

JANUARY 1971

TAPE

RECORDING MAGAZINE

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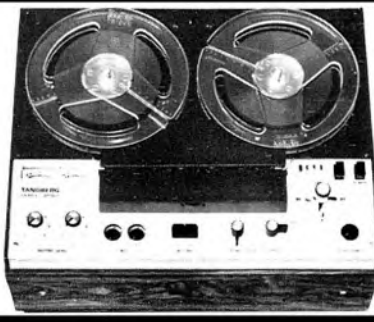
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Special offers for Tape Recorder enthusiasts

TANDBERG Series 3000

Take a close look at the outstanding features and facilities incorporated in this new model: 1. 4 heads. 2. Tandberg cross-field recording technique. 3. Mixing in mono. 4. AB-test switch. 5. Sound-on-sound and echo 2 recording controls and indicators. 6. 3 speeds. 7. Listening during fast and rewind. 8. Pause button. Instant start/stop. 9. Automatic end stop.

Features like these and Tandberg's usual high quality and attention to detail continue through the range of Hi-fi equipment. Ask for details and special discount prices.



FERROGRAPH Series 7

Available in mono or stereo, Ferrograph Tape Records incorporate an unrivalled range of facilities including two inputs per channel with independent mixing, independent tone controls, and signal level meters for each channel for playback and record. They are available in elegant hardwood or in vinyl case to suit any interior or requirement.

FOLLOW THE PROFESSIONALS, RELY ON FERROGRAPH.

GRUNDIG

High quality sound recording without fuss is the keynote of the Grundig Range. With concise easy to operate controls and at Cave's low prices a Grundig gives you real value for money. Compare our prices before you buy. Take these examples.

	List Price	Cash Price
Grundig TK120	£39 5 0	£28 18 0
Grundig TK149	£57 12 8	£46 19 0
Grundig TK146	£68 2 10	£57 3 0

AKAI TAPE DECKS AND RECORDERS

Prove for yourself the outstanding merits of the Akai 4000D. Having all the essential functional facilities, it also has many extras normally found on more expensive machines. The Akai 4000, the full tape recorder version of this excellent deck adds playback amplifiers and a pair of fine built-in speakers for stereo monitoring or just listening. And the Akai 1710 is surely one of the best complete tape recorder buys on the market to-day, combining all the best features of Akai engineering and construction. The above three models and the whole Akai range are available from Cave's at very low prices.

TELETON FBX510 D

The quality of recording on this amazing stereo tape deck, has to be heard to be believed. Features include two vu-meters for record level and adjustable record level, three speeds, provision for seven inch spools, two microphone inputs, and a very attractive walnut finished case. List price £62/0/0. Cash price £52/15/0.

8 Track Stereo Cassette Players and Recorders

Are now in stock at Caves and available for demonstration. The equivalent of 2 LP records' playing time in full stereo is now possible even in your car. Find out more about these fascinating units. Ask for details and Cave's bargain prices.



TAPE RECORDERS AT BRITAIN'S BEST DISCOUNTS!

TAPE RECORDERS	List Price	Cash Price
Revox 1102/1104	£204 15	£180 10
Revox 1122/1124	£236 5	£208 10
Revox 1302/1304	£204 15	£180 10
Revox 1322/1324	£236 5	£208 0
Revox 1222/1224	£246 15	£217 10
Revox 1997 Dust Cover	£5 5	£4 18
Ferrograph 713	£188 10	£166 0
Ferrograph 702/704	£207 7	£180 10
Ferrograph 722/724	£242 10	£202 19
Ferrograph Cover	£6 5	£5 16
Akai 4000D	£89 19	£79 19
Akai 1710L	£89 0	£77 12
Akai 4000	£124 18	£102 19
Akai X5000W	£177 19	£156 13
Akai M10L	£245 1	£215 13

TANDBERG SPECIAL PRICES ON APPLICATION

Philips 4302	£35 17	£29 19
Philips 4307	£49 10	£42 10
Philips 4308	£60 10	£51 19
Philips 4404	£83 0	£71 5
Philips 4407	£105 0	£90 2
Philips 4408	£139 0	£119 6
Philips 2502	£49 10	£42 11
Philips 2200	£14 18	£12 5
Philips FL3302	£28 7	£21 10
Philips 2400	£69 0	£60 13
Philips 2400 inc. Speakers	£86 0	£75 13
Philips 2401 inc. Speakers	£99 0	£87 0
Philips N2202	£29 18	£26 18
Philips N2602	£42 0	£29 19

Uher 4000L	£145 10	£130 18
Uher 4200	£187 5	£168 10
Uher 4400	£187 5	£168 10
Uher 714L	£55 10	£49 18

Sanyo Cassette		£20 19
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Telefunken M501	£43 11	£38 8
Telefunken M204TS	£124 19	£109 18

Grundig TK120	£39 5	£28 18
Grundig TK124	£44 18	£35 7
Grundig TK144	£49 19	£42 5
Grundig TK149	£57 12	£46 19
Grundig TK121	£54 15	£45 19
Grundig TK141	£59 4	£49 14
Grundig TK146	£68 2	£57 3

Truvox R44		£45 10
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Teleton T710	£34 15	£30 10
Teleton 5L40	£37 10	£32 19
Teleton FBX 510D	£62 0	£52 15

Crown CTR8750	£32 11	£24 19
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it makes SOUND SENSE, buy from CAVES

Let's cut the crackle! Telefunken 204 TS.

You don't want a load of waffle about the brilliance of the Telefunken 204TS all-stereo tape recorder.

It speaks for itself!

Whatever you put in, comes out unmolested. No irritating hums, buzzes or crackles find their way onto the track.

But what you want is facts not words.

It complies with the very, very stringent German tape recorder standards.

Separate controls for recording and playback, including sound level meters.

Single selector switch for all operating functions.

Three speeds.

Signal to noise ratio $\geq 50\text{db}$ at $7\frac{1}{2}\text{ips}$.

And it can be used as a straight-through stereo amplifier as well!

Another fine example of the Telefunken philosophy: dedication to faithful reproduction.

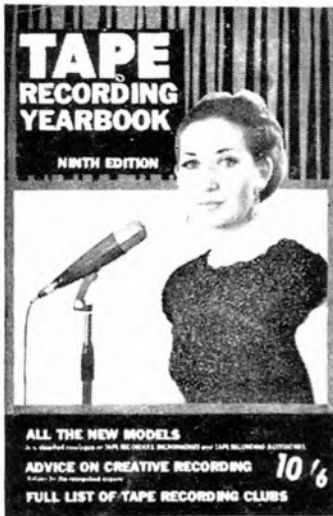
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G.L.C photo

Our concert hall is little bigger than an LP sleeve

Any good speaker will reproduce orchestral sound with a fair degree of accuracy. But some speakers give you a depth and richness of sound that adds new pleasure to your listening.

B&W's DM1 is just such a speaker. We modelled it closely on our DM3—already acknowledged as the finest monitor speaker in its class.

Response over the whole frequency range is exceptionally smooth, and distortion is minimal. In listening terms this means bright, clear, faithful reproduction. The strength of the brass, the softness of the strings. All the majesty of the full orchestra.

You'd expect any speaker that gives you this kind of performance to be a little on the big side. But the DM1 is small—so small it's not much taller than an LP sleeve. Consequently, it fits in a lot of places where larger speakers don't, and leaves you more room for the furniture.

Listening to the DM1 is very much like having an orchestra performing in your own home . . . except there's a lot more room!

B&W DM1
£32



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Wide
—because of its wide frequency response: 30–20000 Hz.

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(we could go on) —because of its matt chrome finish.

Philips EL6042; a dynamic omnidirectional microphone that's easy on the eye, for high quality audio that's easy on the ear. Just return the coupon and we'll tell you about its light weight, low impedance and all the other details that make Philips EL6042 just right for your equipment at only £32.



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The Sansui Anticipators

In the Sansui lexicon, to merely be contemporary is to be obsolete. It's a condition we simply can't live with if we're to maintain our world-famed reputation as the anticipators of new ideas in stereo.

Ideas like the 200 watt EIGHT AM/FM Stereo Tuner Amplifier and the 3-motor 4-head SD-7000 stereo tape deck. Components for those who can't wait for tomorrow. From the company which specializes in tomorrow.

Take the EIGHT, a receiver so advanced it's quite on a par with the most sophisticated control amplifier. Which in fact is equipped with a Triple Tone Control circuit, a virtue usually associated only with such amplifiers. Which has a wide 10 to 40,000Hz power bandwidth, a 10 to 40,000Hz frequency response range in its separately usable preamplifier section, which handles up to three sets of speaker systems and two taping units and which makes distortion a word without meaning.

Or take the SD-7000, more than a match for any comparably priced tape deck you can name. Equipped with an advanced relay/solenoid controlled tape transport section, it anticipates every

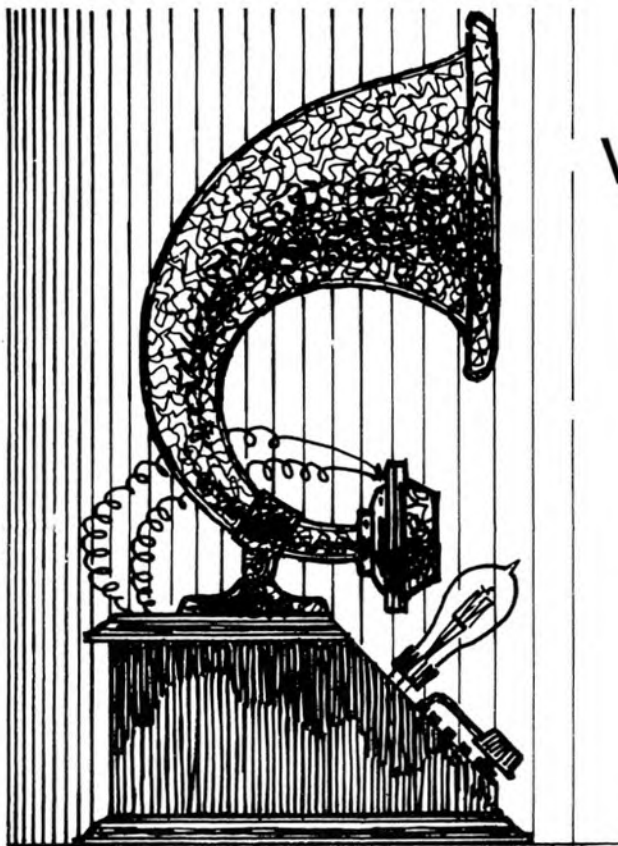
feature you've ever hoped for in a 4-track 2-channel deck.

Such as Automatic Rewind and Repeat in addition to Automatic Reverse. Such as an impressive array of tape protection devices. And tonal quality you have to hear to appreciate.

If contemporary stereo interests you, almost any stereo maker can help. But only your authorized Sansui dealer can show you the components you see here.

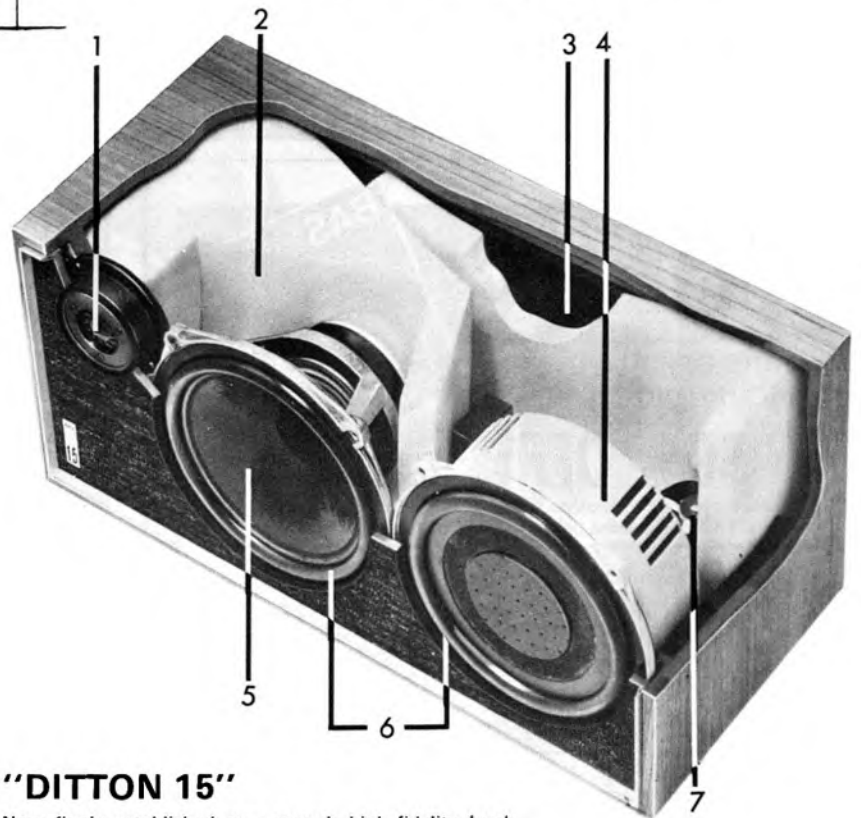


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Philips N2400	23	0	0	3	15	0	68	0	0
Philips N4404	28	0	0	4	11	8	83	0	0
Ferguson 3232	33	5	0	5	1	10	93	5	0
Sony MR929	33	4	9	5	6	10	97	4	9
Sony TC252	33	5	0	5	10	10	99	15	0
Philips N4407	35	0	0	6	13	4	105	0	0
Akai 1710L	36	6	8	6	1	2	109	0	0
Sony MR939	38	13	6	6	2	3	112	0	2
Grundig TK247	37	10	0	6	5	0	112	10	0
Sony TC630	66	15	0	11	18	0	199	15	0
Sony TC230	40	11	9	6	15	0	121	11	9
Telefunken 204TS	41	19	0	6	13	4	124	19	0
Philips N4408	47	0	0	7	13	4	139	0	0
Tandberg 1241X	49	0	0	8	6	8	149	0	0
Sony TC540	50	15	0	8	5	0	149	15	0
Akai 1800	53	0	0	8	13	0	158	0	0
Akai 1800SD	66	6	8	11	1	2	199	0	0
Akai M9	65	0	0	10	16	8	195	0	0
Ferroglyph 722/4	82	10	9	13	6	8	242	10	9
Philips Pro 12	83	10	0	13	16	8	249	10	0
Revox 1122/24	78	15	0	13	2	6	236	5	0

