phil Moffat** is just that — he will be delighted to give you his expert advice and technical assistance on all aspects of Ferrograph recorders and tape recording.

# NuSound

THE FERROGRAPH SPECIALISTS

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(HALF DAY THURSDAY)

# TAPE

RECORDING  
MAGAZINE

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

Vol. 13

No. 3

March 1969

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**COVER PHOTOGRAPH:** In larger-than-life close-up we have a really clinical view of the three-head system on the Sony TC 355. The camera lens clearly shows every little detail, even down to specks of dust. For this picture we actually used the machine which is also reviewed this month in Test Bench on page 93, where with equal candour we consider the performance of this interesting tape recorder.

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# Tape trends and tape talk

By Douglas Brown

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I REMEMBER the arguments, a few years ago, as to whether video recording could or would ever replace photographic film. It was rather like the other argument as to whether tape can or will ever replace the disc record.

I have no doubt both arguments will remain with us for some time to come. The one about videotape underlay a four-page supplement to *The Times* last month. Naturally, *The Times* played it safe—the supplement was entitled “Videotape and Film” and contrasting points of view were carefully balanced. But the contributors had some interesting things to say.

None was more emphatic than Ian Abrahams, the Chairman of Television Recordings. He wrote: “. . . virtually anything film can do videotape can do better, faster and more economically.” Mr. Abrahams is naturally wedded to tape—his company boasts of being “the best studios in London for colour videotape production.” They have direct links with the GPO Tower and so are able to transmit direct into Eurovision circuits or, by satellite, to almost anywhere in the world.

Not everyone has Mr. Abrahams’ unrestrained enthusiasm for videotape, it must be admitted. Elsewhere in *The Times* another expert, W. J. Fenwick, argued that film is a more flexible medium than tape, easier to edit and, in some cases and particularly on location, cheaper.

The argument will probably become hotter later in the year, for colour commercials will blossom on television next autumn and the advertising agencies are busily at work on them now—using tape and film.

A *Times* science reporter quoted two of the most powerful points. One, boosting videotape, was the recent triumphant “outside broadcast” from the American spacecraft circling the moon. The other, counting against tape, is that programmes being sold to overseas television stations are best handled on film until such time as video recorders of different type and manufacture can be made compatible.

What is happening in the space research laboratories and in the commercial TV studios is, of course, of great concern to amateurs waiting to get their hands on domestic video equipment. There is little doubt that domestic sound recording arrived on the scene sooner than would otherwise have been the case because of the developments pushed forward, without regard to expense, during the last war.

PROOF that there are opportunities in local radio for amateur enthusiasts who have the determination and the ability is provided by the experience of Rex Conway, of Ashby-de-la-Zouche. Not only has he had his recordings broadcast regularly by Radio Leicester, he is getting a regular billing in the local edition of the *Radio Times* in a much bigger role.

During the past year he has compiled, edited, produced or broadcast nearly 100 programmes, including two regular weekly spots. He has also acted as stand-by programme assistant, helping out when holidays or illnesses have depleted the already hard-pressed regular staff.

He explains: “This means rising at 4.30 a.m., driving to Leicester, some 18 miles away, opening up the studio and seeing what taped contributions are waiting, noting record requests and extracting the discs from the library, consulting the day’s diary of events, perhaps greeting a studio guest, and then checking and placing in order the news provided by news service, ready for the first newscast.”

Then he comes into the studio, gets the programme on the air and the day begins. Mr. Conway will be writing fully about the job in the next issue of the *Federation of Tape Recordists’ Bulletin*.

One thing he says needs to be stressed: contributions from clubs and from individual enthusiasts are few and far between and he is anxious to receive contributions, about two minutes in duration.

\* \* \*

THE CLOSING DATE for the British Amateur Tape Recording Contest is behind us and the jury will soon meet for the preliminary sifting of entries. I am happy to hear that it looked, at closing date, as if there would be a much-better-than-usual response. Unfortunately, the postal strike interfered with delivery of entries during the final few days, but the organisers are showing some latitude so that no competitor should suffer.

\* \* \*

CYRIL REX HASSAN tells me that preparations are going forward very satisfactorily for the new-style Audio Festival, which will open at Olympia on October 16 and run for six days. Each exhibitor will have a specially constructed 20 by 16 feet studio, as well as display stands. The Audio Festival will be grouped in the gallery at Olympia, with the Photo Fair on the ground floor, and one admission charge will admit to both.



# ACTION

## QUO VADIS ?

Basil Dawson answers his own question  
To stereo !

**M**ONO or stereo? That is the question. Record companies and high fidelity equipment manufacturers would deny that the problem exists. For them there is only stereo—mono is finished. As mono recordings are deleted from the gramophone lists the dealers sell two loudspeakers where they would have sold one and everybody is happy.

Or are they? What about the amateur recording enthusiast? Surely he is entitled to look twice, and then look again, at the costs involved in making the mono to stereo change-over in his cherished gear? Then there is the question of changes in technique. Will a succession of reliably good results in mono automatically mean equally satisfactory stereo recordings, or does one have to start learning all over again? And, in the final analysis, is such a change really worth it from the amateur's point of view?

These and other questions are the ones I shall be trying to answer in the coming months. I have made my decision. After what seems to be a lifetime of mono recording I am about to take the plunge and "go stereo".

It all began about twelve years ago. I really found myself involved in recording by accident. My brother sang in a church choir and so he bought a Baird tape recorder thinking he could record whilst he performed. He was soon in difficulties and called on me to help.

The machine—mono of course—had a half-track Collaro Transcription deck running at 15, 7½ and 3¾ ips. In addition it had two sets of heads, one for each track, so that by operating a "change direction" control it would record from right to left on the lower track. This was a very useful facility because it saved fiddling about turning the tape over during a performance; as soon as track one was fully recorded the operator had only to press two control keys to carry on recording on track two. Back in the "dark ages" this system was very popular, but then it seemed to die a natural death. I have been amused to find that some manufacturers are now



Whither goest? To stereo! So says Basil Dawson who is pictured here with John Claxton on the left together with one of their Brennel mono machines. As a working team they are going to explore the advantages—and disadvantages—of "going stereo" and will report their progress in the months to come

offering this arrangement once again—but of course it is described as one of the latest sophisticated developments!

It really is impossible for any single person to keep one eye on his music the other on the conductor and by some physical contortion watch the record level indicator on the machine and operate its controls whilst at the same time giving a natural vocal performance. Human beings were just not designed for such dexterity. So I was asked to go along to King's College Chapel, Cambridge, to record the Gregorian Association's Festival Evensong.

My brother had obtained prior permission to use the equipment in the Chapel and so we arrived early in the morning to investigate the lay of the land. It was my first recording assignment although I had previous experience of running public film shows. This had

taught me to carry a limited range of tools together with a selection of various sized mains plugs. Our chief problem was to get the tape recorder in the right place. I knew it should be as near the choir as possible because we were using a crystal microphone on a short lead. Unfortunately the only possible station for the machine was adjacent to the organ console on the top of the rood screen, and this was some distance from the centre of the choir.

So with as much optimism as ignorance we extended the cable to the crystal microphone by some 30 or 40 feet. My brother assured me he had used this method successfully on previous occasions so I didn't give a thought to the horrors of hum interference that the pundits assure us will ruin any recording taken

Please turn to page 85

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TRG

under these conditions. We ran our 40 feet of coaxial cable from the top of the rood screen along the top of the choir stalls on the north side of the chancel and then dangled the crystal microphone from a suitable chunk of wooden carving so that it hung some 10 feet above floor level about half way along the choir.

Of course it shouldn't have worked, but with typical beginner's luck it did. There was no detectable hum and the quality of the 7½ ips recording was to my ears excellent. I was delighted with my first effort—and slowly came to realise I had been well and truly hooked.

Many other exercises of this type followed and although subsequent ones did not always meet with the same success the challenge of recording was irresistible. There wasn't very much money to spare owing to my existing interest in both still and cine photography. However it was obvious that I had to acquire my own machine. After much careful searching of the shop windows and advertisements I finally became the proud owner of a second-hand Spectone, a machine fitted with the same Collaro deck as the Baird. The very first recording taken on the Spectone was a recital given by the Ministry of Education Choir at St. James' Church, Piccadilly. At this time I was still really quite raw and knew nothing of the finer points of technique. My microphone was the simple crystal model supplied with the tape recorder. On this occasion I took up a recording position on the south side of the gallery and dangled the microphone over the edge so that it was above and to the left of the choir standing across the sanctuary steps. The result was moderate only and seemed to be out of balance. Looking back one could hardly expect otherwise with such a one-sided microphone arrangement.

About this time I first heard of a class in Tape Recording Techniques being held at an Evening Institute in Brixton. When the next session began in the autumn of that year I joined and for the first time met Denys Killick who was an instructor at this and a number of similar classes in South London. It wasn't long before I realised just how little I knew of the subject. With my other class-mates I soon found Denys' enthusiasm rubbing off on to me, so after about twelve months with the class I decided to buy both a better recorder and a quality microphone. It was not an easy decision to make. Recording equipment could only be purchased by curtailing photographic activities. It was obvious that I couldn't do both. Photography was abandoned (sadly I will admit) and the search began for a Brenell, Mk. V M and a Reslo RBTL ribbon microphone with matching transformer. This Brenell still forms the main basis of my equipment today.

During the time I attended Evening Institute classes my interest had been more and more concentrated on the live recording of music using such church choirs, music students and amateurs as I was able to persuade to work with me.

Although I had a number of friends with similar interests I did not have a regular recording partner. In my opinion live music recording is essentially a team undertaking and the minimum requirement is for two operators who both know each other and their equipment thoroughly. Compatibility between friends is as important as compatibility of equipment. Now I had a stroke of real luck. By sheer chance I happened to meet John Claxton, a young BBC engineer working on video recording. It's funny how these things happen in the recording world. The word got around that I was an enthusiast and I had a message from my son's piano tutor asking if I would kind enough to co-operate with a friend of his who also owned a Brenell Mk. V M in a dubbing and editing session on a French sketch that was being prepared for use in school. The willingness of enthusiasts to help each other in such little jobs is one of the delightful aspects of sound recording, and I was only too pleased to offer my services.

It was in this way that I first met John, and from that dubbing session sprang a friendship which is the basis of our many joint recording expeditions. Having little technical ability myself John added invaluable technical know-how to our activities. Under his direction a mixer was built to give us two low impedance microphone inputs (which could also double as high level inputs) together with a further high level input. By using this for two microphone channels and feeding a third into the microphone input of the Brenell via a line transformer we were now able to independently mix three low impedance microphones and our activities became more and more ambitious. We already had the Reslo and John and I each bought a Sennheiser MD411 HLM. Described as a "hypercardioid" the MD411 offers an acceptable quality standard at not too prohibitive cost. This microphone equipment was supplemented occasionally by the loan of two more MD411s and a Sennheiser MD211, a really top quality omni-directional instrument that is invaluable for securing genuine church or cathedral ambience.

