

NOVEMBER 1968

TAPE

RECORDING MAGAZINE

24

SOUNDS IN PROFUSION

Making and Using
Sound Effects

Collecting
on Tape

AUDIO FAIR—NEW PLANS

TEST BENCH
TECHNIQUES
REVIEWS, Etc., Etc.

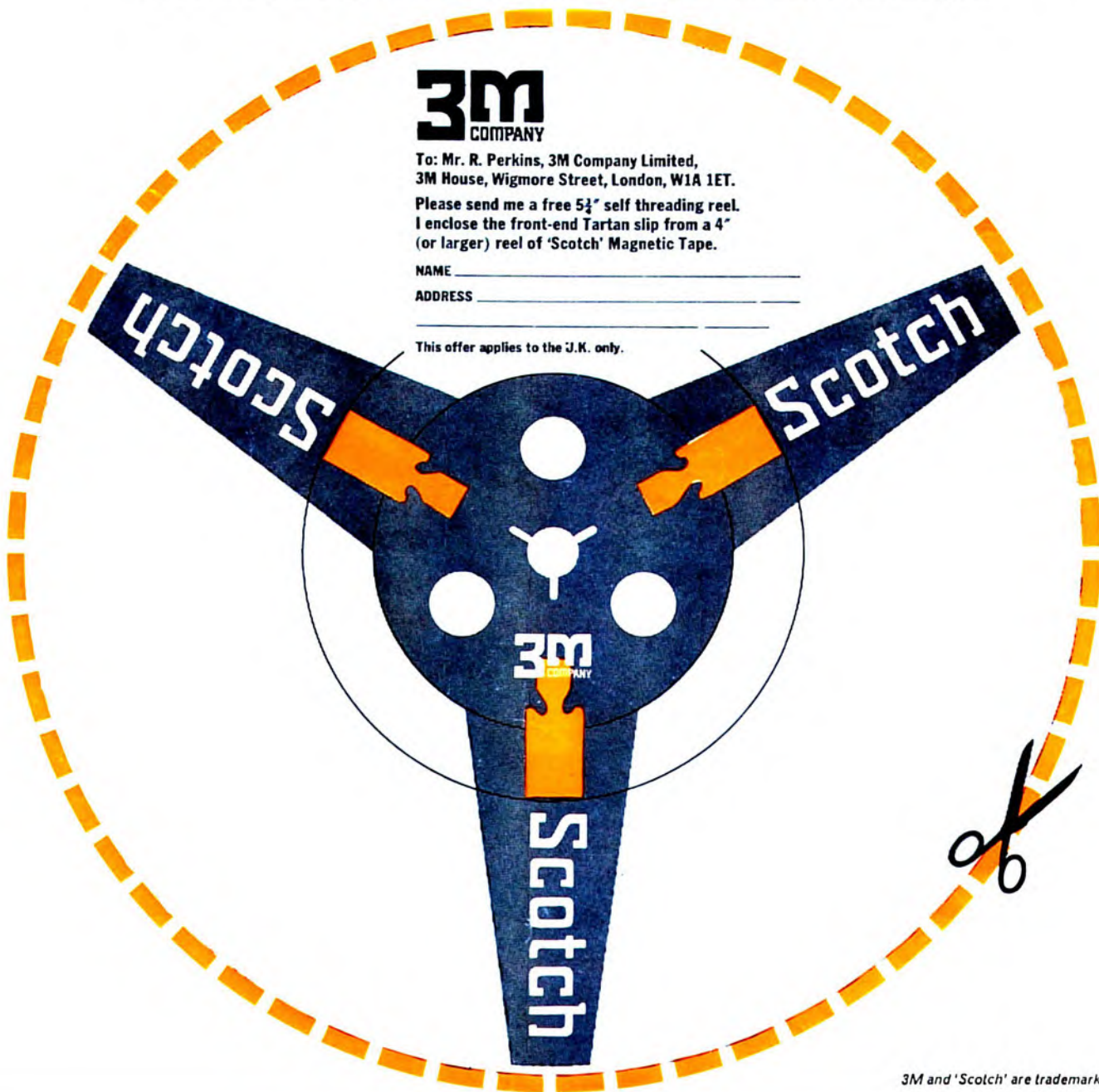
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New York Post Office N.Y.*



FREE

We're giving away 10,000 of these 5 $\frac{3}{4}$ " self threading reels. Each one's worth 9/10d.
All you need to do to get this: fill in the coupon and send it off with the front-end Tartan slip from your purchase of any reel of 'Scotch' Magnetic Tape of 4" diameter or larger — we'll send you your reel by return. So long as we've got one to send.
We've only 10,000. So hurry!

- * Automatic wind-on. Just lay tape in hub of spool. The reel then threads itself.
- * No loose ends.
- * Cuts down tape handling
- * Maximum tape protection
- * Fastest known method of threading reel.



New
from
Tandberg

The Series 15

The new Series 15 combines Tandberg's world renowned qualities of faithful sound reproduction, reliability and compact modern design at a quite remarkably low price. It incorporates many superb features:—

- ★ Programme mixing facilities with separate controls for microphone and line inputs.
- ★ 10 watts output using an external speaker.
- ★ Volume control for monitoring whilst recording at loudspeaker level.

★ Loudspeaker selector switch providing choice of playback through internal speaker, or external speaker or both simultaneously.

- ★ Three speeds.
- ★ 4 digit illuminated counter with instant reset button.
- ★ Pause control gives instant stop/start.
- ★ Separate Bass and Treble lift and cut controls.
- ★ Signal to noise ratio 55db below maximum recording level.

★ Frequency response:—
7 1/2 ips : 30-20,000 Hz
(± 2dB40-16,000 Hz)
3 3/4 ips : 30-13,000 Hz
(± 2dB50-10,000 Hz)
1 7/8 ips : 30-7,000 Hz
(+ 2dB60-5,000 Hz)

Elstone Electronics Limited,
Hereford House,
Vicar Lane, Leeds 2.

Tandberg
move up to

Series 15 from 69/1/2 guineas.

Ferguson make 'more for



Model 3232

LOOK! a Ferguson stereo recorder with track transfer and 2nd channel monitoring.

This sophisticated 3-speed 1-track Stereo Tape Recorder is packed with special features – much more than you could expect for the money. It has 7" reels and accommodates standard pre-recorded tapes. Employing all transistor circuits it is, in effect, two recorders and replay amplifiers independently controllable and integrated to provide stereophonic recording and reproduction. Housed in an attractive teak veneered cabinet with transparent lid.

- Twin all transistor amplifiers • 3 speeds, 7" spools play up to 17 hours on double play tape (mono) • Automatic end of tape stops • Clutched dual concentric controls • Input mixing facilities • Latching pause control • Calibrated meter record indicators • Monitoring while recording on built-in speakers • Track transfer on mono • Second channel monitoring • Comprehensive input and output sockets • Suitable extension loudspeaker available • Supplied complete with two dynamic microphones, reel of tape (1200'), take-up spool and connecting leads.

Model 3232 – **£91.13s.**

LOOK! a Ferguson mono tape recorder with 3 speeds and input mixing.

Outstanding value is offered by this 3-speed 4-track mono Tape Recorder. With 3-Watts audio output on speech and music, interlocking controls that prevent accidental 'wiping' of tapes, a metal foil operated automatic stop and a solenoid operated remote pause control. The unit incorporates a new symmetrical motor with low hum field and extensive signal head shielding reduces mains hum to minimum. The cabinet is attractively veneered in teak with a transparent lid.

Model 3216 – **£64.19s.**

your money' tape recorders



Model 3238

LOOK! a new Ferguson portable tape recorder.

A 3-speed, 4-track Tape Recorder with 7" spools, presented in black leathercloth with a teak-veneered loudspeaker grille. A removable cover at the rear provides access to input and output sockets, storage space for mains lead and microphone, etc.

- Four tracks, 3 speeds, 7" spools play up to 17 hours on double play tape
- Automatic end of tape stop
- Input mixing controls
- Remote control from microphone
- Latching pause control
- Double track replay
- Monitoring while recording
- Meter record level indicator
- 4-digit, push-button position indicator
- Graduated dials on rotary controls
- Tape editing index
- Comprehensive input and output sockets
- Powered socket for accessories
- Microphone with remote control switch
- 1200 ft LP tape, take-up spool and connecting lead included.

Model 3238—£58.11s.

A wide range of accessories are available for all Ferguson Tape Recorders.

**To: British Radio Corporation Ltd.
284 Southbury Road, Enfield, Middlesex**

Please send me your free full-colour fact-filled leaflets about Ferguson Tape Recorders.

Name _____

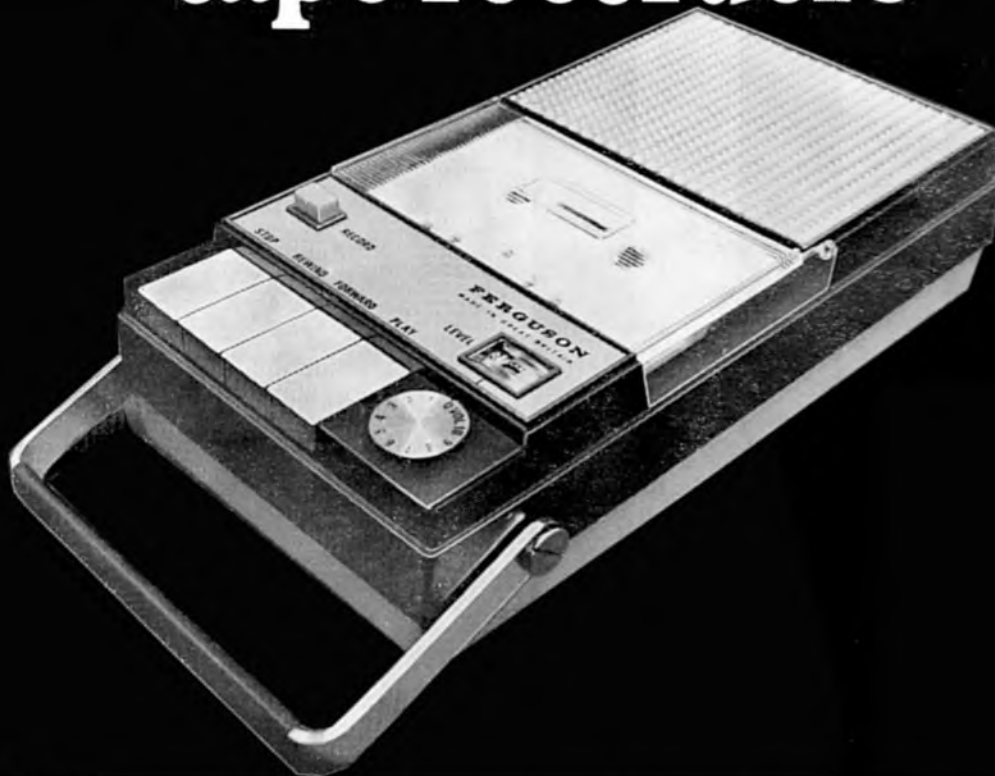
BLOCK CAPITALS PLEASE

Address _____

THORN British Radio Corporation is a member of The Thorn Group T.27

Fine! It's a FERGUSON

Ferguson make 'more for your money' tape recorders



LOOK! a superb compact Ferguson Cassette Recorder

This Ferguson Cassette Recorder is the enthusiasts sketch-book and enables you to pick up material for transfer later to the tapes in your library. It is housed in a cabinet moulded from high impact material in black, contrasted with light grey and has a silver coloured metal grille. This machine is battery powered utilising the new instant loading 'Compact Cassette'. It may also be used to reproduce 'Musicassette' pre-recorded tapes monophonically. It has simple piano type keys for tape motion control and a dynamic microphone with remote stop/start control. It is powered by 5 HP 11 type cells and a socket is provided for external power supply. The dimensions of this recorder are: Length 8 $\frac{1}{8}$ "", width 5", depth 2 $\frac{1}{8}$ " and it weighs only 3 $\frac{3}{8}$ lbs.

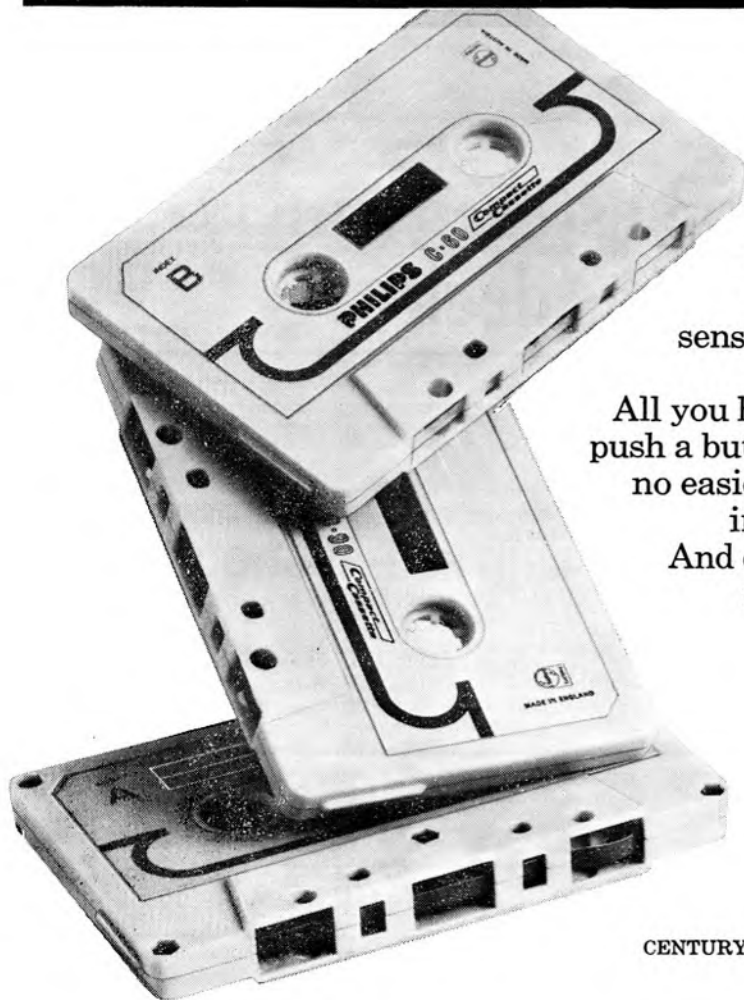
Model 3236 **£26.14s.**

- Moulded black cabinet with light grey contrast and silver coloured metal grille.
- Ideal for indoor and outdoor use and as a dictating machine.
- Simple piano keys for tape motion control.
- Dynamic microphone with remote stop/start control.
- The instant loading 'Compact Cassette' of tape provided, plays for one hour.
- Meter level and battery condition indicator.
- Will reproduce 'Musicassettes'.
- Operates on five HP 11 batteries or external power supply.
- Comprehensive input/output socket.
- Supplied complete, with remote control microphone, cassette of tape, radio connecting lead and muting plug.
- Like all Ferguson tape recorders, the 3236 is British made.

Fine! It's a FERGUSON

THORN British Radio Corporation is a Member of The Thorn Group.

We started a small revolution



Philips started the Compact Cassette Revolution. . . and our cassette is still the best. The magnetic coating is carefully bonded to the base material. Ensuring unvarying sensitivity essential for really high fidelity recording.

All you have to do is snap in a cassette, push a button—and you're away. There's no easier way of making great recordings. Time after time after time.

And every Compact Cassette comes in a library box, with indexing card, that stands upright in Philips Library racks.

PHILIPS

PHILIPS ELECTRICAL LIMITED,
CENTURY HOUSE, SHAFTESBURY AVENUE,
LONDON, W.C.2.



Sanyo puts you in the world class



Superb new DC 534 stereo tuner/ amplifier and playing deck

- Moving magnet cartridge
- Inside force canceller
- 12 watts per channel
- Excellent channel separation
- Optimum amplification and sensitivity on AM, FM, /FM stereo

Amplifier Tuner

Frequency range
AM 535—1,605 kc
FM 88—108 mc

Sensitivity
AM 100 (μ V/m
at 30 dB)
FM 1 (μ V/m
at 30 dB)

Signal-to-noise ratio
AM more than 40 dB
FM more than 60 dB

Frequency response
20-20,000 \pm 1 dB c/s

FM distortion
Less than 1.0%

FM MPX separation
(dB at 1,000 c/s)
35 dB at 1,000 c/s

Output
Effective power
12W + 12W
(at .5% distortion)

Controls
Noise filter,
Rumble filter

Output impedance
8 ohms

Playing deck
Turntable speeds
33 $\frac{1}{2}$, 45 rpm

Wow and flutter
Less than 0.25%

Frequency response
20-20,000 c/s

Cartridge
Moving magnetic type
stereo cartridge with
diamond stylus.

Recommended Retail Price
£132.10.0

SANYO

RELIABILITY IS BUILT IN



NuSound

BRITAIN'S LARGEST SPECIALISTS



TAPE RECORDER AND HI-FI CENTRES

EVERY LEADING MAKE AVAILABLE

- EASIEST HIRE PURCHASE TERMS
- GENEROUS PART EXCHANGES
- FINEST AFTER SALES SERVICING
- EXPERT STAFF & EXPERT ADVICE

Stockists of: Akai, Ampex, Arena, Armstrong, B. & O., Brenell, Dynatron, EMI, Elizabethan, Ferguson, Ferrograph, Garrard, Goldring, Goodmans, Grundig, H.M.V., Hacker, Kef, Leak, Loewe-Opta, National, Nusound, Ortofon, Philips, Quad, Reps, Rogers, Sanyo, Sony, Stereosound, Tandberg, Telefunken, Thorens, Truvox, Uher, Van Der Molen, Vortexion, Wharfedale, Wyndor, etc.

Every make and model of Tape Recorder and Hi-Fi Unit is available for immediate demonstration by our specialist staff who will be delighted to assist you in selecting equipment to suit your individual requirements. Only from NuSound can you benefit from all these invaluable features—the most comprehensive range of equipment on display in the country, expert staff, free technical advice, immediate demonstration of any model and the finest after sales servicing available.

WE OPERATE A PERSONAL EXPORT SCHEME
SAVING UP TO 20% ON LIST PRICE.

NuSound

TAPE RECORDER CENTRES

WEST END 82, HIGH HOLBORN, W.C.1. Tel. 01-242 7401
(200 yards Kingsway—Half-day Saturday)

CITY 228, BISHOPSGATE, E.C.2. Tel. 01-247 2609
(Opp. Liverpool St. Stn.—Closed Sat. Open Sun. 10-2)

E. LONDON 2, MARYLAND STATION, E.15. Tel. 01-543 5879
(Adjacent Maryland Point Stn.—Half-day Thursday)

N.W. LONDON 360, KILBURN HIGH RD., N.W.6. Tel. 01-624 1656
(Opp. Kilburn Stn.—Half-day Thursday)

TAPE AND HI-FI CENTRES

N. LONDON 242/4, PENTONVILLE RD., N.1. Tel. 01-837 8200
(200 yards King's X Station—Half-day Thursday)

ILFORD/ESSEX 85/100, ILFORD LANE, PIONEER MARKET.
Tel. 01-478 2291 (200 yds. Ilford Stn.—Half-day Thurs.)

