

JULY 1970

TAPE

RECORDING MAGAZINE

2'6



MUSIC ON THE MOVE

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REVIEW—AKAI 4000

Cross Talk

Music Reviews

New Products

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Ferguson 3232	33	5	0	5	1	10	93	5	0
Sanyo MR929	33	4	9	5	6	10	97	4	9
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
Sanyo 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
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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 62/64-X	52	6	8	8	14	6	157	0	8
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Telefunken 300TS	19	5	0	3	4	2	57	15	0
Telefunken 302TS	22	15	0	3	15	10	68	5	0
Uher 4000L	48	10	0	8	1	8	145	10	0
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Philips 4307	16	15	3	2	13	1	48	11	11
Telefunken 201	17	3	0	2	17	2	51	9	0
Ferguson 3238	20	12	0	3	5	0	59	12	0
Philips 4308	20	14	2	3	5	7	60	0	10
Ferguson 3249	22	9	0	3	3	8	62	9	0
Ferguson 3216	22	16	0	3	12	2	66	2	0
Tandberg 1541	28	0	0	4	10	0	82	0	0

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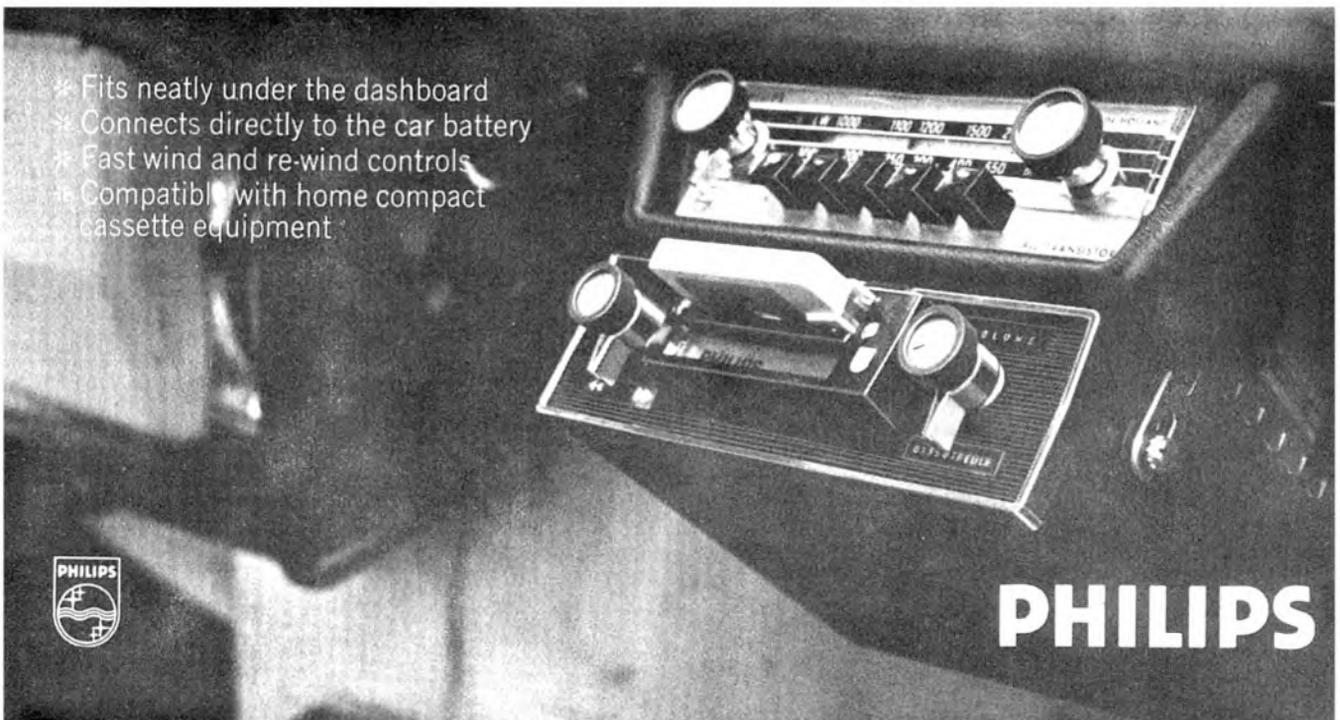
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X1800SD	£199 18	£175 10	Akai AEH10	£20 0	£17 0	7"/1800	56/7	41/3	37/4
4000D	£89 19	£71 19	A.K.G. K-50	£9 10	£8 6	4 1/4"/900	34/1	24/9	22/6
1710L	£109 0	£95 18	A.K.G. K-60	£13 10	£11 16	5"/1200	39/3	28/6	26/-
4000	£124 18	£110 0	Beyer DT48	£33 14	£28 13	5 1/4"/1800	56/5	41/3	37/2
X5000L	£177 19	£156 13	Beyer DT48S	£33 14	£28 13	7"/2400	69/6	57/-	45/9
M-10L	£245 1	£215 13	Beyer DT109	£23 18	£20 7	5 1/4"/2400	69/5	51/-	45/7
Ferrograph 713	£188 10	£166 0	Eagle SE1	£4 19	£4 7	7"/3600	86/7	63/9	56/10
Ferrograph 702H	£216 3	£190 7	Koss PRO 4	£23 0	£20 0	BASF Low Noise High Output Tape			
Ferrograph 722	£242 11	£213 12	Koss ESP6	£45 0	£37 10	5"/900	37/9	27/5	25/-
GRUNDIG			Pioneer SE50	£19 3	£16 6	5 1/4"/1200	43/5	31/6	28/9
TK120	£39 5	£28 18	Pioneer SE30	£12 12	£10 14	7"/1800	62/1	45/5	41/-
TK124	£44 18	£35 7	Pioneer SE20	£7 2	£6 2	5"/1200	43/3	31/6	28/7
TK144	£49 19	£42 5	Pioneer SE 2P	£6 15	£5 15	5 1/4"/1800	61/11	45/5	40/9
TK149	£57 12	£46 19	Rotel RH 600	£5 10	£4 14	7"/2400	76/7	56/3	50/4
MARCONIPHONE			Rotel RH 711	£9 0	£7 13	5"/1800	61/9	45/4	40/7
4218	£89 11	£80 10	Sansui SS2	£7 14	£6 12	5 1/4"/2400	76/5	56/3	50/2
4248	£52 14	£47 7	Sansui SS20	£16 10	£14 0	7"/3600	95/1	70/1	62/4
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EL3312	£56 10	£48 13	Teleton SH301P	£4 0	£3 10	C 90 Std.	25/1	16/3	14/9
4302	£35 17	£30 16	MICROPHONES			C 120 Std.	33/7	21/6	19/6
4307	£49 10	£42 10	Beyer M64	£10 7	£8 16	AMPLIFIERS			
4404	£83 0	£71 5	Beyer M64 SH	£14 7	£12 4	Rogers R/bourne	£59 10	£47 10	
PIONEER			Beyer M67	£29 6	£24 18	Rogers R/bourne (Case)	£64 0	£54 0	
T600	£183 8	£161 3	Beyer M818HL	£22 18	£19 10	Rogers R/brook	£42 10	£37 3	
T500	£167 11	£147 4	Beyer M81HL	£11 5	£9 13	Rogers R/brook (Case)	£47 10	£41 7	
C6000	£325 1	£285 6	Beyer M55HL	£8 18	£7 11	Rotel 100	£45 10	£36 8	
Sanyo Cassette		£20 19	Eagle DM58HL	£11 0	£9 13	Rotel RA 840	£75 0	£60 0	
Standard Cassette		£15 15	TAPES & CASSETTES			Sansui AU222	£62 18	£53 10	
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SL40	£37 10	£32 19				Sansui AU777	£115 15	£98 8	
FXB 510D	£52 10	£46 0				Teleton SAQ 203	£27 15	£20 15	
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TANDBERG, UHER, TELEFUNKEN, DUAL, VORTEXION		Send for Special List of Caves reduced prices				Teleton SAQ 101	£37 10	£31 0	
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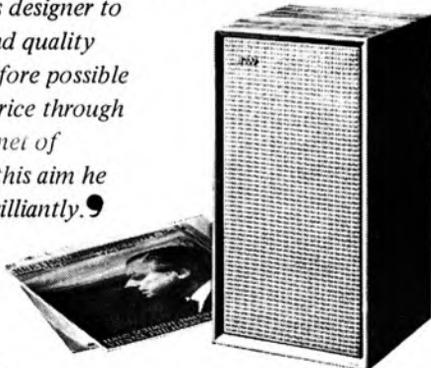
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You may still be a little sceptical about the outspoken claims we've made for our DM1 loudspeaker.