It never rains but it pours, and we now had at our disposal more microphones than channels to accept them. When the mixer was built we were thinking in terms of 50 ohm balanced line microphones and so the inputs contained 50 ohm transformers. The Sennheiser microphones were all 200 ohm, but this mismatch did not seriously affect quality;

however it did give the idea of making up two junction boxes so that a pair of MD411s could be connected in parallel reducing the effective impedance to 100 ohms. By using two such junction boxes we could feed four microphones into the mixer (with one pair independently balanced against the other) and a fifth could be fed directly into the Brenell as before. Now we were able to use five microphone channels. Flexibility of control was obviously not one hundred per cent and we had to be careful to position each microphone in the "Siamese pair" so that sound levels would be roughly equal between the two. Like the majority of amateurs we found our recording activities were often taking place in very resonant churches or halls and the ability to use four MD411s with their very tight cardioid directional pattern proved to be of immense value.

In the past we had to look for material to record, but now we found ourselves being asked to undertake recording assignments. This is a situation that will always occur as one develops more and more contacts amongst choirs, music students and all manner of people who take an active part in making music. When my son first went to Dulwich College he lost no time in "piping up" about his father's recording interests. He happens to have a rather good treble voice and so he was accepted in the college Madrigal Group. Needless to say it wasn't long before their performances were being recorded on our Brenell.

The stage has now been reached where John and I have begun to ask ourselves, where do we go from here? Mono has been our only experience so far but we are well aware that stereo is now the accepted medium of the day. We could continue working as we have done but there would always be the feeling that we were perhaps missing something. If we are to progress at all it can only be towards stereo.

We have some sympathy with mountaineers who claim that they climb mountains "because they are there." Stereo exists and because it exists we cannot ignore it. Having made up our minds it is our intention to start the exploration of the stereo field forthwith. Hopefully we anticipate that our past experiences will serve us well, but there is no doubt that we will have to do a lot of re-thinking and will have much to learn. During the coming months we shall deliberate on the problem of acquiring suitable equipment and once we have our hands on it a great deal of time will have to be spent familiarizing ourselves with its idiosyncracies. We look forward to this new project with excitement and hope to report again from time to time on our future experiences, both failures and—we hope—some successes.



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# DEAD OR ALIVE

## THE HALL—NOT THE RECORDIST

**T**HE choice of a hall or studio for recording any given musical work is always a tricky problem. I have recently been concerned with selecting premises suitable for recording a recital by a soprano with piano accompaniment. The extent to which the vocalist's voice is changed in character by the local acoustic really does have to be heard to be believed.

In a "dead" acoustic the artiste has to work very hard and she finds performance both difficult and unrewarding. Final results would lack brilliance and, in very bad cases, would be unpleasant to listen to. But at the other extreme, one of exceptionally long reverberation time, the subjective effect is even worse. With sound bouncing around all over the place the powerful top notes "peak" disastrously sending the needle in the record-level meter hard up against the stop-pin with distortion shooting up to heaven-knows-what percentage and a sound quality more reminiscent of the girl next door in the bathroom than of a professional singer displaying her virtuosity.

The only solution is to steadfastly refuse to go ahead with the recording until the right premises have been found. Even so, one is wasting one's time looking for perfection—it does not exist. The solution is to find a hall with sufficient reverberation to make the singer happy and to give added colour to both voice and piano but without the very nasty emphasis that will turn a perfectly sung note into a hollow screech. In addition it must be free from interference from outside noise (traffic, aircraft, children playing etc.) and must have reasonable access for portable equipment, not to mention the availability of a separate small room to house all the gear together with monitoring speakers.

It's hardly surprising that final choice is invariably a compromise falling short of the ideal. I might add that the engineer's requirements usually come last—everyone is far more concerned with conditions in the auditorium than with the poor old recordist's problems in his little hide-away. But it's just this kind of thing that makes such work so

challenging. When successful one has really achieved something to be proud of.

Forming opinions about the suitability of particular premises for any given recording job is not easy; it's a knack acquired from experience and long practice. The extreme cases present no problem—when an acoustic is quite hopeless it should be so obvious that the engineer need not waste time. Often the sound of his own footsteps will tell him all he wants to know.

One of the halls recommended to me for my own recording job came into that category. The person suggesting it was both intelligent and well-meaning. It sounded worse than the worst bathroom one could imagine: always be wary of premises "recommended" by non-technical people. As a rule they know nothing of actual recording requirements and honestly do believe that any empty floor area with a roof over the top will do.

The really tricky situation arises when a hall is *nearly* right. There's a very subtle distinction to be drawn here and often trial recordings have to be taken before decisions can be made. But before going to those lengths the recordist should be able to get some idea of the probable results by carrying out simple investigations on the spot.

One of the time-honoured methods is to create short, percussive sounds and then listen carefully to the resonances set up. Equipment required: one pair of hands for clapping and one pair of ears for listening. Fortunately the average human being has all the gear built in!

Preliminary checks of this kind should be taken from a number of positions in the hall, the most likely best results being found about one third to one quarter of the distance from one end looking forward into the main space. Variations will occur in different buildings and they will depend on overall dimensions, angles of walls, height of ceilings and disposition of sound-absorbent surfaces such as soft furnishings, if any.

Low ceilings are the very devil, because the ceiling surface is invariably of some

hard, sound-reflecting material that will encourage the formation of standing waves. Peculiar shaped towers and recessed "lantern lights" can also have a curious effect; I always look for such architectural freaks in churches and church halls. A pitched ceiling like an inverted letter "v"—usually meaning the ceiling is also the roof of the building—can often help break up unpleasant resonances but heaven help you if there happens to be a heavy rain storm during the recording session. Such a ceiling/roof combination lacks insulation and can make falling rain sound like the drums of the massed bands of the Brigade of Guards.

The effect of any local acoustic on a recording will be modified by the kind of microphones used. An omni-directional microphone will pick up the sum total of all resonances to which it is subjected so it will make a bathroom *sound* like a bathroom. Changing to a cardioid pattern will effect an immediate improvement, whilst one of the so-called "hyper-cardioids" would be better still.

In a dead acoustic one has to think the other way round. Possibly the best recording would be taken on an omni, next best figure-of-eight (ribbon), then cardioid and lastly hyper-cardioid. Which just goes to show that there's no such thing as a *right* microphone for all purposes—it depends on the job and the location.

All too often the problem is not one of selecting the most suitable premises but of modifying microphone techniques to fit what is an all-too-obviously wrong acoustic. This is frequently the case when recording, say, a public performance of some kind. Under such conditions the recordist has, in my opinion, a simple basic function. His task is to produce, as faithfully as possible, a documentary record of what is to take place.

Such a recording will not be a work of art from the production point of view. It should be immediately recognised as a life-like representation of the performance by both audience and performers, but it will not be—and cannot be—anything more.

There is so much misunderstanding and misapprehension on the part of the general public; they just do not appreciate these things. We have all become so used to hearing excellent quality (both recording and performance) from records and radio that people seem to think that by some black magic, mechanical reproduction should always be up to that high standard—and if it isn't then the recordist is to blame. So it is as well to prepare them for what they might expect to hear. Once this is understood your services will be appreciated and the recording will be regarded as it should be—with respect.

IT is very pleasing to note that when *TAPE Recording Magazine* takes a critical look at future trends it invariably comes up with the right answers. In our January edition the Editor commented that British manufacturers "will have to think on the scale of the large foreign corporations rather than in terms of the traditional small British family business."

Now comes the news that the Rank Organisation is to purchase the famous hi-fi firm of H. J. Leak Ltd. Built up from a combination of enthusiasm and sound engineering in the thirties, Mr. Leak did not have the advantage of extensive financial backing. Yet with more optimism than money he founded a firm whose reputation is now world-wide.

The significance of this "take-over" is obvious. In the Bradford firm of Wharfedale, Rank already have a large stake in high fidelity; with the addition of the Leak expertise and manufacturing capacity they will assume a dominant position amongst British manufacturers. So it is interesting to conjecture on the direction the new combine will take in its future manufacturing and marketing.

We can be quite sure that the names of Leak and Wharfedale will not disappear—they are part of the "establishment" of the hi-fi world and as such are universally regarded as being synonymous with quality and service. This fine reputation is of inestimable value to the Rank Organisation; it should be enhanced still further. We can be equally certain that the manufacture of the two main classes of products, loudspeakers and electronics, will be rationalised between Wharfedale and Leak respectively.

But—and it's a very big but—the demand for truly high fidelity equipment represents a minority interest compared to the vast sales in mid to low-quality audio that can be anticipated in the next few years. Any accountant worth his salt could put up a devastatingly strong argument in favour of going all out for the mass market. It is just this argument that must be resisted if mergers are going to really benefit the home consumer and the export trade.

There are plenty of foreign—and some British—firms in the "low fidelity" business, but such a stigma has never been attached to the names of Leak or Wharfedale. To the contrary, under Rank management Wharfedale have consistently proved their faithfulness to the principles of good quality sound reproduction. But the bigger the manufacturer the more tempting it is to exploit the largest market, and the new merger will leave us with a veritable giant.

As all readers (or ex-readers) of fairy stories know, there are Bad Giants and Good Giants. May I therefore remind the Rank Organisation that although the

# CROSS

# TALK

## By Audios

Good Giant always undergoes the most severe trials and tribulations he is the one who wins through to prosperity in the end, whilst the Bad Giant ultimately suffers the pangs and torments of the damned in the horrid depths of Hades!

\* \* \*

TO us in the West there's something rather ominous about Eastern Europe in general and about East Berlin in particular. Under the shadow of The Wall one imagines a twilight half-city of squalid intrigue, half-living and half-breathing in a fetid air of ceaseless propaganda. Surely there could be no flowering of artistic endeavour under such oppressive conditions?

So it can come as something of a surprise to learn that last year was a record one for Britain's jazz musicians visiting the Democratic Republic. The Kenny Ball band played in Berlin in September, Chris Barber had his third successful season there and Mr. Acker Bilk will introduce himself to the Berlin public early this year.

Turning from jazz to classics we find that the first-ever complete edition of Beethoven's compositions is being prepared by ETERNA, the classical record company of the Republic. All the major works will be available on about eighty long-playing records by December 1970, the 200th anniversary of the composer's birth, and the collection is scheduled for completion in 1971. It will be divided into eight sections, marches and dances, solo music, chamber music, symphonies, ballet music, vocal music, music for the theatre, musical plays and operas. There will also be an illustrated text book containing a complete register. Apart from some self-contained sets each record can be purchased individually.

It is difficult to imagine the magnitude of a project like the Beethoven recording. From the purely technical point of view, both musical and recording, it must represent one of the major endeavours in the history of recorded music. The 200th anniversary of Beethoven's birth is an obvious excuse for producing special record issues, and there are suggestions of "complete works" from other sources as well. I shall be noting the progress of these marathons with eager interest.

\* \* \*

AS the poet said, "The old order changeth . . ." It might be as well to keep an eye on your local pub because it could undergo a dramatic change in the very near future. I know all about this unexpected metamorphosis—it has just happened to one of my own favourite hostels.

The Six Bells and Bowling Green has long been a haunt of the thirsty citizens of

Chelsea. With acres of open floor space, a blazing fire in winter and an attractive garden in summer, it was a meeting place, a drinking place and a place to discuss the way-out exhibitions of the works of Chelsea artists displayed on the walls. Suddenly it has all gone. Even the name has gone. In its place is "Bird's Nest No. 2".