S. E. & KENT 36, LEWISHAM HIGH ST., S.E.13. Tel. 01-852 2399
(Opposite Chiesmans—Half-day Thursday)

SEE THIS EQUIPMENT



Tandberg SPECIALISTS

See, hear and compare the complete range of Tandberg Stereo and Mono Tape Recorders. Our experienced staff are able to give expert advice and also demonstrate the many outstanding features of this wonderful range of equipment.

MODEL 1241

4-track, 3 speed stereo recorder. A few still available at our special price of

ONLY
105 GNS.

List price £126



MODEL 64X

4 track stereo tape unit with pre-amp. 138gns.

SERIES 15

2 or 4 track, 3 speed, 10 watts mono recorder from 69gns.

At every Nusound showroom you'll find a wonderfully comprehensive range of equipment backed by over 13 years' experience in this ever growing and highly specialised field—in which the Nusound reputation is "second to none". Four Nusound Centres are devoted exclusively to Tape Recorders and Accessories and the other three Nusound Centres specialise in both High Fidelity Equipment and Tape Recorders.

Visit any Nusound Centre and you'll be certain of 100 per cent Service and Satisfaction.

**BRITAIN'S
LARGEST
TAPE
& HI-FI
SPECIALISTS**

THE MAN WHO PROVED OYSTERS CAN SING!



Oysters can sing. Dick Kenny in the U.S.A. has not only listened to oysters singing, as can be seen from this picture, but has also recorded them on tape. He now owns hundreds of micro-noises of this kind, including flies walking about, the sound made by prawns and falling snow-flakes.

Pedagogic College Hinataya region taken systematic s, with him some ut 1,200 Agfa- Knowledge the last 12 s in Otto- founded as able recording of it had probably never been made. It was held in the sparsely lit courtyard of a temple where several hundred members of this sect were gathered round the area reserved for the dancing of their magnificent robes and masks. I kept careful notes because the background which was rather unsatisfactory, I suppressed the songs and instrumental accompaniment to some extent by squinting in front of my camera. The had rendered the recording.

... and also recorded the 'micro-sounds' of flies, prawns, moonbeams and falling snow! Extraordinary feats by an extraordinary man—nicknamed by his hundreds of friends as 'the crazy tapeworm'! Read all about him in the latest issue of Agfa Magneton Magazine. True stories like this, technical features and a host of tips for the tape enthusiast can be found within its pages. Every issue also contains a wealth of information about the wide range of Agfa Magneton tapes and useful accessories you can buy. It illustrates the benefits of low noise level without print-through, low distortion level, consistency, and the extreme tensile strength of all Agfa Magneton tapes.

AGFA MAGNETON RECORDING TAPES



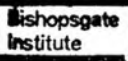
PROVED BY THE PROFESSIONALS

To: AGFA-GEVAERT LIMITED, Magnetic Tape Division, Great West Road, Brentford, Middlesex. Please send me my FREE copy of Agfa Magneton Magazine.

NAME

ADDRESS

of them had and... which was surrounded... force of the... however...



CITY TAPE RECORDER CENTRE

BISHOPSGATE
Liverpool Street Station

**228 BISHOPSGATE
LONDON, E.C.2.**

Tel. 01-247 2609

Opposite Liverpool Street Station

Hours of Business:
MONDAY TO FRIDAY
9 a.m. to 6 p.m.
Closed all day Saturday

**OPEN
SUNDAY**

10 a.m. to 2 p.m.
Part of the Nusound Organisation

At the City Tape Recorder Centre you can see one of the finest selections of tape recorders on display in London. Every leading make and model from Akai to Vortexion.

SPECIAL OFFERS— We still have a very limited quantity of **B & O 2000 DE LUXE TAPE RECORDERS** at the Pre-Budget price of £145 Also Tandberg at 105 gns. Buy now while stocks last and save from £21 to £40!

We are easy to get to being almost opposite Liverpool St. Station (see diagram above) and remember we are the only tape recorder specialists in Gt. Britain open on Sunday!

Do your weekly rush shopping on Saturday with your wife and visit us on Sunday at your leisure!

- GENEROUS PART EXCHANGES
- FREE AFTER SALES SERVICING
- UNBEATABLE SPECIAL OFFERS
- EXPERT STAFF EXPERT ADVICE

WE OPERATE A PERSONAL EXPORT SCHEME— SAVING UP TO 20% ON LIST PRICE



Our manager Bob Hookings is a keen tape recording enthusiast. Bang & Olufsen's are his speciality, having used B. & O. equipment for several years his knowledge of this wonderful range is second to none. He is able to give personal callers his expert advice (please avoid telephoning) not only on B. & O. but on any other recorder suitable to your individual requirements and pocket.

WHEN IN THE CITY — CALL IN AT THE CITY!

THE BANG & OLUFSEN SPECIALISTS



Snap-in sound for town and around!



Battery Portable Cassette Recorder EL 3302

Record or play back—anywhere. Instantly. It's all so easy with this neat little portable recorder.

Just snap in a Compact Cassette or Musicassette—and you're away!

Simple controls. Complete with microphone and carrying case, it's a sound buy at 30 gns.

Meet the
'Mood Matcher'—
Philips Cassettophone



The player that matches your mood at the drop of a Musicassette! Simple fingertip controls—big-set sound. And hundreds of Musicassettes to choose from! Be one of the first to own a Mood Matcher. For only 13 gns.

Great Musicassette offer!

Three exciting E.P. Musicassettes for only 34/6, when you buy any Philips Cassette Recorder or Player to help you start building your collection of exciting Musicassettes.

Please send me more details of Philips Cassette equipment.

Name

Address



Philips Electrical Limited,
CenturyHouse, Shaftesbury Av., London, WC2

TM.1

PHILIPS

TAPES



CLIFF RICHARD
Cliff In Japan
Columbia TA-SX6244



THE MOVE
Move
Regal Zonophone TA-LRZ1002



CILLA BLACK
Sher-oo!
Parlophone TA-PMC7041



THE TEMPTATIONS
The Temptations Greatest Hits
Tamla Motown TA-TML11042



THE BEACH BOYS
Best Of The Beach Boys (Vol 2)
Capitol TA-T20956



LULU
Love Loves To Love Lulu
Columbia TA-SX6201



PROCOL HARUM
Regal Zonophone TA-LRZ 1001



THE SEEKERS
Seekers Seen In Green
Columbia TA-SX 6193

The Move

Move
Regal Zonophone
TC-SLRZ1002



THE SOUNDS

The Beatles

Sgt. Pepper's Lonely
Hearts Club Band
Parlophone
TC-PCS 7027

Four Tops

Four Tops
Greatest Hits
Tamla Motown
TC-STML 11061

OF YOUNG BRITAIN

The Shadows

From Hank, Bruce,
Brian & John
Columbia
TC-SCX6199

The Seekers

Seekers Seen In Green
Columbia
TC-SCX 6193

Diana Ross & The Supremes

Diana Ross & The
Supremes'
Greatest Hits
Tamla Motown
TC-STML 11063

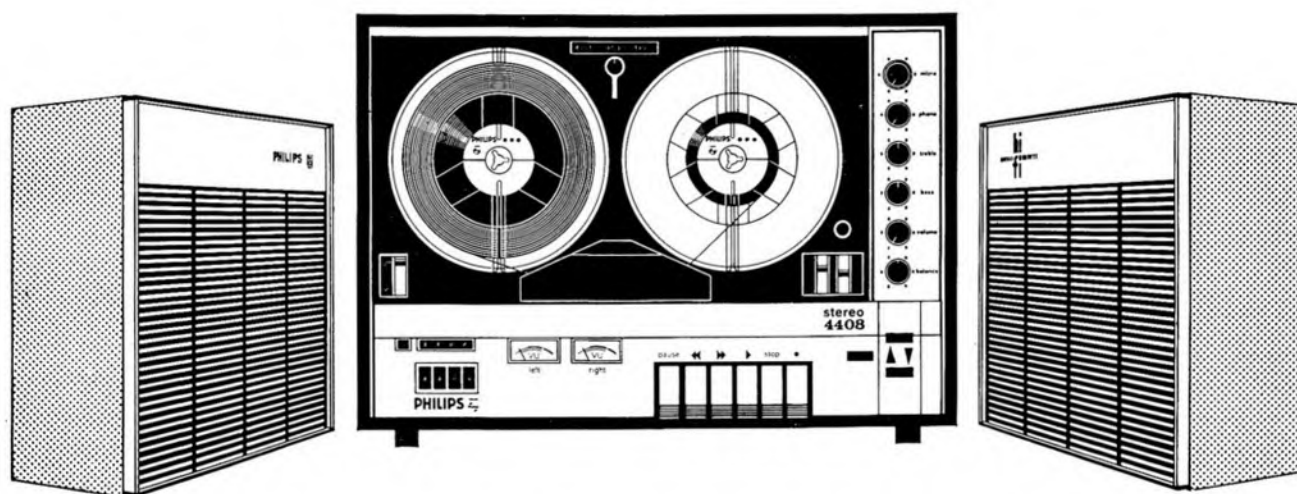
The Hollies

Butterfly
Parlophone
TC-PCS7039

E.M.I. Records (The Gramophone Co. Ltd.) E.M.I. House, 20 Manchester Sq. London W.1

MUSICASSETTES

Philips announce the stereo recorder you never thought you'd be able to afford!



The Philips 4408 stereo model sets a new standard of quality in tape recording. Here is a really sophisticated recorder which delivers superbly realistic 'Living sound'—at a sound price £133.16.8.

And what a machine! Four tracks, three speeds and the full range of input/output controls and sockets. Push-button tape control. Two perfectly matched detachable speakers can be positioned exactly for optimum stereo effect. Six watts output per channel gives impeccable reproduction to Hi Fi standards. Electronic ore-selector gives instant re-find of any item on the

tape. Modulation level control has separate VU meters, dB calibrated for each channel. Illuminated red-green indicators for every recording and playback operation. Multiplay facility lets you build up composite recordings on one track. Even the shape is versatile—you can use the 4408 vertically or horizontally. Get the full-story brochure from us or your Philips dealer.

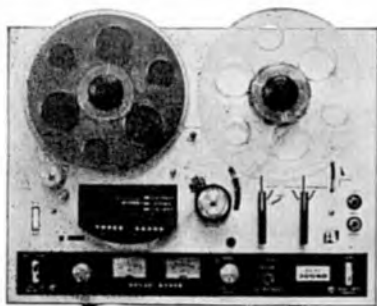
Free music tape With your 4408 you get a free tape carrying both popular and classical music. Ask your dealer to play it for you: here's what a tape recorder should sound like!

PHILIPS

Full Stereo Model 4408

LARGEST STOCKS OF TAPE RECORDERS IN THE U.K. AT R.E.W.'s TWO AUDIO CENTRES!

Call and see the world's leading makes and this country's biggest ranges of Tape Recorders and High Fidelity—or write for lists. H.P. Terms available on anything.



AKAI 3000D TAPE DECK

Our price only £99.15.0! (INTEREST FREE TERMS AVAILABLE)

A superb quality three head Stereo Tape Deck from one of the world's leading makers—*4-track stereo/monaural recording and playback. For playback, the 3000D requires external power amplifier and speakers. *2 speeds (3 $\frac{3}{4}$ and 7 $\frac{1}{2}$ ips). *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.

... and all these at PRE-BUDGET PRICES!

TELEFUNKEN 204E
STEREO

99 gns. List price £136.12.0

PHILIPS EL 3310
Cassette Mains Tape Recorder

26 gns. List price £41.2.10

SONY TC 530 4 Track
complete Stereo Recorder

£135 List price £145

AKAI 1710 W
STEREO

£89.10s. List price £109.17.3

AKAI X300
STEREO

179 gns. List price £263.18.3

B & O 2000
DE LUXE STEREO

£150 Suitcase Model
£145 Table Model

PHILIPS TAPE RECORDERS (at Pre-Budget Prices!)

EL3302 Cassette Portable, current price £31.10.0. **OUR PRICE 24 $\frac{1}{2}$ gns.**

EL3312 Stereo Cassette, current price £66.19.0. **OUR PRICE 55 gns.** (includes 2 speakers).

N4304 Mains 2-Track, current price £33.2.10. **OUR PRICE 26 gns.**

EL3303 De luxe Cassette tape recorder, current price £37.5.9. **OUR PRICE 29 gns.**

N4306 Mains 4-Track, current price £56.1.8. **OUR PRICE 44 gns.**

EL3575 Stereo 4-Track, current price £110.19.4. **OUR PRICE 80 gns.**

N4408 Stereo Prof., current price £133.5.0. **OUR PRICE 105 gns.**

Ample stocks of these "hard-to-get" machines!

- Ferrograph Series 7
- Revox 77 models
- Akai X5 and 1800

- Tandberg 15
- Sony 255 and 355

Send for lists or call! Interest free terms available

STOP PRESS!

Limited stocks of latest model

TANDBERG I241X £144.18.0.

Many new and exceptional features!



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

- HEADQUARTER SHOWROOMS AND MAIL ORDER: DEPT. T.R.M., 266-8 UPPER TOOTING ROAD, LONDON. S.W.17. Tel.: 01-672 4471/2 & 9175
- WEST END SHOWROOMS: 146 CHARING CROSS ROAD, LONDON, W.C.2. Tel.: 01-836 3365 (opposite Astoria Cinema)

SANYO PORTABLES put you in the world class



Sanyo Campanetta 15H-860

15 transistor 7 band portable. Long Wave, Medium Wave, 4 Short Waves and FM. Superb reception sensitivity through double antenna system. Excellent tone quality from large oval 4" x 6" speaker. AFC control on FM stations. Fine tuning control. Battery (6 'D' size) or mains operation with adapter. Output power max. 2000 mW. Undistorted 1400 mW.

Recommended selling price **£61.19.0**

Even if you've a roomful of fixed hi-fi in your home, you'll still be impressed with the performance of these special SANYO portable radios and tape recorders. Everything about them is designed to give the highest possible

performance within a reasonable compass of size and price.

For further information write to:

Sales Manager, Marubeni-Iida Co. Ltd,
164 Clapham Park Road, London SW4.

SANYO reliability is built in

Where can you get a STEREO TAPE RECORDER with this specification, and at these prices, but from **HEATHKIT?**

Kit **£58** incl. P.T. P.P. 10/6

Ready to Use **£72** incl. P.T. P.P. 10/6

FOR THIS SPECIFICATION

- 1/2 track stereo or mono record and playback at 7 1/2, 3 3/4 and 1 1/2 ips
- Sound-on-sound and sound-with-sound capabilities
- Stereo record, stereo playback, mono record and playback on either channel
- 18 transistor circuit for cool, instant and dependable operation
- Moving coil record level indicator
- Digital counter with thumb-wheel zero reset
- Stereo microphone and auxiliary inputs and controls, speaker headphones and external amplifier outputs . . . front panel mounted for easy access
- Push-button controls for operational modes
- Built-in stereo power amplifier giving 4 watts rms per channel
- Two high efficiency 8 in. by 5 in. speakers
- Operates on 230V ac supply.



The New Heathkit Stereo Tape Recorder has built-in audio amplifiers and speakers giving you complete recording and playback facilities in one compact cabinet that's easy to carry from room to room or house to house. The kit is complete with a good quality moving coil mono microphone, 5 1/2" spool of long play (1,200 feet) magnetic tape and one spare spool. Cabinet finished in Black Rexine with Grey panel.

Versatile Recording Facilities. The Heathkit Recorder can record "live" from microphones or from auxiliary sources such as radio tuners, records, etc., and playback . . . in 1/4 track stereo or mono at either 7 1/2, 3 3/4 or 1 1/2 ips. And you can make sound-on-sound recordings by playing back through one channel and recording through the other channel . . . stereo record and playback . . . mono record and playback on either channel.

Other Features. Two audio amplifiers produce 4 watts rms per channel into two high efficiency 8" x 5" speakers giving high quality sound in a portable instrument. Gives startling realism to stereo reproduction . . . jacks are provided for connecting to external speakers if required. Moving coil level indicator for visual monitoring of recorded signal level. Separate inputs and controls for microphones and auxiliaries, separate outputs for speakers/headphones and external amplifiers . . . all front-panel mounted for easy access. Ganged controls for easy operation.

So Easy to Build . . . the Heathkit way! Simple step-by-step instructions and large pictorial diagrams in the manual show you where every part goes . . . tell you exactly what to do . . . guide you every step of the way. No special skills or technical knowledge required.



See Britain's Finest Range
of Hi-Fi · RADIO · TAPE
in the latest **FREE** Catalogue



To **DAYSTROM LTD.**, T.11 Gloucester

Telephone 29451

Please send my **FREE BRITISH HEATHKIT** Catalogue

Please send model.....
Enclosed is £ s d plus postage and packing.

Name

Address

Prices and specifications subject to change without prior notice.

CHAPMAN transistorised stereo tuners

NOW MADE BY RESLOSOUND

**MODEL 2005 FULLY TRANSISTORISED
AM/FM RADIO TUNER WITH IMPROVED PERFORMANCE**

- Two short, medium and long wavebands and FM. Stereo reception (decoder) optional extra.
- Meter for visual tuning.
- AFC switching for local station and distant reception.
- Universal AC mains input: 100-125 V and 200-250 V 50-60 c/s.
- Built to a good medium tropical specification for reliable operation in most parts of the World.



Without decoder **£58/10** + P.T. **£14/5/2**
With decoder **£67** + P.T. **£16/6/7**

FM 1000

FM 1005

Also available the standard AM/FM transistorised tuner, long, medium and short wavebands, type FM1005A, and the FM only model FM 1000A.



RESLOSOUND microphones

PRECISION ENGINEERED
GIVE THE SENSITIVE ACOUSTICAL PERFORMANCE
REQUIRED TODAY

CPD 2 Cardioid Pencil Dynamic Microphone—
improved version of the well known Reslo CPD
microphone. Most suitable for:—

High Quality Music Recording.
General Sound Reinforcement.
Loud close singing or speaking if used with an
amplifier incorporating reasonable bass cut.

Frequency response is smooth over the range 70 c/s to
16 Kc/s.

Rear response better than 20 dB below the front from
100 c/s to 1 Kc/s and over 14 dB from 1 Kc/s to 16 Kc/s
dropping to 30 dB at upper presence frequencies.