STEREO TAPE UNITS

	Deposit			12 Monthly Instalments			Cash Price		
	£	s.	d.	£	s.	d.	£	s.	d.
Sony MR801	24	3	0	4	0	6	72	9	0
Sony TC252D	24	9	0	4	0	6	72	15	0
Sony TC355	34	2	6	5	10	0	100	2	6
Tandberg 1641-X	30	0	0	4	19	2	89	10	0
Akai 4000D	30	18	8	4	18	4	89	18	8
Tandberg 3000X	33	18	0	5	10	0	99	18	0

CASSETTES

	Deposit			12 Monthly Instalments			Cash Price		
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Sony M48M	7	5	0	1	3	4	21	5	0
Sony M410G									
Mns/Bat.	11	5	0	1	17	6	33	15	0
Philips RR290									
+ Radio	11	10	0	1	17	6	34	0	0
Sony TC100A									
Mns/Bat.	14	9	3	2	6	8	42	9	6
Sony MR411									
Mns/Bat+FM/AM	16	15	0	2	15	0	49	15	0
Philips 2400 Stereo	22	14	0	3	15	6	68	0	0
Philips 2400									
incl. L. Spkrs.	28	14	0	4	15	6	86	0	0
Sony TC130 Stereo	37	10	0	6	5	0	112	10	0

BATTERY OPERATED

Philips RR290	11	10	0	1	17	6	34	0	0
Grundig C200	12	7	6	2	0	10	37	17	6
Philips RR482	18	4	0	3	0	8	54	12	0
Telefunken 302TS	22	15	0	3	15	10	68	5	0
Uher 4000L	48	10	8	8	1	8	145	10	0
Uher 4200/4400	62	10	0	10	7	11	187	5	0

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AKAI 1710L STEREO

3 Speeds, 4 Track, 2 Built-in speakers. Demonstration Tape. Black Leather with Carrying Handle.

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LONG PLAY	List Price	AVON PRICE	Qty.	C.60	List Price	AVON PRICE	Qty.
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5" 900'	34/3	17/1			31/4	19/9	
5 1/2" 1200'	39/5	26/-		LH Low Noise, high output. Specially for the amateur			
7" 1800'	56/7	37/3		LONG PLAY			
DOUBLE PLAY				5" 900'	37/9	24/6	
3" 300'	14/4	*9/-		5 1/2" 1200'	43/5	27/6	
4" 600'	16/-	26/1		7" 1800'	62/1	40/6	
5" 1200'	39/3	26/-		DOUBLE PLAY			
5 1/2" 1800'	56/5	37/3		5" 1200'	43/3	27/6	
7" 2400'	69/7	46/3		5 1/2" 1800'	61/11	40/6	
TRIPLE PLAY				7" 2400'	76/7	50/-	
3" 450'	21/10	14/6		TRIPLE PLAY			
4" 900'	34/1	22/3		5" 1800'	61/9	40/6	
5" 1800'	56/3	37/3		5 1/2" 2400'	76/5	50/-	
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stereo/mono mixing unit

Meets professional specifications for frequency response (± 2.5 dB 20-20,000 Hz) noise (55 dB, S/N an input signal of 180 uV at 200 Ohms or 70 uV at 30 Ohms) and distortion (less than 0.05% at rated input). The input stages are suitable for ribbon, moving coil or capacitor microphones (1 stereo pair and 2 pan controlled mics). The output stages are suitable for feeding any tape-recorder or amplifier. Individual test certificate with every unit. Price £45 (ex-factory). (PP18 Power Pack now available, £8 15s).

John Borwick wrote in the April 1970 issue of THE GRAMOPHONE: "These are excellent results and were verified on all four inputs."

AUDIO RECORD REVIEW wrote in its report: "Our product reviewer Peter Cox has had this 4S mixer in regular use for the last couple of months and has admired its professional performance . . . warmly recommended."

Further details from:

SOUNDEX LTD.

18 Blenheim Road, London, W.4. 1ES

Tel: 01-995 1661

More Akai 4000D tape decks are sold than any other make.

(and it's not just because they cost less)

A lot of people say that the Akai 4000D is the best tape deck in Britain for under £100. It's certainly the biggest selling tape deck in Britain, if that's anything to go by. But then you do get a lot for your £89.19.1 (recommended).

The Akai 4000D gives you 3 heads for off-the-tape monitoring and sound on sound recording. And it also gives you the famous Akai one micron gap heads for increased frequency response.

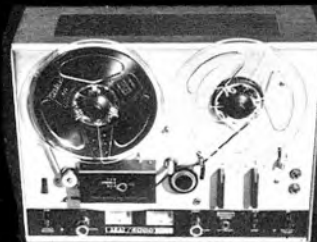
It's this combination of sophisticated features and low price that makes the Akai 4000D such good value.

And it doesn't only apply to the 4000D tape deck either. For £124.18.0 you can have the Akai 4000 tape recorder. It has the same specification as the 4000D plus a power amplifier and monitor speakers.

There are a lot of other things we could tell you about Akai tape equipment—but why listen to us when you can go to your hi-fi dealer and listen to the real thing.

PERFORMANCE SPECIFICATIONS

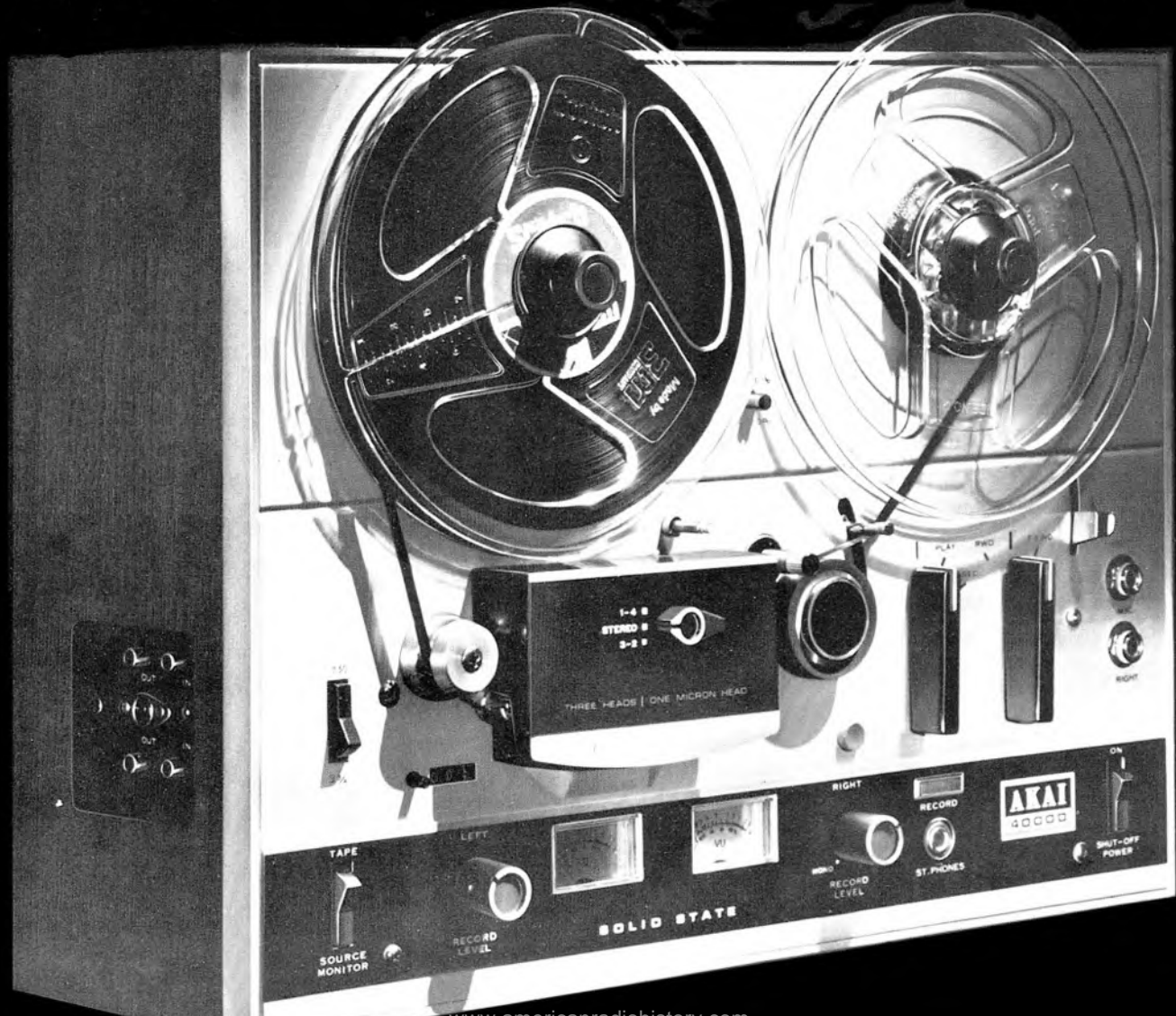
TAPE SPEED	2 speeds . . . 3 $\frac{3}{4}$ and 7 $\frac{1}{2}$ ips
WOW AND FLUTTER	Less than 0.15% RMS at 7 $\frac{1}{2}$ ips Less than 0.20% RMS at 3 $\frac{3}{4}$ ips
FREQUENCY RESPONSE	30 to 22,000 Hz \pm 3db at 7 $\frac{1}{2}$ ips 30 to 16,000 Hz \pm 3db at 3 $\frac{3}{4}$ ips
SIGNAL TO NOISE RATIO	Better than 50db
LEVEL INDICATOR	2VU meters
RECORDING SYSTEM	4 track stereo/monaural system
SPECIAL FEATURE	3 heads for off-the-tape monitoring Plus sound-on-sound recording



AKAI®

For further details, write to:

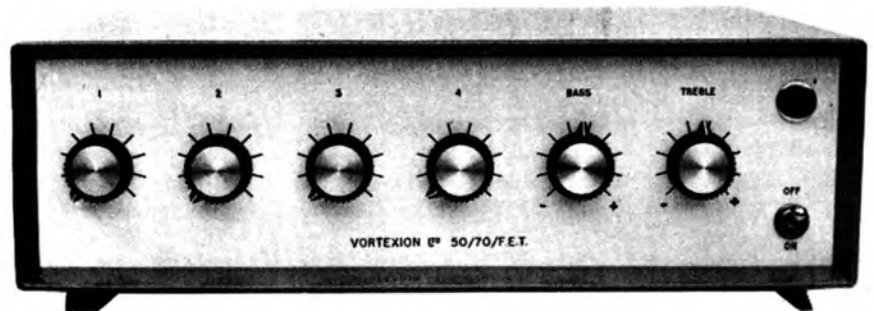
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Telephone: 01-568 9222



Vortexion

This is a high fidelity amplifier (0.3% intermodulation distortion) using the circuit of our 100% reliable – 100 Watt Amplifier (no failures to date) with its elaborate protection against short and overload, etc. To this is allied our latest development of F.E.T. Mixer amplifier, again fully protected against overload and completely free from radio breakthrough. The mixer is arranged for 3-30/60Ω balanced line microphones, and a high impedance line or gram input followed by bass and treble controls. 100 volt balanced line output.

THE VORTEXION 50/70 WATT ALL SILICON AMPLIFIER WITH BUILT-IN 4 WAY MIXER USING F.E.T.s.



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

100 WATT MIXER AMPLIFIER. with specifications above is here combined with a 4-channel F.E.T. mixer, 1 gram, 1 tape and 2 mic. inputs with tone controls and mounted in a standard robust stove enamelled steel case. A stabilised voltage supply feeds the tone controls and pre amps, compensating for a mains voltage drop of over 25% and the output transistor biasing compensates for a wide range of voltage and temperature. Also available in rack panel form.

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

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

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Abridged Specification - Model SA73

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 Harmonic Distortion -1 dB
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 (406 x 127 x 300 mm)
 Weight: 18 lb (8.2 kg)



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Frequency Range FM: 88-108 MHz
 AM: 525-1605 Hz (571-187 M)
 Music Power (IHF) 90W at 4Ω, 80W at 8Ω
 Continuous Power (RMS) 32/32W at 8Ω
 Frequency Response 30 Hz-60,000 Hz +3 dB
 Harmonic Distortion -3 dB
 Sensitivity 0.8%
 FM: 1.8μV, AM: 20μV
 Dimensions 19 3/4" w x 5 1/2" x 14" d (502 x 130 x 350 mm)
 Weight: 28 lb 8 oz (8.4 kg)



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TAPE RECORDING MAGAZINE

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

Vol. 15 No. 12 January 1971

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Cover Photograph: HRH The Duke of Edinburgh presenting the Golden Nightingale Trophy to Patrick Sellar, an electrical engineer of Purley, Surrey, during The Countryside in 1970 Conference at the Guildhall in London. The gentleman in the background is Robert Boote upon whose inspiration the European Countryside Year 1970 largely depended.

The full story behind Patrick Sellar's award is told in our Nature Notes feature on Page 21 of this issue where our contributor reveals how pure chance led him to take a recording that brought him a Silver Nightingale in the same competition.

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Tape trends and tape talk

By Douglas Brown

THE FIRST amateur videotapes prepared competitively – shown to the judges of the International Recording Contest (CIMES) in Geneva recently – led me to a very encouraging assessment of the future of video-recording as a hobby. Three of the tapes I saw in Geneva had taken the prizes in the first-ever national videotape contest, staged in Holland last September.

One of them featured a girl pop singer, photographed in close-up as she sang several numbers. Each number had a different background, and these backgrounds were secured by back projection of cine films – though it was in no way evident that this was the technique which had been used. In this way, the amateur who made the tape had managed to escape from the limitations of a recorder requiring mains supply and studio facilities.