The Brewers, Watney Combe Reid, commissioned a young German architect, Thomas Gehrig, to redesign the interior as a "new-style entertainment centre" to attract the young in heart. His interpretation is a sort of cross between an English pub, a Bavarian beer house, a discotheque, a restaurant and a telephone exchange.

All the traditional British drinks are served from a central bar area but the customers sit at terraced tables beneath a complex of heavy wooden beams. The whole place is very woody and trendy. Each table has a number, and on each table stands a white telephone. So instead of rushing across the room to speak to the pretty girl opposite—falling over the raised platform arrangements in the process—one merely dials her table number. At least, that seemed to me to be the prime function of the advanced telecommunication system. Of course the 'phone can also be used to order food—at very, very reasonable prices—and to speak to the "music centre" as well.

At the head of the tiled dance floor is a glass-panelled control room equipped with two Garrard 401 turntables and a Philips Compact Cassette playback mechanism. There's also a microphone and an array of switches and knobs. From here will be "broadcast" to the assembled company nightly music programmes complete with D.J. in attendance. And the brewers stress the high quality of the audio reproduction.

The premises were officially opened last month, an event celebrated by a private party attended by some two hundred and fifty distinguished guests including Simon Dee (who had a whale of a time serving behind the bar) Cleo Laine and—as an afterthought—yours truly. Fully engaged in enjoying mine host's hospitality I regret to report that I didn't pay too much attention to the audio quality of this very unusual set-up. Be honest, would you have done? I do seem to have a vague recollection of it sounding pretty good. . . .

Seriously, when in London one should visit Chelsea, and there could be no better place for a meal and a drink than Bird's Nest No. 2. And at the same time you can ask the disc jockey to play your favourite Musicassettes. Perhaps you would let me know if it really does sound as good as I thought it did!

\* \* \*

WHEN you listen to a voice recording how much can you learn from it? To an expert the human voice is as revealing and as individually personal as a photograph.

One of the specialists in this field is Mr. P. A. D. MacCarthy of the phonetics department of Leeds University. According to a recent report in the "Guardian" he was able to give the police an astonishing amount of information about the recorded voice of a man they wanted to interview.

Basing his opinions on an expert knowledge of the subject Mr. MacCarthy was able to say that the voice was of Central European origin with a transatlantic Jewish accent, probably belonged to a man aged under 45 whose family had emigrated from Czechoslovakia, Germany or Poland to the United States before or shortly after he was born and that he had been brought up in the Mid-West!

# SONY

Strictly on the record... the TC-230 stereo tape recorder from Sony will make you wonder why you put up with anything less. Three speeds, four tracks, split lid speaker system, stereo/mono recording and playback, front panel selection of tape/mic, tuner or disc inputs – and another big plus – SONY research.  
*Recommended retail price £121:11:9*

The TC-230W, a variant of the same model, has a superb oiled walnut case and optional matching speakers.  
*Recommended retail price £110:4:9.*  
Optional, pair SS-23 speakers:  
£31:17:0.

**SPECIFICATIONS.** **Recording system:** 4-track stereo/mono recording and playback. **Power requirements:** AC 60W, 100, 110, 117, 125, 220, 240V, 50, 60 Hz **Reels:** 7" (18 cm) or smaller. **Tape speed:** 7½ ips, 3½ ips, 1½ ips. **Frequency response:** 40–18,000 Hz at 7½ ips, 40–12,000 Hz at 3½ ips, 40–6,000 Hz at 1½ ips. **Signal-to-noise ratio:** Better than 46 dB. **Wow and flutter:** Less than 0.17% at 7½ ips, less than 0.3% at 3½ ips, less than 0.4% at 1½ ips. **Harmonic distortion:** Less than 3% at 0 dB line output. **Level indication:** Two VU meters. **Power output:** 4W × 2. **Inputs:** Rec/PB connector: impedance approx. 10K ohms. Microphone inputs: sensitivity -75 dB (0.14mV), impedance 600 ohms. Phono inputs: sensitivity -52.5 dB (2mV). Tuner (auxiliary) inputs: sensitivity -25 dB (44mV), impedance approx. 100K ohms. **Outputs:** Line outputs, output level PB 3 dB (1.1V), rec. 1 dB (0.87V), load impedance 10K ohms. External speaker outputs: 11.3 dB (2.83V), impedance 8 ohms. Headphone outputs: impedance 8 ohms or more, Rec/PB connector: impedance approx. 3.5K ohms. **Heads:** PP30-4202LN, EF18-2902H. **Transistors:** 2SC402 × 10, 2SC401 × 8, 2SD28 × 4, 2SB383 × 2. **Diodes:** FR-1P × 2, 1T2 × 2. **Dimensions:** 17" (W) × 9½" (H) × 14" (D). **Weight:** 29 lbs. (13 kgs.). **Accessories:** 2 microphones (F-45), Empty reel (R-7A), connection cord (RK-56), head cleaning ribbon, motor pulley, pre-recorded 5" reel demonstration tape. **Optional accessories:** Telephone pick-up (TP-4S), microphone mixer (MX-6S), stereo headset (DR-3A, DR-3C).



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THE FIRST PART OF AN ACCOUNT OF A  
PRACTICAL ADVENTURE IN ELECTRONIC MUSIC

# PROJECT ALPHA

By CYRIL CLOUTS

WHAT IS ELECTRONIC MUSIC? IS IT GENUINE  
MUSIC AT ALL? BUT FIRST OUR AUTHOR  
ANSWERS A MORE DIFFICULT QUESTION—  
WHAT IS MUSIC?



**F**OR several decades new music has met with a response which would suggest that composers were more and more contradicting its very nature and the advent of electronic music seems, for many people, to signify a final abandonment of music.

This response, though negative, does reflect the fact that something has happened to music to change it. What has happened, of course, is that times have changed and music with them. In this article I will suggest what types of change have taken place. In addition, I hope to demonstrate what I consider to be a significant fact about this change. I believe that composers have begun to present music in terms more—and not as it might seem, less—relevant to its nature. Traditionally music was thought of as a means of illustrating the varied aspects of human nature. Now, in our time, it is possible to regard music as an expression of its own nature, that is, as an aspect of the natural world.

Consider what music consists of. Its basic material is sound. Sound is vibration; vibration is motion. Nature itself is dynamic, in constant motion. We, as part of nature, are subject to motion. That is to say, human consciousness, which springs from the functions of body and mind, is an aspect of this motion. Music is an extension of the senses, therefore, an expression of body and mind; so music can be seen as an expression of the dynamic principle of nature. Following from this it is possible to say that, for music to move us, it need not set out to depict emotions, it need only express its own nature, which is motion, and we will be moved. For me, and for many composers, this fact is central to the change which music has undergone.

History shows how our awareness, our interpretation of what we are and what the world is, changes. The arts, which actively demonstrate our response to the world, reflect these changes. A way of interpreting the world can last a long time. Though details of the interpretation will change, the premise which underlies it persists: There comes a time, however, when the changing details begin to outweigh the older premise. A new interpretation emerges which indicates that the old one has lost its relevance. This is what has happened. The sort of changes which have occurred over the past few decades are evidence of the emergence of a new interpretation of the world.

## Music as depiction

Within the older interpretation the subject of music was man, his feelings, sentiments and the conditions of repose and conflict in daily circumstance. This view can be traced back to the Renaissance. It saw man as the centre of the world and his intelligence and passions as the primary aspects of nature. One of the results of this view was that men came to think of themselves as beings above all other forms of living things. They also saw themselves, in many ways, as (something) separate from inanimate nature. It is strange to observe how, out of a vision which sought to investigate and understand the world, nature emerged as an object. By the middle of the 17th century, coincident with the beginnings of the classical symphony, nature was interpreted in terms of man's rationality, as a mechanistic system. A distinction had been made between man and nature. The world had been divided into mind and matter, reason and feeling, body and mind.

It was within the form of this aware-

ness of the world that music developed as a depiction of human emotions and sentiments. The classical symphony can be said to be a model of a rational system in which feeling and mood were given order. The Romantic movement, in which the beginnings of the new interpretation can be seen, retained the fundamental processes of the classical tradition though in loosened and freer forms.

## Music as an Aspect of Nature

The older interpretation of the world has finally disintegrated and, with it, the old conception of music. A new interpretation has now emerged—or, more accurately, re-emerged—and it is not surprising that the new music should exhibit types of sound and organisation which express the new awareness.

One of the facts from which the new interpretation has sprung is the realisation that we are not, in any sense, above or apart from nature. We have become aware again that nature is a dynamic, functioning phenomenon and cannot be contained within a static rational system. It has become clear that everything in the world is part of nature's dynamic function; that we, with all other living things, are aspects of this function. Mind and matter, mind and body, reason and feeling are not divided but are also aspects of this function. We can no longer relate nature to ourselves. We need to discover our relationship with nature. We are part of a process. This implies that the investigations into nature which take place will inquire into aspects of the process of which we are a part.

This is the case. From the new awareness have emerged the investigations of particle physics, inquiries into the processes and structure of the mind and the

nature of the genetic code, the field of microbiology, the study of environments, the questioning of the processes and institutions which govern society. A salient feature of these investigations is the fresh urgency with which they search for the smallest aspects of structures and how these are connected. Coincident with this the range and accuracy of technical means have been developed to make the investigations possible.

Within this new awareness, music has changed. It is now possible to think of music, not as primarily a depiction of feeling, but as an aspect of nature open to investigation.

### Harmonic Structure

As I have said, the classical and Romantic tradition expressed the older awareness. The foundation of the old musical order was harmonic structure, governed by a tonic key (the fundamental) and its nearest related key, the dominant. This concept of musical motion as a function of harmonic ordering emerged, as did the old awareness, from the late Renaissance. From it evolved the technical means, instrumental resources and musical processes of the classical and romantic tradition. The division of the octave into twelve equal semitones, the equal temperament system of tuning, which originated with the keyboard, met the need to modulate in all major and minor keys; notation developed into the unified score, the systematic grouping of rhythmic units into uniform pulse and measure, and made possible the precise co-ordination of attack required by harmonic writing; the orchestra evolved into its separated instrumental groups as the source of a balanced harmonic sonority within the unities of rhythm and tempo.

Associated with harmonic structure was the division of time into clear cadenced periods. It is relevant to note that these derived from the structure of dance forms and so were related directly to specific motions of the body. It is relevant also that the dominant succession of classical and romantic composers (Haydn, Mozart, Beethoven, Schubert, etc.) belonged to the Germanic tradition. The dance forms of this tradition, and of Northern Europe in general, reveal a restriction of bodily gesture to simple, square movements of trunk and limbs. These declare themselves in the uniformity of rhythmic pulse and periodic sequencing of classical music. At the root, therefore, of the developed notation are the limited bodily expressions of northern dance forms and this resulted in the relatively rigid types of musical motion which the symphonic tradition presents.