Impedance values: CPD2/L—30/50 ohms or 600 ohms
supplied with 18 ft. of dual impedance
cable **£17/15**
CPD2/M—200 to 300 ohms **£17/10**
CPD2/H—30/50 ohms or Hi—Z
Appropriate cable set to order **£17/15**



MPD2

An inexpensive small omni-directional micro-
phone for hand held use, weighing 2 1/2 oz. only.
Frequency response: 200 c/s to 15 Kc/s ± 4dB
ref. 1 Kc/s.

Sensitivity: 58dB below 1V/dyne/cm² (High
impedance). Available in either high or low
impedance.



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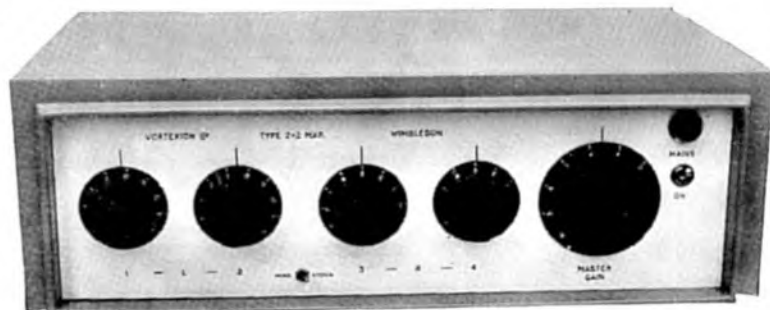
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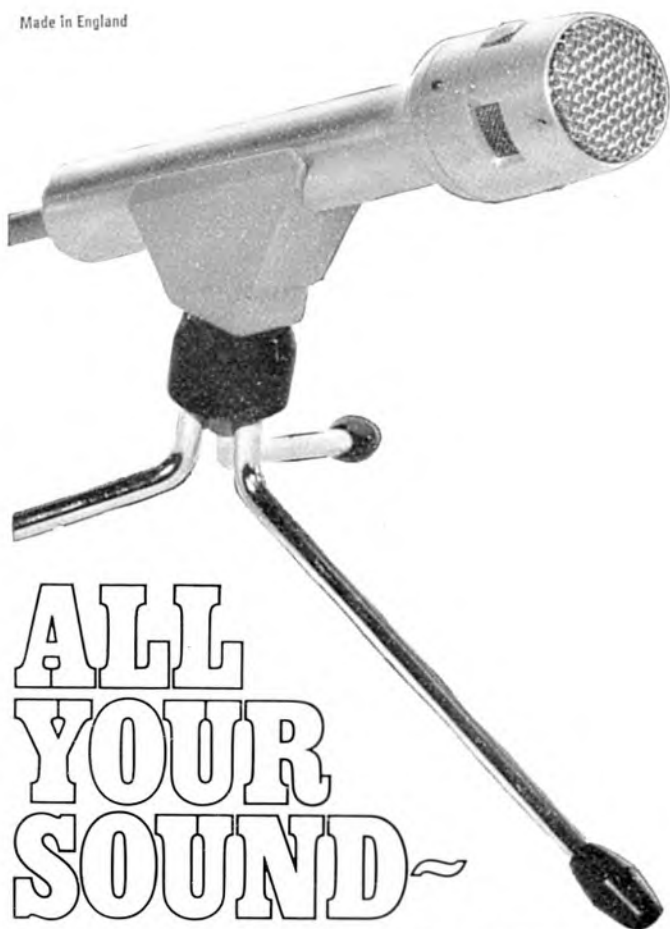
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Vol. 12 No. 11 November 1968

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COVER PHOTOGRAPH: The production of sound effects is an important part of any drama or feature tape. Here we see Studio Manager Patience Sheffield working with water noises to demonstrate the training of BBC Studio Managers. Note the plastic raincoat—a very necessary protection! Also note the acoustic panels to the walls; domestic bathrooms can easily provide the water, but tiled walls give a distinctive reverberation which may spoil the effect. This could be overcome by hanging soft drapes, such as blankets. CAUTION—on no account should mains electric leads be used in bathrooms or in proximity to water. John Borwick discusses making and using a multitude of sounds in his article on page 466 of this issue. Photo by courtesy of BBC.

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Tape trends and tape talk

By Douglas Brown

THERE WILL BE no more International Audio Festivals in the familiar form at the Hotel Russell in London—but the possibility of an Audio Exhibition in a big hall is under active discussion. This important news was released by Cyril Rex Hassan, who has organised the sixteen Audio Fairs to date, at the recent Northern Audio Fair at Harrogate.

In the industry a lively discussion is now taking place about the best method of displaying audio products in the future. Mr. Rex Hassan's annual luncheon to leaders of the industry takes place at the end of October, and a decision will have to be reached then.

The new situation appears to have arisen because the Hotel Russell is not available for an Audio Festival next year. Perhaps another hotel might be found, so the event *could* continue in the traditional way.

But the recent successful audio exhibition in Dusseldorf was visited by leading British manufacturers and audio journalists—and by Mr. Rex Hassan—and clearly it set the visitors thinking hard. This event was held in an exhibition hall and special demonstration rooms were constructed. Everyone agrees that they were extremely successful and there is no doubt that some firms hanker after similar provision when next there is a British event.

So Mr. Rex Hassan has naturally been giving thought to the idea of an exhibition in a hall. He has discovered that there is no suitable hall available in London next Spring; but Olympia is available in October 1968, at the same time as the Motor Show will be staged "down the road" at Earl's Court.

Could a successful Audio Exhibition be put on next year at Olympia? A hall of that size has a capacity of 100,000 visitors. What would an Audio Exhibition bring in? Basing an estimate on past performance, a reasonable figure is about 40,000.

I believe that one idea being actively considered is that an Audio Exhibition might be combined with the Photographic Fair: not necessarily a completely integrated exhibition, but two self-contained shows sharing the same turnstiles. I believe, also, that there is some measure of disagreement in the industry about the advisability of this approach.

Disagreement there may also be about the timing of the event. Some people prefer an event in the Spring to one in the Autumn. This is a big subject. Is the Audio Fair aimed primarily at the dealers, to give them information about developments so that they may plan well ahead towards the following Christmas and winter selling period? Or is the Fair primarily designed to inform and educate the public? In which case, there may be a strong case for an end-of-summer date.

For my part, I shall regret it if there is no Spring function. That is a time of year when dealers need advance information; it is also the beginning of a period when consumer demand might, in the ordinary way, begin to fall off. The Audio Fair, and the advertising that is associated with it, certainly stimulate sales at what might otherwise be a difficult period.

But I see that there is a problem if there is no suitable hall available in the Spring. So, a suggestion. Could we not have an ambitious Festival of Sound, perhaps at Easter, somewhere in the provinces—or perhaps two or three such Festivals in different parts of the country? They would, of course, be additional to any exhibition in the capital.

One idea I have heard put forward on behalf of retailers is that demonstrations of equipment are not important as part of an exhibition or fair—that the public wants to *see* the latest equipment and to get the printed literature about it, but that it is better to go later to a local dealer to hear comparative tests in ideal conditions. I offer no comment; it is a valid point of view.

Perhaps readers of *TAPE Recording Magazine* feel they have points of view that should be heard by the organisers. If so, write to me about it.

* * *

WHEN YOU READ these words I shall be in Heidelberg, in southern Germany, whereas I had planned to be in Prague, Czechoslovakia. The 1968 International Recording Contest and the Twelfth Congress of the International Federation of Sound Hunters has had to be transferred, at the eleventh hour, to Heidelberg.

It is a considerable achievement by the German association to get alternative arrangements made so quickly and smoothly. I know Heidelberg and I shall look forward to visiting that beautiful town again.

But it is a great sadness that our Czech friends, the first organisation of recording enthusiasts in Eastern Europe to work in cooperation with the International Association, are not able to realise their ambition to stage the event this year.

* * *

I DO NOT propose to start a column for lonely hearts, but I cannot resist quoting from a letter I've received from Hans van Bruggen, of Ijsselstraat 4, Apeldoorn, Holland.

"I should like to tapespond with an English or an American girl of 16 or 17," he writes. "I am learning for television-reporter. I am 17 years old. I have three tape recorders, of which one works by batteries. I like to make commentaries and interviews. I like cinema, music of all kinds, pop music, handsome girls."

Well, don't we all? Good luck, Hans.

THE MANIA FOR COLLECTING IS SOMETHING WE ALL SUFFER

SO WHY NOT START

COLLECTING ON TAPE

Asks Mervyn Love

SINCE the beginning of civilization mankind has had an insatiable desire to collect things. Things to touch, to taste, to see and smell. Today, the miracle of electronics has placed yet another dimension within the collectors' grasp—SOUND!

One of the pitfalls for the new recordist when the first novelty has worn off is boredom. The best way to avoid this state of affairs is to begin using the machine with *purpose*. Become a collector with a difference—a collector of sounds.

Almost everyone has an interest or hobby that lends itself to recording, and an interesting and often unique sound collection can soon be built up. Look at the prize winning enthusiast who gathered together a miscellany of hotel sink noises on tape! Motor cars, steam engines, fair-ground organs, animals of all description, in fact anything that makes a noise can be recorded, edited and spliced into a coherent and specialised sound library.

If possible, go after something unusual. Remember, rarities make the best collections. The most cherished tape I have is a set of interviews, mostly humorous, of people I have known over the past ten years or so. Naturally, this tape is unique and I value it highly.

An important item in this activity is, of course, the tape recorder. The mains machine has the advantage, broadly speaking, of giving better quality reproduction coupled with a larger spool size, but the battery portable is unquestionably the more versatile for this type of work. Prices vary considerably, depending on what sort of quality you want, but if you're not too concerned about obtaining the ultimate in high fidelity, a model in the £25-£40 class will serve admirably.

When choosing a tape recorder bear in mind the sort of conditions under which you will be using it. If outdoors, then something with a sturdy carrying case and shoulder strap with the controls easily operated from the hip, plus a microphone that can be clipped to the strap, is to be

indicated. If you envisage doing a lot of editing then you may prefer a machine taking 3 in. to 5 in. spools. On the other hand, items collected on a Compact Cassette recorder, can later be dubbed on to standard $\frac{1}{2}$ in. tape using a mains machine with little loss of quality. The cassette can then be used over and over again.

Some machines are provided with a microphone embodying a remote control switch for the tape transport. A most useful feature for a sound collector.

Acquiring your sound can be an art in itself, and like all good (and successful) collectors you will need a certain amount of patience and resourcefulness. The results, however, are always worth it.

Always have your machine at the ready. Either plugged into the mains, with the lid unclamped, or with fresh batteries in as the case may be, and have a spool of blank tape, or a cassette, threaded up ready. If design permits, the mike can be left plugged in so that valuable seconds are saved in bringing the machine into action.

Cultivate the habit of carrying your transistor portable about with you wherever you

go. It will pay off in many "sound scoops" that you would otherwise miss. Ask any keen photographer who constantly totes his camera if he regrets it!

The moment a likely "collector's piece" in sound presents itself, switch on and record. Don't worry about volume or tape speed until you are able to assess the situation. Better to get a poor, but rare, recording than no recording at all. If the opportunity is there take *another* recording after the first. This time you may be able to carefully position the mike, adjust the volume, and select the best speed. **DON'T REWIND** and record over the first attempt—take another two or three samples so that the best one can be chosen later at leisure.

It is always a good idea after each recording to make a careful note of exactly what you have taped. (E.g.: 1918 Model T Ford, Brentwood Old Crocks Rally, August, 1968). If "on location" with a portable, find a quiet corner and record these details on to the tape itself. These can be, and should be, snipped out of the final tape, but until then will serve as an ideal reminder when collating the finished piece.

Always aim at collecting a set. In the collectors' world a complete set is generally more

Please turn to page 465



An Essex pensioner discusses the art of rug making using carpet "thrums," oddments of wool left over from commercial manufacturing processes

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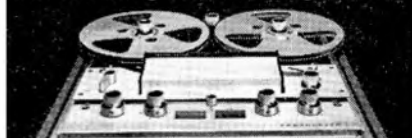
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Continued from page 461

sought after, and more valuable, than separate items. So, if you are after dialects, aim at a set of voices in the same dialect. For example, collect the speech of a man, a woman, a child, an elderly man and an elderly woman. This could be further extended to take in teenagers, plus the very old, as each generation has its different inflections and peculiarities of speaking.

Without doubt one of the most rewarding fields for the sound collector is people. Their voices, their work, their play, what they think. You can specialise in many ways. Children never fail to produce something worthwhile, whether they are your own or somebody else's. Generally speaking they are better tackled in a group than on their own. Shyness is forgotten when one's pals are by one's side.

Try asking such questions as: Which game do they like best? Getting them to describe how it is played. What do they think of the Prime Minister, or some other well-known personality? What is their favourite book, and how does the story go? Once a start is made the recordist is more likely to run out of tape than talk!

At the other end of the scale, old folk are a fruitful and rewarding pasture for the collector to graze in. They abound in real life folk stories, folk legends, superstition, ancient recipes, herbal cures, and so on. In my experience elderly people are less worried about facing a "live" mike than middle-aged and younger folk.

Avoid placing the microphone too close to the speaker's mouth. The more unobtrusive it is the better. Once the recording is under way, try not to fiddle with the controls, but show a

keen interest in what is being said. In this way you will draw out the best from your interviewee.

You will add polish to your interview if you take care to eliminate those natural verbal responses to what your subject is saying. Ask questions by all means, but 'um's' and 'yes's' from the recordist only obtrude on playback. Instead, encourage the speaker with a nod or shake of the head, or by silently lip talking 'yes' and 'no'.

Once start an old codger reminiscing about the days of blacksmiths and steam lorries, of when mother was in "service" at the Hall and worked from seven in the morning till nine at night, of when beer was a penny a pint and you could stable a horse for half a crown a night, and you will be sure to come away rich in recorded material.

Old arts and crafts offer another source of material. One such is the tradition of "corn dolly" plaiting in Essex. How are they made? How did they originate? What is their purpose? With a tape recorder you can collect the answers. With the gradual decrease of the older generation how long will it be before this and similar arts are relegated to antiquity? Just as the photographer is busy recording the beauties of a rapidly diminishing countryside, so can the recordist collect and preserve in sound things which in only a few short years may become extinct.

"Old crocks" rallies are fertile events which can yield a lot in sound material, plus interviews with knowledgeable owners who can usually be persuaded to give absorbing information on their particular "pet." Sets of this kind can be contained handily, and economically, on three-inch reels. Put each

set on one spool even if only a few feet of tape are involved. (Spare spools are only a shilling or so).

When you have enough sound samples to comprise a set, select the best and splice them together into a definite sequence. Separate each item either by a spoken commentary or by a few inches of white leader tape. Label each spool clearly, and don't forget to add the date. As time goes on you may be able to replace poor samples with good ones, or add new recordings to enlarge or supplement a basic set.

You may be fond of music, (and who isn't?), then why not start a collection of your favourite artist, composer or orchestra? The advent of VHF has brought really first class audio into many thousands of homes via radio, and collecting music can be a real joy.

Bearing in mind copyright restrictions record from "live" broadcasts, not records. If an audience is present there is also the added boon of "atmosphere." Again try to collect a set whenever possible. What about Beethoven's nine symphonies, or a set of your favourite overtures? If you fancy a stab at something a little more difficult, and you are a nature lover as well as a music lover, try collecting these: *The Cat Waltz*, *The Dog Waltz*, and *The Butterfly Study*, by Chopin, *The Bee's Wedding* by Mendelssohn, *The Bird String Quartet* and *The Frog String Quartet* by Haydn. Start the whole thing off with *Raindrop Prelude* by Chopin and you will have a novel and attractive collection which will be a pleasure to play back anytime!

It used to be "pioneers." Today it's "trend setters." So pick up that microphone and launch out—start a collection!



NATURE NOTES FOR NOVEMBER

BY RICHARD MARGOSCHIS

HAVE you ever wondered why some of your recordings are a "bit on the rough side"? Perhaps on replaying birdsong the notes have lost their sweetness and occasionally the speaker groans and "wuffs", even when your replay gain is at a moderate setting. Among natural history recordists arguments on this point revolve around the type of microphone used, a reflector that is said to make the sound seem tinny, over-modulation, and so on.

After listening to a lot of recordings sent to me as tape editor of the Wildlife Sound Recording Society, I have come to the conclusion that it is *over-modulation* which causes most of the trouble; and the trouble, of course, is the resulting distortion.

Modulation is controlled by the gain (or volume) control and all recorders have either a "magic-eye" or a meter to indicate whether or not the signal level is correct; if the signal is fed to the record head at too high a level than over-modulation results. Denys Killick has dealt in detail with the matter in his "Tape Recording Techniques", especially in the September 1966 issue of *TAPE*.

With birdsong the main difficulty is the nature of the sound itself, for although it does not have the dynamic range of an orchestra it does have its soft and loud components and the peaks are of particularly short duration. I thought it worth while doing a little analysis in an attempt to show what happens.

I selected the song of the blue tit as being familiar to most people; starting with three definite notes it runs off into a trill. The method used was first to replay a 15 ips recording at 3½ ips, this made it quite clear that the complete sequence was made up of no less than nine separate notes. At 15 ips it was easy to mark off the beginning and end

of each with a chinagraph pencil, the duration of each note was then timed by measuring the length of tape occupied by the note. As 15 inches represents one second then a note stretching along the tape for 1½ inches has a duration of one-tenth of a second, and so to measure accurately to one half of one-tenth of a second was not difficult.

The duration of the sequence used is almost exactly one second. The first three notes are completed in about half a second; the first and third notes have a duration of one-tenth of a second, the middle one is rather longer and the two intervals slightly less than one-tenth of a second. Each of the six notes forming the trill is less than half of one-tenth of a second, and the intervals between are similar.

Now when I tell you that it takes the needle of a meter *three-tenths* of a second to reach full scale deflection (and I have this on good authority) you will see what I am driving at. Consider what happens during the half-second in which the first three notes are delivered. For one-tenth of a second there is a signal, then silence for a similar period, a signal again for just over one-tenth of a second and another silence before the third signal for one-tenth of a second. The signal has not, in fact, been of a sufficiently continuous duration for the meter needle to reach full scale deflection; the situation is even worse during the six notes of the trill when we have signal and silence alternating for periods of one-half of one-tenth of a second.

Full modulation point is normally reached when the needle is about two-thirds deflected, the point beyond which most scales are marked in red. If, therefore, the needle was allowed to show full modulation for the signal under discussion it is more than likely that over-modulation would occur, because the signal was never of sufficient duration to deflect the needle as far as it should have done.