A second tape was a humorous documentary entitled “Sunday”. It showed a young man dragging himself out of bed as the alarm went off, going through the routine of morning ablutions, snatching a quick breakfast, grunting at his wife over his newspaper and then dashing out of the front door, and registering only when he was half-way down the path that his wife was trying to tell him it was Sunday!

The third Dutch tape was a more serious documentary about model car racing.

The programme was completed by a Swiss tape of a folk dance festival.

* * *

THE BIGGEST DIFFICULTY confronting the amateur remains that of editing videotape. Two of the four tapes we saw had been recorded continuously; in the case of the pop singer this must have called for very elaborate pre-planning and great speed and skill in operation during the recording session. The car racing documentary, on the other hand, consisted of a number of scenes separately recorded, and between each there was loss of picture briefly at the points where the machine had been switched off and on.

I recall that when, a few years ago, I set up the first amateur video-recording effort (but using professional equipment), we managed to devise a method of winding back the tape just the right amount each time to eliminate this switching “blackout”, but I do not know how far the new Philips and Sony machines permit this solution.

All the tapes we saw in Geneva had been made on these two makes of machine. In Holland – where the amateurs have committed themselves to the extent of renaming their organisation “The Dutch Club for Sound and Picture Recording” – Philips and the Sony agents each agreed to lend equipment to the national organisation, which then made it available

for a fortnight at a time to each of its affiliated local clubs.

Two weeks is not a long time in which to produce a videotape, but there were 25 entries, ranging from five to ten minutes’ duration.

* * *

AMATEUR VIDEOTAPE contests will certainly be organised in several other European countries in 1971. I hope it may be possible to get something going in Britain. In any case the International Contest next year will have a video section, for amateur tapes not exceeding ten minutes’ duration and on any subject.

For the present, it will probably be necessary to depend on the goodwill of the trade to lend equipment to clubs who wish to pioneer this hobby. Next year will, I believe, see a Philips recorder suitable for amateurs freely on sale here, and Sony have taken the wraps off their comparable machine and will probably aim to be selling it at the same time.

But my guess is that we shall not see any significant number of video recorders in British homes until well into 1972.

I am convinced that by the middle ’70s there will be as many homes with the full audio-visual recording-replay equipment as there are today with some form of hi-fi.

Thorn Electrical, Britain’s largest producers of TV receivers, have just announced that they will enter the colour video cassette market early in 1972, using the Philips VCR colour standard. Initial marketing will be for educational purposes, “developing into the domestic market in due course.”

And there is news that the biggest European firms engaged in the daily distribution of newspapers and magazines – including W. H. Smith in Britain – have formed an international consortium to distribute video cassettes on the same basis as they now handle printed publications.

I shall not be surprised if, before the decade is out, *TAPE Recording Magazine* reaches you in the form of a monthly video-cassette, accompanied by a small folio of supplementary printed matter.

* * *

FOR THOSE KEEN on tape recording contests – another opportunity. The Gevaert Association for Sound Recording has just announced the first “Audiorama”. This is a contest for amateur tapes on the subject “Humour” and the first prize is 10,000 Belgian francs (about £85). Closing date is April 1 next year and entries will be accepted in English, French, German, Spanish or Dutch.

Rules and entry forms are obtainable from J. Elsmoortel, Rombaut Keldermansstraat 8, 2520 Edegem, Belgium.

PLAY A TUNE to make you well soon



SUNDERLAND Hospital Broadcasts, or SHB as it's known to the patients in the town's ten hospitals, first began transmissions in September '68. The programmes reach the patients through a closed circuit channel and in most wards they listen on headphones, although there are some loudspeakers. This voluntary organisation was an offshoot of Sunderland Hospitals Commentators' Association, which for about fifteen years previously had provided commentaries on football matches from Roker Park and from St James' Park, Newcastle.

Billy Bremner setting up an attack . . . tries to chip it out on the side, but they get a ricochet off the foot of Clark and the ball eventually put out of play on the far side of the field for a throw-in to Leeds."

SHB's job was to supplement these commentaries by providing a wider range of programmes. The obvious first choice was a record request programme, and so, every Thursday night, the two thousand patients were encouraged to join in Thursday Get-Together.

" . . . and with the time on SHB at twenty-seven minutes past nine we'll move on to the next request, which is for Mrs Mary Brown in ward ten of the Havelock Hospital. Mary, this comes from your husband Bill, with all his love and a message. He says 'Hurry on home . . . the washing's piling up', and he says one of your favourite tunes is 'Nobody's Child'.

(MUSIC - "Nobody's Child" . . . instrumental version by Ken McKenzie).

Although that version of 'Nobody's Child' is not available on disc, SHB does have unlimited needle time. For a nominal payment of a shilling per year, the Mechanical Copyright Protection Society have granted a full licence. Well, from one request programme a week, the service has now expanded to seven nights a week with a variety of programmes. One of the first extra programmes was called "Spotlight" and featured local entertainers like the Amazing Bean Bag Band.

(MUSIC - "Matty's Restaurant" by the Amazing Bean Bag Band).

And, from Ryhope Grammar School, a sixteen year old singer called Anna-Marie Macchi.

(SINGING - "Ave Maria" by Anna-Marie Macchi).

As well as amateur artists, many professional entertainers give their services free to SHB, among them, Rolf Harris, who's definitely an all-round entertainer. When he visited Sunderland, he recorded a whole show in his dressing room, without any preparation or script.

"You're right then . . . we're rolling".

(SINGING - "Blaydon Races" by Rolf Harris).

In towns and cities all over Britain groups of tape recording enthusiasts have found an outlet by providing taped programmes for closed-circuit hospital broadcasting systems.

These enthusiasts have provided a foretaste of local radio; in some cases, individuals are graduating from these amateur programmes to the B.B.C. local transmissions. One such case is KEN MCKENZIE, of Sunderland.

He has been a principal organiser of the Sunderland Hospitals Broadcast system, and the documentary tape in which he describes its activities was the "Tape of the Year" in the 1970 British Amateur Tape Recording Contest and a top prize-winner in the International Contest at Geneva.

We print the full script of that tape because, in addition to the valuable guidance in scripting and production which it offers, it tells the story of one of the most successful hospital broadcasting programmes in Britain.

A Geordie song by an Australian singer. The professional entertainers who visit the town not only provide music, but often give a deeper insight into their own beliefs; for instance, Mucunda Das, of the Radha Krishna Temple:

"Religion is something that can change, I can be a Mohammedan one day, Hindu the next, then a Buddhist or a Christian. I can change my religion. Krishna Consciousness is actually the constitution of the living entity."

The next step was to start a newsreel, dealing, of course, with local news.

Some of the interviews are live, but the majority are taped. The recent election was covered in full, but there was a result which you may not have read. A Northumbrian Nationalist won his seat with an overwhelming majority over Labour and Conservative. In fact, this was a mock election at the Bede Grammar School and the successful candidate was sixteen-year-old Ian Lamb.

"I suppose cutting the school hours appealed to the people in the school, and also having something original like the Northumbrian Nationalist to vote for and not just Labour and Conservative."

Dr Horace King, the speaker of the House of Commons, visited Sunderland to speak at a conference on the problems of mentally handicapped children.

"I'm probably associated with every national group of physically or mentally handicapped children. I have many friends in Sunderland and happen to be a patron of the Sunderland Society for the mentally handicapped."

Occasionally, when there's not time to send a reporter with a portable recorder, it's necessary to interview by telephone, but this technique is also used when appropriate to the subject. When the Samaritans opened a branch in Sunderland, a telephone interview seemed particularly apt.

(Phone rings) "Samaritans of Wearside, Can I help you?"

"Oh hello, who's that speaking, please."

"This is the Director of the Samaritans."

"That's Robin Davies?"

"Robin Davies, yes."

"I wonder, can you tell me what exactly happens when someone in trouble rings you up?"

"When they ring me up, one of our members would be here answering the phone . . . they wouldn't have revealed their full name, as I revealed

it to you . . . they merely ask "Can I help you?" and then allow the person to talk, encourage the person to talk, to discover what the cause of their particular problem might be."

Christmas with SNB means special programmes, including a pantomime and a carol festival.

"Oh mother, I wish we weren't so poor".

"We're not really poor, Aladdin."

"Well, how come we've got candle grease on our bread?"

"The doctor said I had to go on a light diet."

"That's because you're not very bright."

"Well, you're not exactly the television brain of China."

(SINGING - "We Three Kings", by combined choirs).

And that's the choirs of St Peter's Church, Thornhill Methodist Church, Hillview Junior School with the Monkwearmouth Salvation Army Band and Songster Brigade.

Well, putting on these programmes takes up a lot of time, and you may ask "Is it worth it?".

Here's what some of the patients think:

"I think it's great, just fantastic, but we think it should be extended, like."

"I think it's a good thing, it makes the morale of the patients you know . . . aye and that you know."

"Yeah, it's great . . . listen to it every night."

"Well, I mean, they're nice . . . something to look forward to."

And finally the opinion of a Sunderland doctor:

"My own personal opinion is that hospital broadcasting can be absolutely invaluable. The whole business of hospital broadcasting can do nothing but good for patients, and must be, of necessity, a very useful psychological adjunct to their recovery."

*Sunderland Hospital Broadcasts
Play you a tune to make you well soon
Now the doctor will say chase your blues away
Listen to your radio every day
To the Sunderland Hospital Broadcasts
Play you a tune to make you well soon.*

The Encyclopedia of Tape Recording

THE THREE TITLES, NOW AVAILABLE, ARE:

NATURAL HISTORY SOUND RECORDING,

by Richard Margoschis 40p (8s)

WRITING A SCRIPT,

by Terry Devereux 30p (6s)

ABC OF TAPE RECORDING TERMS,

by H. W. Helyer 30p (6s)

Order from PRINT & PRESS SERVICES Ltd, 7 ALVERSTONE AVENUE, EAST BARNET, HERTS, enclosing remittance.

I HAVE BEEN fortunate enough to acquire the use of one of the new Kellar Dolby B cassette machines. And what a revelation it is!

Recordings taken "off the air" compare very favourably with 7½ ips open spool versions of the same item; the noise on cassette would seem to be less than one would have to endure working open spool at 3¾ ips. The frequency response is outstandingly good and so the overall sound quality leaves little to be desired.

The one snag would seem to be that tape quality is now going to be the limiting factor. Drop-out has always been a problem at very low tape speeds and most of us know just how bad this can sound in the cassette system. It can be caused either through imperfections in the oxide coating or by lack of constant contact with the record/playback head. When the tape itself is faulty there is nothing that can be done; fortunately this is not so often the case as some people think. Head contact, or lack of it, is more likely to be the reason for excessive drop-out. Two factors are involved here — the precision of the tape transport system (tensions have got to be just right) and the ability of the tape to "wrap" itself round the head.

When the tape is too thick, or when it is thin but insufficiently pliable, we shall be in trouble with drop-out. It will sound like momentary hesitations in the reproduction of recorded repertoire. The music literally "drops out" and then comes back. An extreme case could be likened to a string bag — a lot of holes joined together.

Quite a lot of work has been carried out to establish the optimum tape thickness for cassette use and the present consensus of opinion seems to favour the long play C90. Because it is thinner than C60 the wrap-round characteristic is better; C120 tends towards the other extreme and is so thin the user could be in difficulty with the occasional jam. My own recent experiments have confirmed these findings and I would recommend those who want maximum convenience plus quality should use C90s. With forty-five minutes' programme time per side we have a duration identical to that offered by a 7-inch spool of ¼-inch l.p. tape running at 7½ ips. The comparison is interesting because one saves about a pound, or perhaps even more, when buying a cassette instead of a spool of l.p. tape.

With all this upgrading of quality within the cassette system I can't help wondering if there is not scope for improving the mechanical performance of the cassette itself. I am quite sure that when it was first designed the Philips' engineers had no idea that the system

CROSS TALK

By Audios

would ever progress to its present eminence. It was not regarded as a high fidelity medium and so now, from the engineering point of view, its capabilities are being stretched to the limit. Don't forget that each tiny cassette package contains its own spool hubs, neither of which can ever run on precision bearings. There are many problems relating to tensions within the cassette itself that still have to be solved. In the future could we not have two grades of cassettes: one at low cost as at present for applications where high fidelity is of no concern and the other, more expensive but with superior manufacture, for the enthusiast who places sound quality above the expenditure of a few extra shillings? Such a "superior" cassette need not cost as much as a pound more than the standard and so would still be less costly than using open spool l.p. tape at 7½ ips.

No doubt the manufacturers would argue that where absolute quality is the criterion then the user should be working open spool any way. Although agreeing emphatically with that general point of view — however good cassettes might be in the years to come there will always be room for first-class open spool equipment — that is no reason for failing to improve cassette quality still further if the opportunity presents itself.

The enthusiast should never forget that many of the developments relating to cassette equipment can also be successfully applied to open spool machines. The Dolby B noise reduction system, for instance. It has come into being because of the obvious demand and ready application within cassette machines, but it can perform an equally valuable task when associated with open spool equipment. Hence the evolution of the "black box". I just can't wait to get my hands on one and then try it out on a 15 ips live recording. Under these conditions we are promised a significant reduction in noise although it will not be so obvious as it is in the cassette application simply because there is less noise present in the first place.

This is a most exciting time within the tape recording field. Here we are at the beginning of a new year, 1971, with the immediate prospect of seeing develop-

ments that will revolutionise the amateur approach to sound recording and recorded sound. In ten years' time 1971 will be looked back upon as a watershed, a turning point from which tape leapt forward to dominate audio. It's good to be in touch with the people who are making such things happen.

* * *

WITH ALL THIS emphasis on quality the acoustic conditions of the listening room become more and more important. The point of four-channel stereo is to attempt to simulate the impression of participation within an auditorium instead of listening to a recording at home. Although four-channel is the only correct approach a somewhat similar effect can be produced by changing from a conventional two-channel two-loudspeaker set-up to a two-channel but multi-loudspeaker arrangement.

My own investigations along these lines quickly made me realise that if an extra pair of loudspeakers is introduced it is essential to be able to control their output independently from the main stereo pair. Consequently two amplifiers have to be used.