Harmonic ordering and the symmetries and tensions of period and cadence fused into symphonic structure. This assumed the following general form: (a) exposition (statement of thematic material), (b) de-

velopment (redisposition of the material in new keys), (c) recapitulation (return of the material to the tonic key). As this indicates, the governing principles of this structure are similar to the processes of mind associated with classical logic, that is, correct argument from first and second premises to a conclusion. What emerged was a closed form, as is its model in logic. The other factors mentioned, such as the representation of a restricted bodily gesture and the concept of music as depiction, sealed the form more firmly into a closed architectonic structure: a music which moved but was not mobile, resembling a symmetrical building complete with colonnades and wings. This closed formality suggests how a fuller expression of musical motion was limited by a system of constraints.

The harmonic basis of structure—and all processes associated with it—began to disintegrate one hundred years ago. Harmonic function dissolved into the abiguities of constant modulation, as used by Wagner, and resulted in the fully chromatic idiom of his music drama. The musical structure retained, however, its function as a means of depiction, in this case psychological and dramatic conflict. Following from this, it is possible to see Arnold Schoenberg as a bridge between the old and new musical worlds. With the discovery of his method of composing with twelve tones related only to each other and not to a fundamental, he produced a system which, though still tied to the older depictive intentions, suggested ways of composing without the older functions of harmony. In doing so he pointed a way to a means of expressing the new awareness.

### New Directions

With the disintegration of harmony as the basis of structure, new ways of placing sounds in sequence have had to be found. In order to do this, composers have had to re-examine every aspect of their medium. This has entailed new thinking about the material of music—sound—and about the properties of sound, which are frequency, duration, timbre and amplitude. This investigation is in effect a means of coming close to aspects of the processes of nature. Such an inquiry demonstrates the means by which mind and matter are being rediscovered as a unity. Out of this concern has emerged a music which demonstrates the properties of its material and so depicts its own processes as an aspect of nature.

The music of several composers over recent decades has expressed these aspects of the new awareness, and the resources of electronics have emerged as relevant to the new inquiries into sound. In this way the electronic sounds and apparatus are a material demonstration of the manner in which music has changed.

Electronic music is the general term that describes music which uses electrically generated or modified sound as its basic material and electronic processes for its realisation. For twenty years composers have been investigating and using this new medium and have developed several processes of composition. These can be summarised as follows:—

1. Composition on to magnetic tape using audio-signal generators as sound sources. Techniques of composition include the additive synthesis of wave forms, sound transforming circuits and tape manipulation. Realisation of sound is through a loudspeaker system.
2. Composition on to tape using any sound. Techniques involve sound transforming circuits and tape manipulation. Realisation is through a loudspeaker system.
3. Composition intended for live performance using any sound. Procedures of composition can include the use of pre-recorded tape and techniques of recording and playback as part of a performance in front of an audience.
4. Composition using automatic programming and sound generation procedures.

Electronic resources make available the complete and continuous range of audible frequency. With the sine wave generator the overtone structure of any sound can be synthesised. Direct access to the sound on tape makes possible, by cutting and splicing, the use of any desired duration of sound measured in centimetres or inches along the tape. By means of the variety of circuits, such as ring modulators and filters, the structure of sound can be altered. Small differences of amplitude can be controlled by means of decibel meters and potentiometers. In these ways, electronics offer access to a wider field of sound than has been available before and, in doing so, constitutes a new instrument of infinite flexibility. In addition, when working with tape, a composer is in direct contact with every aspect of the production and realisation of his work. *He becomes at the same time both composer and performer.*

The possibilities inherent in an instrument with analytical capabilities were envisaged by Edgard Varèse forty years ago. In his earlier music such as *Intégrales* (1926) there is evidence of his awareness of new modes of musical organisation related to pitch, timbre and duration. In *Deserts* (1954) and *Poème Electronique* (1958), which are among the first examples of a synthesis of electronic and instrumental resources, Varèse demonstrated the types of sound formation electronic analysis makes possible. The methods by which Anton Webern isolated aspects of pitch and timbre as functions of musical

*Please turn to page 95*



# NATURE NOTES FOR MARCH

BY RICHARD MARGOSCHIS

**A**N old country saying tells us that if March comes in like a lamb it will go out like a lion; I believe there is some truth in this. Certainly the worst of the hard weather should be behind us by now, and this is the month during which we really look forward to the break of Spring. Even so, it can be a bleak and very windy time.

Wind is one of the greatest hazards with which the outdoor recordist has to cope; in fact, I find that it is only on very rare occasions that I need take no account of the wind. On the other hand, I certainly do not allow windy conditions to prevent me from going out in search of recordings because I know that there are certain precautions that I can take.

Probably the most obvious is to find a sheltered spot. It is remarkable how much cover can be obtained on the lee-side of even a small hill, and a valley can be even better providing the wind is not blowing along it; a roughly circular depression is perhaps best of all. Buildings, stone walls, thick hedges and even bushes can also provide considerable shelter. Half the battle is knowing the district in which you work. I frequently select the area to visit according to the weather conditions prevailing.

Wind shields can be purchased and do provide some protection; their efficiency varies considerably, but it is hopeless to expect even the most expensive to give one-hundred per cent protection against a strong wind. It just will not do when you are working at the high gain so often necessary in this type of work. Some of these shields are made for a specific range of microphones, whilst others, such as the rubber ball type, can be made to fit microphones of varying diameters. This latter type also has the advantage of being very light, which is an important point if you are using a hand-held parabolic reflector.

The most effective wind shield to use with a reflector can be made from stiff nylon netting, the sort that is used for dresses; *not* curtaining, that is too limp. It is applied in *two* thicknesses as a tent covering the microphone and reflector complete; mine has elastic threaded around its circumference which, when in use, grips the lip around the edge of the reflector.

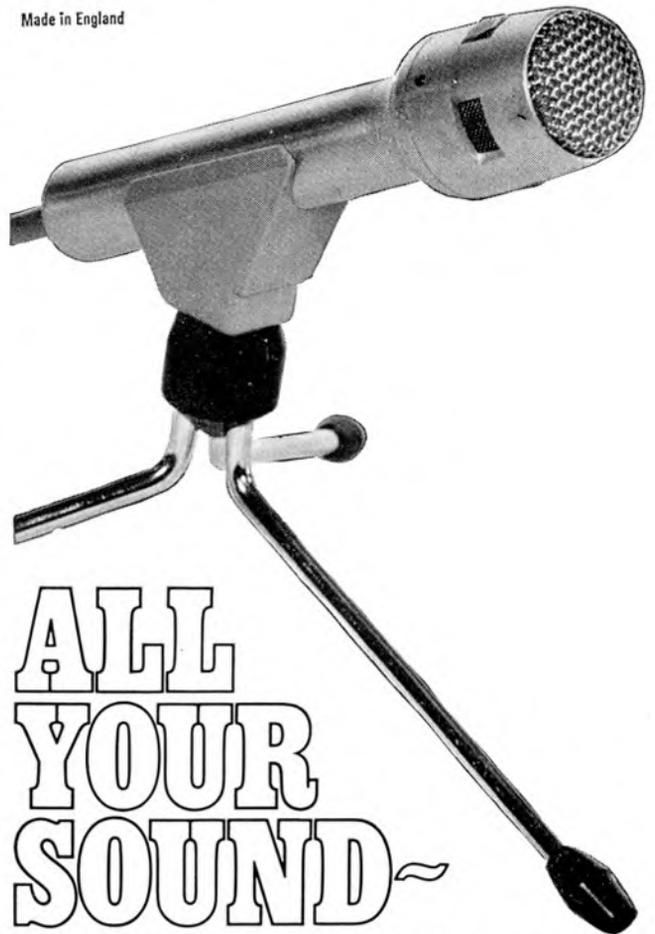
Unfortunately, trouble caused by the wind does not end with the interference directly at the microphone. You find a sheltered spot and aim the reflector at a tree and promptly pick up the sound of the leaves moving; there is not very much you can do about it! It is a very revealing exercise to listen to a recording made from a reflector which has been panned from open country across a clump of trees and then upwards to the sky—try it when there is a breeze blowing.

One of the principal purposes of bird song is to stake out territory in which the individual feeds and breeds, but there are some birds which have no real song. The Lesser Spotted Woodpecker and the Great Spotted Woodpecker, also known as the barred and pied woodpeckers respectively, fall into this category but are particularly interesting because they have developed mechanical means of defining their territory. The method used, known as drumming, is to strike a series of rapid blows on a branch or trunk of a tree with the beak; dead or dying trees are usually selected.

The sound of the drumming carries for a considerable distance, up to a quarter of a mile under good weather conditions, and will be heard in the woods during the next two or three months. As it is territorial it will be repeated at fairly regular intervals around a location and so with patience it is possible to work your way into the area, locate a drumming post and wait at close quarters for the bird to perform.

As their names suggest, the one species is smaller than the other. Distinguishing features are the red crown and barred white upper parts of the Lesser and the red nape and under tail coverts (or vent) of the Great Spotted Woodpecker.

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# TEST BENCH

## SONY TC 355



INVESTIGATED BY R. HIRST AND D. KILICK

### MANUFACTURER'S SPECIFICATION

#### Sony TC 355

Power: AC100V, 110V, 117V, 125V, 220V, 240V, 50/60 Hz. 30 watts.

Tape Speeds: 7½, 3¼ and 1⅞ ips; automatic switching for equalisation.

Reel Size: 7 inches or smaller.

Recording System: 4-track stereophonic or monophonic.

Frequency Response: 20 to 25,000 Hz. at 7½ ips; 30 to 17,000 Hz. at 3¼ ips; 30 to 9,000 Hz. at 1⅞ ips.

Signal-to-Noise Ratio: Better than 52 dB at 7½ ips.

Wow & Flutter: Less than: 0.15 per cent at 7½ and 0.25 per cent at 3¼ ips.

Harmonic Distortion: Less than 1.6 per cent at 7½ ips.

Level Indication: Two VU meters, calibrated to NAB standard reference level for record and 0 dB line output level.

Inputs: Microphone Sensitivity -72 dB (0.19 mV) 600 Ohms. Auxiliary Sensitivity -22 dB (0.06V) 560 kOhms.

Outputs: Line out 0 dB (0.775V) suitable impedance more than 100 kOhms. Headphone -28 dB (0.031V) impedance 8 kOhms.

Integrated Record/Playback: Output level 0 dB (0.775V) 10 kOhms. Input sensitivity -40 dB (7.75 mV) 10 kOhms.

Dimensions: 15 3/16 inches x 7 1/16 inches x 14 inches.

Weight: 22 lb.

Recommended Retail Price: £100 2s. 6d. including purchase tax.

Distributor: Sony (U.K.) Ltd., Clockhouse Lane, 11, Ascot Road, Bedfont, Middlesex.

**C**ONTINUING our reviews of tape decks, or "units" as they are sometimes called—decks and pre-amps for recording and playback requiring the use of an external amplifier and loudspeakers—we turn this month to a Japanese model, the Sony TC 355. This is a mains four-track three-head stereo deck, operating on three speeds and offering full before-and after-record monitoring together with Sound-on-Sound facilities by means of track transfer.