After all, having put a top-class speaker in an enclosure not much taller than an LP sleeve, we feel we had something to shout about.

But we won't say another word — we'll just let this extract from Denys Killick's review in Tape Recording Magazine do the talking for us.

... we can summarise the DM1 enclosure by describing it as the very best we have heard within its price range, having as it does a performance standard higher than that sometimes found in larger systems. We believe it represents a very sincere attempt on the part of its designer to offer better sound quality than was ever before possible at this sensible price through the use of a cabinet of sensible size. In this aim he has succeeded brilliantly. ♪



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TAPE

RECORDING
MAGAZINE

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

Vol. 14 No. 7 July 1970

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Cover Photograph: Philips tell us that stereo in the car is a completely new experience, and to prove the point they are sending 20 vehicles round the country to demonstrate their car radios and stereo cassette players. And our young lady is one of twenty Miss Cassettes (the prettiest of course!) who will be only too pleased to play cassettes in her car for you. The promotion will last several months and each car will be stationed at a different garage every week. If you should be fortunate enough to locate our cover girl her name is Madeline Lee. For our own opinion about music in cars read "Music on the Move", page 225 this month.

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DENYS G. KILLICK

Tape trends and tape talk

By Douglas Brown

IT IS POSSIBLE to visit the United States for a couple of weeks and never see evidence of tape recording as a hobby. "Music bars" are everywhere, in departmental stores as well as specialist shops, with bewildering selections of cassettes of taped music. But of the fact that a tape recorder can be used for recording, no suggestion.

In New York and Chicago recently I tried to find a magazine or book on tape recording in both bookshops and audio shops, without success.

Even more so than in Britain, Americans lack the patience to settle to a hobby like this. The need seems to be for instant satisfaction. But there's no doubt that they get this from music on tape. Nearly a third of all recorded music sold in the USA is now on tape.

In Connecticut I heard of an organisation operating a scheme the like of which I have not encountered in Britain, the "Tape-a-Letter League". It started with pensioners and the handicapped. The organisation provides pensioners' associations, organisations for the blind and convalescence homes with tape recorders, then collects in the recorded letters.

Individuals with similar interests are "matched" and their letters are exchanged. No identification is provided at first, but if the exchange of letters goes well and both parties agree they are introduced to one another. It is essentially a "lonely hearts" operation, but with social purpose. A planned development of the scheme will enable the bed-ridden to dial a local phone number and to dictate a letter on to a central recorder.

* * *

ON TWO RECENT overseas trips I have been speculating whether the special atmosphere or character of a country can be evoked by particular sounds. In Norway last month, as the Spring thaw got under way and the high waterfalls began to thunder, I felt sure that this northern nation could best be portrayed in sound by cascading water.

And in America a month earlier I concluded, sadly, that the characteristic sound is that of police sirens wailing in the night.

How would you portray Britain in a single sound? I'd be interested to hear your ideas.

* * *

CONGRATULATIONS to John Bradley and Peggy Puchanan on the Spring issue of the *Federation News and Views* which has set an entirely new standard for club journals. John and Peggy have developed a lively interest in printing and look to be well on the way to creating a notable private press.

The decorative headings, the justified text, the thoughtful editorial comment, the lively and varied news roundup, with plenty of good factual material

about contests and clubs, makes *News and Views* one of the most interesting publications to reach my desk.

* * *

CLOSING DATE for the 1970 British Amateur Tape Recording Contest is June 30. Tapes should be addressed to the Secretary at 33 Fairlawnes, Maldon Road, Wallington, Surrey. If you have mislaid your rules and entry form, there is just time to get another copy and to submit your entry.

As usual, there are prizes totalling £200 in cash or equipment, plus ten silver trophies. And, again as usual, the best British tapes will go forward to the International Recording Contest which, this year, will be staged at Geneva next October.

* * *

PAUL McCARTNEY sent me a pressing of his latest disc, with notes on the way it came to be made. Of the first track he wrote: "When the Studer 4-track was installed at home, this was the first song I recorded, to test the machine."

Obviously the second number was also a test operation, for he notes of it: "I only had one mike, as the mixer and v.u. meters hadn't arrived."

And song number three: "Recorded at home. Made up as I went along . . . ad-libbed, with more concern for testing the machine than anything else."

I'm prepared to wager that no man ever made test recordings to such good (and profitable) effect!

* * *

NEWS FROM Cyril Rex Hassan about the next International Audio Festival and Fair, to be staged at Olympia in October. Since last year he has been diligently researching methods of providing first-class audio studios and this time exhibitors will have the choice of an amended design. He thinks he has solved all the problems involved in giving satisfactory demonstrations in an exhibition hall.

All the space originally allocated for audio has been sold and audio exhibitors are spilling over into other parts of the hall. This year there will be lectures and presentations every two hours each day, with provision for audiences of 300 to 350. There will also be film shows. And Olympia has been booked for the Audio Festivals of 1971, 1972 and 1973.

* * *

WHOEVER THOUGHT that the small, compact size of the tape cassette would be the cause of problems? Apparently retailers have discovered that it is all too easy for shop-lifters to slip cassettes into their pockets.

In fact, Precision Tapes, a new subsidiary of Associated Television, is opening a shop in Soho — as a preliminary to marketing tape records — simply to gather experience in combating shop-lifting!

MUSIC ON THE MOVE



The Mecca MC 7200 cassette machine with its two loudspeakers and microphone.

that he needs the calming influence of sweet music, the reassurance of security, the taming of that aggressive instinct.

Since our manufacturers are motivated by such noble ideals it would be churlish indeed to question their sincerity. The safety and the comfort of the driver is the thing – the cash profit that also accrues is an... embarrassing... by-product!

Since we at *Tape Recording Magazine* have an interest in all aspects of recording, and since by force of circumstance we also happen to drive cars, we decided to carry out a little experiment on ourselves. In the editorial car we fitted on one side of the steering column an eight-track cartridge player, and on the other a cassette machine. The

MUSIC FOR THE MOTORIST is about to become very big business indeed. Equipment manufacturers and publishers of recorded repertoire reason that the man who enjoys listening to music within his own home is also likely to appreciate the same facility when driving his car. Every year there is an increase in the number of cars on our roads, and similarly the average time spent in the driver's seat tends to get longer. Isolated within the insulated luxury of his super-powered tin can the driver is a solitary figure whose loneliness requires to be compensated by entertainment, information or even instruction.