I have taken the output from the Tape Out socket of the main amplifier and fed it into the Auxiliary input on the second amplifier. The two loudspeakers driven by this extra power source are placed with their grilles facing the walls, one on each side of the room nearer to the "listening end" than the main pair.

In use volume settings are critical. Too much output from the secondary pair produces an awful result with an acoustic that is literally like nothing else on earth! But get it just right with a delicate balance between the two so that the sound from the extra loudspeakers is adding to the ambience without adding to the primary sound and the effect is dramatic. Music at once opens up to give a new sense of freedom and reality. Having now grown accustomed to this rather complicated installation I find that listening to a simple stereo pair without any reinforcement is relatively dull and uninteresting.

So far as I can judge at present the quality of the second pair of enclosures does not need to be as good as that of the main pair. Since their sole function is to "squirt" sound at the walls at a fairly low level there could hardly be any output from them at all at the bottom end. On the other hand if very "hissy" loudspeakers are used they will spoil the effect by adding to the background noise.

There's plenty of scope for experiment here. Most amateurs have extra loudspeakers and amplifiers available even if it means pressing into service a portable radio or extra tape recorder. Try a number of different positions and volume settings. If you get it right the result will be most rewarding.

* * *

DID YOU READ our appeal for Green Shield Stamps in last month's issue? More important, having read it did you send any?

These stamps, or books of stamps, are badly needed by the Tape Recording Service for the Blind. When they collect enough they will exchange them for a new Ferrograph Series 7 machine that is urgently required for use in the preparation of recordings being made for the use of persons who have lost the use of their sight. Perhaps you intended to look out some stamps — or some books — and then forgot. If so I would remind you that the address is: Mrs Maureen Baylis, Hon. Secretary, Tape Recording Service for the Blind, 48 Lye Copse Avenue, Farnborough, Hants. Please make an effort over the Christmas holiday to help this deserving cause.

CHROMIUM TAPE

in collaboration with H. F. Engineering
of Sunbury-on-Thames

IT WAS SOME two years ago that we first revealed the existence of what was then regarded as a new "wonder-medium", a magnetic tape using a radically new coating composed of particles derived from the metal chromium instead of the iron formula that is common to all other recording tapes. Some authorities ridiculed the suggestion that chromium dioxide tape would ever be used in audio applications because of its relatively high cost. We maintained that chromium tape *would* be manufactured and sold for amateur recording use. Now, thanks to the co-operation of Philips Electrical Ltd, we have been able to examine and test a sample of this new material.

When the American firm of Du Pont announced the development of chromium dioxide tape under the trade name of Crolyn it was said that through the use of their new recording medium it would be possible to record exceptionally high frequencies at very slow speeds and it was suggested that the discovery would revolutionise the data processing industry where the ability of the equipment to record and store a very large number of "bits" of information is one of the limiting factors. But that self-same requirement is a pre-requisite of any audio system, too. There is a relationship between digital processing and sound reproduction. So now many of our leading tape manufacturers are experimenting with their own versions of the Du Pont formula for audio. Chromium dioxide recording tape is only a step away from the hi-fi store.

We must stress, however, that the sample submitted to us from Philips is *not* taken from a commercial production batch; it is an experimental product not yet for sale. It is possible that the final material as marketed will be slightly different in minor respects.

The new tape as examined by us has an overall thickness of approximately 30 microns; that is it is about half-way between our normal long play and double play material. Black in colour it is highly polished on *both* sides; the user will have to be very careful not to lace up with the oxide turned the wrong way. It has a very distinctive odour that is quite different to the smell from ordinary iron oxide tape, and this might well originate from the "binders" which we found to be proof against the usual solvents such as amyl acetate.

As the prime reason for our investigation was to establish the performance of chromium dioxide tape under conditions of normal amateur use we decided to carry out our experiments on a machine of the type that might be found in any good-class high fidelity sound reproducing system. The final equipment choice was of a four-track

Sony TC-355 stripped down to its chassis so that bias variation could be made conveniently, and before starting work on chromium the machine was finely adjusted to give optimum performance on standard tapes.

Our first investigation was to determine what happens if chromium tape is recorded at a bias level commonly found on our present domestic tape recorders, and to do this we recorded signals at a level to give approximately 3% distortion. It was found that at a conventional bias setting chromium tape is about 4 dB down at 1,000 Hz but 5.5 dB *up* at 10,000 Hz when operating at 7½ ips to the NAB equalisation of 50 microseconds. Machines with CCIR equalisation of 70 microseconds would give rather more output at that frequency, probably in the order of an extra 2 dB. Repeating the experiment at 18,000 Hz our graph literally shot off the paper and we were in trouble with the record amplifier "chipping" due to the inordinately high level. A tremendous flux can be recorded on this tape at short wavelengths.

From these observations we regard the behaviour of the new tape against bias variations to be fairly conventional at low to medium frequencies but at high frequencies it has the capability of accepting unheard-of saturation levels.

Next we established the degree of alteration that would be required in bias settings to give optimum results on chromium tape. This was found to be an increase of approximately 25% on a "normal" bias current required for a tape such as Scotch 125, or 2.5 dB on output. This refers to 7½ ips open spool operation. We believe that for cassettes the increase would be slightly greater, but we did not have any samples in cassette form so our opinions as to the use of the new medium in that format can only be assumptions.

Uniformity of output is important. Variations in coating thickness or faults in tape manufacture would show up as differences in the levels of recorded tones. The worst conditions are likely to be found in the edge track of a tape recorded on a four-track machine and so we recorded signals of 150 Hz, 1,000 Hz, 10,000 Hz and 18,000 Hz on track 1 on

the Sony. Replay showed a standard of uniformity that is rarely equalled in the best iron oxide tape. Excellent.

The ability to erase within the machine is another measure of the usefulness of any given tape to the amateur, and as chromium needs rather more "punch" from the bias it could, like most of the higher coercivity tapes, be resistant to erasure. At 1,000 Hz we found we had an effective erasure on the Sony of -67 dB. This could be better; at such a level there is the possibility of hearing a faint shadow of an old recording in the quiet or silent sections of the programme that replaces it. Any machine that has difficulty erasing iron oxide recordings would be likely to be in trouble with chromium.

With the bias adjusted to our predetermined optimum level we next checked on the recorded bias noise and found this to be 52 dB unweighted or 59.7 dB to the "A" scale. On bulk erased tape the figures were 52.5 dB unweighted and 61.8 "A" scale. These measurements relate DIN reference level to RMS noise. Comparing these results with others from conventional tapes we can say that the unweighted noise levels from our chromium dioxide sample were approximately 3 dB worse than we would expect to find from a modern iron oxide high coercivity low noise tape. We found the noise spectrum to be similar to that produced by BASF PES35LH.

At this point we changed our tactics completely and took both tape and machine out of the laboratory to attempt some experimental recording, putting ourselves in the place of the enthusiast who manages to acquire a spool of the new recording medium and who is dying to "try it out". Working at 7½ ips with the bias a little higher than normal we connected the Sony to a Quad 33 control unit taking signals from a Sony FM tuner. Comparisons were made by means of the A/B switching arrangement.

Our first impression was of "screaming top", as had been expected from the results of our laboratory work. It was found that to bring the sound down to flat we had to use the 10,000 Hz filter giving an actual cut of -6 dB at 10,000 Hz and -12 dB at 15,000 Hz. At such a setting the comparison between tape and

source was quite good.

Following the same line we then repeated the exercise at 3¾ and 1½ ips, using different combinations of tonal correction to get as close to flat as possible. The outstanding feature of these tests was the brilliance, clarity and freedom from distortion of the top response. When properly equalised this is likely to be much superior to that produced from existing iron oxide tapes. But, without proper equalisation, the sample of chromium tape as tested was virtually "unlistenable".

From what we have said it should be quite clear to the reader that chromium dioxide tape is *not* a magic cure-all for all ills. To the contrary, it is a fascinating material that behaves in such an extraordinary way that it requires a proper understanding of its characteristics before it can be used successfully. Or a completely new breed of tape recorder in which the electronics and heads have been specially designed to take full advantage of the performance potential that is about to become available.

CHROMIUM DIOXIDE TAPE

Frequency Hz	Overall Response dB	
	7½ ips	3¾ ips
1000	0	0
2000	+1.0	+3.0
4000	+4.0	+6.0
6000	+6.0	+9.0
8000	+7.5	+12.0
10000	+10.0	+14.0
15000	+15.0	+21.5
17000	+16.0	+23.0
20000	+17.0	

Fig 1. The overall response (record to playback) of the sample of chromium dioxide tape under test, using a bias setting appropriate to "normal" tape such as Scotch 125 and relating outputs to the level at 1,000 Hz.
Equalisation NAB

To demonstrate the extent of the problem that chromium presents we returned to the laboratory to take overall frequency response measurements. These we now publish in chart form as Fig 1. When considering these figures it must be remembered that without exception the manufacturers of machines and tape have devoted their energies to sustaining the top response. In conventional equipment the response has a tendency to fall away at the upper end and it has required a really good machine loaded with first-class tape to produce a curve that is, to all intents and purposes, a straight line all the way up to 20,000 Hz and beyond. That is the ideal. In our chart such a curve would show a row of "noughts".

Now look what happens with chromium dioxide! Instead of falling off we have an incredible and somewhat frightening ascent until we are measuring 17 dB above flat at 20,000 Hz at 7½ ips. The only reason we stop at that point is

because the B. & K. signal generator just doesn't go any higher, but there is every indication that the line could be extended still further at even higher frequencies.

Results at 3¾ ips are even more astonishing. Here we rise to 23 dB above flat at 17,000 Hz. Our curve then vanishes, probably because the head in the Sony was never designed for such a response at that speed and therefore does not have the optimum head gap for such an application. Given the correct head assembly there is little doubt that the line could be extended to what can only be called absurd limits.

So when using the new tape we are at once faced with a reversal of many of the basic problems associated with sound recording. Instead of struggling to keep the upper response *up* we are now concerned with ways to hold it *down!* Advertisers whose sales line has been to claim extended frequency responses are now hoist with their own petard! An extended — and exaggerated — top response can and will give rise to a great deal of trouble.

One of the aims of sound recording must always be to make use of a wide bandwidth, but that in itself is not enough. Over this bandwidth there must be "flatness" without any particular segment of the audio spectrum sounding relatively louder than any other. The circuits within a tape recorder that seek to do this make up the record and playback equalisation.

When a drastic change in the recording medium results in an equally drastic change in the overall response pattern there is obviously a case for changing the equalisation standards to suit the new conditions. Chromium dioxide tape demands considerable attenuation of the upper frequencies, and this can only take place "automatically" if the equalisation characteristics are modified.

At present different equalisations are used for different recording speeds. When working at 15 ips, for instance, there is more top recorded without artificial emphasis than there would be at 3¾ ips and so the equalisation applies less emphasis on the upper frequencies at the faster speed. The subjective results obtained with chromium could be likened to recording and playing back at a very fast speed but using the equalisation that would be correct for a slow speed.

It is interesting to conjecture on the probable results of using an optimum equalisation for chromium dioxide at 7½ and 3¾ ips. We have already stated that the tape is inherently slightly more noisy than a good iron oxide, but the subjective effect of attenuating the top response must be to attenuate high frequency tape hiss as well. So from this point of view it might come to be regarded as *less noisy*.

Our general conclusions about the use

of chromium dioxide in open spool applications are that it *could* hold the promise of improved audio quality at both 7½ and 3¾ ips, but this will only be possible if the machine manufacturerers are prepared to take the requirements of the new medium into account. We must have heads that are capable of handling very high frequencies at relatively slow speeds, *but above all we must have an agreed standard for replay equalisation.* Without such an agreement there would be chaos in the amateur recording world.

We also feel that in spite of the tape's dramatic performance in the dizzy upper regions it should be improved in the medium to low registers. In these areas the sample as tested needed a little more solidity in the response curve, and we wonder if this would not be achieved by using a slightly thicker coating. It is believed that the coating on our tape was only 4.5 microns thick and experience with iron oxide indicates that a greater depth of coating enables a higher saturation level to be achieved at the lower end of the spectrum.

Unfortunately we have not yet had the opportunity to examine chromium dioxide in the cassette format, but we have discussed our findings with engineers who have done a great deal of work in this field. By co-relating their findings with our own observations on ¼-inch open spool material we have been able to arrive at certain general assumptions.

Surprisingly, perhaps, it is our opinion that chromium dioxide, when used within the cassette format at 1½ ips, is *not* likely to offer any very startling improvements to audio quality above those that can now be achieved through the use of really good iron oxide tapes. Even today it is possible to extend the frequency response of conventional cassette tape to extreme limits. What we need is not just a dramatic top but a flat response over the entire audio spectrum at reasonable levels with a minimum of noise and distortion.

So now we come back to the fundamental reasons for what we are doing. No audio system or medium is created for the sole purpose of entertaining engineers watching their instruments. The end product is not a graph but a sound. The only thing that counts is the faithfulness of that sound. Chromium tape is technically fascinating and experimentally interesting. But to be useful to us its physical properties must be properly utilised through the use of the right equipment. Change for the sake of change is pointless. If chromium is going to sound better it has a future; if it is going to do nothing more than provide a subject for technical debate its practical value will be nil. It all depends on the response of the equipment manufacturers — to the peculiarities of the new tape!

IN OUR Music Review section this month we are proud to present the first notes on the new Dolby-processed commercial releases. To the best of our knowledge these will be the first detailed notes on such cassettes to be published anywhere.

To avoid confusion we now repeat the basic facts regarding the Dolby B Noise Reduction System as applicable to pre-recorded cassettes and general amateur recording.