The results of our laboratory investigation are set out in the usual tabular form, but, as we so often find, the figures themselves require detailed explanation before they can be regarded as meaning-

### SONY TC 355 TEST CHART

Frequency Hz	Overall Response dB			Playback Only dB	Signal/Noise Ratio dB	Distortion	Crosstalk dB
	7½ i.p.s.	3¼ i.p.s.	1⅞ i.p.s.	7½ i.p.s.			
15.....	- 7.0	- 2.1		- 6.5	43 (51)	1.2% (3.2%)	40
20.....	- 0.7	- 2.1		- 0.9			
30.....	+ 1.7	- 3.3	- 2.4	+ 2.7			
40.....	+ 2.3	- 3.3	- 1.5	+ 3.3			
50.....	+ 0.7	- 1.6	- 1.3	+ 0.9			
60.....	+ 0.2	- 0.1	- 0.5	0			
100.....	+ 0.2	- 0.4	- 0.5	0			
250.....	+ 0.6	- 0.6	- 0.5	+ 0.9			
500.....	0	- 0.6	- 0.6	0			
1000.....	0	0	0	0			
2000.....	+ 0.7	+ 1.7	+ 1.3	+ 0.9			
4000.....	+ 2.0	+ 2.8	+ 2.5	+ 2.3			
6000.....	+ 3.3	+ 2.9	+ 0.4	+ 3.2			
8000.....	+ 4.0	+ 3.7	- 3.0	+ 3.4			
10000.....	+ 4.6	+ 5.5		+ 3.7			
12000.....	+ 5.0	+ 6.5		+ 3.8			
14000.....	+ 6.4	+ 2.9		+ 4.2			
16000.....	+ 6.5	- 3.3		+ 4.6			
18000.....	+ 7.0	- 4.5		+ 5.0			
20000.....	+ 8.5			+ 5.1			
22000.....	+10.0						
24000.....	+ 5.9						
26000.....	+ 3.4						
Wow and Flutter	0.13%	0.22%					

NOTES.—The Overall Response figures relate to record and playback. Playback Only relates to the reproduction of a 70 microsecond test tape at 7½ i.p.s. (C.C.I.R.).

For Signal-to-Noise Ratio the tape was recorded at peak level and then the input signal was removed from the record amplifier, but see text for further information. By reference to the signal level recorded and the resultant tape noise, the noise voltage was read off, with the tape still in motion. Distortion is quoted against a 1,000 Hz signal recorded at the correct maximum level as indicated by the manufacturers and the figure is an R.M.S. value (see text).

Wow and Flutter is also R.M.S., the test frequency being 3,000 Hz. Test equipment used includes: Bruel and Kjaer Signal Generator, B & K Frequency Analyser Type 2107, B & K Level Recorder Type 2305, Marconi Distortion Factor Analyser and Gaumont-Kaylee Wow and Flutter Meter.

ful. Taking frequency response first, it will be noted that both the overall curves and the replay curve show an increasing rise from flat above 1,000 Hz to a peak well up towards the higher limit of response when the trend is reversed with a sharper decline to the end of our measurement scale.

If the reader turns to the manufacturer's specification he will see why we have pushed our tests up as far as 26,000 Hz

at 7½ ips; the response at that speed is claimed as being "up to 25,000 Hz." Unfortunately no tolerances are quoted and so such a claim is, in practice, meaningless. All it says is that some sort of signal can be recorded and reproduced at that very high frequency without stating in quantitative terms "how much" or whether the response has been pushed so exceptionally high at the cost of deterioration further down the scale in the all-

important audio region. Our table gives the answer.

Certainly the manufacturer's claim is justified, but to achieve that result he has had to force his top response all along the line so that it rises from plus 2 dB at 4,000 Hz to plus 10 dB at 22,000 Hz with an uncomfortable plateau of from plus 5 to plus 8.5 dB in the sensitive area from 12,000 to 20,000 Hz. A glance at these figures should warn the experienced reader to beware of the danger of accentuated hiss.

The specification gives no indication of the tape for which bias has been set (we used Agfa PE 31) neither does it state the equalisation characteristic. These are two serious omissions. On checking with Sony (U.K.) Ltd. we are advised that equalisation is to NAB, the American standard, and this accounts for the more gentle rise in our replay figures. However, that only serves to show the overall response in a rather worse light since the record network must therefore apply even more top boost than a comparison between the two sets of figures implies.

There are always two ways of looking at any set of circumstances, and that is the pessimistic. On the optimistic side we can also state that an improvement will be achieved if a tape less sensitive in the upper range is used (Sony should recommend it) and finally it is a fact that if we must depart from flat it is very much better to be above, rather than below, the straight line. Correction can be applied at the main amplifier, and by introducing top cut at that stage a useful benefit can also be achieved by reducing basic system noise at one and the same time. However, we must be honest, and confess that a rise of the order of that obtained from the TC 355 does present something of a problem. One of the most common faults of pre-recorded tapes is the presence of tape hiss; when reproduced on this machine one would expect that hiss to be accentuated to an obtrusive degree, similarly the high frequency noise that is present in FM broadcasts would suffer the same fate.

As we have said before, signal-to-noise ratio and distortion are closely inter-related. This inescapable fact is emphasised by measurements obtained on the Sony. Distortion is an incredible 1.2 per cent—better than the best—but signal-to-noise is way down at 43 dB, although without tape and with the machine in its replay condition this improves to 53 dB. There is, of course, a very simple explanation for these rather weird results. In our opinion the meters are wrongly calibrated. For signal-to-noise and distortion measurements we load the tape to maximum according to the indication shown on the meters. Going "over the top" merely

increases distortion; with the test machine it was found that the input signal could be increased by as much as 6 dB with the distortion rising to only 3.2 per cent. If we were now to regard that new input level as "maximum modulation" then (because there is more signal on the tape relative to system noise) the signal-to-noise ratio figure shoots up to a very respectable 51 dB, and this could be improved still further by the use of one of the new low noise tapes.

Expressed in more simple terms one can say that the user of this machine can safely permit a degree of "over modulation" and in fact we would recommend this modified technique in order to improve noise levels. It is not easy to accurately re-calibrate a meter without instruments; the best approach is to bring the level up whilst carefully checking the after-record signal aurally. Stop increasing as soon as distortion is obviously heard. Mark the meter glass with red Chinagraph at that point and then make another red mark halfway between that level and the beginning of the black segment. Rub out the first mark and take the second as the new maximum level indication. It will be about right. Before leaving the question of noise it should be mentioned that at mains frequency, 50 Hz, the noise level was an excellent 56 dB below peak.

Crosstalk between tracks was shown to be better than 40 dB and between channels better than 42 dB, both excellent figures. Short term speed stability was good with wow and flutter readings of 0.13 per cent at 7½ ips and 0.2 per cent at 3¼ ips. These findings are well within the accepted "high fidelity" standards. An unusual control provided on the deck is a "Noise Suppressor." This is in the form of a hiss filter and at 7½ ips it reduced the output by 3.4 dB at 10,000 Hz and 8.7 dB at 16,000 Hz. We have not come across such a facility on any other machine reviewed in this series, and so could surely be forgiven for wondering whether its inclusion was in any way influenced by the rising response curves . . . !

So much for our technical investigation. But a tape recorder is bought for practical use under domestic conditions, not to kick a needle in a laboratory instrument. Ease and convenience of use, reliability and subjective listening results are what really count in the end. These are the aspects dealt with in our user comments that now follow.

In appearance the TC355 is smart without being fussy. There is an obvious restraint in both design and layout which could almost be regarded as severe when compared to some other machines. Judgment on such matters is purely personal,

but we find this kind of styling to be particularly pleasing. Encased in the usual hardwood plinth (first-class cabinet work here) the main deck plate is a deep jet black with brushed silver to the large head cover and narrow front control panel. All controls have been reduced to an absolute minimum.

Tape movement is controlled by a single massive rotary lever positioned to the right of the sound channel. It has three positions: Off in the centre, Forward when turned to the left and Rewind to the right. For Fast Forward an adjacent button is depressed whilst the lever is turned into its Forward position. The mechanical action of this control is very positive and robust. To the left of the sound channel are the pair of Record Level Meters, which although unlit incorporate red warning pilot lights which illuminate in the Record mode. Above the meter assembly is a four-digit counter and a slide Pause control.

On the forward panel are found, from left to right, the slide Noise Suppressor, Stereo Monitoring Jack, two Microphone input miniature jacks, two red slide keys for setting the Record mode, a pair of Gain Controls, and on the far right two small slide switches selecting before- and after-record Monitoring, the green mains pilot light and a rocker On/Off switch. Speed change is by a substantial rotary lever at the top of the deck between the two spools; the choice of speeds is 1½, 3¼ and 7½ ips.

Two panels recessed at the rear of the machine contain on one side the mains voltage selector, fuse and mains lead connection and on the other two pairs of phono sockets for Line In and Line Out, a 5-pin DIN Record/Playback socket, an Earth connection facility and a combined Sound-on-Sound switch and volume control.

There has been a tendency in some previous Sony models for the record controls to be hidden away, almost as though the manufacturer was being rather coy about including such a facility. In this machine the trend has been maintained, although the recessed panel in which the microphone sockets and knobs are mounted is at last open to view instead of being covered by a flimsy plastic hinged cover as happened in the past. The knobs are however still much too small and too awkward for convenient use; accurate setting and adjustment is made unnecessarily difficult, and miniature jacks are by no means the best plugs to use for microphone cables.

The single pair of Gain controls do not permit mixing between microphone and line inputs, so to achieve Sound-on-Sound a separate switched volume control (operating on one track only) is provided

—but it is tucked away unobtrusively in the rear panel of the machine. Once again Sony seem to be admitting their shame at having provided such a facility! Or perhaps they reasoned that the majority of owners would rarely use it and so by concealing it from view there would be less danger of it being accidentally operated by the inexperienced. They probably have a point there.

As soon as we came to connect up the TC355 we discovered a rather strange anomaly. Being inherently lazy (aren't we all?) and having available an amplifier with a combined DIN Record/Playback socket we used a suitable lead with DIN plugs at either end to save fiddling around with four phono plugs. To our surprise the monitoring facility, both before- and after-record, did not operate at all when the machine was set in the Record Mode. The instruction manual offered no explanation. Perhaps the lead was incorrectly wired? Perhaps Sony used a non-standard pin connection? Perhaps the lead was faulty? Or the amplifier was faulty? Maybe the machine was faulty?

All these questions we asked ourselves, just as a new owner would speculate when he first tried his brand new piece of equipment. We also muttered a few—just a few—rude words under our breath as we changed all the connections over

from DIN to phono (which also meant changing amplifiers!) to see what happened.

It worked. The phono outlets are correctly wired to the monitoring switch. A further check revealed that the output at the DIN socket is muted when the red Record keys are moved into the Record Mode. It was as simple as that. The omission of information about this peculiarity in the instruction manual is serious, and Sony (U.K.) Ltd. have agreed that an amendment slip will be included as soon as possible in all handbooks issued with machines sold in this country. They also apologise for any inconvenience caused to users . . . ! So if you want to check recorded quality *whilst recording*—which is the main use of the third head—you *must* use the phono sockets, not the DIN. This situation does not affect the tip-ring-and-sleeve Monitor Jack which is at all times available for use in the normal way.