It can safely be assumed that Shakespeare knew nothing of Compact Cassette or Stereo-8, or even motor cars for that matter, but he could have been writing an ad-man's copy when, in *The Merchant of Venice*, he said:

... nought so stockish, hard and full of rage

But music for the time doth change his nature.

The man that hath no music in himself, Nor is not moved with concord of sweet sounds

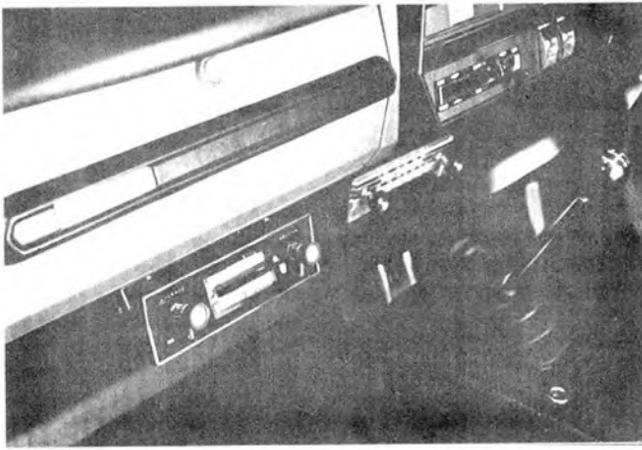
Is fit for treasons, stratagems and spoils. . . . etc.

Our Javelin SS 548 Stereo-8 unit. Both this and the Mecca machine above are supplied with fixing brackets and bolts so they can be permanently attached to the underside of the dash. Both machines are suitable for cars using a 12 Volt system with negative earth.



Within the psychology of the motor car there's a strong emphasis on aggression. This is revealed in the very names given to cars by their manufacturers (the latest, Hillman Avenger, is a classic example), the monotonously violent theme of the petrol companies' advertising and, of course, in the way some people drive. And yet every driver knows, in his saner moments at least, that the blood and gore of the casualty ward is no more than a hair's breadth away from his brake and accelerator pedals. Small wonder, then,

former is a Javelin model SS 548 costing £46. 3. 7d., and the latter a Mecca model 7200 costing £66 and distributed by Teleton Electro (U.K.) Ltd. Both equipments are wired to the same pair of loudspeakers (the ones included in the purchase price of the Mecca machine) and these are placed on the parcels shelf below the rear window of the car. Equipped with a selection of cartridges and cassettes we tried to assess our own reactions to "music on the move" and also the relative merits of the two systems.



One of the latest Philips stereo cassette players, model N2602, costs £42. The cassettes are merely "posted" in a slot; no further attention is required from the driver until automatic ejection at the end of the track. Here we can see how neatly and inconspicuously the equipment fits into the vehicle.

inevitably happens on some of the classical cartridges. This is one of the snags of the system, and we found it disturbing — even to the point of increasing tension and irritation.

With the cassette machine there's a little more fiddle. The "Up" key must first be depressed to insert a cassette, the mechanism must then be closed and the Play key depressed. None of these were found to be difficult operations when driving, and we must mention that the latest Philips equipment uses the letter-box posting principle where the cassette is inserted into a slot and then a flange is pressed downwards to bring the tape up to the head and to actuate the mechanism.

The cassette tape may be fast wound in either direction so with this system we can at least find the beginning of the programme. Turnover is manual, but it does occur at sensible places. On the Mecca there is also a record facility but this is only via the microphone supplied. This could be an invaluable extra for the business man who wishes to save time by dictating letters in his car, so we asked the Metropolitan Police if it would constitute a motoring offence to actually record whilst driving. They told us that, as such, this is not a statutory offence, but they added that it is an offence to drive without having proper control of the vehicle. If one were to be unfortunate enough to be involved in an accident whilst recording we should imagine it would be very difficult indeed to convince a judge and jury that one's driving ability was not impaired. For safety's sake we suggest that one should *never* attempt to record on the move.

In this connection we noted that none of the Philips equipment now available and designed solely for motor car use includes a record facility. This is a top level policy decision that has been taken by the company in the interests of road safety. Whilst congratulating them on their care and thoughtfulness we do feel that the individual motorist must be credited with a little commonsense. There's not the slightest danger in recording whilst the car is stationary by the roadside or in a car park and it seems a pity to deprive him of this facility because a minority of idiots can't be trusted.

But to return to our music on the move. We frankly believe that there's not a great deal of difference between the quality, performance and efficiency of the two systems. As Stereo-8 runs at 3¾ ips it would be reasonable to assume that it would be less subject to annoying wow than cassette at 1.7/8 ips. In fact we found the contrary to be the case. Some cartridges were very bad in this respect and on enquiry we find that the reason

At the beginning of the experiment we concentrated solely on Stereo-8 and used a different pair of speakers. These, supplied by Javelin Electronics Ltd., were placed as recommended one in each of the two front door pockets. They comprised simple drive units mounted on an ornamental front plate. There was no attempt at proper acoustic loading. First impressions were disastrous! With shrill top, lack of bass and thoroughly objectionable peaking due to the restricted air volume within the vehicle we found that the resultant sound *increased* tensions producing all the symptoms of listening strain — headache, irritability, etc. It must be remembered, however, that this was a personal reaction

from someone who has spent years listening to "good" sound. For us this just would not do.

Out went the loudspeakers with a shudder, and they were replaced by a pair of Ditton 15 enclosures. These had to be placed on the rear passenger seat where, of course, they took up most of the space But the result was superb. . . . It was rather like driving around with the Albert Hall in the car. We were limited now to carrying a single passenger who invariably had a glazed look of stupified amazement on his face when subjected to the treatment. We enjoyed ourselves immensely and as we didn't actually hit anything the experiment could be counted a success.

All good things must come to an end and the Dittons finally had to go. At that time we fitted the Mecca machine and tried out the two parcel shelf speakers. Again there is no attempt at proper acoustic loading, just two drive units in a couple of plastic boxes, but we felt that the sound they produced would have to be accepted as a reasonable compromise. At last the rear passenger seat was free again.

Now that the two systems were playing through the same speakers we could begin to compare efficiency, quality and convenience from the driver's point of view. Each has its own peculiar advantages and disadvantages. There is an absolute minimum of distraction involved in the Javelin Stereo-8 mechanism. A cartridge is merely pushed through the slot and the programme starts. At least, it doesn't actually *start* because it will begin to play at the random point on the tape at which the cartridge was last extracted from the machine. Track change is automatic, so that at the end of one track there's a pause, a "clonk", a light comes up behind the appropriate track number on the machine face-plate and off we go again with no attention at all. Which is fine so long as the break does not come slap in the middle of a musical phrase as



For the man who has just about everything, why not a portable Stereo-8 player? This one runs off dry cells or 12 Volt car battery, reproduces in mono and costs £25.18.10d. It's the Automatic Radio model EPE 9821 from United Mercantile Co. Ltd., of 13/14 Queens Street, London, W.1.

relates to difficulties associated with getting just the right tension on the endless loop. Such faulty cartridges should be returned without hesitation to the shop from which they were bought. Apart from that one qualification sound quality was excellent. In our "Ditton 15 Period" we were able to appreciate the full potential of the Stereo-8 system, and it really will stand up to listening on the most critical speaker equipment.

Most of us are familiar with cassette quality, and under ideal conditions this too will stand reproduction via full range

When driving at high speed down a motorway in a reasonably well-insulated car (Vauxhall Victor) we found that the ambient noise level was so high that playback levels had to be increased to an absurd degree to really *hear* the music. At such times the driver's attention was undoubtedly diverted. When "poodling" through London traffic jams the right music could indeed soothe the savage breast, and when happily driving into the country at the week-end without a care in the world we found that suitable music elevated contentment to ecstasy.