1. *The Dolby B system has been evolved to reduce noise in domestic tape recordings. It performs no other function whatsoever. The only claim for it is that it will reduce background noise by some 10 dB in Compact Cassettes and proportionately less in faster speed recordings.*

2. *Cassettes (or tapes) recorded to the Dolby B characteristic have to be played back on a machine equipped with Dolby B playback circuitry if advantage is to be taken of the noise reduction potential. It is not designed to reduce the noise in existing non-Dolby recordings.*

3. *If Dolby-ised recordings are reproduced on equipment that does not incorporate the special playback circuits there will be no noise reduction benefit and it will be necessary to apply a little top cut at the amplifier in order to bring the response back to "flat".*

4. *It is claimed that Dolby B system cassettes are "compatible"; in other words if reproduced as in 3 above there will be little difference between them and an ordinary, non-Dolby version of the same item.*

These statements obviously call for some investigation and comments, and so now that we have a selection of Dolby-ised cassettes from the first Decca release we have carried out a few simple tests. The cassette equipment used comprised a Kellar DCR 1 record/playback machine fitted with switchable Dolby B circuits on both record and playback, a Sony TC-127 machine (as reviewed this month) without Dolby and the small Bush Murphy TP-60 battery portable mono machine. This latter was selected as representative of the large number of low-cost portables that are both available in the shops and already in the possession of consumers.

First playback trials on the five Musicassettes supplied by Decca revealed an immediate and dramatic reduction in background noise when reproduced on the Kellar with its Dolby switched in. For the first time ever we have an almost silent cassette system. There is no doubt that the claims for noise reduction are more than adequately met.

Next we put ourselves in the place of the owner of good-class equipment who lacks any special Dolby facility by

OUR FIRST EXPERIENCES
WITH

DOLBY B NOISE REDUCTION

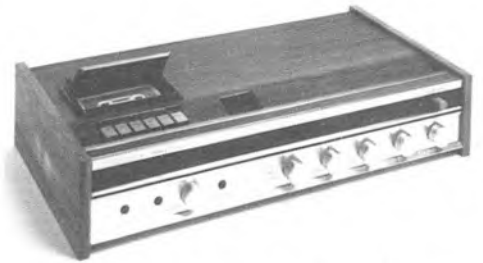
WILL ANSWER MANY QUESTIONS
ABOUT WHAT IT IS AND WHAT IT
DOES

playing the same cassettes on the Sony TC-127. The familiar cassette noise was at once audible and the top response was un-naturally hard and harsh. By making suitable adjustment to the tone controls on the amplifier we found that we could obtain a highly acceptable audio quality. We doubt if many people listening to Dolby-ised cassettes reproduced in this way (without Dolby playback but with tonal correction) would be able to tell the difference between them and non-Dolby versions.

Finally we attempted to assess the problems that would arise when playing these cassettes on a tiny portable. To do this we prepared a non-Dolby copy of one of the cassettes (Vienna Imperial) by playing back on the Kellar and re-recording on the Sony. The copy was then played on the TP-60, a machine that is not fitted with tone controls. From the high fidelity point of view the sound quality is totally unacceptable, as might be expected in view of the miniature loudspeaker. Machines of this kind are just not intended to produce "good" sound in purist terms.

When we changed cassettes and played the original Dolby tape we can only describe the result as "less acceptable". What had been a bad sound became worse due to the false emphasis on the top.

However we regard these remarks as being somewhat academic. The consumer who is content to listen to the kind of sound produced by the TP-60 or any other similar machine is hardly likely to protest at the further degradation of quality which is comparatively far less than that introduced in the first place by using such light-weight equipment. In our opinion it's all a matter of degree.



The Kellar DTA 50 Dolby B machine, a model similar to that used in our tests.



The Bush TP-60, a good low-cost portable.

From the point of view of noise advantage there would seem to be no doubt that the enthusiast would be well advised to acquire the new Dolby-ised recordings whenever possible; they have within themselves the inherent possibility for the enjoyment of a totally new experience in noise-free listening in the future, whilst at present they can be played successfully on ordinary audio equipment. Those content with the low standard of quality obtainable on small portables are unlikely to be concerned unduly about noise levels so they should try one of the new recordings on their own machine to see if the sound is acceptable to them personally. If it is then there is not the slightest reason why they should not promptly forget all the complications and ignore the whole thing.

The present policy of the repertoire companies is not unanimous. Some might issue all their future recordings to the Dolby B characteristic; others will choose selected items (classical works in particular) for the Dolby process.

Finally the advantages of Dolby are not confined to the reproduction of pre-recorded tapes. Those fortunate enough to be able to acquire a Dolby machine will be able to make all their own recordings, either live or "off the air," with a level of background noise that will seem to be quite incredible to those who have not experienced it. Existing equipment will *not* be rendered obsolete. Owners will very soon be offered a self-contained "box of tricks" that will couple up to either a cassette or an open spool machine to give an identical noise improvement as that to be obtained in equipment where the Dolby circuitry is fully integrated.

I HAVE RECENTLY been going through about one hundred questionnaires returned to me by members of The Wildlife Sound Recording Society and I was not really surprised to find that only about a dozen looked upon themselves primarily as recordists rather than naturalists; I am one of those twelve. This, and other evidence, seems to indicate that, even after writing these notes for three years, I am not preaching to the converted. Why, I wonder, are the majority of W.S.R.S. members naturalists who have taken up sound recording to record the sounds they hear in the field, rather than recordists who have decided to apply their art to natural history? Perhaps it is because the pure naturalist knowing little or nothing of the techniques of recording, simply does not realise the immense problems to be faced, whereas the recordist knows these hazards but little of the methods of approaching his subject. Personally, I believe that the recordist, turning his attention to nature, has the more difficult job to learn; the naturalist also has his problems, of course.

The sound engineer working in his studio has virtually everything under his control. He can be precise about the placing of his microphones; he can rehearse his subject to check his record level; he can adjust the reverberation time and he should have no worries about ambient noise. The natural history recordist, however, is at the other end of the scale. His subject simply will not respond to his directions regarding microphones; he might have a chance to check levels if a bird is singing from a song post but with mammals he has virtually no chance of doing so; space is his studio and so any reverberation will depend upon the contours of the land, trees and buildings, and, in this country particularly, noise pollution will be an ever present hazard.



The Golden Nightingale Trophy in the EBU Wildlife Recording Competition in which our author won the silver award in the mammals' section. Our front cover photograph shows the top award being presented to Patrick Sellar by HRH Prince Philip at the Guildhall, London.

Photograph by courtesy of the B.B.C.

Why then, you might ask, should anyone want to spend many, many hours out in the countryside, often under very uncomfortable conditions and at all times of the day and night, in an attempt to make sound recordings under the worst possible conditions? The answer, I believe, is as with any worthwhile pastime – *the challenge*. To match that challenge one must have a great regard for nature, a love of open spaces, a good working knowledge of sound recording techniques and, as I have said so many times before, unlimited patience. Luck will play its part if allowed to do so. No wild animal is going to come into your living room and perform for you. You must go out to the animals and the more you are out, at any time of the year, the greater are your chances of success. When success really comes your way it is undoubtedly a most rewarding experience. Allow me to relate this story of personal success to illustrate what can happen – often unexpectedly.

I had been conducting a week-end school in natural history sound recording at Woodchester Park Field Centre. After a full day's lecturing I found myself too 'keyed up' to sleep and so, just before midnight, slipped out into the valley where I knew I should be alone. It was May, an absolutely perfect night with no wind but a suggestion of moonlight to pick out the features of the valley and positively no 'ambient' noise.

Soon I knew that I was standing very near to some fox cubs and so, with the Tandberg 11 running quietly at my side and a reflector on a monopod, I waited; in twenty minutes it would be necessary to change a tape. After nearly a quarter of an hour I heard the vixen give a low bark; she came nearer, got my scent and retreated – two minutes silence. Then she came again, nearer and nearer as she circled me, barking to warn her cubs of the danger. She came so close that I heard the faintest 'wuff'. For over five minutes those wonderful sounds came off the tape into my headphones and I stood enthralled. As I crept into bed at half-past-one my wife knew, without my saying anything, that I had a good recording, though at the time neither of us knew the full import of it.

First, in consultation with Roger Burrows, author of *Wild Fox*, it confirmed his interpretation of the meaning of the call. Then it was used in the Midland Region programme 'In the Country' to illustrate a conversation between myself and Phil Drabble. After this it was accepted



NATURE NOTES FOR JANUARY

BY RICHARD MARGOSCHIS

by the British Library of Wildlife Sound and there it was heard by an American who used it on the Pepsi-Cola stand at Expo 70 in Japan; what connection the red fox has with Pepsi-Cola I have yet to discover! It was used in a film called *OISIN* which was made in Ireland for European Conservation Year and fairly recently the B.B.C. Natural History Unit purchased reproduction rights. A few days before writing this, in October, came the most thrilling news of all; as one of my entries in the E.B.U. Wildlife Recording Contest, organised by the B.B.C. for Conservation Year, it won the mammals section – a silver nightingale award – and was runner-up to the overall winner in the competition.

So, to make the top mammal recording in Europe was the reward for taking my equipment with me that night when I went into the valley for a spell of peace and quiet. I do not want you to get the impression, however, that a recording must be as successful as this to give satisfaction; I have many recordings which few people have heard but which, to me, are a complete reward to the challenge set.

The overall winner of the competition was my friend Patrick Sellar whose reward included receiving the Golden Nightingale from the hands of Prince Philip at a ceremony held in Guildhall, London, on October 28th. I was present to see the delight on Pat's face as he received the award and then introduced his recording. We heard the calls of a Leach's Petrel echoing around those ancient walls. Pat started recording wildlife sounds in 1960 and most of his work is done in Scotland or abroad; his winning recording was made in Iceland and is the greeting ceremony when one of the pair of birds returns to the nesting burrow. Congratulations Pat.

The competition, divided into four classes, was open to anyone residing in Europe. A total of 237 entries was received from 71 naturalists living in 14 countries; United Kingdom led the field with 25 competitors and was followed by West Germany with 11. There were 144 entries from 59 competitors in the class for birds. The most popular species was the nightingale (19) and so John Fisher did very well to take the silver award for the class with his recording of a nightingale. The bronze award went to Denmark for a marsh warbler.

In the class for vertebrates there were 19 competitors with 36 entries. In this class my own silver award was followed by Pat Sellar who took the bronze award with his Norway Lemming. The edible frog was the most popular species in the class. There were 35 entries from 16 competitors in the class for insects. The silver award went to West Germany and the bronze to Switzerland. The stereophonic class attracted 21 entries from 10 competitors, the silver award going to the German Democratic Republic and the bronze to West Germany.

A number of unusual and rare recordings turned up among the entries. Most notable were the exceedingly rare Cory's Shearwater and the second only known recording of an Aquatic Warbler. From Magnus Sinclair, in the Shetlands, came the sounds of the first Snowy Owls ever to breed in Britain, and from David Page the Hebridean Wren – an island race of the Common Wren.

I am indebted to John Burton, Sound Librarian at the B.B.C. Natural History Unit for this, and much more, information. On John's shoulders fell the task of organising the competition, and when I tell you that he had to listen to all the entries several times to prepare a short list for the judges you will realise that it was no easy task. His seven judges were spread over seven European Countries – Britain, Sweden, Denmark, France, Austria, Czechoslovakia and Russia – and so he sent copy tapes of the shortlisted entries to each judge. Marks were awarded for popular interest value (30), technical quality (30), freedom from extraneous sounds (20), rarity/difficulty value (20). As the results came back to him John was able to tot up the points to reveal the winners. He tells me that the quality of all the entries was exceedingly high and he had a very difficult job to prepare the short lists.

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DURING RECENT YEARS the story of the development of loudspeaker enclosures has been a story of smaller sizes, lower costs and better quality. Like so many facets of audio nowadays we are presented with a situation that appears to be contradictory – the old-fashioned rule of thumb is “a good big ‘un will always sound better than a good little ‘un”. That is still true. The difficulty lies in defining that elusive word “good”. And the truth we have to face is that with modern research a number of firms have produced tiny enclosures at reasonable prices with a sound quality that can be judged to be superior to that obtainable from many larger and more expensive, though less “good”, “boxes”.

There are three ways of evaluating the performance of loudspeaker systems. One would be to carry out extensive laboratory measurements from which general assumptions could be drawn; another approach would be to confine the tests to subjective listening and merely comment on whether we like or do not like the sound heard. The third method, and the one we propose using, is to combine the two. We shall conduct certain laboratory investigations but will mainly rely on subjective impressions of the sound heard under a variety of listening conditions. As an overall check on audio quality we shall make comparisons between the sounds heard at the loudspeaker and our impression of those same sounds when reproduced via a Koss ESP-9 electrostatic headset.

For the first of this new series we are looking at a completely new model made by Celestion, the Celestion 120. Measuring only 17 x 7 $\frac{3}{4}$ x 8 $\frac{3}{4}$ inches it is truly of bookshelf dimensions. At a cost of £48 per pair the 120 system could offer a solution to that most difficult of problems – how to compromise economy with audio quality.

Previous Celestion models have achieved a popular reputation amongst audio enthusiasts everywhere. One of their unique features is the use of a passive membrane known as the “Auxiliary Bass Radiator”, or ABR for short. The purpose of this device is to improve, or reinforce, the low frequency output under conditions when, due to the smallness of the enclosure, one would expect to find a severe cut-off around or just below 100 Hz. An invention of the Celestion engineers it has proved itself to be successful in their other models such as the Ditton 10 and the Ditton 15. The 120 is a “scaled down” version of these systems using the same HF 1300 treble unit coupled with a sophisticated long throw medium/bass driver with cross-over at 1,500 Hz. The third element within the enclosure is a new version of the ABR. Impedance is claimed to be 4 to 8 Ohms, and power handling 20 Watts to the DIN

FIRST OF A NEW SERIES EXAMINING LOUDSPEAKER ENCLOSURES

CELESTION MODEL 120



45 500 specification.

First tests involved checking frequency response with particular attention to the lowest end of the spectrum so that we could confirm the action of the ABR unit. It would be reasonable to assume that an enclosure of this size would give little significant output below about 60 Hz., and yet we found the tiny Celestion 120 producing a measureable and quite useful signal as low as 30 Hz. This is quite remarkable for a bookshelf enclosure.