Most battery portables on the market today employ a meter of the VU type, magic eyes are more common on the older machines and have a disadvantage in being difficult to read in bright sunlight. I suspect, however, that they are equally as sensitive as meters, perhaps more so, because it was when I started using a machine with a meter that I really ran into this trouble of over-modulation. With the machine I use I get a well modulated signal when the needle just flicks from rest. Monitoring the signal from a point in the amplifier before the recording is made, which is the case on most machines, will give no indication of modulation.

I should perhaps mention that what I have said does not apply to one or two very expensive machines which have a more complicated type of meter or on which it is possible for the signal to be monitored *off the tape*.

Finally, a reminder that entries in the 3M's Wildlife Sound competition must be in by the first of December.

Making & Controlling Sounds in Profusion

MOST home studios will get involved at some time or another in recording drama or documentary productions. Even simple tapes to accompany programmes of colour slides or home movies can become artistic productions in their own right. They then need occasional swatches of background, mood or "incidental" music and sound effects. In the world of pop music too, it is becoming common to introduce odd (I almost said weird) noises and trick effects.

The home studio should therefore be equipped for accurate cueing and playing of gramophone records and tapes and the production of sundry trick effects and ordinary sound effects at the microphone.

As for building up a library of mood music and sound effects, I am going to give you two pieces of advice—which contradict each other. First, you should indeed try to grow a third ear which you keep continually on the alert for interesting noises. If you are out recording the vicar in his vestry, for example, and you find that he has a particularly squeaky rocking chair: move him into a squeak-free chair for his recorded talk. But make an extra recording of the squeak on its own and file it away for future use.

Do the same with the church bells, the nervous coughs of the congregation, their footsteps at they troop out into the street, dogs barking, cars starting up, babies crying, aeroplanes passing over, birds twittering, children playing hop-scotch: any one of these sounds may be just the thing you want in a future recorded production. So bag them when you can, edit them as necessary and file them away on carefully indexed reels of tape.

Perfect microphone balance of the sounds is not necessary as they will not usually have to stand out on their own. They will mainly be used for scene-setting and can sound as distant as you like. It is much more important that each of these sounds should be taped as separate and individual items. You can easily mix together a montage of footsteps, birdsong and cars starting up—using separate recordings. What you cannot do is pick out these individual sounds from a recording which already contains them all mixed together willy-nilly.

Second, here comes my contradictory piece of advice: be prepared to experiment and improvise. You will find that however large your library of music snippets and effects becomes, almost every programme you do seems to need something a little different from what you have. Take the BBC recorded effects library, for example. This contains literally thousands of discs (gradually being converted to tape) containing every sound you can imagine. Yet the studio operators nearly always find that some "doctoring" of the effect is needed to produce the sound they want.



Photo by courtesy of BBC

Not a junk shop but an effects table in a BBC studio. All the "props" are the kind of oddments that can be found around the house or could be improvised very easily

Improvised sound effects

As an example, just look at the array of everyday objects in **Fig. 1** arranged on a sound effects table ready for recording a play. A raid on the kitchen cupboard is often the prelude to drama recording but every object is used as itself alone. The bottle might be used for ordinary drinks effects, of course, but twisting the cork in the neck might give a realistic creaking noise for boat rowlocks—or what about blowing across the neck for a fog-horn or (more gently) for wind howling.

Similarly the bucket can stand in for the clanking of armour; you can press your fingers into the sugar bowl for walking in gravel, etc. etc. Experimenting will work wonders.



Fig. 1. A typical table of sound effects for a play might include a door bell or buzzer, bottle (cork squeak also used for rowlock), soda syphon, bucket (also used for armour), bowl of sugar (used close to microphone for walking in gravel or snow), bunch of keys, book (pages flipped for banknotes or flapped for birds' wings)

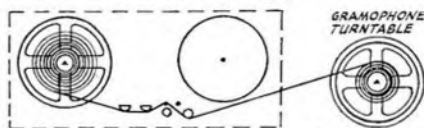


Fig. 2. How to use a gramophone turntable to play back tapes at different speeds

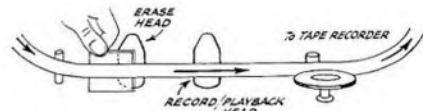


Fig. 3. How to improvise a superimposition button with a piece of cardboard or stiff plastic

Amongst the tricks you can get up to for transforming sounds—both the "kitchen" variety and those you have recorded on location—is speed changing. A church bell speeded up, for example, can make a very realistic mantelpiece clock.

All tape machines with more than one running speed can cope with ordinary speed doubling or halving. But it is useful to get more flexible speed control. **Fig. 2** shows one way of achieving this by running the tape on to a take-up spool placed on a gramophone turntable. The old "wind-up" clockwork gramophone is best and the trick is somehow to feed the tape so that it misses the drive capstan on the recorder.

Superimposing one recording on another is a useful trick too, for instance to build up a whole herd from your recording of a single cow. First record a few spaced out moos (there is bound to be some member of the family who can imitate the sound). Then wind the tape back a few times and repeat the recording with variations—taking care that you have rendered the normal erase function inoperative.

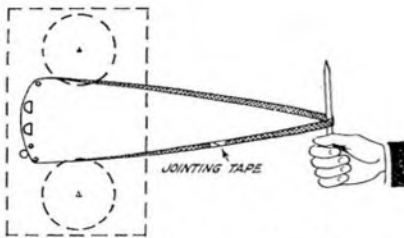


Fig. 4. How to support long loops

This cutting out of erase is easy to arrange. Many recorders have a "superimpose" or "trick" button which does it or you can somehow lead the tape away from the erase head. This is illustrated in Fig. 3, where the tape is simply being held away from the erase head by a piece of cardboard or stiff plastic.

Tape Loops

Superimposing allows you to increase the complexity of your sound effects. Another very good trick is to make any sequence of sounds repeat itself over and over again—by making a tape loop.

Say, for example, you have a recording of wind noise with a single owl hoot in the middle of it, or a few seconds of car engine noise. You may be recording a play in which one or other of these noises is required more or less continuously for several minutes.

The trick is to cut off a length of tape including the required noise and join the ends together with splicing tape to produce an endless loop. You thread this past the tape heads in the ordinary way and take care to avoid snagging on any projections. Fig. 4 shows how to support a longish loop on a pencil, etc., but I have ended up with loops all round the room before now.

The two examples of loop effects I instanced above—(a) an occasional owl and (b) continuous car noise—present different problems in planning. Clearly, a loop that lasts a few seconds is all you want for (b) neatly joined to preserve the engine rhythm and disguise the fact that a join takes place. For (a) it is necessary to space out the owl and any other associated noises by a minimum of about 10 seconds or else the listener will begin to detect the cyclic nature of the repetitions.

Sound effects on disc

You will have gathered that I recommend you to manufacture your own sound effects, beginning with the real thing or everyday objects that you can manipulate to simulate the real thing.

But it is also possible to obtain ready made sound effects recordings. You will sometimes see disc or tape effects advertised in *TAPE Recording Magazine* and there is an excellent EMI series. These are 7-inch, 45 rpm discs and cost 7s. 4½d. except for Extended Play items which cost 12s. 8d. No royalty payment is necessary for re-recording or public performance by private individuals or amateur societies. The latest EMI list I have shows over 40 discs with sound effects ranging from gunfire to ghosts, crowds to crashes and even a series of trumpet fanfares.

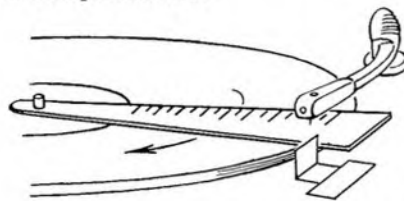


Fig. 5. This improvised cueing device consists of a strip of cardboard or plastic pivotted on the record spindle. The pick-up rests on the strip above the required groove with the record rotating freely. When the tab is released the strip rotates with the disc (till it meets a stop post) leaving the pick-up to play the record on cue

Incidental music

For music too, I recommend you to experiment with the home-made variety—if time and facilities allow. The film "Genevieve" showed how much could be done with imaginative harmonica (mouth organ) playing and a solo guitar or piano could produce very effective linking and mood music for many tape feature programmes.

You could also try your hand at electronic music or *musique concrete* (which often ends up sounding like electronic music but is distinguished by the fact that it starts from natural sounds instead of oscillators etc.). This would put you right up to date with modern trends in film, radio and theatre productions and the current series of articles by Fred Judd tells you how it's done.

For many situations, however, conventional music may be the best answer and, unless you can go and record a local amateur orchestra playing non-copyright music*, you will have to face up to copyright and performers' rights. The appropriate regulations are given in the Copyright Act 1956 and the Dramatic & Musical Performers Protection Act 1958.

In a nutshell, you need the permission of the copyright holders and the performers before you can record or re-record music, otherwise than for research or private study. The latter concessions do not apply to gramophone records and here, even for private purposes, you must first obtain the permission of the copyright holders who are normally the issuing record company.

This all sounds very complicated but, fortunately, several music publishers issue special mood music records which are ideally suited to film and tape programme building. They include every kind of national and atmosphere music and permission to re-record is easy to obtain—via the Sound Film Music Bureau, 380 Streatham High Street, London, S.W.16.

Record cueing

For all the purposes outlined above, the home studio should be equipped with a first class gramophone turntable (two are better) and some cueing device to enable you to play in from a precise note or sound on the record. One of the best commercial cueing devices is the Auriol Pickup Control (£3 12s. 6d.) which has controlled lowering and a calibrated support arm for pin-pointing cue spots on the record.

You can improvise cueing devices of your own, of course. A neat way is to fix a tiny mirror on the back of the pickup arm and use it to view a numbered scale stuck on to the motorboard. Fig. 5 illustrates another dodge in which you rest the pick-up on a piece of card or plastic and release this when you want to play in the sound.

You will also find it useful to pre-listen to the records; that is to monitor them on headphones beforehand so that you can be ready set up to play them on cue during the hurly-burly of a production. Ordinary headphones connected to the pre-amplifier should do the trick and a change-over key is useful to switch from pre-listen on the turntable to monitoring the main programme from the mixer or tape machine.

Next month we tackle the subject of tape editing.

*Note that membership of the Federation of British Tape Recordists and Clubs is a help here because, on payment of a small annual fee, you can be licenced to record such copyright musical works as are controlled by the Mechanical-Copyright Protection Society Ltd. Further information on the FBTRC can be obtained from John Bradley, 33 Fairlawnes, Maldon Road, Wallington, Surrey.

FACED with rising equipment costs due to the recent imposition of purchase tax many enthusiasts are taking a long hard look at the secondhand market before acquiring equipment. It certainly has much to offer—it also has many pitfalls into which the unwary might fall. There is no doubt that a great deal of money can be saved by making a wise purchase of used appliances, but it is equally certain that a foolish or unlucky purchase will result in disappointment and frustration apart from being far more expensive in the long run. So just how does one look at a piece of secondhand equipment and decide if it's a good or a bad buy?

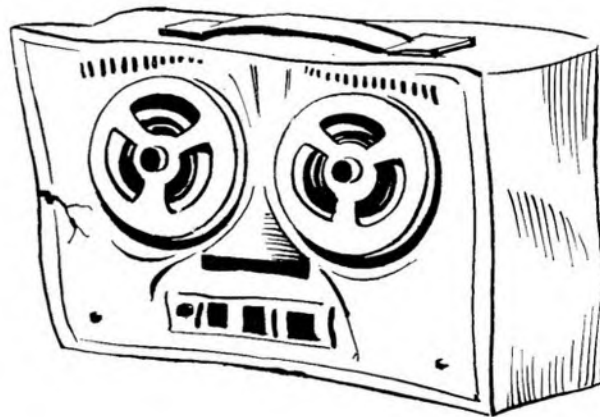
A tape recorder that might look very handsome as a piece of domestic furniture might be quite impractical as a recording instrument for use in halls, churches and other away-from-home locations. In just the same way the ideal semi-professional machine might be too clinical in appearance to suit the ladies of the household as a permanent addition to the furnishings. Such considerations are, however, merely matters of *preference*, and should be secondary to the all-important considerations of specification (ladies permitting that is!).

The old arguments immediately arise. Mono or stereo? Half-track or quarter-track? A complete machine or a deck and preamp only? Two heads or three? Mains only, mains/battery or battery only? What speed or speeds are required? Is the design of the deck suitable for easy editing? Are the record level indicators both reliable and visible? These and many more questions will have to be answered by the intending purchaser before proceeding any further at all.

You will note that no reference has been made to cost. I believe it is a great mistake to think primarily of cost and then only to consider equipment at that price level. Far more important than cost is what the equipment will actually *do*. This does not mean that one goes blithely on spending more than can really be afforded; on the contrary, it means that one actually saves money by steadfastly refusing to purchase equipment that is obviously incapable of performing the tasks that the owner will require it to undertake.

The correct line of thought is firstly to work out the specification for the ideal machine to suit all your personal requirements and then to take a look at the new models that are offered for sale. In ninety-nine cases out of a hundred none will be suitable in every single respect. So next one reconsiders one's ideal specification, trimming it of all features that are not absolutely essential. By comparing this revised list to manufacturers' specifications one will get a very good idea of the cost of suitable new equipment. It is at this stage

BUYING SECONDHAND



that one really begins to seriously consider how much money might be sensibly invested and if the answer is the proverbial lemon—as is all too often the case—this is the moment to examine the secondhand market.

By working around to secondhand equipment in this way we at least know exactly what we want and even have a very good idea of what makes and models are likely to provide the facilities required. A good secondhand machine is likely to be priced at something between one-half and two-thirds of the price of a new model. It is this considerable saving which is so tempting and which makes possible the apparently impossible.

There are three potential sources of used equipment; by buying from an established and reputable dealer, by contacting a private vendor through the classified advertisement columns or by buying privately from a friend or an acquaintance. There are pros and cons in each case—however the purchase is made the one desire is to avoid parting with good money in exchange for absolute rubbish. It's a bit like buying a secondhand car; if you get a good one it can be excellent, perhaps even better and more reliable than the next-door neighbour's brand new model; but get a bad one and you are in for a packet of trouble and expense. So extreme caution is indicated.

There are certain basic tests that should be carried out on any secondhand tape recorder whether or not it is being purchased privately or through the trade. If facilities for this examination are re-

fused either in a shop or a private house then the purchaser should firmly decline to proceed further with the matter and look elsewhere. Excuses for not allowing a purchaser to examine a piece of equipment properly are legion. "Sorry old man, would love to but just haven't the time." "At this very low price of course you will just have to take it as it comes." And so on and so on. The purchaser's attitude must be quite firm and straightforward. No tests, no sale.

The first investigation can be purely visual. A glance at the case, cabinet work, deck and fittings will at once show whether they are in good condition or whether they have been subjected to prolonged heavy use, or perhaps even ill-treatment. There is a difference between a fairly new but well-bashed-around machine (sign of ill treatment) and a more tatty but older machine showing wear on all working surfaces and so displaying a long period of regular or heavy use. The amount of wear or use is rarely related to the actual age of the equipment. Tape recorders can sometimes be put away in a spare room and stored for two or three years before an owner decides to sell. Long periods of storage are often revealed by irregularity of fading or marking on the exterior casework which is seen in conjunction with a relatively new appearance of the covered deck fittings. Storage can be harmful to rubber or plastic belt drives, but very little else provided the machine has not been subjected to damp or excessive heat.

A secondhand motorcar reveals its (alleged!) mileage by the reading on the

speedo. The wise purchaser of motorcars will roughly check this figure by comparing the amount of wear on pedal rubbers to see if this roughly corresponds, knowing full well that unscrupulous garages or owners are quite capable of "cooking" the mileage. On a tape recorder we have no such convenient meter to register the number of hours use so instead we go straight for the vital signs of wear that correspond to the pedal rubbers in a motorcar.

The abrasive action of the tape will cause obvious and easily visible signs of wear on any fixed metal parts in the tape path and the obvious ones to look for are on the tape guides and heads. Examine tape guides first. Wear is most noticeable on fixed circular guides—the tape will cut into the metal to produce an obvious "flat," making it look almost as if the metal had been filed away with an engineer's flat file. Remember the term "fixed guide" simply means that the guide does rotate with the tape; often the guide is so arranged that when a flat has been worn in the surface it may be rotated half a turn to bring a new curved surface into the tape path. So look around the guide to see how many flats it carries. An alternative type of tape guide consists of a cylindrical metal pillar with a section cut out so that the tape travels through an existing groove. Wear is not quite so easy to detect here since a deeply cut groove exists even in the new unused condition. However a careful examination will show the abrasive action of the tape, particularly at the outer and inner edges, often revealing quite clearly the depth of actual wear.

Next a look at the heads. A brand new head has a perfectly contoured surface; the action of the tape causes similar grooves as were found on the tape guides. The deeper the grooves the greater the use the machine has had. Examine the capstan and pinchwheel. Invariably one of these components is metal and the other is composition-faced. The metal one should be absolutely smooth and polished. The slightest trace of a groove here means that the machine has had exceptionally heavy use and is possibly on its last legs.

Of course an old, well-worn machine can easily be fitted with new tape guides and heads just as a motorcar can have new pedal rubbers fixed. But even this tells the purchaser something—it means that if one finds brand new heads and guides on an obviously elderly recorder then it has almost certainly given a good few years of use to its previous owner. Such a machine should be worth less than one half of new price.

With a spool of tape in position connect up the power supply (noting if the indicator light, if any, is working prop-

erly) and try the various run functions. Listen particularly for excessive mechanical noise, uneven fast wind or rewind, fierce or slack braking and irregularities of movement in the play mode.

Simple record and playback tests should follow using all the inputs on the recorder in turn. Judge sound quality both from the internal speaker and from a full range speaker driven from the external speaker outlet; also assess sound quality as heard when the tape recorder is coupled to both a main amplifier and a full range speaker. Remember that in the last set of circumstances you are listening under ideal conditions to as much as will ever be heard from tapes recorded on that machine. Listen for good points as well as bad. Note clarity or lack of top response, note excessive noise and listen for crackles or other intermittent types of interference that should not be present.

To get some idea of the erase efficiency and signal-to-noise ratio record a passage of reasonable length at maximum modulation, wind back and erase from a point about half way through the recording. Wind back again past the point at which erasure commenced and listen carefully to the playback. Is there a "ghost" of the heavily recorded passage in what should be the silent portion of the tape? Listen too for excessive hum and/or hiss in the silent portion.

The final test is a check on speed stability. For this it will be necessary to have first provided yourself with a recording of known quality standard, preferably with some long sustained notes such as are produced by piano or organ music. Put this pre-recorded tape on the machine under investigation and listen carefully to playback. Excessive wow and flutter should immediately show itself when the sustained notes are reproduced. Long term speed errors will be revealed by overall differences in pitch. This latter may be difficult for many to detect and ideally the purchaser should also take a tuning fork along as the only foolproof guide to absolute pitch. This latter precaution is only necessary if the machine is to be used for really critical work.