We could have told them that at no cost at all. It is by no means clear whether or not the *quality* of the loudspeaker equipment has been taken into account, or the kind of repertoire, or the listening level and we believe those to be vital factors.

The Road Research Laboratory added that "no strain or ill effect has been noted." Sorry, experts, but we can demonstrate "strain and ill effect" within the home without stepping inside a car.

At the present time there is an intense campaign under way to convince the motorist that he should have "music on the move." We question this only in the interests of road safety. Do any of these people really know what effect their music has on the driver? We doubt it.

Philips is the biggest name in this business, so we asked them what precautions they had taken to ensure that their products do not produce accidents. In answer they tell us that a car radio has never yet been blamed for an accident (it would be a most difficult thing to prove, but boredom and sleepiness have caused accidents), their equipment is thoroughly padded for safety on impact (our concern is to avoid the impact), the driver is not distracted by a record facility (which we have already dealt with) the "letter-box posting" insertion of cassettes is costly but has been introduced in the interests of road safety (laudable but a irrelevant) and the longer playing time of the new double play cassettes means less turn-over distraction. And then lastly, the comment that Philips Records produce a selection of Musicassettes that have been specially compiled for mobile use. In these tapes a quick number if followed by a slow; the variation in repertoire is deliberately intended to keep the driver awake and alert and this seems to be the first step towards true safety in the mobile music business.

At the present time twenty cars fitted with Philips radio and cassette equipment, and a mini-skirted demonstrator, are touring the country. Stationed at major garages they are inviting the public to experience the new sensation of music on the move. This campaign will be followed by others.

As responsible road users we feel entitled to ask for a proper scientific and medical investigation into the physiological and psychological effects of music on the move. This is too important a subject to be left to the whims of individual manufacturers. Death by road accident is sudden, horrible and utterly final. With more and more drivers on the road we must be even more careful. We doubt if this subject has ever been properly analysed. Now is the time to do it — before it is too late. For you. Or me.



Also from Automatic Radio, the SCE 6804 Stereo-8 player at £54.0.9d including two speakers. AM/FM radio modules costing £27.17.11d are available; one of these slipped into the cartridge slot gives excellent radio reception. And if you happen to be one of the few people with a stock of 4-track stereo cartridges then an adaptor for that system will cost only 24s.

enclosures. Main advantage here lies in the vast selection of home equipment and recorded music available (over 1,000 titles) and, of course, the possibility of recording one's own repertoire for mobile use. With the advent of the new "double l.p. cassettes" priced at 71s. 6d. compared to the cost of two full-priced records at 79s. 10d. we have a minor price break-through and less turnover distraction. And we would be happy to accept bets that within the very near future we shall see a range of budget-priced cassettes from a completely new name in this field.

Whichever system is used we found that some kinds of music definitely tend to distract the driver. Classical music (for which we have a preference) has a wide dynamic range. In order to hear the quieter passages above the noise of the car and the surrounding traffic we found that a relatively higher volume level must be used as compared to "pop" music where the dynamic range is negligible. On loud passages this could be distracting.

Certain musical effects can also cause trouble. We have one cartridge which includes a percussive effect that sounded, the first time we heard it, just like the knocking of a big end. Equally troublesome are effects such as whistles blowing, sirens wailing, etc. All these things will distract the driver.

So back at the desk once more we asked the Ministry of Transport whether any investigations had been carried out on the physiological and psychological effects on drivers of reproducing music in moving vehicles. From our experience in audio we know that one way of assessing a loudspeaker enclosure is to judge how much strain it produces in the listener. We say that if a system (which might cost up to a hundred pounds or more) gives listening fatigue and headache, then it is at fault. If this is a valid method of assessment then all these mobile appliances with their frankly rudimentary loudspeakers could be potentially dangerous. Killers, in fact. Quite the opposite of the advertisers' message. Or, alternatively, could the extended response of a quality loudspeaker be more distracting?

It seems that the only investigation that has been carried out relates to car radios, and this was done under the auspices of the Road Research Laboratory. An eminent panel of doctors and experts deliberated and they came to the following dramatic conclusion: "Under certain circumstances music reproduced in a moving vehicle could help to lull the driver to sleep — but under other circumstances it could help him to keep awake." Brilliant! It either is — or it isn't — conducive to road safety.

Learning the easy way

When this Miss is old enough to buy her own potted music, gramophone records will be museum pieces.

So she's starting out the right way. By insisting on musicassette music; the Philips pioneered system that's easy to listen to, easy to play. When you like. Where you like.



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conducted by Wolfgang
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Follow her into the 70's with the sound of the 70's — Musicassettes from Philips.

NOW THAT the tumult and the shouting have faded into the past we can take a more detached view of the recent Sonex '70 exhibition and assess both its merits and its probable place in the audio world of the future.

One opinion I heard expressed at Skyway Hotel was that as an exhibition it was the biggest non-event ever, but as a *demonstration* its success must have exceeded even the most optimistic wishes of the organisers. This basic difference between exhibiting and demonstrating could well be the key to the future of Sonex and the traditional Audio Fair. The former fulfils its best function by demonstrating high quality audio equipment to what we must acknowledge to be a relatively limited audience of enthusiasts, whereas the latter's success lies in the exhibiting of a broader range of equipment to a larger number of people. With such a subtle difference of emphasis there could well be a future for both events.

The vastness of Olympia is conducive to the "grand show" laid on in lavish style; however good the demonstrating studios might be they can never really simulate domestic conditions. In a hotel we have the advantage of rooms closely approximating the average dimensions of ordinary living accommodation; the visitor gains a much better impression of how the equipment is likely to sound within his own home. But the facilities within a hotel are never large enough to enable a mass audience, such as we had at Olympia last year, to circulate in comfort.

At the present time general interest in audio is rapidly increasing. More and more people want to know what it's all about. For them, as newcomers to the subject, the Audio Fair and Olympia would be ideal. There they will find equipment at the "popular" price levels and skilled technicians to answer their questions. Their sheer weight of numbers is likely to encourage the more knowledgeable enthusiast to stay away. For him Sonex provides the atmosphere that Olympia lacks.

So my forecast for the future is that we shall have all the benefits — and the disadvantages — of two audio shows each year, and that each will gradually evolve its own characteristic approach to the subject. They will, in fact, perform different, but equally necessary, functions.

That is the theory. And yet all the time I have a strong feeling at the back of my mind that many of the familiar faces that were to be seen at Skyway Hotel will turn up again at Olympia in the autumn. The audio enthusiast is a resilient animal, gregariously inclined towards his own kind and possessing an insatiable desire to

CROSS

TALK

By Audios.

see, hear and talk. Courageous in the pursuit of his subject, inflexible of purpose and utterly dedicated he will follow his chosen star wherever it might lead.

The truth is that if an audio show were to be organised in a leaking, unheated wooden shack off the Wapping High Street it would still be jammed to capacity. Such is the level of demand and the measure of the faithfulness of the fraternity. It is doubtful if any other leisure activity has such loyalty from its adherents. Let us hope that those commercial interests who make their livelihood out of this elite corps of audiophiles appreciate their good fortune.

* * *

LATE NEWS ITEM. I have just heard from Highgate Acoustics, distributors of Arena products, that the Arena factory in Horsens, Denmark, has been completely destroyed by fire. This is the factory that was featured in our September issue under the title "At Home with Arena". We extend our sympathy to all our Danish friends.

In the meantime Highgate tell me they have some stocks in hand and do not foresee any problems with servicing. They are now awaiting advice of the probable date when production will be resumed.