Operation of the deck's controls was simplicity itself. The tape transport was positive and quiet and the efficiency of the big lever control made it a joy to use. The front of the heads is free of all obstruction since the pressure pads hinge back to the plane of the deck. Unfortunately the head cover has a considerable overhang so that in spite of the free access

for making editing marks one has to probe a little with the pencil to make contact with the tape. "Inching" of the tape must be done in the Play mode with the tape held by the Pause control; for marking, the function lever is returned to the Stop position to bring the pads clear of the heads. Not quite so straightforward as on some equipment, but easier than on those machines where the heads are permanently obstructed.

As with so many machines today, the automatic stop microswitch (actuated as soon as the tape runs out) does not separate the Capstan from the Pinchwheel; it is important for users to remember that when the tape is not in motion the Run Lever *must* be returned at once to its Stop position. Failure to do this could result in damage to the Pinchwheel and this point is not made sufficiently clear with enough emphasis in the instruction manual.

Our normal users tests were undertaken: copying from 15 ips master tapes and dubbing both stereo and mono "off the air" as well as reproducing pre-recorded tapes of known quality. In all cases we were impressed by the exceptional clarity of the sound produced; the only possible criticism is of the hiss level

*Please turn to page 97*

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## PROJECT ALPHA—from page 91

articulation present a similar awareness. The music of Charles Ives offers innumerable examples of his exploration into a large range of new possibilities of organisation. His use of techniques of superimposition, complex polyrhythmic patterns and later experiments with quarter tones suggest the full gamut of tendencies towards a reconstitution of musical motion.

### Orders of Motion

It is interesting to note the situation and view of the world that existed in the 12th century. It was a time of intense speculation in all fields, of inquiry and experiment. Music was undergoing a dynamic change. Systems for the indication of pitch and duration were being invented and methods of placing sounds in sequence, according to a variety of rhythmic patterns, were being used. These new ways of measuring sounds gave fresh meaning to the prevailing view of music as an order of nature. The medieval composer thought of music as "sounding number," an attitude which demonstrated itself as speculation about its nature and, as indicated by the process of codification which was taking place, an exploration of its properties. The music that emerged from this dynamic presents, unlike the classical tradition, a variety, vitality and

complexity of rhythm which has hardly been known in European music until the present time. As such, this music displays a more open structure in keeping with an understanding of music as an order of motion.

This parallel with the 12th century is drawn to suggest that aspects of the medieval interpretation of the world have re-emerged in our time. A reason for this might be that the music of that time existed in a pre-harmonic age. With the dissolution of harmony, our time can be thought of as post-harmonic. Without wishing to draw too close an analogy, it is interesting to speculate that, without harmony as a structural foundation, we have a problem of organisation similar to the older one. Our solutions therefore are likely to show similarities with those found so long ago. This I believe to be the case, though there are other factors which cannot be gone into here.

I referred near the beginning to the nature of the investigations which are taking place into the processes of nature. There has been a burst of exploration in every field. Exploration involves a process, the result of which cannot be foreseen. This is the active principle of the new awareness. With electronic resources it is possible to enter the properties of sound, discover aspects of connection within the properties and introduce into composition

the impact of one's discoveries. In this way a composer takes part in the new active principle.

I have said that with the dissolution of harmonic structure a central problem has been to find new principles for putting one sound after another. This concern with the dynamics of sequence signifies the new preoccupation with music as a rhythmic order, an order of motion. Our knowledge of the speed of particles, of the modes of vibration of sound itself and of the diaphragm of a loudspeaker, all make of motion a specially relevant quantity with which to articulate the new awareness. Electronics, in making possible an infinite variety of durations, offers a composer the means with which to experiment in any type of rhythmic motion.

In subsequent articles I shall write about aspects of the way electronics can be used as a means for composition. As a technical basis I shall use tape recorders and a sound generator. Two considerations determined my choice: the wide range of frequency provides full scope for overtone synthesis, and secondly access to the tape affords full control of the recorded sound. Similar considerations governed the choice of this process as one of the first to be widely used for the composition of electronic music. It therefore gives a practical indication of the impulses which led to the use of electronic resources.

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## MUSIC ON TAPE

### 7½ ips STEREO

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

#### CONCERTO FOR MY LOVE. George Shearing with Orchestra and Choir. Capitol ZT-1755 7½ ips four-track stereo. 101s. 10d. including purchase tax.

A "rapturous tribute to l'amour" says the sleeve note. If anything that's an understatement. This is unashamed "schmultz," as sticky as a tin of syrup, as sweet as icing sugar and as smooth as silk. Without a false note, or a jar or a blemish, we are quietly lulled into the never-never land of romance. Perhaps it's not such a bad place to be.

When this kind of record has been well done it has a rare beauty all of its own; the present example has probably never been bettered. Repertoire has been carefully chosen to suit the hypnotic mood, including: *Portrait of Jennie, I'm in the mood for love, Answer me my love, I wish you love, Love letters, I fall in love too easily, Love is the sweetest thing, Portrait of my love, PS I love you, Lady love be mine, In love in vain and Love child.* Was the last item included and put right at the end with a fine sense of irony? I like to think so!

When lights are low with drinks sparkling in cut-glass tumblers there could be nothing more soothing and restful. All it needs is a lady to complete the picture. Unfortunately she is not included in the purchase price. So find your own girl and let "Concerto for my Love" do the rest.

#### LISZT. Piano Concerto No. 1 in E Flat Major and Piano Concerto No. 2 in A Major. Sviatoslav Richter with The London Symphony Orchestra conducted by Kyril Kondrashin. Philips PTC 900000. 7½ ips, 4-track Stereo. 104s. 10d. including purchase tax.

With all the lush brilliance of full orchestral sound we have here two piano concertos from the pen of the great Franz Liszt performed for us by Richter. With all the advantages of the faster tape speed this should indeed offer a feast of enjoyment. Happily the recording lives up to expectations in every way.

Piano tone is subtle and elusive. The

Ampex engineers responsible for the mastering of this tape have done an admirable job of work. Dynamic range of the orchestral part is enormous, yet at all times the solo instrument is firmly held in proper perspective, even against the heavily accented *double-forte* passages where it offers a magnificent contrast in tonal colour.

In the enjoyment of a recording of this high standard the listener is offered something different to the experience of listening to a live performance in the concert hall. We are hearing the art of the recording engineer as well as the virtuosity of the performers. Together they add a new dimension to music, giving the listener a more personal and intimate involvement within the familiar surroundings of his own home. When the psychology of music in relation to contemporary society comes to be studied in proper depth (as has not yet been attempted) an analysis of the effect of bringing good music into the home will make interesting reading. Lacking such specific information one can only say that it has a profound reaction in those who hear it. One would like to imagine a Utopian society where such music—and the means to reproduce it—is provided as a public service as essential to health and well-being as refuse disposal. Before you laugh yourself silly remember that we in this country have already come part of the way towards such an ideal with the admirable transmissions of music by the BBC. . . .

But there's nothing like personal choice, which is just what music on tape offers. Unfortunately it's something we have to pay for in hard-earned cash. To my mind this excellent album offers with its superb quality and performance a really fine investment. It's a pity it cannot be obtained free of charge on the equivalent of a National Health prescription, but I suggest purchasing it as the only practical alternative!

Strongly recommended without reservation, since I cannot imagine any class of person to whom it would not appeal.

### 3¾ ips STEREO

#### HOLST. The Planets. The new Philharmonia Orchestra with Chorus, conducted by Sir Adrian Boult. EMI HMV TD-ASD 2301. 3¾ ips Stereo. 47s. 4d. including purchase tax.

On hearing the opening bars of *Mars, the Bringer of War*, I could scarcely believe that this was really a 3¾ ips recording. Truly the quality was startlingly good, and of course the brilliant *Planets Suite* by Gustav Holst shows it off to its best advantage. Are the

days of 7½ ips stereo recordings numbered? Regrettably we have to admit that it does look very much like it. I can only repeat that if EMI can do as well as this at 3¾ ips then surely they could have done just that little bit better at the faster speed and so given us a range of superb recordings which could probably not be bettered. As it is we have to put up with just excellent—if that isn't too Irish!

There can be few who are not familiar with *The Planets*, and at this time of space exploration it is an appropriate moment to listen to the work once again. There is within the composer's musical thought much of the feeling of the enormity and remoteness of the cosmos, although, strangely, the individual items were inspired more by astrological mythology than by scientific fact. In this sense the Suite is dated. But forget the quite illogical view of *Mars* as the "Bringer of War," and of *Venus* as the "Bringer of Peace"; the genius of Holst was such that he was able to convey an interpretation of the heavens that does not in any way conflict with the now familiar view from Apollo 8.

Quite the reverse. I find that the recent dramatic lunar exploration—and the hope of landings in the very near future—enables me to hear and appreciate Holst's music with a new sense of involvement which gives added significance.

Of this month's reviews I would name *The Planets* as my special choice. Very strongly recommended.

#### LOUIS ARMSTRONG. Louis. Mercury STX 61081 3¾ ips four-track stereo. 88s. 0d. including purchase tax.

The very first item in this collection, *Mame*, is the title song from the show. Other items include: *The circle of your arms, So long dearie* (from Hello Dolly), *Tin roof blues, I like this kind of party, When the saints go marching in, Cheesecake, Tyree's blues, Pretty little missy, Faith* (from I Had a Ball), *Short but Sweet* and *Bye 'n bye*.

The magic of Louis needs no words of mine. It stands alone, a towering talent that defies description and needs no embellishment. In this album Louis not only sings for us, but by putting the tape on the machine we invite him to step right into the room. Welcome, Louis! Like most of the other reviews this month this album is a near-perfect example of its genre. One just can't fault it.

The versatility of Louis leaves one breathless with admiration. I wonder what future generations will think of him? Perhaps they will listen to some of the other music of today and decide we must have been very strange people indeed. For the best of Louis you can't go wrong with this collection. And I suggest that in ten, twenty, thirty years' time you will get as much enjoyment from it as you will today.

## TEST BENCH

continued from page 95

### Sony TC 355

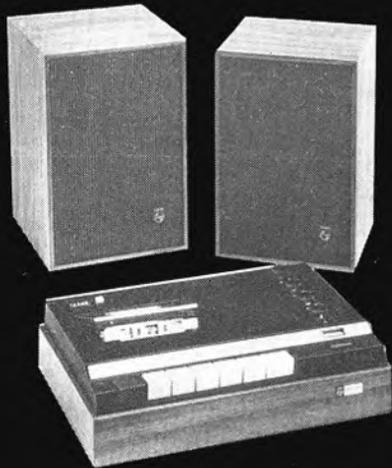
which as we expected was rather higher than usual. In spite of actuating the Noise Suppressor it was necessary to apply top cut on the main amplifier when reproducing tape records where hiss was already present. In all other respects the machine performed with efficiency; in fact we soon became quite attached to it. The

more we used it the more we appreciated the deck layout and delightful simplicity of operation. There is a built-in feeling of "quality" that defies description—the user knows by instinct he is handling a piece of really solid engineering that inspires great confidence.