In carrying out these tests the machine will have been subjected to a considerable amount of use. Check now for excessive heat, particularly on and around the tape hubs. If all is still satisfactory one may conclude that this tape recorder *may* be worth buying, the two remaining factors to be considered being price and service facilities.

Now of these I regard service as the most important of all. When buying through the trade, that is from a retail shop, the shopkeeper will usually state what service if any he is prepared to give. Sometimes he will even offer a "guaran-

tee" covering free or partly free service over a limited period of time. Make quite sure what facilities are offered and what the terms of the guarantee really are. As a further precaution check that the model being offered is of a known and reputable make, that the manufacturer or distributor is in business in this country and is likely to be able to supply spare parts for a good many years to come. Armed with all this information one can begin to start talking about price. . . .

When buying privately one usually reckons to pay less than through the trade simply because there is no retailer's profit to take into account. On the other hand the private individual will not be able to offer any service facilities at all and so the manufacturer's or distributor's ability to service is of paramount importance. Check this very carefully before concluding the purchase.

Having taken all these precautions there is not the slightest reason why one should not acquire an excellent piece of equipment that will give many years of reliable and efficient use. And in nosing around the secondhand market it really is surprising what one can come up against. A broken-down tape recorder apparently inoperative or working so feebly as to be obviously on its last legs is regarded as an encumbrance by its owner and is often offered to a friend or acquaintance for a purely nominal sum. I know of many cases where such equipment has been bought and then put into first-class working condition by merely removing the heavy accumulation of tape oxide that was clogging the heads. It really is staggering how many owners *never* clean their tape heads. Performance deteriorates until the machine is barely operative. The owner gets fed up with it, puts it on one side and a year or two later parts with it for a song. If you are offered a really sub-standard "wreck" take a quick look at the heads; if they are well and truly gummed up there is just a chance you might pick up a real bargain for next to nothing. Alternatively you could be very honest and clean the heads and then demonstrate to the owner just how good his equipment really is. The choice is yours.

Don't ever despair of finding the right equipment at the right price. Sooner or later you'll find what you want but it takes patience, time and trouble. I know of one man whose price limit for a tape recorder was firmly fixed at under £5. Believe it or not he got what he wanted in the end. With it he went through several years of my Tape Recording Techniques classes and attended a number of live recording sessions. He may not have had the last word in either equipment or sound quality but he had much more than £5 worth of fun.

AT the time of writing many unfortunate families in the south east of England are attempting to make good the damage suffered in the worst floods this region has ever known. In the face of such natural disasters the ordinary man in the street realises just how puny and ineffectual human beings really are. To all who have been faced with the horror of inundation I offer my deepest personal sympathy.

It's bad enough if one's personal belongings are soaked with clean water from a burst main pipe, but that is nothing compared to the appalling inrush of mud, slush and sewage that overwhelmed roads, gardens and lower floors of houses in the home counties. The water itself was bad enough but the filth and the unspeakable stench was disgusting.

This tragedy made me wonder what would happen to expensive audio equipment under these shocking conditions. A resident of Hildenborough near Tunbridge has provided a surprising answer. This gentleman, Mr. Brian Matthews, states, "I have an expensive tape recorder which was under four feet of water and covered with slime for several hours. It is now working perfectly after cleaning with demineralised water. I have also cleaned and restored many valuable records by the same method".

It seems quite incredible that any piece of electronic equipment, let alone a tape recorder, could suffer immersion in four feet of slime and water without needing expensive reconditioning. If the treatment given to Mr. Matthews' machine is so effective it should also produce results under less drastic conditions, if for instance, a tape recorder were to be accidentally dropped in a river, in the sea, or even in a bowl of water at home. So just what is the right treatment after such an accident?

To find out the answers I had a talk with the firm of Permutit, a company that specialises in water treatment plants. The treatment they recommend is merely to flush away all the solid foreign bodies and then to allow the equipment to dry out. But the secret lies in the water that is used in the washing process.

If a machine is covered in muck and slime the first obvious step is to wash all this away. But if so called "clean" tap water is used this will leave a deposit of mineral salts as it dries out, and these will probably cause extensive damage. So for the washing process one must use a water from which all dissolved and suspended solid matter has been removed—in other words distilled water. Now distillation is a relatively expensive process and a much more economic method of obtaining truly pure (demineralised) water is by using an "ion exchange" plant known as a de-ioniser. These gadgets are manufactured by Permutit and cost from about £35 or so

CROSS TALK

By Audios

upwards and are used extensively in laboratories and industry as well as in many motor car service stations. Water that has been de-ionised in this way is not only free from all impurity but it also has what is known as a "neutral ph"—in other words it is neither acidic nor alkaline.

To assist victims in the flooded areas a mobile de-ionising plant was made available to residents free of charge by Permutit and it was thanks to the use of this water that Mr. Brian Matthews' records and equipment were saved.



Their advice to the individual whose equipment suffers a similar misfortune is to wash it out thoroughly with de-ionised water just as quickly as possible. Enquiries for the water should be made at chemists' shops or large garages. But speed is essential, particularly if the immersion has been in sea water. A last word of advice from this very helpful firm emphasises the fact that their well known domestic water softeners are quite different pieces of apparatus and they do not produce the clinically pure water essential for equipment cleaning.

So there you are. If you have an accident with your equipment don't despair. Clean it quickly using plenty of this specially

purified water and you stand a good chance of suffering nothing worse than an emotional shock. If you switch on before drying out is properly completed you'll suffer another more serious shock from which you might never recover, so please be cautious!

* * *

THERE are other ways of recording besides using magnetic tape, the most obvious perhaps being the recording of light on a sensitive emulsion—in other words photography. The largest international photographic and photographic equipment exhibition has just taken place in Cologne. Of the many fascinating exhibits my curiosity was stimulated most by a new process developed by our old friends Agfa-Gevaert. Described as "a light image beyond our grasp—a photographic process of the future" they have introduced what they call "holography."

Thinking at first that holography had something to do with arrangements of holes I was pulled up sharply with the rejoinder that the word derives from the Greek *holos* which means total. It now follows that holography is a new process of recording which stores up information over the entire object so that the viewer of the presented hologram sees the subject as through a window in its three dimensions and, according to his viewpoint, from different perspectives. Apart from the 3-D effect of the presentation holography offers a great variety of possibilities for science and in particular for optical data processing documentation and for the use of the entire storage capacity of photographic layers.

It's not difficult to understand why the manufacturers describe this process as belonging to the future. Instead of seeing either a flat (two-dimensional) representation of an object on a sheet of paper, or indeed the false illusion of depth achieved by the newer stereoscopic processes, they now offer apparent solidity of the represented object with correct perspective regardless of the angle at which it is viewed.

The whole thing is obviously fiendishly clever and could only be achieved by making fullest use of the most sophisticated techniques. Whilst not pretending to have the slightest understanding of the way the miracle is performed I do know that it is based primarily on the effect of a laser beam reacting against a sensitive plate. Now that is very interesting indeed because it has been suggested that laser beams could be used in non-magnetic audio recording systems of the future. So it may well be that one day there will be an even closer connection between photography and sound recording than there is at present.

* * *

LIVE recording at home is very difficult for me. We are literally boxed in by railway lines; when a train passes the entire building shakes and trembles. But I do have a small inner room which escapes most of these unwanted noises, and one evening last month I was taking an important spoken word recording in this very humble "studio." It was evening and reasonably quiet. Suddenly—clonk—clonk—CLONK! The people on the floor below were having a carpet laid . . . !

SONY

Hear hear hear hear! The exciting SONY "Quadradiol" sound system gives you four angles of superb reproduction. 4 track stereo/mono recording and playback, with a four way speaker system brings you the unbelievable reality of stereophonic sound on SONY. And to make it complete, there's the superb finish which SONY makes the rule. *Model TC-530. Recommended retail price £145.*

SPECIFICATIONS. Power requirements: 65 watts, AC 100, 110, 117, 125, 220, 240V with voltage selector, 50/60 Hz, Tape speed: $7\frac{1}{2}$ ips., $3\frac{3}{4}$ ips. and $1\frac{7}{8}$ ips. Instantaneous switching with automatic equalization change. Reels: 7" or smaller, Recording system: 4-track stereophonic or monophonic, Frequency response: 30~20,000 Hz at $7\frac{1}{2}$ ips. ± 3 db 50~15,000 Hz at $7\frac{1}{2}$ ips. 30~13,000 Hz at $3\frac{3}{4}$ ips. 30~10,000 Hz at $1\frac{7}{8}$ ips, Flutter and wow: Less than 0.17% at $7\frac{1}{2}$ ips. Less than 0.3% at $3\frac{3}{4}$ ips. Less than 0.4% at $1\frac{7}{8}$ ips. Power output: 5W per channel, Signal-to-noise ratio: Better than 48db (at peak record level to unweighted noise). Harmonic distortion: Less than 3% at 0 db line output. Level indication: VU meters calibrated to NAB standard, Tone controls: Two separate controls for bass and treble, Inputs: Low impedance microphone inputs: transistorized (will accommodate any microphone from 250 to 1k ohm impedance) Sensitivity -72 db (0.19 mV) High impedance (100k ohms) auxiliary inputs: Sensitivity -22 db (0.06V), Outputs: Line outputs: 0 db (0.775V), load impedance 100k ohms Speaker outputs: load impedance 8 ohms Binaural monitor output: will accommodate stereo headset Model DR-3C (10k ohm impedance), Integrated record/ playback connector: Input: Sensitivity -62 db (0.6mV) Impedance 10k ohms Output: Sensitivity 0 db (0.775V) Impedance 10k ohms, Recording time: (with 1,800' tape): 4-track stereo 1 hr. 30 min. at $7\frac{1}{2}$ ips. 3 hrs

at $3\frac{3}{4}$ ips 6 hrs at $1\frac{7}{8}$ ips. 4-track monophonic 3 hrs. at $7\frac{1}{2}$ ips. 6 hrs. at $3\frac{3}{4}$ ips. 12 hrs. at $1\frac{7}{8}$ ips. Transistors: 2SC401 (8), 2SC402 (8), 2SC318 (2), 2SP28 (4), 2SB383 (2), Diodes: 5GD(4), 1T22 (4), Record/playback head: PP30-4202N1, Erase head: EF18-2902H, Dimensions: $19\frac{1}{8}$ " (W) $\times 9\frac{1}{8}$ " (H) $\times 15\frac{7}{8}$ " (D), Weight: 41 lbs. 10 ozs., Accessories: Stereo recorded 5" tape, 7" empty reel SONY dynamic microphone (F-96), Connection cord (RK-46) AC power supply cord, Motor pulley, Reel cap Head cleaning ribbon, Splicing tape.



Newton & Godin

SONY
RESEARCH MAKES THE DIFFERENCE
Sony (U.K.) Limited,
Ascot Road, Bedford, Middlesex.

This won't be the first tape recorder you'll own.

But it could be the last.



It won't be the first because beginners don't usually buy tape systems as good as ours.

But discriminating buyers do. They buy Truvox when they want the ultimate in reproduction, with facilities and reliability resulting from the most advanced circuit techniques used in commercial equipment. When in fact they want a system to last a decade – and still be ahead of its time.

Take a look at our Series 200. It's our top system and consists of tape unit, stereo amplifier, FM tuner and loudspeaker units. They're all in handsome teak cabinets and incorporate silicon solid-state circuitry.

The tape unit is the PD202/204. A $\frac{1}{2}$ or $\frac{1}{4}$ track stereo/mono 3 speed unit. It has separate record and playback amplifiers, 3 separate micro-gap heads, 3 motor die-cast Truvox tape deck, outer rotor capstan motor, auto stop, spool carrier hublocks, editing flap and balanced servo brakes. It gives you full mixing, off-the-tape monitoring, duo-play, track-to-track transfer, horizontal or vertical operation and true-to-life reproduction over wide dynamic range.

The TSA 200 transistor stereo amplifier connects with the tape unit's o-rV emitter-follower output. It gives wide frequency response and 20 watt per channel output with insignificant noise distortion and cross-talk levels. It has extremely efficient scratch and rumble filters and zero-fade balance control.



Then there's the FM200 tuner with its slide-in multiplex decoder. And the matching LS200 loudspeaker unit which has an infinite baffle enclosure to give a full 12 watts RMS handling capacity and a response which belies its size.

Of course, you may not want a whole system. For you we have other editions of the Series 200. Two and four track mono models with their own built-in power amplifiers, like the RB202/204 in a teak cabinet and the R202/204 portable covered in tough grained P.V.C.

Or if you have to compromise on price but still want the finer things of life we've built the Series 50.

It's a 3 speed, 7" spool model using a completely new Truvox tape deck. Its many features include *two* loudspeakers.

No matter what you want, your Truvox dealer can supply it. Why not call and ask for a demonstration? If you don't live near a dealer, write to Gordon Lisle at Truvox. He will arrange a personal introduction to your nearest appointed Truvox expert.

That's a meeting you'll enjoy.



Truvox Limited Hythe Southampton SO4 6ZH Telephone: Hythe 3265
A member of the Controls and Communications Group

THE NORTHERN AUDIO FAIR

THE spa town of Harrogate, Yorkshire, is famous for its waters, its solid respectability and its hotels. One of the largest of these hotels is the Majestic, an enormous brick pile standing like a medieval stronghold in the centre of its own landscaped gardens. The organisers would certainly have found it difficult to select a more beautiful location. Surrounded by the rugged beauty of the Yorkshire hills and moors the visitor had the opportunity of combining a visit to the Fair with a sightseeing trip through some of the most dramatic scenic panoramas that this country can offer. But the weather was against us. For three days we had overcast skies, wind and rain. And as one of the locals commented, "When the weather is good it's very, very good, but when it's bad it's worse than awful!"

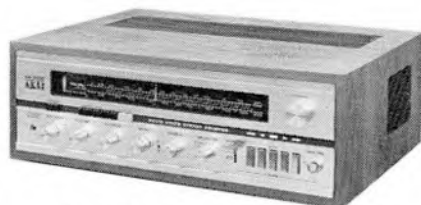
If all were agreed that the weather could hardly have been worse there was equal agreement that the Fair could hardly have been better. With demonstration rooms throughout the first and second floors one could be forgiven for imagining oneself to be back in the Russell Hotel last Easter. This was pure Audio Fair with all the pleasant intimacy that has distinguished this exhibition for so many years. It was almost as if some giant hand had scooped up the London show piecemeal and placed it down in a new rural setting. Unfortunately a few regular exhibitors had apparently been dropped on the way . . . !

As we toured the exhibition we were not surprised to find that very few new products were on show for the first time. This is understandable—counting the London Radio Show this was the third major exhibition of its kind within the space of six months and there is a limit to the number of dramatic new developments that can be revealed in any one period of time. However one or two firms were able to announce the release of new products, although we suspect that this was more by coincidence than as a result of deliberate timing.

Of these the range of new loudspeaker enclosures by Rank Wharfedale were of



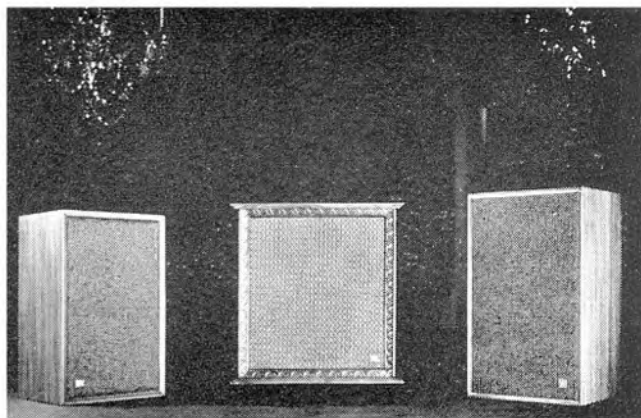
Akai X-360D the deck and pre-amp. version of this new machine . . .



. . . its associated main amplifier which by duplicating the tape transport controls offers positive remote operation

outstanding interest. In addition to the well known Denton and Super Linton this firm was demonstrating the Melton enclosure containing a twelve inch bass unit and separate tweeter with crossover network, the Dovedale III incorporating three transducers, a twelve inch bass, a five inch mid-range and a one inch tweeter complete with crossover giving a claimed response of from 40-20,000 Hertz (said to be without any audible peaks or troughs) and lastly the large Rosedale cabinet which is basically a development of the Dovedale III but substituting a fifteen inch bass unit for the twelve inch speaker in the smaller enclosure.

At their demonstration a well chosen selection of instrumental records were



The three new Wharfedale enclosures shown at Harrogate for the first time

reproduced and in the opinion of your reporters the performance of the Dovedale III was exceptionally good in relation to its size and price. The design staff at Wharfedale have spent a great deal of time evolving the new units and they are themselves extremely pleased with the results. From what we heard they are more than justified and we predict that the Dovedale III will set a new quality standard in this category of loudspeaker enclosures. It is hoped that we will have the opportunity of reviewing the Dovedale III at a later date when production models are readily available.

The Rank Organisation were also showing a new Akai tape recorder marketed by Pullin Photographic Limited. Designated the X-360 this four track stereo/mono machine has a number of exceedingly original features, the most spectacular of which is the "Automatic Dust Minder". It is a fact that more sub-standard recordings are produced through oxide dust clogging heads than through any other single cause—but to equip a machine with all the necessary electronic gadgetry to light up a signal lamp to warn the operator that dust is present does seem to be going a little far! Also typical of the advanced thinking in the X-360 is the automatic volume control (trade name Comput-O-Matic). The method of operation of this system is said to be highly complex but apparently it incorporates its own motor drive component which actually turns the various level controls mechanically as required when the AVC is operative. Finally this unusual machine has a tape transport system which is fully solenoid operated and in fact all the tape movement controls are duplicated on an accessory tuner amplifier which provides a means of positive remote control. Details of these items are given in our New Products section.

We were interested to learn that the Akai Company of Japan is now one of that country's largest manufacturers of tape

TEST BENCH

SANYO MR-801 AND DC-434E Mk II



BY R. HIRST AND D. KILLICK

MANUFACTURER'S SPECIFICATION Sanyo MR-801

Recording System: AC Bias $\frac{1}{4}$ -track.
Erasing System: AC Erase $\frac{1}{4}$ -track.
Tape Speeds: $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{7}{8}$ ips.
Wow and Flutter: At $7\frac{1}{2}$ ips 0.15 per cent RMS, at $3\frac{3}{4}$ ips 0.20 per cent RMS, at $1\frac{7}{8}$ ips 0.30 per cent RMS.
Forward and Rewind Time: Up to two minutes, 1,200 feet tape.
Level Indication: VU meter x 2.
Input Impedance: Microphone 500 Kohm, Line-in 200 Kohm.
Output Impedance: Line-out 2 Kohm, Headphone 10 Kohm.
Record/Play DIN Connector: Input 10 Kohm, Output 2 Kohm.
Playback Output: 0.775 V 0 dbm.
Frequency Response: At $7\frac{1}{2}$ ips 20 to 20,000 Hz (± 3 dB 30 to 15,000 Hz), at $3\frac{3}{4}$ ips 30 to 13,000 Hz, at $1\frac{7}{8}$ ips 30 to 8,000 Hz.
Monitor: Headphone.
Power Source: AC 100 V, 117 V, 125 V, 220 V, 240 V, 50-60 Hz.
Power Consumption: 50 Watts.
Dimensions: $15\frac{1}{8}$ in. wide, $12\frac{3}{8}$ in. deep, $6\frac{1}{2}$ in. high.
Weight: 18 lbs.
Accessories: Empty Reel 7 in., Patch cord x 2, Splicing tape, Dust cover.
Price: £78 including purchase tax.
Distributors: Marubeni-Iida Ltd., 164 Clapham Park Road, London, S.W.4.