* * *

CASSETTES are rarely out of the news these days, and recently some interesting figures were released by Philips Records. It is claimed that the guaranteed playing life of a Musicassette is 1,500 hours against a mere 100 hours for an l.p. record. Fifteen times as much! It seems strange to me that such dramatic news is not shouted from the housetops; perhaps it's because there is too much capital invested in gramophone record interests.

Four years ago the production of Musicassettes at the copying plant in Walthamstow was a modest 200,000 units. Does that sound to be a lot? Well, the 1970 production will reach the staggering figure of 3,000,000! In the past "high speed" copying meant running the tapes through at eight times their playing speed. A cassette with, say, twenty minutes programme time per side therefore took one-eighth of twenty minutes to copy. All four tracks of the tape are, of course, recorded at the same time with side one backwards and side two forwards so the tapes come off the machines "right way round".

But now with the latest equipment in this modern London factory the copying speed is four times as fast — thirty-two times! Increased demand, production and efficiency can only mean one thing. Prices must come down sooner or later. For most of us that day can't come too soon.

Already there are more than 1,000 titles in the repertoire, and these include spoken word recordings on the Caedmon label and language courses. Future plans include the possibility of route cassettes for the motorist. This would give detailed advice for the driver and would be a friendly voice to guide him personally from his home to, say, Barcelona in Spain. What a boon that would be.

I have just been playing around with the figures. If we accept a production estimate of 3,000,000 units, each with a playing life of 1,500 hours then I calculate that the total playing time produced in Walthamstow in 1970 will amount to 50,000 years! As if these statistics were not dramatic enough, Philips add that by 1980 they expect the penetration of Musicassettes to have increased thirteen-fold over the 1969 sales.

More fascinating figures. In America 30% of sales of music are on magnetic tape in one form or another, in Italy it's about 28% and in Norway 24%. Thanks to the crippling 55% purchase tax in Britain the proportion here is around 5%. So we can conclude that if we had a fair and tax-free market then sales of music on tape would reach their natural level, some five or six times the present volume. That increase would be solely due to the public awareness of the advantages of tape over disc and would be an expression of natural preference.

Instead we have a totally false situation brought about by punitive legislation resulting in unfair burdens on the industry and so hampering its ability to compete internationally. And you and I, the cash customers, are denied the choice of product that is enjoyed by our friends overseas. For how long is this state of affairs to be permitted to continue?

* * *

I HAVE just been attending a most important function: the prizegiving for the 3M Wildlife Sound Recording Contest at the Europa Hotel in London. In the chair was W. T. Dagg of the 3M Company, and the distinguished guests included John Burton of the BBC Natural History Unit and actor Nigel Stock who gave the prizes.

Well known for his film and television parts (remember Dr. Watson in the Sherlock Holmes series?) Nigel Stock is in fact an enthusiastic amateur bird watcher. He takes maximum advantage of rural filming locations, both at home and abroad, to observe wild life. He told us that on the set he has been dubbed "leader of the puffin patrol"! In real life he is as endearing a character as the Dr. Watson he has portrayed so often.

A complete list of winners was published in our March issue, but at the Europa we had the pleasure of actually listening to these excellent tapes. I was most impressed by John Gittins' recording of two foxes fighting and Mrs. Anne Dunn's tape of a fallow buck deer patrolling his herd of grazing does. Both of these (they won second and third prizes respectively) were entered in the Mammals and Insects class, but they were full of atmosphere and the mystery of wild, open country. All the recordings were worthy prize-winners, but I single those two out because they appealed so much to me personally.

The contest will be repeated again this year and entry forms are available on request. Please write to W. R. Bowles, 3M Company Ltd., 3M House, Wigmore Street, London, W1A/1ET. The lucky overall winner of the 1969/70 contest received a Tandberg Series 11 machine plus a Grampian parabolic reflector at the Europa Hotel. Next year the top prize will be an Akai X-V battery portable. And don't forget there's a special section, with special prizes, for juniors. So ask for your entry form now and help to make this third contest in Conservation Year the very best yet.



The Filmosound camera and recorder in action.

EVER SINCE the "talkies" made their first appearance some forty years ago a great deal of effort has been devoted to the problems involved in adding sound tracks to amateur films. This research has been intensified over the last ten years; the public – you and I – have become so accustomed to experiencing the phenomenon of sound and vision within our own homes through the medium of television that the silent 8 m.m. home movie has become something of an old-fashioned anachronism. Pictures must talk. Soon they will have to face competition from home video recording in one form or another; with video we shall have sound as a matter of course. To meet the challenge the home movie-maker must have sound as well.

Unfortunately it is not sufficient to play back a random selection of music or sounds whilst a film is showing. This is vaguely reminiscent of the old silent film with its piano accompaniment, and as such can be pathetically humorous. No, the aim must be for "lip synchronisation", such as we have in the commercial cinema and television. Nothing else will do. Now, through the development of techniques using magnetic tape, there is no reason why the amateur should not have a professional-type sound track as he projects his film.

Before discussing and comparing the two most recent systems to become available in this country let us first cross a sword with the advertisers. Potential purchasers of the necessary equipment will undoubtedly be told that with the

MAKING PICTURES TALK

aid of this or that package of electronic wonders the making of sound films is easy. Anyone can do it. With the latter statement we would agree. There's no doubt that with today's sophisticated tools anyone *can* make a film, plus a sound track, and the result will be perfect synchronisation. But there's far more to it than that. The production of a sound film calls for all the skill and artistry of the experienced film-maker *plus* the application of the many techniques involved in sound recording. It is very difficult indeed to get a really good spoken word recording; to film the speaker at the same time increases, rather than decreases, the complication.

With all due respect to our cine friends we do feel that it is here that the vast majority of home sound movies will fall

Cassette, the other on open spool tape. In the former the end result is a "silent" film with the sound recorded so accurately on cassette that when shown on the specified equipment perfect synchronisation is not only possible but virtually inevitable. With the latter the aim is to dub the sound on to magnetic stripe on film so that we have a true "talkie" that only requires to be run through any suitable sound projector to produce both picture and sound. Again synchronisation is absolute. The cassette system has been introduced by Bell & Howell, the open spool method by Tandberg. Introductory notes on the Tandberg system were published last month, so we will start now by examining the Bell & Howell approach to the problem in some detail.

Close-up detail of the cassette machine that forms part of the Bell & Howell Filmosound system. In appearance it is not so very different from any other cassette machine, but it actually includes some extremely sophisticated electronic circuitry that helps to provide perfect synchronisation between camera and recorder when shooting and between projector and recorder when showing.



down. Even if the standard of the camera work is excellent the accompanying sound (although strictly in sync!) could be absolutely terrible. Terrible, that is, by our recording standards. By the same reasoning it is likely that a recording enthusiast will produce films with excellent sound tracks but poor visual effects. This is a medium where *two* skills must come together in perfect harmony; neither is easy, both require time and patience. Electronic gadgetry is no substitute for human creativity, and no sales slogans yet made a good film.

An interesting difference between the two systems we are about to discuss lies in the fact that one depends on Compact

The necessary equipment comprises: a B & H sound camera (model 375 at £54. 1s. 6d or the photographically more sophisticated model 442 at £97. 17s. 6d.), a model 450 sound recorder at £50. 19s. 7d. and a model 428 sound projector at £80. 5s. 3d. It is important to note that for making sound films it is not possible to substitute items by any firm other than Bell & Howell; on the other hand each of the three appliances can be used independently when they will function in the same way as any other standard piece of equipment. For instance, the recorder can be used as an ordinary cassette machine when it will record via its own microphone, play back

pre-recorded Musicassettes and generally behave like other machines of that type. Similarly the films shot with the camera can be shown on any projector that will accept the Super-8 size, but they will not then be effectively linked to the sound track on tape.