In this review we have not hesitated to point out the snags with this machine, and it does have several. The most serious is the rising frequency response found on the test machine. Readers must remember that this effect could be peculiar to the

review model, but we are assured by Sony (U.K.) Ltd. that they are at once arranging for the most stringent investigation to be put in hand in their own service department and we shall be only too pleased to publish their comments in a future edition.

But in spite of our criticisms we are left with the inescapable fact that we do like the Sony TC355 very much indeed. It is a machine that can quickly endear itself to the user's heart and we shall frankly be sorry to part with it.



+

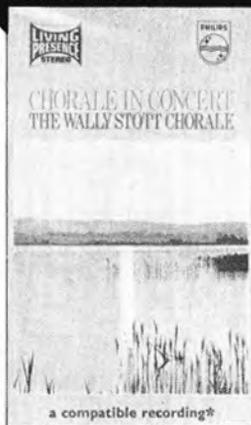


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### Now on Musicassettes!



### Other Musiccassette releases this month include-

**Songs of My Country/NANA MOUSKOURI/CFP 4037**

**Ravel/Bolero/ Ma Mere L'Oye (Ballet)  
La Valse (Poeme Choregraphique)  
LONDON SYMPHONY ORCHESTRA  
PIERRE MONTEUX/CPC 0060**

**Sounds Like/HERB ALPERT  
AND THE TIJUANA BRASS /CYP 194**

**Val/VAL DOONICAN/CYP 196**

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# MUSICASSETTE

## REVIEWS

**CHORALE IN CONCERT.** The Wally Stott Choral. Philips Living Presence Stereo LPC 13001. 55s. 11d. including purchase tax.

When stereo first appeared all the recording companies produced repertoire which, although genuinely recorded in stereo, was derived from strictly monophonic techniques of microphone placing and balancing. It has taken quite a long time for engineers to realise that stereo offers the possibility of developing completely new approaches to the mono conception of recorded sound. But now most of the big labels have a range of stereo material—usually identified by some distinguishing trade name—which offers recordings deliberately tailored to squeeze the very last ounce of quality and stereophonic effect from modern equipment. The Philips contribution to this new philosophy goes under the name of "Living Presence Stereo" and wisely they have taken the plunge and produced Musicassettes in this range of "super-quality/super-stereo" issues. This month I have the pleasure of reviewing the first of them.

I give a cynical smile to myself when viewing the detergent advertisements on television. At one moment we are told that "Brand X" gives us a whiter-than-white wash, and a few weeks later we are amazed to learn that the same firm has improved its product (now described as "NEW Brand X") so that it washes even whiter than whiter-than-white. Either it wasn't as good as they said it was in the first place (in which case the improvement was long overdue and their original advertising was untrue) or they told the truth about the first powder so the improved version cannot be a real improvement at all. They can't have it both ways. But we are dealing with recorded sound, not soap powders, and these new style recordings are undoubtedly different. Unlike detergents the difference can be experienced by comparison. The important question is to decide whether that difference is a step in the right direction or whether by straining to exploit the stereo medium to the full the engineers have produced a result which is only of interest as a piece of technical gimmickry lacking musical value.

When evaluating records of this kind one can no longer refer back to live performance as a yardstick. The old criterion of the "nearest approach to live sound" no longer applies. The recording itself must be considered as an artistic endeavour in its own right, apart and separate from the performance and music, although, of course, always specifically related to them. In other words, if a straight, "old-fashioned" recording had been taken of the same work at the same time would it have more or less artistic merit than the Living Presence Stereo version? It's as simple as that.

I have no doubt at all about the answer. In my opinion Philips have done an excellent job, and whilst avoiding the worst dangers their technicians have managed to endow the recording with an individually distinctive quality of sound that is very pleasing to my ear. This Musicassette, entitled "Chorale in Concert" by the Wally Stott Choral, shows off the technique to great advantage.

The album includes: *Shadows, Trains*

and boats and planes, Country girl, Pat-a-pan, A time for love, The eagle and me, The Dance of the Sugar Plum Fairy, He's gone away, Two for the road, Love is blue, My man's gone now and I'm on my way.

All the items, except *Shadows*, are Wally Stott's own arrangements, in which he uses a very restrained instrumentation with a choir of twenty-four. The whole succeeds brilliantly, and with the help of the new Philips sound we have a collection that can be strongly recommended.

**IF WE COULD CHOOSE.** The Coffee Set. Mercury Living Presence Stereo LPC 13000. 55s. 11d. including purchase tax.

And who, one might ask, are The Coffee Set? A good question, because in this commercial day and age the success of a group depends as much on its projected image as on its musical talent, and it is doubtful if anyone has heard of this ensemble before. There's a very good reason for it. The Coffee Set is made up of previously anonymous "backing vocalists"—the boys and girls who provide the "chorus off" to bolster up the performance of big-name stars. As such they are thorough professionals, lacking only the marketing persuasion that tells you and me that they exist.

So, believing strongly in the rights of the unknown, I welcome this addition to the lists and profoundly hope that these people will now acquire a reputation for themselves in their own right—as they so richly deserve.

The programme offered includes: *Girl talk, San Francisco, It's not unusual, A man without love, A time for love, Can't take my eyes off you, Georgia on my mind, A man and a woman, Michelle, Dindi, What a wonderful world and Walk away Renée.* As might be expected from their origins, The Coffee Set produce a highly melodious sound, which though far from trendy is thoroughly musical and accomplished. I like them. I like them very much.

The recording, another in the Living Presence series, is excellent. The technical handling of stereophony is always open to argument; if too directional it can be gimmicky, if not directional enough it can be little different to double mono. Here we have a nice compromise, giving a firm spread across the sound stage without obtrusive over-directionality. By the way, two of the male voices sing falsetto, which helps to give an identity to the choral blend. A polished collection which I hope will prove to be only the first from this talented group.

**IF GLENN MILLER PLAYED THE HITS OF TODAY.** Jack Nathan and his Orchestra. Philips Living Presence Stereo LPC 13002. 55s. 11d. including purchase tax.

The title of this album speaks for itself. Funny how the Glenn Miller spirit seems to get stronger and stronger as the years pass by. Perhaps it's a natural revolt against some of the more extreme sounds that now pass as music. There's no doubt that the true Glenn Miller sound is as far removed from the accepted commercial "pop" of today as it possibly could be. One can't help wondering if in fact the popularity of certain contemporary musical styles is not the result of mass-hysteria stimulated by sophisticated selling techniques, and as such quite unrelated to entertainment or real musical values.

Deep in the nostalgia of those faraway days when you could tell the boys from the girls, Jack Nathan and his orchestra give us: *Yesterday, What a wonderful world, Do you know the way to San Jose?, Love is*

*blue, Michelle, If I only had time, Joanna, By the time I get to Phoenix, Up up and away, The last waltz, Somewhere my love and The shadow of your smile.*

Selection of repertoire has certainly been conservative by the standards of today, but even so it is interesting to listen to these numbers through the simulated ears of Glenn Miller. Perhaps the flavour is rather of "reproduction" pieces instead of genuine "antiques," but that does not detract. Recording is up to the standard of the other Living Presence albums reviewed this month, so the collection can be recommended for those who look back with regret.

**SUPPÉ OVERTURES.** Suedwestfunk Orchestra conducted by Tibor Szoke. Sentry SS918. 50s. including purchase tax.

As a musical form the overture has achieved a popularity that quite outstrips its original purpose. Written as an introduction, an hors d'oeuvre so to speak, it has come to be regarded by many as a main course in itself. As such overtures are performed at as many contrasting levels of appreciation as food is served in restaurants—from fish and chips to haute cuisine. Which, in my opinion, is not at all a bad thing.

On this album we have: *Light Cavalry, Boccaccio, Beautiful Galatea, Poet and Peasant and Morning Noon and Night in Vienna.* Plenty of basic protein here; the resulting dish is going to depend for its piquancy on the skill of the chef. To my delight I found both the performance and the recorded quality of this Sentry Musicassette to be up to the best standard of a five-star hotel. This is not a package to be doused in vinegar and consumed from last week's newspaper. To the contrary, with subtleties of instrumental tone and interpretation the whole is a gastronomic delight even if the ingredients do have a homely familiarity.

So with the strings and brass of the Suedwestfunk Orchestra ringing in my ears I must recommend this collection strongly to all who do not pretend an over-sophisticated palate. Personally I enjoyed it immensely.

**GOLDEN HITS OF DINAH WASHINGTON.** Barbara Brown. Sentry SS718. 50s including purchase tax.

The sleeve notes to this collection open with the words: "Music is a funny sort of business." With that sage remark no one would argue. But the "funniness" of music is increased by the fact that this tribute to a very great artist should have been produced with an unflattering voice quality that I find hard to understand. It varies from number to number and at times is distinctly boxy with a disturbing shift of the stereo image which is most distracting.

Pity, because this could have been magnificent, giving us as it does: *Where Are You, Yes Indeed, Nobody, Deep River, Swing Low Sweet Chariot, What a Difference a Day Makes, Mighty Like a Rose, Goin' Home, Aura Lee and Joshua Fit de Battle of Jericho.*

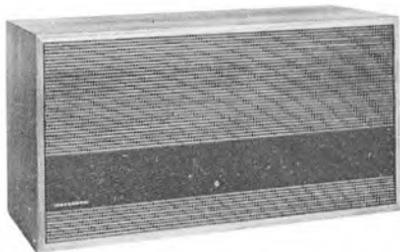
As so often happens, the ear becomes accustomed to the acoustic peculiarities of the recording, and by the time the cassette is turned over it is reasonably acceptable. But if one forgets the finer aspects of audio reproduction one is left with a very solid chunk of melody and rhythm which takes one back to the days when performing skill was the only criterion that mattered.

Good old Dinah Washington! They could have done you better justice, but, more important, at least we are reminded through this album of the personality of a great, great trouser.

## NEW PRODUCTS

### SPEAKERS FROM TANDBERG

CONSOLIDATING their position in the high fidelity world, Tandberg now offer a completely new loudspeaker system under the name Tandberg Hi-Fi System 15.



With a claimed handling capacity of 30 watts and 4 ohms impedance, the unit comprises a 12-inch woofer, 5-inch mid-range and 2.5-inch tweeter. The benefits are said to be extremely high quality sound coupled with the Tandberg compact dimensions. Available now in teak (rosewood versions will follow later) the styling is intended to blend harmoniously with either traditional or modern decor. Price of the teak model is £40 19s.

*Elstone Electronics Limited, Hereford House, North Court, Off Vicar Lane, Leeds 2.*

### ROGERS RAVENSBROOK

FOLLOWING the success of the Rogers Ravensbourne stereo amplifier, the manufacturers now announce a new model, called the Ravensbrook, with the more modest output of a nominal 10 watts per channel. It is claimed that a number of original ideas have been developed to improve performance and reduce cost at the same time. The single printed circuit board is made of fibreglass, and this method is thought to be exclusive to Rogers amplifiers.



The four-way push-button Input selector provides for selection of Disc, Tuner and Tape Inputs; the fourth button gives Mono/Stereo operation. When reproducing Mono the left-hand input channel is connected to both speakers and the output from a compatible stereo pickup is connected in parallel for playing mono records.