SANYO MR-801 TEST CHART

Frequency Hz	Overall Response	Playback	Signal/Noise	Distortion	Crosstalk	
	dB	Only	Ratio		dB	
		dB	dB		Tk/Tk	Chl/Chl
	$7\frac{1}{2}$ i.p.s.	$3\frac{3}{4}$ i.p.s.	$7\frac{1}{2}$ i.p.s.			
30	-3.0	-7.0	-2.6			
40	-2.6	-5.0	-2.0			
50	-1.2	-3.0	-1.0	51		
60	0	-1.0	0			
100	+1.5	-0.5	+1.0			
250	+2.5	+1.0	+1.5			
500	+1.0	+1.0	+1.5			
1000	0	0	0	2.8%	64	48
2000	0	-0.6	+0.5			
4000	0	-1.2	0			
6000	-0.5	-1.5	0			
8000	-1.0	-1.5	-0.5			
10000	-1.5	-3.0	-1.0			
12000	-2.2	-8.0	-1.5			
14000	-2.6		-2.2			
16000	-3.0		-3.0			
18000	-4.0		-3.8			
20000	-6.0		-7.0			
22000	-11.0		-12.2			
Wow and Flutter	0.14%	0.2%				

NOTES.—The Overall Response figures relate to record and playback. Playback only relates to the reproduction of a 50 microsecond test tape at $7\frac{1}{2}$ i.p.s. (N.A.B.). For Signal-to-Noise Ratio the tape was recorded at peak level and then the input signal was removed from the record amplifier. 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 the correct maximum level as indicated by the manufacturers, and the figure is an R.M.S. value. Crosstalk is quoted for track-to-track and channel-to-channel.

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.

OUR review machine this month is the Sanyo MR-801, a $\frac{1}{4}$ -track mains stereo deck with pre-amps only, fitted with two heads, one erase and one combined record/playback. This machine is intended for use with an existing amplifier and loudspeaker set-up.

In July we reviewed the Sanyo MR-939 and commented at some length on both its facilities and performance. The equipment now being investigated is the deck and pre-amp version of the same machine so that our comments published then will apply, broadly speaking, to this machine as well. We would therefore refer readers back to our last July issue which it is intended should be read in conjunction with this report.

An interesting situation arises when we compare the laboratory measurements obtained from the MR-801 with those given earlier for the MR-939. To all

intents and purposes they could be regarded as having been taken from two different samples of the same model. One reason why we are running these two reviews so close together is to demonstrate just what happens when two similar machines are subjected to identical stringent technical tests. It is quite impossible to repeat exactly the readings obtained from the first machine when dealing with the second. Differences occur due to fractional variations in values of individual components (which are made with stated tolerances) and also in the operating conditions of the test equipment if the investigations are carried

out at different times, as was so in this case.

Turning specifically to the MR-801 the remarkable fact is not in how far it deviates from the figures given for the MR-939, but how it broadly follows the general trend of results established for that machine.

Our normal review procedure is to investigate one machine as honestly and as accurately as we can and then state the facts found. What we are now doing is to compare results on two machines so that the reader may judge by how much any random selected model—such as the chance selection that occurs when a machine is purchased from a dealer's

shelf—will be likely to differ from a published review of the same model.

Of course our findings can only be regarded as absolute in respect of the make, model and indeed particular samples investigated. Nevertheless since it is quite impossible for any reviewer to report on a large number of machines it is hoped that it will give an indication of the extent of the minor differences in performance we would expect to meet with in checking a cross-section of an entire production batch, and which we would regard to be wholly acceptable in all respects.

There is considerable incentive today for the purchaser to acquire a deck and pre-amplifier only, rather than a complete tape recorder which includes audio output stages and built-in loudspeakers. Because the latter is a more complex equipment using more components its retail price is bound to be greater than that of the deck and pre-amp version. Since purchase tax is an addition based on cost the amount of tax payable will be proportionately greater, thus widening the price differential. One must also consider the undeniable fact that final output stages in any tape recorder are less efficient, less powerful and very much less flexible than the facilities offered in a moderate-to-good quality separate main amplifier.

And as for the built-in loudspeakers—they should never be thought of as offering anything more than a rudimentary monitoring facility. To really hear what is recorded on the tape separate “hi-fi” loudspeaker enclosures of as large a size and as good quality as possible are essential.

So the arguments in favour of a deck and pre-amp only are pretty strong. Because it must be used in conjunction with other auxiliary equipment we have for review purposes coupled it to a Sanyo DC-434E Mk. II MW/FM Stereo Tuner/Amplifier/Phonograph combination, and we will extend our comments to cover this interesting instrument.

In styling the MR-081 is identical to the MR-939 with the exception of the omission of the right-hand panel of control knobs and with the casing in an oiled teak finish. A recessed panel in the left-hand side carries 4 phono sockets, one pair right- and left-hand channels line-out, and the other line-in. A combined 5-pin DIN record/playback socket is also provided on this panel. The mains cable is a permanent fixture, and as with the other machine is 3-conductor correctly colour coded and of (unnecessarily) heavy grade.

When power is applied by means of the rocker On/Off switch on the main deck panel the pair of level meters are internally illuminated. We must repeat our criticisms that these meters are really too small for either easy or accurate use. The pair of record level controls together with two record function keys are concealed in a recessed compartment beneath a hinged plastic lid on the main desk plate. Again we would like to draw attention to the fact that these knobs are too small for convenient handling and in any case we see no reason why they should be hidden away like this.

The rotary lever control on the right of the deck controls the tape transport modes positively and well, just as it did with the other

model. The only caution we will repeat again is to avoid coming out of Rewind and crashing straight through to the Play position—something no careful user would ever do.

Connection of the machine to its associated amplifier is simplicity itself. We have noted that an increasing number of tape recorders are now fitted with alternative phono and DIN connectors, a practice of which we heartily approve. If the amplifier is provided with a suitable 5-pin DIN socket a single cable only need be run between the two appliances and this will provide complete record and playback connections. If the phono sockets are used the owner may employ four separate single leads with phono plugs on either end (if the amplifier has only phono sockets) or leads with phono plugs on one end and whatever type of plug suits the amplifier sockets on the other. Some of us regard the combined record/playback DIN socket as one of the few good things that have come to us from across the channel.

During user tests we were particularly impressed by the absence of audible hum, an attribute noted in the MR-939. Recordings of known good quality were reproduced to reveal excellent clarity and a welcome freedom from background noise. Such noise as was present was made up of high frequency components (hiss and transistor noise) which for some reason is far more acceptable to the human ear and can therefore be regarded as less obtrusive than low frequency hum. Using the machine for recording we observed the warning published in our July review which suggests that the ballistics of the meters do not allow for the proper registration of transient peaks and so levels were set to allow for slight under-modulation. Working in this way we obtained excellent results that would satisfy all but the most hyper-critical.

Summarising our findings on the MR-801 deck and pre-amp system we must make it clear that this does not represent the ultimate high standard of sound quality that it is possible to obtain if price is no object. In our opinion it represents an excellent “middle of the road” machine whose idiosyncrasies incline towards the high rather than the low fidelity end of the spectrum. At the price it is offered it represents extremely good value indeed.

Turning now to its associated amplifier we can digress to describe and discuss the merits—and demerits if any!—of a piece of equipment that follows the popular trend towards what is known in the trade as a “compact”. At one time high fidelity equipment implied the use of completely separate components. Even the main amplifier was separate from its pre-amp; the radio tuner and gramophone transcription unit were *always* quite separate components, as of course were the loudspeakers. The main reason for this breakdown into individual “boxes” was because of the heat generated by valved equipment. But now we have the transistor, and indeed in some cases even the more sophisticated integrated circuit.

Electronic components can be very much smaller than they were, they generate very much less heat and any heat that is created can be dissipated easily and efficiently. There is no longer the same need to separate the pre-amplifier from the main power unit; they can all be built into a single neat container. As an extension of this idea the separate enclosure for the radio tuner is also disappearing—it is now being housed in the single cabinet containing the amplifier. Having gone so far why stop there? All one has to do is to build in a gramophone transcription unit on top and, lo and behold, the compact has been created.

There are arguments for and against this arrangement. The great advantage of the



MANUFACTURER'S SPECIFICATION Sanyo DC-434E Mk. II

Tuner/Amplifier

Frequency Range: MW 566-185 m, FM 87.5-110 MHz.

Sensitivity: MW 300 μ V/m, FM 5 μ V.

Image Rejection: MW and FM more than 35 dB.

Intermediate Frequency: MW 470 KHz, FM 10.7 MHz.

Frequency Response: 20 Hz-1 dB, 1,000 Hz-1 dB, 20,000 Hz-1 dB.

FM Distortion: Less than 3 per cent.

FM MPX Separation: 25 dB at 1,000 Hz.

Output Effective Power: 16W + 16W at 1 per cent distortion.

Input Impedance: Phono, 50 Kohm, Tape Head 50 Kohm, Aux. 100 Kohm, Playback 50 Kohm.

Output Impedance: Recorder Out RAC 50 Kohm, DIN 100 Kohm.

Tone Control: Bass 100 Hz \pm 12 dB. Treble 10,000 Hz \pm 12 dB.

Noise Filter: 9,000 Hz - 10 dB.

Rumble Filter: 60 Hz - 10 dB.

Playback Standard: Phono RIAA, Tape Head NARTB.

Power Consumption: 120 VA at maximum signal.

Power Source: 100 V, 117 V, 130 V, 200 V, 220 V, 240 V, AC 50/60 Hz.

Dimensions: 24 $\frac{1}{2}$ in. wide, 16 in. deep 11 $\frac{1}{2}$ in. high.

Weight: 41 lbs.

Phonograph

Type: 2-speed turntable with belt drive, automatic return tonearm.

Motor: 4-pole synchronous.

Turntable Speed: 33 $\frac{1}{3}$ and 45 rpm.

Turntable: Aluminium diecast 12-inch diameter.

Tonearm: Static balanced pipe arm with counterbalance weight.

Cartridge: Magnetic Stereo, model MG-2.

Frequency Response: 20 to 20,000 Hz.

Stylus Pressure: 3 grammes.

Price: £172 10s. including purchase tax.

Distributors: Marubeni-Iida, 164 Clapham Park Road, London, S.W.4.

“separateness” of the older style equipment was the ability to change individual parts of a set-up at will. The disadvantage is that one tended to get a mixed collection of odd sized boxes (often with a tangle of wires between) strewn around the living-room. The solution was to put it all in a large hi-fi cabinet and as soon as that is done one has created a rather large compact. But the components will have been individually selected on merit by the enthusiast. The modern compact is sold as a “package deal” where the purchaser usually has little or no option. Some manufacturers offer a choice between two models of transcription unit, but that is as far as they go.

The discerning reader may well comment at this point that the compact could be regarded

as nothing more or less than a radiogram minus its loudspeakers. This is quite true in principle, but in practice all the components making up a compact system are (or should be!) of infinitely superior quality than would be found in any domestic radiogram. Loudspeakers are, and always will be, regarded as separate entities. The moment some enterprising manufacturer tacks a couple of speakers on to the side of his compact hi-fi he will have debased the whole thing to domestic radiogram level. So far as we are aware no-one has yet been foolish enough to do such a thing.

In looking at the Sanyo DC-434E we have to consider what it offers in the way of convenience and performance in relation to its cost price of £172 10s. 0d. It comprises a high grade amplifier with all the usual "hi-fi" controls, an AM/FM radio tuner and a 2-speed record transcription unit. The whole is built into a handsome wood cabinet with the gramophone equipment mounted on the top protected by a hinged tinted plastic cover.

We do not propose to offer the same exhaustive laboratory report for this class of equipment as we do for tape recorders. Apart from any other reason we believe that compact equipments are primarily designed for the user who, although discriminating in his listening, has no wish to involve himself in abstruse technicalities. So we are more concerned here with the audible results as heard (via a pair of Celestion Ditton 15 speakers) than in a mass of tabulated figures.

Considering the amplifier/tuner section first we were a little disappointed to find that the power output fell below the specified 16 watts per channel. A figure around 10 watts RMS is more realistic. Separate Bass and Treble controls are provided (independent for each channel) and a row of rocker switches give facilities for Tape Monitor, 60 Hz Rumble Cut, 9 kHz Noise Cut, Loudness Control and AFC. A stereo headphone socket is provided on the front panel and a rotating mode selector controls amplifier functions as follows: Channel 1, incoming signals on channel 1 are amplified to reproduce through both speakers; Channel 2, incoming signals on channel 2 are amplified to reproduce through both speakers; Stereo, channel 1 to left-hand speaker, channel 2 to right-hand speaker and lastly Reverse which switches channel 1 to channel 2 and vice versa. Adjacent to this is a rotary selector switch with 6 positions. Tape Head: for playback of a recorded tape. Phono: for playing records on the built-in phonograph; Aux: for a separate phonograph, radio, or tape recorder; MW: the built-in tuner receives MW stations; FM: tuner receives FM broadcasts. FM Stereo: for reception of MF Multiplex (Stereo) broadcasts when stereo indicator lamp lights.

In addition rotary controls are provided for Mains On/Off, volume and balance as well as the usual tuner knob. On one side of the tuning scale is a stereo indicator pilot light; this lights automatically when a stereo signal is being received (switching is manual at the selector knob). On the other side of the tuning scale is a small meter-type indicator; maximum needle deflection shows maximum signal strength.

Facilities not offered include "between station quieting" (a control now becoming increasingly popular) and reverse phase—a switch that we must admit is nowadays rarely included on any amplifier—the Reverse position on the Mode knob reverses channels, not phase.

At the rear we have two groups of four phono sockets, the left-hand set for Auxiliary Input and Tape Head; the other group are for Tape Playback and for Tape Record. In

addition a 5-pin Record/Playback DIN socket is provided as an alternative means of connecting to the tape deck. The two speaker sockets are non-standard and the appropriate special plugs must be used. Two important little buttons at the back are marked Overload Protector. One of these services each channel and as soon as the output circuit is either short circuited or open circuited power is immediately cut off and can only be restored (after the fault has been cleared) by depressing the button for the faulty channel. Aerial connections are in the form of three screw-type wire grips marked MW for an external Medium Wave aerial, G for earth (ground) and FM and G for 75 ohm FM dipole. The equipment incorporates an internal ferrite bar antenna for MW and a line antenna for FM.

This section of the equipment operated as smoothly and efficiently as one would expect at the price level. Although used in the Metropolitan London area at some height from the ground (second floor flat) it was found that an external FM aerial improved FM mono reception and was absolutely essential for stereo. The value of stereo radio is still debatable; even the very best receivers reveal a deterioration in signal to noise unless their associated aerial is operating at peak efficiency. We found that the stereo beacon gave a very positive indication that a stereophonic signal was being received and the reception quality was equal to that obtained on other more expensive equipment. The reader contemplating the purchase of any stereo radio equipment is strongly advised to check on reception in his own home area before buying. The Tuning Indicator is, in our opinion, a little too small for clarity but otherwise its performance could not be criticised.

At one time the reviewer would look for signs of "drift" in an FM tuner. Nowadays with modern circuitry, and particularly with the Automatic Frequency Control provided here, one can be reasonably sure that this unfortunate falling off of signal strength will not occur. More important is the rejection of unwanted interference, usually in the form of car ignition noises. Since the ability to discriminate against unwanted signals is related to the strength of the required incoming signal, which in turn is related to the efficiency of the aerial, the reviewer can only consider the tuner and aerial as a single unit. Under our conditions and with our aerial the Sanyo tuner gave a good account of itself. Certainly the sound produced at the speakers was clean and undistorted, stations tuned in positively as shown by the Tuning Indicator and any mush in stereo reception was immediately cleared by switching to FM Mono. Interference was minimal.

The transcription unit mounted on top of the cabinet is a most interesting mechanism. The design philosophy would appear to have been to produce a unit which conforms to basic hi-fi practice and yet has been automated in such a manner that it could be safely used by any member of the family. The result is a hybrid—one might almost call it an "automatic non-automatic" unit. It has no record changer, which is good. Changers ruin discs as they throw the records about and dump the stylus down into the groove. Instead it offers single play only with an automated cueing device which accurately and carefully lowers the pickup head to the disc at the touch of a button and returns it to the pickup rest without further intervention when it reaches the end of the record. This is done by providing an elongated horizontal lowering device against whose support the arm can be moved to pick up the desired starting point either at the beginning of the disc or anywhere across its surface. As

soon as the arm is moved over the turntable edge the record commences to revolve; the arm is only lowered when the operation button is touched. The same control serves as "reject" and when actuated during the playing of a record it will raise the arm and deposit it back on the arm rest. One of the biggest dangers to fragile gramophone records lies in the possibility of heavy-handed use by the operator; this system removes the need for the operator to touch the arm at all. Even children (or wives!) could use this turntable quite safely.

The turntable itself is a suitably massive casting and is fitted with a composition mat. The pickup arm is of tubular metal provided with a non-calibrated counterbalance weight. The instruction booklet states that when the weight is slid on to the back of the arm as far as it will go and fixed into position by means of the setscrew provided the tracking weight at the stylus will be approximately 3 grammes. In fact a check with our balance gauge showed it to be exactly 4 grammes. We did not adjust the weight back to precisely 3 grammes for our listening tests because we felt that most purchasers would follow the instructions and trust to the figures given. It is suggested that owners should invest a few shillings in a simple balance that will enable them to set up the equipment accurately.

The cartridge is magnetic stereo, Sanyo Model MG-2, and the stylus is a diamond suitable for between 1,000 and 2,000 hours use. Turntable drive is by belt and speed change from 33½ to 45 rpm. is by means of a rocker switch which merely slips the belt over the two different radii machined on the capstan.