Although the cassette machine looks very similar to the kind of recorders we are used to it actually incorporates some highly complex circuitry, all of which is necessary to "lock" the sound to the picture. Tape speed is, of course, the standard 1-7/8 ips of the Compact Cassette, but the two types of cassette used for sound tracking have been specially made up with the length of tape needed to suit film runs – four minutes programme time for a fifty foot film or a "long play" version of thirty minutes for the man who exposes a number of fifty foot cartridges in sequence. A vital and unusual feature of these cassettes lies in the fact that they do *not* have a leader tape; the magnetic tape runs straight on to the take-up spool. In order to achieve synchronisation the record function must be operative from the moment the spools start to turn.

Sound recording takes place as the film is shot and so all that is necessary is to insert a cassette into the machine, check that all the tape is on the left-hand spool and then use a special inter-connecting cable to link camera to recorder. As this is done the Record function is automatically engaged and it is only necessary to depress the Play key. As soon as the machine has been made ready in that way it becomes "slave" to the camera and will start and stop as the camera trigger is actuated.

The microphone input is 200 Ohms and the usual kind of microphone provided with cassette machines (including a slide Stop/Start switch) comes with the equipment. One very clever facility is the provision of a strip of Velcro instant adhesive fabric on the underside of the leather carrying case with a similar strip on the microphone itself. By this means the single-handed operator can securely "stick" his microphone in a convenient position, and in spite of its close proximity to the recorder we are assured that noise break-through is minimal. It would, of course, invariably be preferable to place the microphone closer to the subject, particularly for recording speech or solo instrumental items, and so the cable is twelve feet long.

We do feel that one limitation of this system lies in the somewhat rudimentary record facilities that can be obtained on simple cassette machines. The enthusiast would doubtless wish to use other and better microphones, possibly via a mixer, but at present he will find that there is no suitable input on the recorder for such an

accessory. We are told that Bell & Howell are considering the introduction of an optional add-on extra that will provide this convenience, but in the meantime the user is restricted to the one 200 Ohm input. With camera and recorder connected the camera trigger is engaged and the film starts to turn. Immediately a succession of pulses is fed to the lower track of the tape. One pulse represents one frame of film, so as the standard speed for sound filming is 18 frames per second we shall get 18 pulses recorded on every 1-7/8 inches of tape.

Close examination of the operating sequence, however, reveals the fact that the tape does *not* start to move the instant the camera trigger is pulled. Instead a certain number of pulses must first be fed into the recorder to actuate the Start mechanism and to provide a silent "run-in" time. This time is only a little over a second, and when about twenty pulses have built up two things happen. A special light within the camera puts a flash mark on the edge of the film (outside the picture area so it will not be seen on projection) and at the same time the cassette spools turn. As the sound track is recorded on the upper half of the tape the camera speed is accurately registered on the lower. When the camera trigger is released sound track recording ceases and as this happens an 1,800 Hz bleep is recorded on the control track. The tapes does not stop instantly, and its "run-down" time is fractionally less than the "run-in" time that was allowed for when shooting began. Here we are dealing with milliseconds, but they are vitally important.

The camera may be started and stopped as often as one wishes during the length of the film. No attention has to be given to the recorder which will continue to operate as described above. At the beginning of each sequence we shall have a cue flash on the film and at the end a cue bleep on the tape. Remember this bleep cannot be heard because it is registered on the control track.

At the end of shooting the cassette is wound back and the film is sent for processing. When it is returned from the laboratory all is ready for sound projection. Now the recorder is inter-connected to the projector instead of the camera, and it becomes the projector's "slave".

With the cassette in place (tightly wound back to the left) the film has only to be placed in the lacing slot of the projector. As the film goes through the gate we first have that fractional silence. Then the flash cue mark instructs the recorder electronically to start playing back. Sound can be heard through the

built-in recorder speaker or, better, through an extension speaker placed near the screen.

This special projector also generates a pulse sequence in much the same way as the camera did. One pulse for every frame of film. These signals are fed back to the recorder where they are electronically compared to the rate of pulses coming off the tape (i.e. original camera speed). Through compensating circuitry the speed of the projector is automatically adjusted so that the two sets of pulses are always in step with each other. Now we have the projector running at exactly the same time as that which the camera recorded on the control track. Synchronisation of sound must be one hundred per cent.

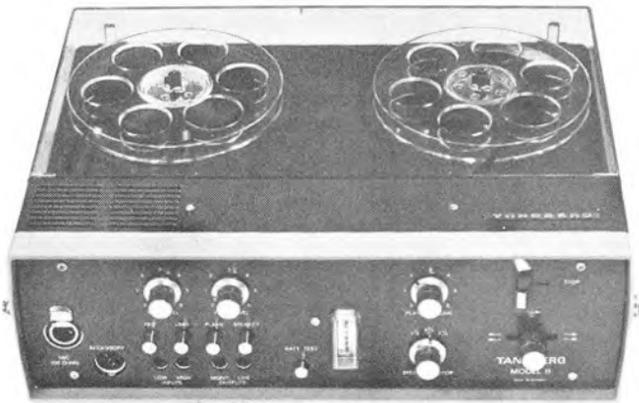
At the end of a filmed sequence the bleep on tape automatically stops playback, and this will only start again when the next cue flash comes up. All the run-down and run-up times precisely coincide, so however many sequences were shot makes not the slightest difference. In fact it is possible to insert silent sections if one wishes – all that happens is that the cassette tape will remain stationary awaiting receipt of the cue flash signal when the next sound sections comes up. Sync. is preserved throughout.

After handling the equipment we came to the conclusion that it is as nearly fool-proof as anything could be, and could be successfully handled by the traditional seven-year-old child. (Disquieting thought: perhaps he would get better results . . .?)

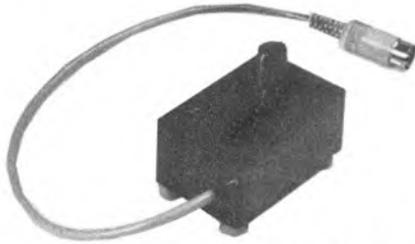
It all works exactly as we have described, and at this point our thought was that it is so good there must be some snags somewhere. So we scratched our heads to try to find fault with it. We were bound to conclude that from the point of view of the family snapshotter it's as near perfect as could be. Provided one is not too concerned about the cassette quality of sound and provided the user does not imagine himself to be an unrecognised film-making genius then he will be happy.

We make this qualification because editing does present some problems. One can edit "sequence-to-sequence" but "frame-to-frame" is almost impossible. We have 18 pulses crammed into 1-7/8 inches of tape so even if we could hear them (which we can't because they're all on the control track for which there is no audio output) we should have great difficulty in sorting them out. Even when transposing entire sequences we have to cut and join *cassette* tape with reasonable accuracy, and although such an operation is quite feasible it's not everyone's idea of enjoyment.

So our conclusion is that for the short



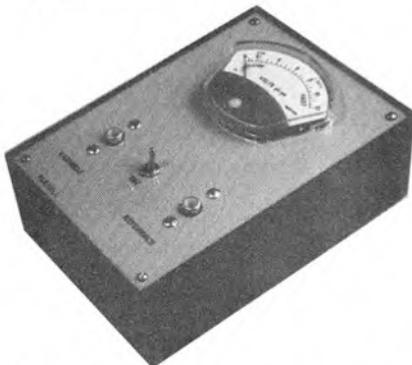
The Tandberg Series 11 battery portable modified so it can be used as part of an advanced film/sound system, bringing lip-synchronisation within the scope of the amateur.