Investigating distortion by reproducing a 400 Hz. tone at 90 dB Sound Pressure Level we measured 1% second harmonic with the third harmonic content down well below 1%. We found that the impedance varies in relation to changes of frequency of the signal being reproduced but at no point does it fall below the stated 4 Ohms. In fact the lowest impedance measured was 4.7 Ohms.

The appearance and finish of the 120 enclosure is excellent. By using a single

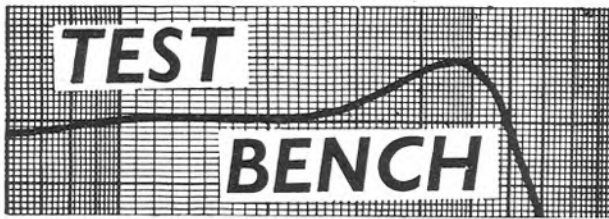
sheet of veneer to completely enclose the four sides of the cabinet there is a joint running along one edge only; consequently it will look equally good in whatever position it is placed. The rear is neatly finished with connections provided by means of two colour-coded screw terminals.

For our listening tests we used a number of amplifiers and different room acoustics. Under all conditions the one common factor was a feeling of presence and reality worthy of enclosures of much higher price and larger size. Compared to some loudspeakers the effect was almost that of drawing a thick curtain aside to reveal living musicians instead of listening to a pale mechanical reproduction of sounds. There can be no doubt at all that these enclosures are very good indeed.

In spite of the fact that laboratory measurement proved conclusively that a reasonable low frequency output is present we came to the conclusion after listening more critically over long periods that as compared to some of the very large systems the 120 has a “lack of solidity”. It is always difficult to express these abstract ideas in concrete terms and it is obvious that we cannot yet expect to get “perfection” at the lowest prices. The 120 *must* lack something, and that something we have called “solidity” for want of a better name. Many loudspeaker systems achieve an effect of solidity through the introduction of false colourations to the sound. One of the outstanding features of the 120 is its surprising *lack* of “boxiness” or other artificial quality, and this is probably one reason why there appears to be a certain “thin-ness” to the sound.

Using the Koss electrostatic headset as a standard we were able to confirm this general impression, whilst at the same time noting once again the natural “musicality” of the enclosures. On solo instrumental passages they acquitted themselves brilliantly; when handling the broad sweep of a full symphony orchestra the comparative lack of depth was apparent but in all other ways the sound was highly acceptable.

Our final opinion of the Celestion 120 enclosures is that they offer extremely good value for money and are ideally suited for those situations where cost and space have to be related to audio quality. It is possible to pay twice the price of the 120s only to find that the sound is in many ways inferior. We feel that these new enclosures will meet with great success amongst those discerning enthusiasts who up to now have been dissatisfied with the quality standard of transducers in this category. Congratulations to Celestion on a valuable addition to the short list of “good” loudspeaker enclosures.



SONY TC-127

INVESTIGATED BY D. KILLICK

WITH MEASUREMENTS BY AN INDEPENDENT LABORATORY

MANUFACTURER'S SPECIFICATION Sony TC-127

Power: AC 100, 110, 117, 125, 220 or 240 V, 50/60 Hz, 11 W.

Cassettes: Compact Cassette system.

Recording System: 4-track stereo or 2-track mono.

Frequency Response: 30 to 12,000 Hz.

Wow & Flutter: 0.2%.

S/N Ratio: 48 dB.

Inputs: Low impedance microphone x 2. Sensitivity -72 dB (0.2 mV). Auxiliary x 2. 560 kOhms impedance, sensitivity -27 dB (0.035 V).

Outputs: Line out x 2, level 0 dB (0.775 V) impedance more than 10 kOhm. Headphone jack x 1, impedance 8 Ohms.

Weight: 10 lbs 9 oz.

Dimensions: 15 3/8 inches wide, 3 7/8 inches high, 8 3/8 inches deep.

Supplied Accessories: Connecting cord x 2; head cleaning tips.

Optional Accessories: All at extra cost; microphone, headset, mixer, additional cables etc.

Recommended Retail Price: £69 15s including purchase tax.

Distributors: Sony (UK) Ltd., Pyrene House, Sunbury Cross, Sunbury-on-Thames, Middlesex.

SONY TC - 127 TEST CHART

Frequency Hz	Playback Only dB		Overall Response dB	Signal-to-Noise Ratio		Distortion %
	Left	Right	Average L/R	Unweighted	A Scale	
31.5	0	+2.5	-3.5	51.5	57.5	5%
40	+2.0	+3.0	-2.0			
63	+2.0	+2.5	-1.0			
125	+0.5	+0.5	+1.0			
250	0	+0.5	0			
500	0	0	0			
1000	0	0	0			
2000	+1.0	+1.0	-0.5			
4000	+1.5	+1.5	-1.5			
6300	+2.0	+2.5	-3.0			
8000	+2.0	+3.0	-4.0			
10000	+1.5	+3.0	-6.0			
12000			-7.0			
Wow & Flutter	0.18% RMS					

NOTES: The Overall Response figures relate to record and playback using a Scotch C90 cassette. Playback Only relates to the reproduction of a standard Philips calibration cassette, reference TC-FR.

For Signal-to-Noise Ratio the tape was recorded to a level to give 5% distortion in the signal and this was related to the noise level produced from tape erased in the machine, but see text for further information on the standardisation of this measurement which is quoted above as both "unweighted" and corrected to the "A" scale.

The distortion figure above is deliberately imposed in order to relate noise levels to a fixed parameter. See text. Wow and Flutter is total RMS, the test frequency being 3,000 Hz. Test equipment used included: Bruel and Kjaer Signal Generator, B & K Frequency Analyser Type 2107, B & K Level Recorder Type 2305 and Gaumont-Kalee Wow and Flutter Meter.

IF THERE WAS one single message of importance from the recent International Audio Fair at Olympia it was the "coming-of-age" of the Compact Cassette system. Today many of the country's leading experts who, up until now, had been strongly anti-cassette are advocating the advantages of this newer medium. One leading authority has even gone so far as to predict the early demise of the gramophone record other than for reproducing 45 rpm singles. For replaying classical repertoire, or for the man who wishes to record either classics or popular music, the cassette is the logical answer.

But there is still a great deal of misunderstanding about what cassette machines can and cannot do. Too many have listened to the sound produced by low-cost portables and then condemned the system because what they heard was bad. Of course it was bad. Any sound reproducing system will sound terrible if it is coupled to a poor quality amplifier driving a tiny loudspeaker. The miniature transistorised radios that now fill the stores do not pretend to hi-fi; most of them sound little better - and many worse - than the kind of noise one hears over the public telephone. Yet that

doesn't mean VHF radio is incapable of giving us some very fine audio quality. To take advantage of that quality one *must* make use of the right equipment. So with cassettes. We can get excellent sound from the system *provided we use the correct equipment*. Our review machine this month, the Sony TC-127, is therefore being examined in the light of that requirement.

The TC-127 is a mains stereo record/playback mechanism designed for use in conjunction with an existing amplifier and loudspeaker set-up. At a recommended retail price of £69 it must

be regarded as coming within the budget class, so we must ask ourselves whether this particular appliance is likely to give us that high standard of audio quality that is now the talking point of the industry?

An examination of frequency response is our usual starting point, not because the other parameters do not matter but because there is little point in seriously discussing them if the response is inadequate. Looking at the playback only figures in our test chart it should at once be apparent that the inadequacy relates to the calibration cassette rather than the machine. With the curve held firmly up at 10,000 Hz our figures cannot extend further because at that point there are no more signals on the TC-FR cassette!

It is not unusual to find cassette playback curves beginning to slide downwards at around 6,000 Hz with the curve becoming steeper at higher frequencies. Our test on this machine shows that at 10,000 Hz the curve is *plus* 1.5 dB on the left-hand channel and *plus* 3 dB on the right. From this it would be reasonable to assume that had the calibration cassette extended to 12,000 Hz we should have been able to report a useful measurement at that frequency. We can therefore say that the TC-127 is giving us the best playback response that we have yet measured on any machine of this kind under test.

The significance of the playback response relates directly to the audio quality that we might enjoy when reproducing pre-recorded cassettes. Discussing this matter with the manager of the Philips Records cassette plant we were told that all the production is subjected to rigorous quality checks and the extreme limits of tolerance are plus or minus 2 dB at 10,000 Hz. They too remark on the fact that they cannot quote higher figures because of the inadequacy of the calibration cassettes at present available. Nevertheless they do suggest that their production of pre-recorded material does have a useful response extending to at least as high as 12,000 Hz, so the importance of a really good playback characteristic in the playing deck is of the utmost importance. Apart from the small difference in outputs between the two channels in the sample under test we can say that the Sony TC-127 meets this requirement absolutely.

Unfortunately the overall response (from record to playback) is not quite so good with a falling off at the upper end to minus 7 dB at 12,000 Hz. These results will, of course, be influenced by the kind of tape used, and for our tests we were working with a Scotch C90 cassette. Here we must comment on the fact that the manufacturers, Sony, do not quote any tolerances in their frequency response

specification; they merely claim a measureable response at 12,000 Hz. We confirm this to be present but now that the cassette system is generally accepted as a high fidelity medium the better manufacturers must tighten up their claims to make them more meaningful. We would suggest that the aim should be to produce equipment that will give a genuine response curve to within plus or minus 2 or 3 dB up to 12,000 or 12,500 Hz. The TC-127 would probably meet such a high standard on playback but it would fall a little short on overall response if our results using the Scotch C90 are generally applicable. In fact a change in tape would undoubtedly mean a change in the record/playback curve and it is possible that a tape of slightly different coercivity would pull the line back up again.

The benefits of extended frequency response are squandered if they are associated with excessive noise so we next looked at the signal-to-noise ratio. There are so many ways of measuring this parameter, all of them giving different and conflicting answers, that it is not surprising there should be some considerable confusion about the true significance of such figures. After considerable discussion we have decided to standardise noise measurements in all our reviews by relating them strictly to the distortion content of the signal. It should be quite obvious that the more signal that can be recorded on the tape the better will the noise ratio appear to be since the inherent noise levels will remain more or less constant but when measured against progressively louder signals they will be comparatively less. But the amount of signal that can be recorded is limited by the increase in distortion so we reason that we should take the distortion content as the controlling factor.

With open spool equipment running at 7½ ips we believe that 3% distortion should be the accepted norm; for lower cost, slower speed machines (including Compact Cassette) 5% should be reasonable. It is interesting to note that the DIN specification demands only under 5% distortion at 7½ ips. We regard this as being not nearly tight enough – in fact we look forward to the day when we can expect to achieve “under 3%” on cassette running at 1½ ips as a matter of course.

To return to our subject, the Sony TC-127, we found that the noise levels were almost identical on both channels (0.5 dB difference) and when a tone was recorded to a level to show 5% third harmonic distortion the worst unweighted noise was 51.5 dB. Measured to the “A” weighting the corresponding figure is 57 dB.

When recording a steady tone at this

modulation level (to give 5% distortion) it was found that the left-hand channel was accepting a signal at 6 dB above the zero marking on the built in meter whilst the right was 5 dB above zero. This state of affairs does not conform to the professional VU characteristic (a single meter with its circuit could cost as much as the total price of this machine so we are not criticizing it on that account!) and there could be some danger of recording musical passages with a relatively high distortion content due to overmodulation that would not be indicated to the operator. Consequently we suggest that the recordist should use his gain controls with care and avoid entering the clearly marked red zone of the scale.

Speed stability is another factor of importance, particularly when reproducing pre-recorded material. Using an electronic counter the reference tone of 333 Hz on the calibration cassette was registered as 333.5. This is so close to absolute accuracy that it is within the tolerances of the tape itself. Wow and flutter are quoted in the specification as being 0.2%. Our RMS measurements gave us 0.18% at the beginning of the tape with precisely the same reading half-way through the cassette. Crosstalk between stereo channels was 44 dB at 100 Hz and 32 dB at 1,000 Hz. Finally we checked on the sensitivity of the inputs, Auxiliary and Microphone, and found both to be slightly more sensitive than the specification claims.

Summarising the technical performance of the Sony TC-127 we can say that this is a machine that is worthy of the new status of the cassette system. It has a performance potential that will seriously rival that to be obtained through the use of good open spool machines; on playback it will enable the user to take maximum advantage of the improved quality of commercial Musicassettes for a cash outlay that can only be described as modest.

Turning now to the user section of our review we must first comment favourably on the overall styling and design of the machine. “Unobtrusive yet smart” would be the best description that could be applied. Tape transport functions are controlled by a frontal array of press keys, all of which are delightfully positive in their actions. The cassette housing is covered with a transparent plastic plate which flies open and ejects the cassette (but not into the air!) when the Eject key on the extreme left is depressed. The others are for Rewind, Stop, Forward, Fast Forward, Record and Pause. This latter, the Pause control, is unusually efficient in its operation.

The twin VU-type meters are also situated in the upper surface; a pilot light is illuminated when the rocker mains

On/Off switch is in the On position. When the record key is depressed a red warning light within the meter assembly also comes on.

Next to the meters are the Record Gain Controls, a pair of vernier-type slide levers travelling against a numeric scale, and to their left is a slide switch marked "Limiter". This brings a type of Automatic Gain Control into operation, a facility that can be useful on some speech applications but whose value is, in our opinion, dubious for high quality recording work where there has yet to be found an efficient substitute for the human operator.

Other features on the main deck surface are a three-digit counter with reset button and what is called a "Tape Sentinal Lamp". This latter, a small opalescent pilot light, blinks on and off all the time the tape is running whether normally or in either of the Fastwind functions, and is something of a novelty. We have not seen anything quite like it before. Its practical purpose is to give a visual indication of the fact that the tape within the cassette is actually turning. Although it is hardly a facility that we regard as in any way essential it is something one can quickly get used to and would then miss if absent. With general improvements in mechanical and electrical quality modern machines run so quietly they cannot be heard; the softly blinking lamp reassures the user that the spools are indeed turning, and if the sound appears to be so good that it couldn't possibly be coming off a cassette then the light will tell him that it really is.