For our first listening tests we reproduced the well-known Shure *Studio Obstacle Course* record. This revealed moderate breakup at the fourth level of sound intensity. However, investigation showed that this tracking difficulty was more audible on the right-hand channel than the left-hand. Although the brochure refers to an "inside force canceller to compensate side thrust" there was no evidence of any anti-skate device being in effective operation and the stylus was obviously subjected to lateral thrust. Mechanically the unit was commendably quiet and although rumble could be heard at excessive settings of the Volume Control this was never obtrusive at normal listening levels. All listening tests were conducted without the 60 Hz Rumble Cut being switched in. Careful listening to test recordings revealed an audible beat in a 1000 Hz pure tone signal (Wow and Flutter about 0.20 per cent RMS) and a progressive fall-off in frequency response at either end of the spectrum below 100 Hz and above 12000 Hz.

All this may sound very terrifying but in fact it is no more than one would expect to find on any equipment which does not pretend to conform to the most stringent high fidelity specifications. We feel that the owner, or potential owner, is likely to be far more interested in subjective results than in academic findings. So having put the test records to one side (who listens to test records for pleasure anyway?) we settled down to enjoy some music.

We had to state truthfully our findings as given above because these were the effects that we noted, but anyone who imagines that in practical terms they can be taken to mean that the equipment is not satisfactory will be making a great mistake. In actual fact it performs exceedingly well indeed *within its own limitations*. Like the associated tape recorder it does not pretend to be the last word in audio quality. Remember that a top grade magnetic cartridge alone can cost well

Continued at foot of next page

NORTHERN AUDIO FAIR

From page 473

recorders. Originally established by Mr. Akai the Company is to "go public" in November of this year. Their expansion programme throws extra emphasis on auxiliary high fidelity equipment such as amplifiers and tuners and we may well find that within the next few years Akai assume a dominant role in this field.

Chatting to Richard Allan Limited, a good old north country British firm, about the state of the market we were delighted to learn that their sales of Sugden amplifiers far exceeded original expectations. Exports are up too—more than 50 per cent of the Company's products are now sold overseas. Congratulations to a firm that has now consolidated its position as an established member of the elite group of manufacturers of true high fidelity equipment.

We have always regarded Tannoy as being a name to conjure with and we were pleased to have the opportunity of listening to their demonstration and talking over current problems with their staff. During the course of our conversation the topic of service cropped up. We didn't realise it before but the service situation insofar as Tannoy is concerned is the most simple and straight forward of all. Every Tannoy loudspeaker enclosure is guaranteed unconditionally. When they say unconditional they mean unconditional; it doesn't matter whether the present owner purchased it new, secondhand, third hand or fourth hand—it doesn't matter when it was bought. The guarantee covers free replacement of all the parts (no charge for labour) and the only exclusion is the very obvious and necessary one of accident, misuse or abuse by the owner. Surely no manufacturer could be fairer than that? The generous terms of this guarantee underline the faith that a first-rate British manufacturer has in his own product. We should add for the sake of foreign readers that overseas purchasers enjoy precisely the same terms. Would anyone in the U.S.A. care to let us know if there is a single loudspeaker manufacturer in that country who offers a comparable guarantee?

One can always learn something at an Audio Fair and one fact we discovered at Harrogate was that we have been giving wrong advice to some people in the past.

TEST BENCH—continued

over £30 and a complete outfit of comparable standard would probably cost about twice the price of the 434. Tracking "difficult" records—those producing a very high stylus velocity—is always difficult. The audible effect is distortion (groove jumping under extreme conditions) and the owner usually blames the record. This unit will avoid obtrusive distortion in all but the most difficult cases and the only way to overcome it com-

When enquirers ask us to recommend a suitable tape recorder that can be used as an office dictating machine we normally point out than a backspace facility is essential for both dictation and efficient transcription, and this feature is only found on equipment designed solely for offices. We now know that we were quite wrong. The Uher Universal 5000 is a three speed machine running at $\frac{1}{8}$ ths., $1\frac{1}{4}$ ths and $3\frac{1}{2}$ ips. with a whole host of highly original features, not least of which are all of those—including backspace—that would be found on the very best office dictating machines. Suitable for a whole range of applications from automatically triggering a slide projector (with the Diapilot as an accessory) to transcribing the notes of a board meeting this must surely be one of the most versatile equipments available. Any reader requiring a combined dictating machine and tape recorder is strongly advised to investigate the Uher Universal 5000.

B. H. Morris & Co. (Radio) Limited of 84/88 Nelson Street, London, E.1 were showing the range of Teac tape recorders which they are now distributing for the manufacturers. They are in the fortunate position of still having a few of these high grade American machines at pre-budget prices. Please don't complain to us if you are unable to find one because supplies are rapidly running out and the new deliveries will, of course, all carry purchase tax. The same firm, by the way, also distribute Trio amplifiers and tuners.

At the last London Audio Fair we were all looking forward to seeing the new British Chilton stereo tape recorder. Unfortunately owing to difficulties in the supply of components the machine was not in production last April. However Magnetic Tapes Limited, the manufacturers, were all geared up to make a real splash at Harrogate. The splash unfortunately came when their Richmond Surrey Works were inundated with water in the floods less than a week before the show opened. We would like to extend our sympathy—not only was the factory flooded but the proprietor's home was inundated as well. However drying out is proceeding and we are assured that Chilton machines will be readily available in the reasonably near future. As one of the very few completely British high-class tape recorders that day cannot come too quickly.

pletely is to spend a lot more money. For the kind of family listening for which it is intended it is eminently satisfactory.

We can therefore summarise the Sanyo DC-434E in similar terms as we used for the tape deck. It offers good value for money for those who are content with a standard of performance that is likely to make less sophisticated neighbours open their eyes with incredulous astonishment but might equally well cause the dedicated hi-fi enthusiast to emit grunts of displeasure occasionally. Certainly the distaff side of the family will

The firm of Van der Molen Limited, well known for the Van der Molen vertical tape recorders, have recently been concentrating on disc reproducing equipment. However it is hoped that we shall see a new tape machine from this Romford company in a few months' time.

Besides the Tandberg Series 11 battery portable machine (reviewed in last month's edition of *TAPE Recording Magazine*) Elstone Electronics were also showing the new Series 12 stereo tape recorder which, like the 6-X, employs an extra head to apply the bias current to the rear of the tape. The machine follows traditional Tandberg styling except that it is now equipped with a pair of edge type meters instead of the more familiar magic eye type.

All these and very many more friends we were delighted to see at the Northern Audio Fair. At the time of going to press we do not have available an official estimate of the number of visitors but we would guess that it is likely to be upwards of 30,000. And if success can be established by sheer weight of numbers then this was undoubtedly a successful event.

We were encouraged to know that the interest stimulated in London was entirely reflected by the attitude of our more northern friends. As we left the Hotel Majestic we drove up over the moors and far away into the Bronte country. Driving through swirling mists and lashing rain we felt that this was truly the Yorkshire of Wuthering Heights. Mere words cannot hope to convey the sense of desolation and isolation of this most stern and unyielding countryside. Yet all the time we were conscious of the sounds of the Audio Fair of the fine music and the spirit of comradeship of the audio industry, and suddenly it all seemed so right and so fitting that this exhibition should have been held in such surroundings.

It is all too easy to forget that high fidelity does not consist of shiny equipment and expensive gimmickry but simply pure sound. So as we set out across the moors leaving Harrogate far behind we forgot the knobs, the transistors, purchase tax and the accumulation of sales and technical wizardry but carried with us memories of pure sound up into the Yorkshire hills and down into the dales. And there we were truly reminded of what high fidelity is all about.

approve its performance and welcome the freedom from trailing wires.

We should mention that the name OTTO is prominently displayed on the lid and on the accompanying literature. It seems that this represents the initials of the words "orthophonic transistorised technical operation." Whilst we have no doubts that this phrase is pregnant with meaningful significance we feel that its detailed interpretation would neither add to the value of this review nor be within the somewhat limited scope of our joint technical ability.

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.

BARTOK. Concerto for Orchestra and Dance Suite. Concertgebouw Orchestra of Amsterdam, conducted by Bernard Haitink. Epic EC 814, ¼-track stereo, 7½ ips. 102s. 5d. including purchase tax.

Béla Bartók is not the easiest of composers for those who are not familiar with his work. His purely orchestral repertoire is limited; he is best known for his songs, dances and piano pieces. But he is a very rewarding composer of considerable stature through whom we in the West have been helped to a deeper appreciation of Hungarian music. His arrangements of traditional dance tunes are, of course, famous, and his *Music for Strings, Percussion and Celesta* is a work that cannot fail to have considerable impact the very first time it is heard.

The *Concerto for Orchestra* was written towards the end of his life, in 1943. Always one to experiment, Bartók treated the instrumental groups of the orchestra almost as solo ensembles with orchestral accompaniment. Reflected against sections of more elaborate orchestration the result is an ethereal quality of varied textures and brilliant contrasts, making a work full of symphonic surprises that will never tire the listener.

Quiet passages at the opening tend to give an impression of general under-recording; this is quite false as the full dynamic range reveals. Bartók presents the recording engineers with some very tricky problems, but they've been overcome remarkably well in both the *Concerto* and the *Dance Suite*, and so I would recommend this tape to all who want to seriously sit and listen.

STRAVINSKY CONDUCTS. *Le Sacre du Printemps* ("The Rite of Spring"). Columbia Symphony Orchestra conducted by Igor Stravinsky. CBS MQ 481, ¼-track stereo, 7½ ips. 129s. 9d. including purchase tax.

Stravinsky's *Rite of Spring* must be the perfect example of the way in which musical tastes have changed over the last fifty-odd years. Every one has heard the story of the riots that met its first performance as a ballet in Paris in 1913. The audience was outraged; the composer was more angry than ever before. It was a shambles. Today we are so familiar with concert performances that it is not merely accepted by sophisticated musicians but has become a "teething ring" on which the younger generation first find their musical teeth. My own youngest son has been naming it as his favourite classical piece ever since he was fourteen.

But this is not surprising. That first unruly audience was older and more conservative, a typical ballet audience. Only a year later at a concert performance a very much younger crowd wildly acclaimed both the work and the composer. Some will suggest

that we now accept *The Rite of Spring* because after the violence of two world wars we are more in sympathy with the extreme violence and cruelty portrayed by the music. If so, why were the young people of 1914 so thrilled with it? The answer must surely be that in his composition Stravinsky was inspired to liberate for the first time the naturalistic primeval emotions that first caused *homo sapiens* to move his feet and body in the rhythmic motions we call "dance."

The sleeve notes in this album have been written by Stravinsky himself and are absorbingly interesting. He describes not only how the work came to be written and performed but also his own feelings at its reception. He even tells us, with an understandable touch of bitterness, how much he received for the rights to use it in the Disney cartoon film. In conclusion he points out that he had no tradition to fall back on in his composition—he says that what he heard he wrote; he was merely the vessel through which *Le Sacre* passed.

Too modest words for such a monumental achievement. The magnitude of what this man has done can only be appreciated by listening either to a concert performance or to a first-quality recording reproduced through the very best equipment one can lay one's hands on. This tape certainly fulfils one of those requirements. With minimum background noise and no audible distortion at all, it is a perfect example of the superiority of tape over disc. The overall dynamic range is enormous. I also have the disc version and it takes a superlative cartridge mounted in a precision arm to track those grooves without running into trouble.

With tape the problem just doesn't arise; we only have to worry about the capability of the loudspeakers to handle the powerful transients.

One can be quite sure, knowing the fiery temperament of the composer/conductor, that the recording company would not have dared to produce anything other than a perfect finished product. And, of course, they have. My only complaint is that I would have much preferred this work to have been offered on a double play tape to avoid the unfortunate break in the middle. This is no more than a legacy from the gramophone record days when discs had to be turned at the end of the limited programme time on each side. Nowadays this is quite unnecessary with tape where the whole of the two sides of a 12-inch LP disc can easily be accommodated on one side of the tape. Still, if that had been done the price would have been even higher, so I must not complain too loudly.

As you might gather, I am enthusiastic about this album. The more so because I have heard so many very feeble disc versions where, due to misuse, most of the high frequency content has been lost. The vital "edge" to the sound is essential in this above all other music. Dull the brilliance and all the natural excitement is swept away. My advice is either to buy this tape or to confine your listening to this work to the concert hall.

We have been asked to point out that although prices of tapes in our Music Reviews are quoted inclusive of purchase tax some dealers may still hold stocks of a few tax-free items; such supplies are naturally limited but they do represent a substantial saving.

Tapes handled by the Imported Division of E.M.I. Ltd. are only obtainable from E.M.I. Specialist Dealers.

MUSICASSETTE

REVIEW

BIG SWING FACE. Buddy Rich Big Band. Fontana CFJ 6002. 54s. 6d. including purchase tax.

Almost all the "Big Bands" suffered economic decline during the post-war years. As the small instrumental groups became more and more popular increasing costs sounded the death-knell for many famous large orchestras. So it's a refreshing change to hear now the deeper, wider sound of the new Buddy Rich Big Band.

It's a highly individualistic sound, too, in no way reminiscent of the thirties. Handling modern beat music with aplomb he opens the door to a new look at the contemporary musical scene whilst at the same time giving a number like *Bugle Call Rag* the ring of authenticity combined with a modern gloss. The album comprises: *Norwegian Wood, The Beat Goes On, Monitor Theme, Wack Wack, Love for Sale, Mexicali Rose, Willow Crest, Big Swing Face* and *Bugle Call Rag*.

My favourite is definitely *The Beat Goes On*, with twelve-year-old Kathy Rich taking the vocal. She's quite a girl, and by rights we should hear a great deal of her in the future. I have never before heard such poise and natural sense of rhythm and tonal values from a child of that age.

An unusual album well recorded and recommended.

3¾ ips MONO

I WAS MADE TO LOVE HER. Stevie Wonder. Tamla Motown TA-TML 11059. 47s. 9d. including purchase tax.

One has to be awfully careful of misplaced sentiment. It may be a subject that many of us would wish to shy from, but I'm talking about blind negro singers.

I remember that fifteen years ago, when I was caught up in a wild and all-embracing adolescent craving for true and historic jazz and blues music—the stuff of the early twenties and thirties—I would seek out re-issued records by performers like Blind Blake and Blind Lemon Jefferson in preference to other, equally obscure artistes . . . simply because they were coloured and sightless. We've seen a similar thing in the slavish adulation of Ray Charles . . . talented, certainly, but genius, no (Although I could be lynched for saying as much).

Now we have Stevie Wonder. Formerly Little Stevie Wonder. Well, here we don't have to be awfully careful. We can say without fear of contradiction that Stevie Wonder is a knockout performer, and well worthy of being included in the fantastic brigade of talent that Tamla Motown is currently off loading upon us.

The tape begins with one of Stevie's best known hits, *I Was Made To Love Her*. You all know the record. You all know the quality of recording. Of course it's the same here.

Perhaps the best thing about this tape is the variety in it. We have "soul", we have high-powered, driving numbers with full orchestral backing, we have steady, beaty ballads with a choir in the background. My

personal favourites happen to be *I'd Cry and A Fool For You* . . . although on the latter, Stevie Wonder's voice tends to be swamped by the backing. Incidentally, this particular track is a Ray Charles composition . . . and sounds it.

This tape begins with *I Was Made To Love Her, Send Me Some Lovin', I'd Cry, Everybody Needs Somebody, Respect, My Girl*. Side two: *Baby Don't You Do It, A Fool For You, Can I Get A Witness?, I Pity The Fool, Please, Please, Please and Every Time I See You Go Wild*.

SUMMER PARTY. MRS. MILLS Parlophone TA-PMC 7046. 47s. 9½d. including purchase tax.

I have nothing at all against "Our Glad". Mrs. Mills is undoubtedly a good entertainer.

But honestly . . . what's this sort of stuff doing on tape? At the price the Government forces us to pay these days, are we really expected to fork out for a half-hour or so of public-bar piano that we could have for a half of bitter in the local?

All right . . . so many of our bar-room ivory ticklers are awful, and not a patch on Mrs. Mills . . . but this kind of barrelhouse rag-picking is surely suited only to the background at any event. Well, maybe if you're having a knees-up party, and Auntie Kate can't manage to lift down the lid on the old joanna and entertain your guests, you could go and buy this tape. Otherwise, no. It defies review, and the only thing I can say in its favour is that it is so well recorded that it almost gives me a hangover to listen to it.

Hear Glad left-hand her way through *In The Good Old Summertime, Tip-Toe Through The Tulips, You Are My Sunshine, Roses of Picardy, April Showers, Isle of Capri, Down At The Old Bull And Bush, Cruising Down The River, Blue Skies, Indian Summer, Shine On Harvest Moon, I Do Like To Be Beside The Seaside, Out Of Town*, and *Let's All Sing Like the Birdies Sing*.

Aaaah! Whatever happened to *On The Sunny Side Of The Street*?

GREATEST HITS. The Temptations. Tamla Motown TA-TML 11042. 47s. 9½d. including purchase tax.

Over three years ago, at a Detroit theatre, a big beat show was taking place in front of hundreds of fans . . . but it wasn't going so well. Primarily, because the hottest act on the bill was unable to appear.

Five young boys at a nearby party heard about this, and went down to offer their services. They called themselves The Temptations, accepted fifteen dollars a head, and saved the show!

I like The Temptations. Perhaps because of that brass-necked story of their launch into successful show-business. They're out on this very professional and easy-on-the-ear tape from E.M.I.—yet another on the Tamla Motown label.

Recording is good and well-balanced, and the tracks have a pleasant orchestral backing that complements, but never intrudes.

What is there to say except that once more it's the usual Tamla Motown sound? I might wag just one cautioning finger in the direction of E.M.I. They're issuing an awful lot of this stuff, and it certainly tends to sound very samey. So it's good, but the market could get swamped. Nobody (not even someone from Detroit) could listen to Tamla Motown all night.

Tracks here are: *The Way You Do The Things You Do, My Girl, Ain't Too Proud To Beg, Don't Look Back, Get Ready, Beauty Is Only Skin Deep, Since I Lost My Baby, The Girl's Alright With Me, My Baby, It's Growing, I'll Be In Trouble, and Girl (Why You Wanna Make Me Blue?)*

CLIFF IN JAPAN. Cliff Richard. Columbia TA-SX 6244. 47s. 9½d. including purchase tax.

Resisting the temptation to comment "velly velly nice" and recommend that the tape is played upside down and back to front, I'll say this live concert by Cliff Richard in the Land Of The Rising Sun is appealing. If you ignore the obvious "emptiness" that surrounds these live shows.

Cliff goes through a repertoire drawn from many sources, and including a good sprinkling of his older hits. Minus The Shadows this time, he is accompanied by an orchestra conducted by the redoubtable Norrie Paramor, and enjoys the backing of an anonymous female group. Unhappily, he also enjoys the accompaniment of the odd microphone whistle in parts.