With this variable speed unit the rate of tape travel can be made to precisely equal the actual recording speed when the film was shot.



This pulse generator is linked to camera and recorder; it puts one pulse on the second track of the tape for every frame of film exposed.



The synchronisation indicator is the latest addition to the Tandberg sync. equipment. Farnell-Tandberg will welcome enquiries but all these items are so new that at the time of going to press they were still awaiting descriptive literature. So if you write please be patient.

family film, the brief sales message, the direct instructional aid, the Bell & Howell Filmosound 8 offers a practical system at reasonable cost that could be used by the most inexperienced of amateurs with guaranteed instant success. But what of the more advanced amateur who has rather more ambitious ideas? On his behalf we have looked at an alternative offered by that well-known audio firm, Farnell-Tandberg.

Here the only mandatory piece of equipment is the Tandberg Series 11 recorder. As we reported last month this is now available in a modified version called model 11-2M at a cost of £191, or an ordinary Series 11 machine can be modified for about £19. There is some choice in both camera and projector that would be suitable for use with the system, so owners of existing cine equipment might well find themselves in the fortunate position of already owning some of the items required. This will represent a considerable saving and so help to offset the higher cost of the recorder. (If any recording enthusiast feels he needs an excuse to buy a machine as beautiful as the Tandberg Series 11 he should read our Test Bench review published in issue dated October 1968).

The first advantage of the Tandberg system, then, is that it includes the use of a really superb recording machine, which, of course, can always be used for its normal record function quite apart from working on film sound tracks. All things being equal we should get a very much better sound quality than could be expected from cassette — which is only reasonable as the recorder costs nearly four times as much!

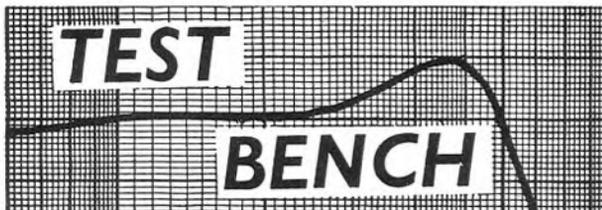
Also needed are certain accessories: a variable speed unit (£10. 10s. 0d inclusive of tax), a pulse generator (£18. 0s. 0d.), a neon strobe light and a synchronising device for the projector. Quite a battery of gear, but with this outfit we can do a really man-sized job.

Again the pulse system is used. The pulse generator is connected to the recorder on one side and the camera on

the other. There is no further automation — all control is in the hands of the "crew". Now the recommended tape speed is 7½ ips and this confers two advantages. Firstly we get superior audio quality and secondly those vital 18 pulses per second are now registered along 7½-inches of tape instead of 1-7/8 inches. Identification, separation and editing pulse-to-pulse is not only possible but is even quite easy compared to critical audio editing. Lacking the built-in cueing devices of Filmosound 8 we now have to use the professional clapper-board technique to give both a visual and an audible signal against which to cut. The amateur will feel himself to be truly a giant of the cinema . . .

As this recording has ultimately to be transferred to magnetic stripe on the film itself it must next be dubbed on to perforated tape (Cinetape type A1) and for this a stereo playback unit is required. The process was fully discussed last month. But since then we are advised that it is probable that a method will very shortly be evolved that will dispense with this stage completely so that the original audio/control tape can be dubbed directly to the stripe on the film. This would save both time and trouble, but the end result would be the same. Using Tandberg equipment we have all the possibilities of editing that are open to the professional film-maker. At the present state of the art this is undoubtedly the method for the creative enthusiast.

To summarise, both Tandberg and Bell & Howell give us rock-steady synchronisation. The latter is the least costly and easiest to use, ideal for applications where frame-to-frame editing is not required and at its simplest for short film runs. Sound quality will be up to cassette standard and unless the microphone supplied is replaced by a better instrument then the hi-fi addict could well be disappointed. Tandberg on the other hand offer excellent sound potential (when the recorder is properly used with good microphones) and a thoroughly professional editing facility that brings the amateur epic within the reach of all and could be regarded as essential for the longer, more serious industrial or educational film. We feel that neither system competes with the other. They do different jobs and we have tried to explain what those differences are. Good sound films on either systems will require skill, patience and experience. If you have these, plus ambition, then this equipment will open up new possibilities for a whole range of creative activity. But, whatever the advertisements might tell you to the contrary, without those attributes you will just produce bad talkies instead of bad silents. The choice is yours.



AKAI 4000

INVESTIGATED BY R. HIRST AND D. KILLICK

MANUFACTURER'S SPECIFICATION

Akai 4000

Tape Speeds: 3¾ and 7½ ips
 Wow and Flutter: Less than 0.15% RMS at 7½ ips and less than 0.20% at 3¾ ips.
 Frequency Response: 30 to 22,000 Hz ± 3 dB at 7½ ips 30 to 16,000 Hz ± 3 dB at 3¾ ips
 Signal to Noise: Better than 50 dB
 Inputs: Microphone more than 0.5 mV Line more than 50 mV. DIN more than 5 mV
 Power Output: 7 Watts per channel, or 12 Watts Music Power.
 Equalisation: NARTB
 Record-Level Indicators: 2 VU meters
 Recording System: 4-track stereo/mono
 Heads: Three; one each erase, record and playback
 Motor: Induction
 Speakers: Two 4" x 6" elliptical
 Power Consumption: 65 VA
 Dimensions: 12¾ inches x 15⅞ inches x 7½ inches.
 Weight: 26½ lbs.
 Price: £124. 18s. including purchase tax
 Distributors: Pullin Photographic, Rank Audio Products, P.O. Box 70, Great West Road, Brentford, Middlesex.

AKAI 4000 TEST CHART

Frequency Hz	Overall Response dB		Playback Only dB	Signal/Noise Ratio dB	Crosstalk dB	Distortion %			
	7½ips	3¾ips							
30	-4.0	-4.0	-3.6	49.6	56	3.2%			
40	-3.0	-3.2	-3.2						
50	-2.2	-1.0	-3.2						
60	-2.3	-0.2	-2.8						
100	-1.8	0	-1.8						
250	-0.2	+1.3	-1.0						
500	-1.0	+0.8	-0.3						
1000	0	0	0						
2000	0	+1.0	+0.2						
4000	-0.3	+1.2	+1.2						
6000	-0.5	+1.6	+1.8						
8000	-1.6	+1.6	+2.4						
10000	-2.2	+0.2	+2.4						
12000	-2.8	-1.9	+2.4						
14000	-2.8	-4.1	+1.8						
16000	-3.0	-7.0	+1.2						
18000	-3.3		+1.0						
20000	-3.4		+0.5						
22000	-4.1								
Wow & Flutter		0.14%	0.20%						

NOTES.—The Overall Response figures relate to record and playback. Playback Only relates to the reproduction of a 50 microsecond test tape at 7½ i.p.s. (N.A.B.). For Signal-to-Noise Ratio the tape was recorded at 0VU plus 10dB and then the input signal was removed from the record amplifier, but see text for further information. By reference to the signal level recorded and the resultant tape noise, the noise voltage was read off, with the tape still in motion. Distortion is quoted against a 1,000 Hz signal recorded at the same level and the figure is an R.M.S. value (see text). Wow and Flutter is also R.M.S. the test frequency being 3,000 Hz. Test equipment used includes: Bruel and Kjaer Signal Generator, B & K Frequency Analyser Type 2107, B & K Level Recorder Type 2305. Marconi Distortion Factor Analyser and Gaumont-Kalee Wow and Flutter Meter.