Inputs and outputs are sensibly positioned along the rear of the machine giving both phono sockets and an alternative 5-pin DIN connection for record/playback via a single lead. The exceptions are the two microphone sockets (miniature jack) and a stereo headphone jack on the front. The mains lead is permanently attached and exits from the rear. On the underside there are substantial rubber buffers to prevent damage to furniture. The whole is well conceived and in our opinion presents an appearance that is in every way typical of that elusive marriage between styling and function. There could be few households that would not be graced by the addition of this machine into the living room.

Our first user tests were devoted to the reproduction of a selected number of pre-recorded Musicassettes and the immediate subjective impression was of a quality standard that we have not heard bettered. The very fine playback characteristic of this machine is at once apparent when reproducing good repertoire via a quality amplifier and pair of full-range loudspeaker enclosures. We do wish that some of the critics of the cassette system (and there are not too

many of them left!) could have heard the sounds that we enjoyed from this equipment. Far in excess of anything that could be reasonably expected from such a slow tape speed we found to our delight that many of our existing cassettes actually contained material of better quality than we had imagined. It was both a joy and an excitement to hear old favourites reproduced with a new edge and a new clarity.

"This", we said to ourselves, "is how all cassette machines of the future *should* sound". Without doubt the Sony TC-127 is a machine of the future in this respect.

As a recording instrument it also functions well; the meters are easy to use and the slide controls provide a degree of fine adjustment that is not obtainable in any other way. The value of the Limiter is, as we have said, somewhat dubious. The circuit has a fairly long time constant so that when recording live an exceptionally loud noise will cause the circuit to drop the level and so undermodulate subsequent quiet sounds for an appreciable time. The device will probably be put to its best use when recording discussions or meetings; we would suggest relying on manual operation whenever quality is of importance.

So much of this review has praised the machine we must find a few points to criticize. One immediately springs to mind, and that is the lack of an adjustment that will enable the recorder to be used with the new chromium dioxide tape when it is available in this country.

At present there is *none* of this tape in the shops; the only specimens available are being used for test purposes by the major manufacturers. But it is coming, and when it arrives it will give us an improved frequency response *provided* the machine on which it is used has a properly adjusted bias current and equalisation. Many of the new cassette machines now incorporate a slide switch enabling the user to select "chromium" or "normal" tape. For the present the "Chromium" position should not be used because no-one can record on chromium tape, but within the fairly near future this new material should be freely available and then the enthusiast will want to make use of it.

But that is an oversimplification of what is really a very complex matter. At the time of writing there is to our knowledge no agreed standard for equalisation on equipment using chromium dioxide, although we hope that this will come about very soon. Until that happens one can only wonder what degree of standardisation exists in equipment already providing a bias/equal-

isation facility purporting to be suited to the new medium. It is better to be cautious and to ignore future possibilities rather than produce equipment that might record and playback to a non-standard characteristic.

As we understand it there are two equalisation possibilities. At present cassettes are equalised to 120 microseconds at the top end. If chromium dioxide recordings are made to suit that replay characteristic they could be replayed on all existing equipment with which they would be compatible. Against this great advantage there is the snag that by changing the equalisation to 70 microseconds there is an improvement to noise levels – but at the cost of compatibility.

Since a Dolby circuit will adequately look after noise there would seem to be little reason for drastically changing the equalisation. On the other hand some commercial interests might claim that it would be to the consumers' advantage to save the cost of Dolby by working to a new replay characteristic that would have the effect of reducing noise levels. And as if to confuse matters still more at least one record company is hoping to produce musicassettes on chromium tape during next year. These will presumably have to be recorded to the existing standard.

Then there is Dolby itself. The TC-127 does not include Dolby B noise reduction circuitry – one could hardly expect it to at its price. This is not such a disadvantage as it might seem. At least one firm (Kellar Electronics) will shortly be marketing a Dolby "black box", and the model suitable for use with cassette equipment will cost around £45. By using such a black box the user will increase the overall versatility of his equipment since the noise reduction appliance could also be connected to any existing open spool equipment that might already be owned. In fact we feel that it might well be a better proposition to keep the two elements (Dolby and recorder) quite separate. Under such conditions the user is free to decide whether or not to go to the additional expense at his own option. Certainly the quality standard of the TC-127 is very high without any special noise reduction appliance – with it there would be an improvement that should satisfy the requirements of the most dedicated high fidelity enthusiast.

We referred at the opening of this review to the "coming-of-age" of the cassette system. With the advent of the Sony TC-127 we have the analogue to the key of the door. It is a fine machine producing a standard of audio quality that was undreamed of not so very long ago at a price that should suit even modestly lined pockets. We strongly recommend it.

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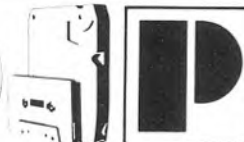
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Music

Musicassette Reviews

Consultant Critic Katinka Seiner

VIENNA IMPERIAL. New Year's Concert of 1970 by the Vienna Philharmonic Orchestra conducted by Willi Boskovsky. Decca SXC 6419. 49s 9d including purchase tax. Dolby processed.

With this, the first of five Musicassettes recorded to the Dolby B characteristic received from Decca, I have been able to judge the merits of this new noise reduction system. It is not easy to dissociate the startling technical development of Dolby B from the other qualities of the cassettes. For instance, I find that all five of these Decca albums have a somewhat similar tonal quality – almost a “clinical” kind of sound – that is rather far removed from what one actually hears at a live performance. This *could* be because of the use of the new noise reduction system (it shouldn't be!) or it could be the result of the Decca engineers striving to attain a common standard of quality. Since all five cassettes about to be reviewed cover different orchestras with different conductors performing within different acoustics one would expect to find greater differences in the collection than were actually noted. As it is I was chiefly impressed by their acoustic similarity instead of, as I should have been, by their contrasts.

But about the benefits of noise reduction I am in no doubt whatsoever. The background in the silent and very quiet passages of this Strauss album is as silent as anyone could wish for. In that respect it is indeed a contrast with other pre-recorded cassette tapes, and as such is a joy to listen to.

The repertoire itself comprises the annual New Year's Day concert given in Vienna to celebrate the great Strauss family. Broadcast on radio and television, the city of Vienna, home of the waltz, speaks to the world in her own language. Many recordings of this event have been published by Decca in the past and the present cassette is taken from the performance given by Willi Boskovsky and the Vienna Philharmonic in the Musikverein Hall in 1970 of works by Johann Strauss the Younger, including some of his less familiar compositions.

The repertoire comprises: *Franz Josef I Jubel Marsch*, *Lagunen Walzer*, *Orpheus Quadrille* (strict tempo version) *Schneeglockchen Walzer*, *Waldmeister Overture*, *S'gibt nur a Kaiserstadt*, *s'gibt nur a wien*, *Polka*, *So ängstlich sind wir nicht*, *Polka schnell* and lastly the concert version of the *Orpheus Quadrille*.

It might seem strange to find the *Orpheus Quadrille* appearing twice, once on each side of the cassette. As the very copious sleeve notes explain the first is in a modern strict-tempo ballroom arrangement which takes into account the changes that have occurred in the Quadrille since Strauss's days. In the arrangement as recorded here it would have practical application on the modern dance-floor. This may be compared to the concert version on side two where the work appears as it was first heard in Vienna in 1860.

Some of the other titles might not be too familiar, but the music is unmistakably Strauss.

Franz Josef I Jubel Marsch, for instance, was composed by the young Strauss at a time when he was seeking favour at court. It celebrates Franz Josef's recovery from an assassination attempt and uses extracts from the Austrian National Anthem, as does *S'gibt nur a Kaiserstadt*, *s'gibt nur a wien*, which means *There's only one Imperial city, there's only one Vienna*.

The entire collection can be strongly recommended for all who love the genuine sound of Viennese music; and who better to perform it than the Vienna Philharmonic? I feel that this particular cassette has more clarity and definition than some of the other Decca samples. With its absence of background noise it offers the listener a true high fidelity listening experience, although throughout there is the unmistakable feeling of the Decca engineers having their hands firmly on the controls.

I like this collection enormously and shall often play it. It was a happy choice for the first of our Decca reviews.

BEETHOVEN. Symphony No 9 in D Minor, Opus 125, “Choral”. Leopold Stokowski and the London Symphony Orchestra and Chorus, Chorus Master John Alldis. Soloists: Heather Harper, Soprano; Helen Watts, Alto; Alexander Young, Tenor; Donald McIntyre, Bass. Decca PFC 4183 47s 9d including purchase tax. Dolby processed.

The benefits of noise reduction are immediately apparent in the reproduction of this album. Starting with a very quiet passage the opening notes could be completely lost if the background sound were not to be minimal. But, alas, the opening notes also tell us other things about this album too.

To my ear the whole has a thoroughly artificial sound quality, an effect perhaps originating through the endorsement “Phase 4 Stereo”. With a false top, lack of definition and general bundle of noise being produced in the loudest passages (with some distortion too) it is difficult to properly judge the standard of performance. With the sound of Kleiber's live performance still ringing in my ears – no Dolby, no stereo; just tears of emotion – I found myself to be unmoved by this recording under Stokowski.

Scarcely able to credit my own lack of reaction I compared this cassette with the Karajan version by DGG on 7½ ips four-track stereo tape (Ampex DGP 8807). What I heard confirmed the correctness of my initial feelings. Over the past 150 years millions have been moved by this monumental work; they were not stirred by the kind of sound produced by this review sample. I can't help wondering when the original recording was made? There's a strong case for introducing legislation to compel gramophone companies to prominently display on every album the actual date of the origin of the master tape. At first I thought from the overall sound quality that this must have been taken from an elderly master, but a

glance at the names of the soloists (their performance is the one bright spot in an otherwise totally gloomy review) suggests that the recording could not have been taken so many years ago.

As soon as one hears the opening notes of the bass singer, Donald McIntyre, at the beginning of the 4th movement one's faith in the music is restored. The power and beauty of his voice make up for much of the frustration that has gone before. So, too, does Heather Harper, coping courageously with the devilishly difficult soprano part; this is so difficult it could almost be classed as “unsingable”.

At the conclusion of this album I could not help feeling very sad. Why, oh why, was this particular recording used for Decca's initial cassette release? Someone seems to have confused frequency response with emotional response. The former grates – the latter is nowhere to be found.

One cannot help thinking philosophically on the value of technical achievements. There is today too much emphasis on the cleverness of the engineer and too little understanding of the aesthetic values of the artist. Technical advance becomes pointless when it does not serve as the handmaiden to art. In this album great music has been reduced to the level of a firework display. And even some of the squibs are damp.

BEETHOVEN. Symphony No 7 in A Major, Opus 92, and Overture Leonora No 3, Opus 72a. The Vienna Philharmonic Orchestra conducted by Hans Schmidt-Isserstedt. Decca SXC 6447. 49s 9d including purchase tax. Dolby processed.

And what a contrast the sound of this version of Beethoven's *Seventh* Symphony offers us as compared to the *Ninth* reviewed above! They are absolutely, totally and utterly different! Gone is the strain and the harshness of the previous album; instead one can relax and take pleasure in the warmth of the string tones of the Vienna Philharmonic, a quality for which that orchestra is famous.

Even so there is the occasional hard sound with, say, the flute taking on more of the identity of the French horn, and there is too a trace of distortion at the lower end of the audio spectrum. But then perhaps our critique is becoming a little more critical – it must be now that the cassette is truly a high fidelity medium. We must demand, and get, recordings to the highest possible standard, although as mentioned previously, musicality should always take pride of place above technical brilliance.

In fact there is little here that one could complain about from the purely technical point of view. In interpretation there is quite a lot that can be admired. The third movement, for instance, is given a certain manliness or robustness that is often lacking in other conductors' versions, and I find it to be an outstanding feature of this performance.

The coupling with the *Overture Leonora No*

3 makes the whole an album of value and is to be recommended to those who do not already have these items in their music collections.

By the way, I note that Decca do not use leaders within their cassettes; instead the actual recording tape itself appears to be taken through to the empty hub. I wonder if this will stand the wear that is imposed on the first few inches, remembering that this is the part that normally takes most of the strain when fastwinding back and forth? I have purposely subjected one of these samples to pretty severe treatment without it suffering any damage, but it does seem to be a rather cheese-paring economy.

On the other hand the sleeve notes from Decca are the longest and most informative of any I have come across within the cassette format. For these they deserve congratulations.

TCHAIKOVSKY. Serenade for Strings, Opus 48, and Souvenir de Florence Opus 70. Academy of St Martin-in-the-Fields directed by Neville Marriner. Argo ZRC 584 49s 9d including purchase tax. Dolby processed.

This orchestra under Neville Marriner has received well-deserved critical acclaim for its immaculate performances of Baroque music. Now, with this Argo release from Decca, we find that the same talents are giving us an equally impressive interpretation of very different repertoire. Overflowing with expansiveness and romanticism, the music of Tchaikovsky is in direct contrast to the compositions of the late seventeenth and early eighteenth centuries. Yet the orchestra of St Martin-in-the-Fields produces broad sweeps of delightful string tone in the very best romantic idiom.

One cannot help comparing the true romanticism revealed by both the composer and conductor with the false sentimentality of some of the modern arrangements of popular melodies. I am thinking of certain works where the lyricism of reinforced string sections is degraded to simulate a pseudo-angelic chorus dispensing hygienically pre-packed parcels of near-hysterical emotion to a starving population. There is much confusion between the meaning of the word "romantic" as applied to either literature, pictorial art or music. It could perhaps best be described in its simplest terms as the translation of human feelings into intellectual form whilst still retaining the warmth of the original inspiration. As such the work expresses nobility, not sentimentality.

Just because a piece such as *Serenade for Strings* that has been heard countless times by untold millions has the merit of true romanticism it can be heard again and yet again without either boring or tiring the listener. Just as one can look many times at a great picture and always enjoy a fresh, unjaded aesthetic experience, always finding something new to appreciate, so good music not only survives repetition but even gains in stature the more frequently it is played.