The tape (which all Cliff Richard fans will want, but may safely be passed over by others) includes a considerable sprinkling of inter-number screams. A Japanese scream, incidentally, sounds exactly the same as a British one! One final note . . . you can actually hear Cliff doing a bit of announcing in the Jap tongue!

Tracks: *Shout, I'll Come Runnin', The Minute You're Gone, On The Beach, Hang On To A Dream, Spanish Harlem, Finders Keepers, Visions, Move It, Living Doll, La La La La La, Twist And Shout, Evergreen Tree, What'd I Say, Dynamite, Medley: Let's Make A Memory, The Young Ones, Lucky Lips, Summer Holiday, We Say Yeah.*

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Readers wishing to pursue the suggestions made by John Borwick in his article, "Sounds in Profusion" on page 466 are strongly advised to study two of our Tape Recording Handbooks: *The Law and Your Tape Recorder* by Andrew Phelan and *Sound Effects on Tape* by Alan Edward Beeby. Both these publications cost 3s. 6d. each post free from: Tape Bookshop, Prestige House, 14/18, Holborn, London, E.C.1.

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... always ask for UHER tape recorders and accessories. Quality is the simple, single aim behind their manufacture. Their production is also the sole pre-occupation of the UHER Company, whose specialisation has led to many outstanding developments, including the first application of printed-circuit techniques in tape recorder manufacture. For further details contact BOSCH LIMITED, UHER Division, Rhodes Way, Radlett Road, Watford, Herts. Telephone Watford 44233.

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has established a universal reputation for quality backed by continuous research, development and over 80 years of manufacturing experience. 85,000 BOSCH employees are universally engaged in the research, manufacture, distribution and service of BOSCH products. These include an impressive range of domestic appliances; radios; stereograms; tape recording equipment; automotive accessories and safety equipment; electric tools; hydraulics; language laboratory and closed circuit television systems... all of which are marketed in the U.K. by BOSCH LIMITED... a member of the BOSCH GROUP.

NEW PRODUCTS

TWO SPECIALS FROM TRUVOX

TWO new all-British tape recorders have been introduced by Truvox Limited and they are designated Models R5 and R25. They correspond respectively to the mono versions of the recently introduced Truvox Series 50 and Series 200 recorders with modifications to make them suitable for such application as teaching, public address systems and various commercial and industrial duties.

The R5 is a medium priced machine at 59 guineas plus purchase tax and operating half-track it offers three speeds— $1\frac{1}{2}$, $3\frac{1}{2}$ and $7\frac{1}{2}$ ips. Wow and flutter is claimed as better than 0.14 per cent at $7\frac{1}{2}$ ips and frequency response 30-17,000 Hertz plus or minus 3 dB at that speed. Signal-to-noise ratio is given as better than 48 dB and equalisation is to the new CCIR standard. Jack sockets are fitted throughout for both inputs and outputs.



In addition to recording and playback simple superimposition of a commentary or background music is possible. Greater versatility is offered in the R25 which is available in two- or four-track versions. This machine has tape/source monitoring, track to track recording and an improved specification. Wow and flutter is quoted as 0.08 per cent at $7\frac{1}{2}$ ips and frequency response 30-18,000 Hertz plus or minus 2 dB at that speed. Signal-to-noise is claimed to be better than 50 dB on the half-track version and better than 48 dB four-track. Output power is 10 watts and the equipment is supplied complete with semi-cardioid moving coil microphone. Cost of the R25 is 97 guineas plus purchase tax for either the half-track or four-track versions.

Truvox Limited, Hythe, Southampton.

AKAI ULTIMATE SOPHISTICATION

TWO highly sophisticated tape recorders from Akai are now being launched by Pullin Photographic Limited. Model X-360 is a complete record/playback equipment including two built-in 5 in. speakers and audio output of 25 watts per channel (music power) at the extension speaker outlets. Model X-360D is identical in all respects but is offered less the audio output stages and so is intended for use with an existing amplifier and loudspeaker setup.



The vast range of highly complex and ingenious facilities offered in these machines is too great for detailed listing but they include: magnetic brake, Crossfield head, switchable automatic record control; automatic dust minder (indication by warning pilot light), automatic continuous reverse, sensing tape reverse, three speed motor offering four speeds with capstan sleeve, four heads—erase, playback, record and bias—tape lifter in fast forward and rewind operation, electrical track selector, wow and flutter claimed at less than 0.04 per cent rms at $7\frac{1}{2}$ ips, frequency response given as 30 to 18,000 Hz plus or minus 3db at $3\frac{1}{2}$ ips, equalisation correct to NARTB standards, etc. etc.

Recommended retail prices of these machines, inclusive of purchase tax, is £339 for model X-360 (complete machine with audio outputs) and £290 for model X-360D (deck and pre-amp only). Full details from: *Pullin Photographic Limited, The Rank Organisation, 11 Aintree Road, Perivale, Greenford, Middlesex.*

ANOTHER BIB ACCESSORY

YET another ingenious tool is introduced by Multicore Solders Limited—the Model 6 BIB wire stripper and cutter.



It is claimed that this new tool enables insulation to be removed precisely and quickly from the ends of flex and cable without nicking the wire. Adjustable aperture settings are provided for different diameters of cable and in addition there are two cutting positions, one for normal flex and the other on the tip for cutting wire after it has been connected to a tag or bolt. Recommended retail price is 8s. 6d.

Multicore Solders Limited, Multicore Works, Hemel Hempstead, Hertfordshire.

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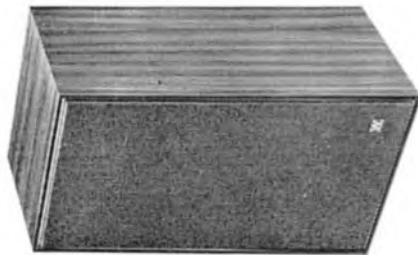
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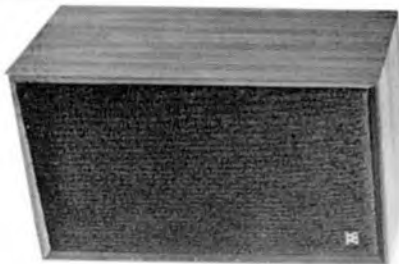
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ROTHWELL, KETTERING, NORTHANTS

LATEST DEVELOPMENTS BY WHARFEDALE

THREE completely new loudspeaker units are being offered by Rank Wharfedale Limited. The first of these, the Melton, is said to give the advantages of big speaker systems in a compact cabinet. A new wide spectrum 12 in. base unit and the Acoustiprene low mass tweeter are claimed to give a clear firm bass response together with smooth treble performance. An electrical crossover unit links bass and treble loudspeakers at 1500 Hz and it is at this point that each loudspeaker is designed to roll-off mechanically. The resulting response is claimed to be smooth from 45 Hz to 17,000 Hz. Styled in a choice of oiled teak or polished walnut veneers dimensions are 21 in. x 13 in. x 10½ in. and power handling capacity is given as 20 watts rms and impedance 4 to 8 ohms. Cost of the Melton is £29 10s. 0d. per unit.



Next in line is the Dovedale III which the manufacturers state has the smoothest performance they have ever produced. This has been accomplished by using three new transducers and an ingenious crossover network to carry the response from 40 to 20,000 Hz without any audible peaks and troughs.



Each loudspeaker, 12 in. base, 5 in. mid-range and 1 in. tweeter has been specially matched to the needs of the system. The physical roll-off characteristic of each speaker has been designed to match its neighbour and the electrical cross-over operating at 500 Hz and 2,500 Hz makes the change over points audibly undetectable. Power handling capacity is given as 25 watts rms and impedance 4 to 8 ohms. Cabinet work is in oiled teak or polished walnut and the price of the Dovedale III is £39 10s. 0d.

The largest unit in the range is the Rosedale which incorporates a 15 in. base unit. Rosedale cabinets are beautifully finished in period style with teak or walnut veneers and the physical dimensions are 24 in. x 23 in. x 13½ in. Power handling capacity is given as 25 watts rms and impedance 4 to 8 ohms. The price of the Rosedale enclosure is £55.

Rank Wharfedale Limited, Idle, Bradford, Yorks.



A FULL RANGE OF SCOTT EQUIPMENT

A COMPLETE range of Scott amplifiers, tuners, and tuner amplifiers are about to be distributed in this country by H. H. Scott International. Special features include FET's in a silver plated front end in all tuners and tuner amplifiers, silicon transistors and the use of integrated circuits in the more powerful models. A U.K. service and spares organisation is being set up, and a two-year guarantee is offered with all equipment.



The models offered include 299F stereo control amplifier 20 watts rms per channel at £82, 260B a more powerful version giving a claimed 40 watts rms per channel at £125, 315B a self powered stereo wideband FM tuner at £99, 342B an integrated FM stereo tuner/amplifier with a claimed output of 20 watts rms per channel at £149, 382B an integrated FM stereo and AM tuner/amplifier output 20 watts per channel at £169 and model 344C an integrated FM wideband stereo tuner/amplifier with a claimed power output of 30 watts rms per channel at £189.



The manufacturers emphasise the special care devoted to factory testing before sale. It is said that every unit undergoes a "life test" in which it is constantly on for 6 to 24 hours a day at maximum voltage and under simulated speaker load. In addition, every unit undergoes two separate listening tests, is shaken and dropped eight inches before test, is visually inspected at least five times, every fifth unit is re-tested as an overall quality check, every fifteenth unit is "life tested" and then rechecked by senior quality control technicians and finally one out of every twentyfour packed units is re-opened and rechecked. The Scott catalogue contains a great deal of interesting audio information as well as complete technical specifications and is obtainable from:—

H. H. Scott International, 84, Hucclecote Road, Gloucester.

BSR PLINTHS AND COVERS

FOLLOWING the growing demand for shelf unit audio systems BSR Limited is now making available plinths and covers for its MA65, MA70, and MA75 automatic/manual turntable units.

The bases are sturdily constructed in wood, with cutouts to accommodate any of the three units. Covers are made in styrene, tinted bronze for an attractive appearance but enabling the changer to be seen through the cover. Overall dimensions with base fitted to cover are 13½ in. x 15 in. x 7½ in. deep.



Covers and bases are available separately and prices are: plinths £6 8s. 0d. (including £1 3s. 0d. purchase tax) covers £4 16s. 11d. (including 17/5d. purchase tax).

BSR Limited, Monarch Works, Old Hill, Staffordshire.

TRADE ANNOUNCEMENT

As from October 1, prices of all Mono tape recordings marketed under the Recotape label will be reduced by as much as 7s. 6d. on a tape previously selling at 47s. 6d. including Purchase Tax. Proportionate reductions run through the entire range of prices and have been introduced to offset some of the burden of Purchase Tax.

MUSICTIME Background Music will be similarly reduced in price; 1½-hour programmes come down from 61s. inclusive of Tax to 56s. inclusive of Tax and the 3-hour programmes are being reduced from 114s. 10d. to 100s. inclusive of Tax.

Prices for imported Stereo tapes, and UK-dubbed stereo tapes remain the same and we are advised that considerable stocks are still available free of Purchase Tax.

Full details of all items affected by these price changes may be obtained from dealers handling pre-recorded tapes, or direct from the distributors: Transatlantic Music Tapes (Distributors) Limited; 36, High Street, Salisbury, Wilts. Salisbury 3888.

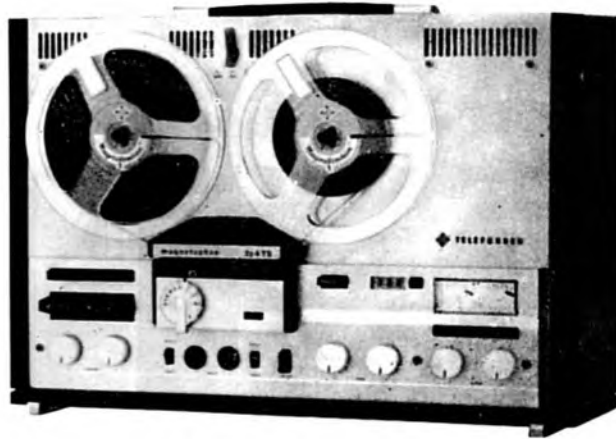
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40-8,000 cps at 1 1/2 ips
Signal to noise ratio
50 db at 7 1/2 ips, 48 db at 3 3/4 ips
Wow and flutter, $\leq \pm 0.25\%$ at 3 3/4 ips
 $\leq \pm 0.15\%$ at 7 1/2 ips, $\leq \pm 0.4\%$ at 1 1/2 ips
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Ferguson 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	0 0	96 0 0
Philips EL3555 ...	25	19 4	6	5 8	101 19 4
Aiwa TP1012 ...	26	0 0	6	8 2	102 18 0
Akai 1710W ...	27	17 3	6	16 8	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 5 0
Ferrograph 722/4 ...	46	15 0	11	10 5	185 0 0
Akai M9 ...	49	3 5	12	3 4	195 3 5

STEREO TAPE UNITS

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 ...	40	6 8	10	0 0	160 6 8

4-TRACK MONAURAL

Grundig TK140 ...	11	14 6	2	18 4	46 14 6
Philips EL4305 ...	11	17 9	2	16 8	45 17 9

4-TRACK MONAURAL

	Deposit		12 Monthly Payments		Cash Price
	£	s. d.	£	s. d.	
Ferguson 3226 ...	11	10 0	2	16 8	45 10 0
Telefunken 201 ...	11	18 9	2	19 7	47 13 9
Ferguson 3228 ...	11	19 0	3	0 0	47 19 0
Philips EL4306 ...	14	1 8	3	10 0	56 1 8
Ferguson 3230 ...	14	13 0	3	13 2	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
Wyndor					
Vanguard ...	18	18 0	4	14 6	75 12 0
Truvox R54 ...	18	18 3	4	14 11	75 17 3
Tandberg 1526 ...	20	19 0	5	3 4	82 19 0
Truvox R204 ...	31	14 2	7	15 0	124 14 2

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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	18 3	4	14 11	75 17 3
Beocord 1100 ...	24	10 0	6	2 6	98 0 0
Brenell MkV/3					
Std. 26 17 9			6	10 0	104 17 9
Brenell MkV/3 Mtr. 28			2	7 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 ...	35	16 8	8	16 8	141 16 8

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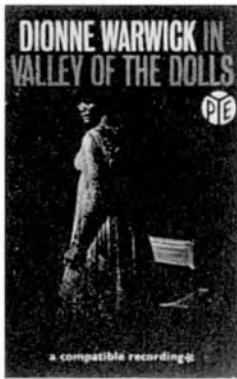
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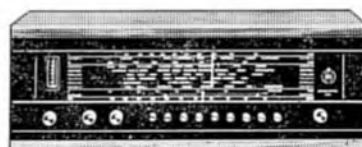


Bang & Olufsen— for those who consider design and quality before price

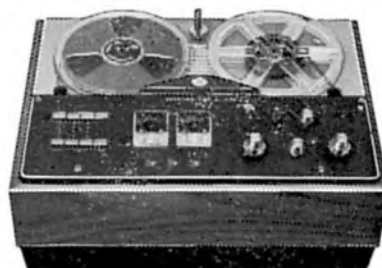
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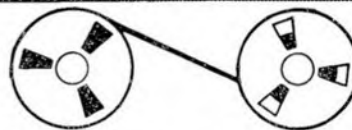
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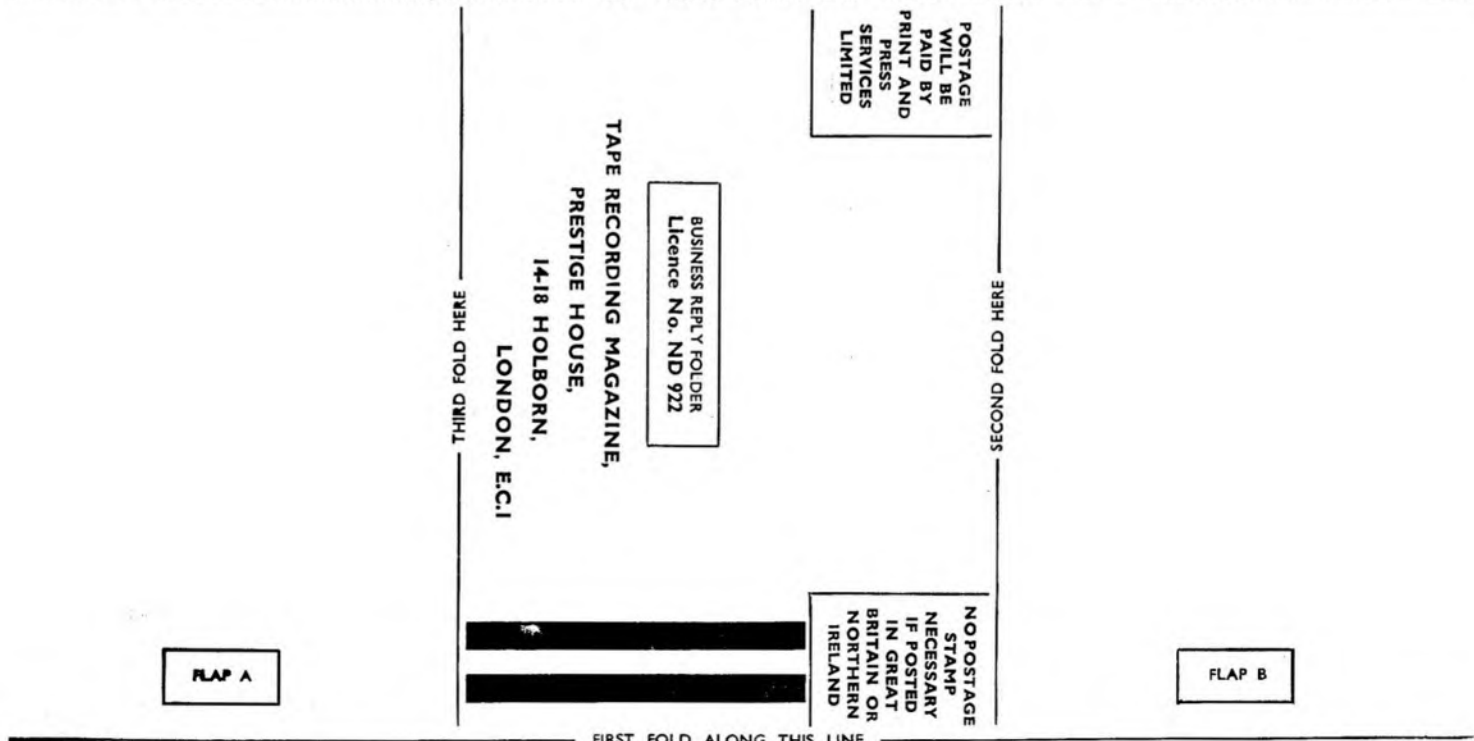
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