Provision of a Tape panel socket (duplicated at the rear) to the DIN Record/Play-back standard together with full monitoring via a three-head machine make this model particularly interesting to recording enthusiasts. On the disc side a dual sensitivity switch

provides four inputs which are said to cater for virtually all high quality pick-ups, from ceramic to the new very low output magnetic types.

Power output is quoted as 10 watts RMS into 15 ohms (15 watts RMS into 8 ohms) and total harmonic distortion as less than 0.1 per cent 1kHz at 10 watts into 15 ohms and less than 0.25 per cent at 10 watts into 15 ohms over the range 100 Hz to 10 kHz. Output impedance matching is 8 to 16 ohms.

Special features of the circuitry include a low noise pick-up input stage using a special low noise PNP transistor in conjunction with a high output second stage to achieve a wide dynamic range and avoid distortion on peak recorded passages. Quadrifilar transformers are used to drive two pairs of high current gain transformers giving very low distortion. All four windings on the transformers are wound simultaneously, a technique which is said to result in maximum coupling and perfectly balanced windings. Silicon transistors are used throughout, apart from one germanium device in the regulated power supply.

Dimensions are 14½ x 9¾ x 5 inches in case including knobs and feet, and prices are: £42 10s. for the chassis model, £47 10s. for the cased model and for the teak case alone if required £5 plus 10s. 1d. purchase tax.

*Rogers Developments (Electronics) Limited, Rodevco Works, 4/14, Barmeston Road, Catford, London, S.E.6.*

### SIXPENNY TO SPARE?

SIXPENNYWORTH of solder—enough for about fifty average joints, is now offered by Multicore in an attractive envelope container.



Said to be ideal for all household odd jobs and electrical repairs, full instructions for use are given on the reverse side of the packet. Invaluable for making good faulty leads, no recording enthusiast should be without a supply of good solder for emergency running repairs—and nothing could be more handy than these neat little envelopes.

*Multicore Solders Limited, Hemel Hempstead, Hertfordshire.*

### VARIETY OF CONNECTORS

AMONGST the wide range of components for which Electrostatic Limited have been appointed sole UK agents by Richard Hirsch-



mann of West Germany are: Terminals, panel mounting and spade types, Single-Pole Sockets, insulated and non-insulated, Banana Plugs both standard and precision types for laboratory and instrument use, Test Prods in five styles, Crocodile Clips, insulated and non-insulated and Miniaturised Plugs and Sockets with 2 mm and 1.6 mm contacts.

Full information and catalogues are available from:

*Electrostatic Limited, 73b, North Street, Guildford, Surrey.*

### MANUFACTURERS' ANNOUNCEMENTS

"Business as usual" reports Bruce Nicolls, Manager of the Tape Division of **BASF United Kingdom Ltd.**, after fire swept through the firm's Gillespie Road premises on Sunday 19 January.



The fire was discovered shortly before 7.00 am, and at one time thirteen appliances were present. Thanks to quick thinking by members of the Salvage Corps much of the stock was preserved undamaged and the fire was put out in little more than two hours.

BASF staff worked continuously through Sunday and Monday to sort and re-pack damaged items, and replacement stock was on its way by air from Germany the next day. As a result all lines can be supplied as usual.

By mutual agreement the marketing association between **Technomark Ltd.** and **Radford Electronics Ltd.** of Bristol was dissolved as from February 1, 1969. From that date all sales and service matters are being dealt with directly from the premises of Radford Electronics Ltd. at Ashton Vale Road, Bristol 3. This change of policy has to a great extent been dictated by the conflicting interests of Technomark Ltd. in its reorganisation, and the decision has been taken with some reluctance due to the happy working relationship which had existed between the two firms.

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These superb CONCORDE Interceptor headphones, available in Mono or Stereo, represent a breakthrough in quality, efficiency and price. They bring dramatic sound—30 to 17,000 cps—and a full bass response usually associated with 'phones selling at twice the price. They are equipped with 2½ in. speakers which operate at full efficiency on an input of one twelfth of a watt. Impedance 8 ohms. Perfect comfort and full adjustability, large plastic washable earmuffs, finished in attractive two-tone grey. Recommended Retail Price 99/6.

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A huge purchase of this wonderful music tape enables us to offer this exciting bargain. (Offer closes on 30th April, 1969.)

**GUARANTEE.** If you feel that the quality of this offer falls short of your expectations or that you consider it faulty in any way; return both items to us within 7 days and we undertake to refund your remittance in full, plus the cost of your posting them back to us.

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TRM5

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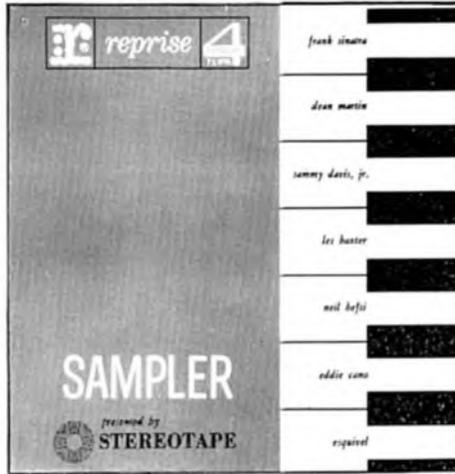
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A huge pre-March 1968 Budget, purchase of this wonderful tape enables us to include this galaxy of Stars FREE, as part of this promotion for RECOTAPE Recording Tape. This tape is not available through any other source.

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**GUARANTEE.** If you do not agree that this offer represents exceptional value or you feel that it falls short of what you expected, just return both tapes to us within seven days. We undertake to refund your remittance in full, plus the cost of the stamps used in posting it back to us.

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TRM3

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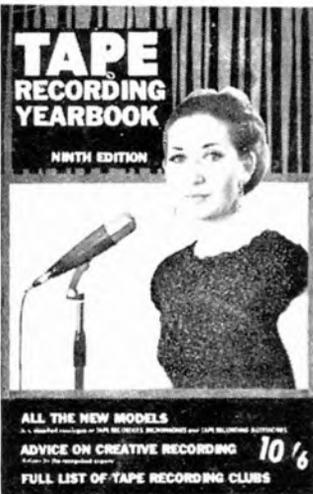
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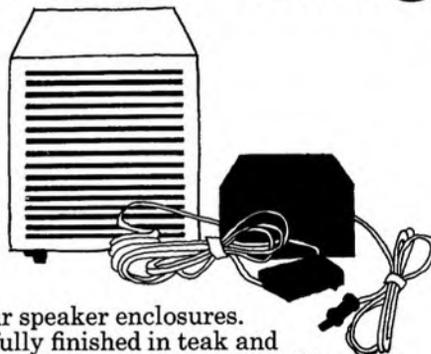
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" . . . high quality and rapid service I have found in you

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3 for	3/-	7/6	9/6	12/6
6 for	8/6	22/-	27/9	36/9
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March 1969

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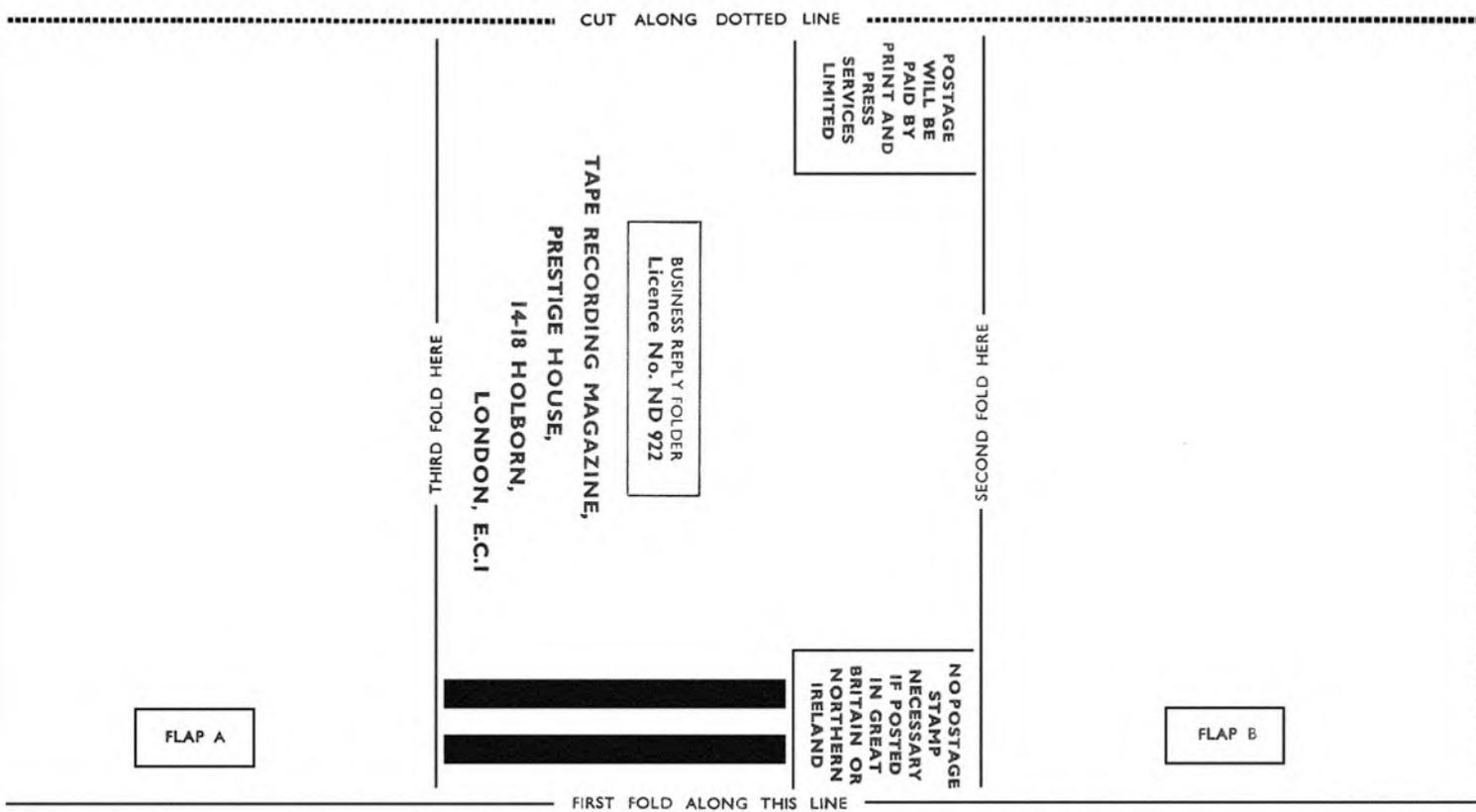
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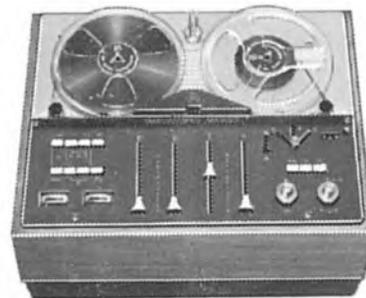
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