In this album the *Serenade* is coupled with *Souvenir de Florence*, a work that is much less well known and indeed in my opinion less substantial. Lacking the brilliance of the melodic lines of the *Serenade* it offers pleasant enough listening in this version for string orchestra (it was originally written as a sextet) without necessarily conveying a true sense of the source of its inspirations. Florence is a queen of cities with its abundance of art treasures. *Souvenir* does not echo my own recollections of visits there.

Recording is very good indeed, although still with what I have called that typically "Decca" sound. On the other hand the more I hear this tape the more I like it. The sleeve notes are

again crammed with highly relevant information, but I must take the publishers to task for not giving a single word of explanation within any of these Dolby processed cassettes of what the Dolby system is all about. So perhaps my recommendations in favour of such items from this company – and I include this album in the list – should be qualified by the rider: "only to be purchased by those who, like the readers of this magazine, know how to properly reproduce the tape!"

ALBÉNIZ. Suite Española. Rafael Frühbeck de Burgos with the New Philharmonia. Decca SXC 6355 49s 9d including purchase tax. Dolby processed.

In this suite of eight pieces by Albéniz the last, *Cordoba*, is really out of place. In its original form the last item was entitled *Cuba*, but in preparing his orchestral transcription Rafael Frühbeck de Burgos preferred to substitute one of five pieces from *Cantos de España*. Opus 232.

One cannot help smiling at this change, said to be due to de Burgos' wish to retain scores relating directly to his own native country. It could not, of course, have any political motivation . . . !

The moment politics enters the field of the arts all is lost, so let us hasten to give our conductor the benefit of the doubt. Again we have copious explanatory sleeve notes that do much to clarify the musical intention and also to interpret the evolution of musical forms originating in Spain. Many of us are familiar with the Spanish idiom only through the more popular native dance rhythms or the numerous musical pictures painted for us by composers of other nationalities who were inspired by what they heard on visits to that country. Here we have excellent orchestral arrangements of music that is truly Spanish rather than derivative.

In fact the music of Spain is as rich as it is diverse. In Galicia (north-west corner above Portugal) the native instrument is – believe it or not – the bagpipes, whilst in Catalonia (with a strong French influence) a flute and drum combination are played by the same performer. The sleeve notes comment that there is as much difference between an Andalusian and a Castilian song or dance tune as there is between a Scottish reel and a Morris dance. Further, since Albéniz was a native of Catalonia the music of Andalusia would have been as foreign to him as it was to Debussy and Ravel!

This is a first-class collection that really does open the door to new aspects of Spanish music for most of us. I again find the recording to be a little over-bright, requiring modest adjustment to the treble control to bring it down to something approaching the reality of actual musical instruments. Too often the strings have a "wirey" quality that is never produced by competent players performing on good instruments. Once again technical brilliance has overshadowed musical tonality, but in this case not to such a degree that it cannot be corrected very easily. Failure to apply that essential top cut could lead to listening strain and fatigue.

Apart from that one reservation the album can be strongly recommended. The Dolby noise reduction system works perfectly – of course!

In its form as recorded the suite comprises: *Castilla* (Seguidillas), *Asturias* (Leyenda), *Aragón* (Fantasia), *Cádiz* (Cancion), *Sevilla* (Sevillanas), *Granada* (Serenata), *Cataluna* (Corranda) and *Cordoba*.

ROSEMARY BROWN'S MUSIC. Inspired by Liszt, Chopin, Beethoven, Debussy, Brahms, Schubert, Schumann and Grieg. Philips 7300 048. 49s 11d including purchase tax.

Do you remember the sensational story about Rosemary Brown? It was in all the newspapers and on television a few months ago. So far as I can recall she claimed that the "spirits" of long dead composers had communicated with her and had "dictated" musical compositions. She, without any musical training, was then able to write down the scores and many musicians debated whether or not the resultant music did or did not display the style and characteristics of the composers who were said to have been "in communication".

I am sorry to have to rely on my memory for these basic facts. The reason is because Philips have (astonishingly) given us no sleeve notes at all within this album. Here we have what can only be called a dramatic story without which the cassette is relatively meaningless, yet not one word of this is passed to the consumer. How odd! Have Philips been "posthumously instructed" to maintain strict silence? There could surely be no other logical reason for such a serious omission . . . !

But what of the compositions? Can any serious-minded person really attribute them to the composers whom Rosemary claims inspired her? The answer to that one is probably "yes". But only within the terms of comprehensible human inspiration. Each and every work is in the idiom of the composer whose name is attached to it. But what I cannot accept – from the purely musical point of view – is that any of these works could have been written by the composers referred to. Unless, that is, the act of dying also implies a reversion to childhood.

All the composers listed here had, in life, reached a maturity in their work that is only too obvious to any student. The music they were writing at the times of their respective deaths had a stature and depth of experience within itself – a "soul" if you like – that elevated mere collections of notes to the status of works of art. This product of genius can be found in their earliest writings, but there it is undeveloped.

In my opinion the collection of works recorded here could have been written by any musician with a good working knowledge of the various styles, plus, of course, the benefit of studies in the art of composition. It was said (if I remember aright) that Rosemary Brown did not have any proper musical training. This was part of the argument produced to bolster the authenticity of her claim to have been "contacted" by the dead composers. Was she then under spiritual guidance as she performed quite tolerably on side two of this album? Her performance standard compares well with Peter Katin's on side one, yet he is a pianist of distinction. What is one to believe?

Take Liszt, for instance. Since his death there has been no small controversy as to the artistic merit of much of his work. One would have thought that had he been able to compose after death he would have taken some trouble to refute his critics. Instead one of the pieces on the second side purporting to originate from him is musically one of the weakest and, if seriously accepted, could only confirm the validity of the condemnation to which he has been subjected. To say that it strains the credulity is an understatement. The work attributed to Debussy can only be described as an insult and as for the Beethoven . . . One can only assume that "Ludwig" had absentmindedly forgotten the creation of all his later quartets. . .

One does not wish to be cynical for the sake of cynicism; rather it is better to be open minded. But in matters such as this the evidence as offered must be evaluated sensibly. From my own musical experience I would say that from what I have heard here there is a stronger probability of a gigantic leg-pull than there is of "proof" of life after death. Which, I suppose, is really what it's all about.

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NEW PRODUCTS

DOLBY FROM BELL & HOWELL

BELL & HOWELL confirm that supplies of their new Dolby B cassette machine are expected to arrive in this country during the month of February. They also add that the demand has been enormous and orders already booked will more than absorb the first delivery. Arrangements are being made for follow-up supplies just as quickly as possible.

Basically a precision-built cassette deck intended for use with an existing high fidelity amplifier and loudspeaker installation, the Model 1700 will cost around £100. Its specification refers to a frequency response on standard tape of from 20 to 15,000 Hz (40 to 12,000 plus or minus 3 dB) and weighted wow and flutter of 0.15% according to CCIR.



The Dolby circuitry is switchable, and when operating the signal-to-noise is claimed to be 52 dB at 0 VU. There is a facility for changing the bias and recording equalisation for use with chromium dioxide tape and it is said that this is so designed as not to interfere with the compatibility of playback of existing recordings.

Sensitivity of the microphone input is 0.2 mV for 0 VU at 600 Ohms, the auxiliary input 100 mV for 0 VU at 100 kOhms and the output is 1 Volt for 0 VU at 5 kOhms. Total harmonic distortion is claimed to be less than 2% at 0 VU and erasure better than 60 dB, channel separation at 1,000 Hz better than 35 dB. Dimensions are 14.25 inches x 4.4 inches x 8.4 inches.

Bell & Howell Ltd, Alperton House,
Bridgewater Road, Wembley, Middlesex. HA0 1EG.

REDUCED PRICE PRO PORTABLE

HARDLY a "New Product", but certainly new at the price, a limited number of these machines are now being offered directly to the public, so we draw readers' attention to the EMI solid-state, battery powered portable tape recorder type L4 at a cost of £59, rather less than half-price.

Previously available only for applications in the scientific and industrial spheres the L4 offers a number of features of particular interest to the enthusiast seeking full professional facilities in a modestly priced portable recorder.



The L4 operates at tape speeds of 7½ and 3¾ ips, and both half-track and full-track versions are available. Amongst its specialist features are a synchronising head for film and TV applications, separate record and replay channels allowing continuous monitoring of the recorded signal, power rewind and h.f. erase.

Other features include two microphone inputs with separate gain controls, microphone bass-cut switches, line-in and line-out sockets, A-B (input and output) monitoring facilities and a loudspeaker with a separate 200 mW amplifier. Meter monitoring of battery voltage, h.f. bias, recording level and line-out is provided.

The L4 is powered by a rechargeable 14 Volt battery, which is included in the price of £59, together with carrying case. Only a limited number of these machines are available.

EMI Electronics Ltd, Hayes, Middlesex.

AND A NEW L4 ACCESSORY

AN INTERESTING accessory for use with the EMI L4 battery portable tape recorder is announced by K. J. Grinsell of Birmingham. In his release the manufacturer states that the appliance has been produced with the approval of E.M.I. Electronics Ltd.

The accessory comprises a dry battery unit accepting 12 AA cells, type HP7 or equivalent, and is intended to replace the rechargeable lead-acid battery supplied with the machine. By changing the power source to dry cells the equipment becomes more versatile since it can then be used in locations where mains power supplies for charging are not available.

Based on 30 minutes recording use per day the operational battery life is claimed to be 2 hours with a current consumption of 18 Volts at 13 mA giving a supply of 16 to 20 Volts DC. A remote control cable switch is available as an extra and there is provision for connecting this in the external socket of the power pack. Dimensions are the same as those of the lead-acid battery it will replace and the weight complete with HP7 cells is given as approximately 13½ ozs. The cost of the dry battery unit is £12 10s.

K. J. Grinsell, 180 Burbury Street, Lozells,
Birmingham B19 1TR.

SANYO CLAIM STUDIO QUALITY

"STUDIO QUALITY" is claimed to be fitting description for the new Sanyo MR805 3-head stereo tape deck.

Intended for use with an existing amplifier and loudspeaker installation the MR805 operates at three speeds, 7½ 3¼ and 17⁄8 ips, offers full A/B monitoring facilities and accepts spools up to 7-inch in diameter.

The specification claims a frequency response of from 30 to 20,000 Hz, plus or minus 3 dB at 7½ ips, with the upper limit restricted to 13,000 Hz at 3¼ ips and 8,000 Hz at 17⁄8 ips. Wow and flutter is claimed to be 0.08% RMS, 0.18% RMS and 0.25% RMS at each of the three respective speeds. Input impedances are quoted as 20 kOhms for the microphone sockets, 220 kOhms auxiliary and 10 kOhms for the record/playback connection. Impedances at the line-out and record/playback are both 2 kOhms with a stereo headphone connection available at 8 Ohms.

Special features include sound-on-sound, sound-with-sound and echo effects. A bias current switch matches the electrical characteristics to the kind of tape being used, either standard or "low noise high output". It is claimed that tape hiss and noise can be suppressed by means of a novel "actual noise silencer".



Dimensions are approximately 15½ inches x 13¾ inches x 7¼ inches and the weight is 23.14 lbs. The machine is supplied complete with an empty 7-inch spool, connecting leads and splicing tape at a cost of £99 15s including purchase tax.

Also new from Sanyo is the SX-80 loudspeaker system containing three drive units and yet compact enough to be placed on a bookshelf.

Measuring approximately 13½ inches x 10½ inches x 23¾ inches the enclosure is manufactured to provide what is described as a "unique hermetically sealed construction". Intended to prevent air leaks around the backs of the speaker cones, the cabinet is not screwed or bolted but sealed with adhesives. This is claimed to eliminate unwanted "peaks" or "dips" in the response which might otherwise arise due to propagation of rear speaker vibrations; this design is also said to lower the speaker's resonance and dampen excessive piston movements so improving sound quality in the bass range. The enclosure can also be driven at comparatively high volume level by high power amplifiers.

The manufacturer also states that conventional speaker mounting results in a cavity around the baffle edge which affects sound reproduction; for this reason the woofer in the SX-80 is mounted with its edge attached to the front of the baffle to give crisper unfiltered bass reproduction.

The three drive units used in the SX-80 are: a 25 cm woofer, an 8 cm squawker and a horn



tweeter. Maximum input power is given as 40 Watts (peak music) or 25 Watts (music) and the impedance 8 Ohms. Frequency response is quoted as 50 to 20,000 Hz with crossovers at 600 and 8,000 Hz. Recommended retail price of the system is to be announced.

Sanyo Marubeni (UK) Ltd, Sanyo House, Bushey Mill Lane, Watford, Herts.

NEW STYLING AND PERFORMANCE FROM LUXOR

NEW FROM Highgate Acoustics is the Luxor four-track stereo tape recorder, MP-813 This model is a complete record/playback mechanism with an audio output claimed to be 15 Watts RMS per channel and a pair of monitoring speakers 4 inches x 6 inches.

The machine operates at three speeds, 7½, 3¼ and 17⁄8 ips and the frequency responses to DIN 45511 are given as 40 to 18,000 Hz, 40 to 12,500 Hz and 40 to 7,000 Hz respectively. Wow and flutter to DIN 45507 is quoted as 0.1%, 0.15% and 0.3% with signal-to-noise 53 dB to DIN 45405. Maximum spool size is 7-inches and the recorder has separate volume controls for each channel, two input indicators and one output indicator. Separate treble and bass controls are also provided.



An interesting feature of the machine is the provision of separate inputs for connecting a magnetic pick-up (7 mV/50 kOhms) without the use of an accessory pre-amplifier, or a crystal pick-up (25 mV/500 kOhms). There are also inouts for two mono microphones (0.2

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The machine comes in a choice of either teak or rosewood cabinets complete with acrylic plastic dust cover at a recommended retail price of £175 including purchase tax.

An alternative model, reference MP-823, is an identical deck-only version without the final audio amplifier stages and costs a recommended £135 inclusive of purchase tax.

The firm of Luxor in Motala, Sweden, claims to be the largest Scandinavian manufacturer of radio, television and sound reproducing equipment with exports now being sold all over the world. Unlike many such companies their policy is to produce as many components as possible within their own workshops, thus exercising maximum quality control.

Highgate Acoustics, 184/188 Great Portland Street, London, W.1.

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