THIS MONTH'S Test Bench machine review is of particular interest because it deals with the latest version of a tape recorder with which we are already familiar, the Akai 4000. In October of last year we reported in detail on the Akai 4000D; now we are looking at what is virtually the same machine but instead of just a deck and pre-amplifier the model 4000 is complete with audio output stages and internal loudspeakers.

As a result we have what is really a "second chance" to examine and report on a single type of recorder after an interval of some eight months. One of the weaknesses of any review lies in the fact that the notes must be specific to the actual specimen examined; now we are

able to repeat our tests on what amounts to an identical model. Comparisons between the results of the October review and our findings this time will give a very fair idea of the standard of consistency that one might expect to find in equipment from this famous Japanese firm.

Following the same general appearance and layout as is found in other models of the 4000 series, this machine is a mains, four-track, three-head stereo record/playback mechanism, offering two speeds, 3¾ and 7½ ips. At the current retail price of £124.18s. including purchase tax it must be regarded as being at the lower end of the quality price list. In fact we stressed that the 4000D was remarkable as an example of value for money at £87. 10s.;

the difference in cost between the two, £37. 8s., is what we pay for the extra pair of amplifiers and internal loudspeaker equipment.

Without further ado let's turn to our test chart listing the readings obtained from laboratory investigation. If this is studied in conjunction with the chart relating to the 4000D published in October the reader will at once be struck by the similarity of the figures. Although they vary slightly the overall pattern is identical for all three sets of frequency response tables. Maximum deviation between the October chart and the present one is around 1 dB, and most of the time it is very much less.

In October we mentioned that our tests had been carried out using Scotch 150 tape and drew attention to the fact that had one of the newer, low noise, tapes been used there would then have been some improvement in response at the mid to upper end of the spectrum as well as an extra couple of dB in the signal to noise ratio. This time we again used Scotch 150 tape, mainly so as to parallel the conditions of the previous tests, so the same remarks must apply.

We do think it most unfortunate that the distributor should not clearly indicate to the user just what brands or kinds of tape are recommended for use with the recorder. It is such a little thing to do, and if such advice is given and followed the user will benefit greatly from improved performance.

This suggestion is very much in the distributor's own interest. It would be a simple matter to glance at our quoted figures, refer to the specification with its claimed tolerances of plus or minus 3 dB, and jump to the conclusion that the Akai 4000 is outside spec. Not so. A simple change of tape would pull those curves up to give us response readings well within the specified claim. We all know that figures "can be made to prove any thing"—they can also disprove anything if not interpreted correctly!

This is the first time we have had the chance to carry out such a comparison and its result far surpasses the best we could have hoped for. Akai should be complimented for their remarkable ability to produce equipment of consistently high and consistently similar performance standards. But we still wish they would give a clear recommendation regarding tape . . .

Signal to noise ratio against a 1,000 Hz signal recorded at the indicated peak as shown on the meters gave us a figure of 49.6 dB (50.4 dB last time—again less than a dB in it) and this would come up to something like 52 dB when using high coercivity tape. Distortion was measured twice this time, once at 10 dB above indicated peak to give us 3.2% (3.6% at that level last time) and again when reduced to peak level to give a new figure of 1.6%. We went to this additional trouble because, strangely, no mention of distortion appears in the specification. The 4000D quoted under 2% at 0 VU so we thought we would just like to confirm that the 4000 also meets that claim. As can be seen it easily does, so we wonder why it should have been omitted from the spec.

Speed stability is very important indeed in these days of improved frequency responses. We were pleased to record 0.14% at 7½ ips (0.12% last time) and 0.2% at 3¾ ips (0.18% last time). Here there were differences between the

models, and that is hardly surprising since the 4000 series depends on the manual change of a capstan sleeve to produce the two speeds. Any slight change in the fit of the sleeve would be bound to show up in variations to the comparative figures, but even with the tiny deterioration in performance recorded by the present machine the result still comes up to the manufacturer's claim.

As we are now dealing with a machine equipped with an audio output stage we have to examine tone controls, if any, and output power. In fact the only tonal correction possible with the 4000 is by a two-position switch giving "flat" in one setting and a bass boost of about 8 dB at 100 Hz. in the other. The purpose of this is obviously to "improve" audio quality at the built-in speakers; little bass response is possible from the self-contained loudspeakers in any tape recorder so an extra lift at the lower end of the spectrum gives a subjectively better sound.

Output power is claimed as 7 Watts into 8 Ohms; we arrived at 6.8 Watts into 10 Ohms, so that's about right.

In summarising our technical findings we must relate the figures to cost and also to what we consider to be the philosophy behind the machine. First we can say without any hesitation at all that this latest machine to come from Akai offers a very high standard of performance indeed—comparable to, or even identical with, that of the 4000D. From the point of view of technical capabilities the machine has not been built "down to a price". And yet from another point of view it has. In order to reach what is really a budget level in a high-performance machine something has to go, and with the 4000 series we lack some of the more sophisticated facilities to be found on more costly models. The things that really matter are there—response, noise, distortion, speed stability, off tape monitoring—but economies have been introduced by simplifying the speed change mechanism (manual change of capstan sleeve) and dispensing completely with some of the "frills".

Now one area where we feel costs have been cut is in the design and facilities offered at the final amplifier in this model. A tape recorder with an amplifier that could really perform the functions of a main audio amplifier (provided it has a specification comparable to the 4000) is likely to cost best part of £200. Here we have a price ticket marked at £75 less. So we can't expect—and we don't get—the same results.

In our opinion the amplifiers in the 4000 could *not* be made to double up as alternatives to a quality high fidelity amplifier. They are just not flexible or comprehensive enough. Instead they offer the simplest playback facility plus modest

power to drive extension loudspeakers with a minimum of tonal control. For such applications the machine is excellent; but readers are warned not to expect it to perform tasks that can only be done satisfactorily by equipment costing half as much again. That would be unreasonable. It was never designed for such use. Instead we do get a record/playback device capable of operating at near-professional standards at bargain price. What more could one ask?

Passing now to our user tests we must repeat once more the details of the general appearance and layout. As this has been dealt with before we will be brief. First important point: the 4000 series dispenses entirely with pressure pads. Next, the tape path follows a rather complicated line which does not make for easy threading but which incorporates a micro-switch mechanism linked to the mains On/Off switch. The Brief Pause control is still terrible (as it was on the 3000 before) and the A/B monitoring switch is superb (again as it was on the 3000, but we've gone one series further back—you see how confusing it all is!)

A pair of massive rotary controls provide for Fast Forward, Rewind, Play and (in conjunction with a press button) Record. In the latter function a red warning light is clearly illuminated. Mains On/Off, A/B Monitoring and Speed Equalisation are all controlled by similarly styled, two-position rocker switches. A pair of standard jack microphone sockets are also on the top panel, as well as the spare capstan sleeve with its retaining pillar, a three-digit position counter and the pair of illuminated meters. Instead of a single pair of rotary gain controls we have on the 4000 a pair of dual knobs in which the lower half controls playback volume and the upper record level.

These knobs are still the weakest feature of the series 4000. Too small and inadequately styled we found that in practice it was almost impossible to adjust the record levels without inadvertently altering the playback volume settings as well. There has been so much excellent attention to detail in this machine it is surprising—and disappointing as well—to find that so little thought has been devoted to what are the most important controls on the deck. Perhaps the factory would care to note our comments in this respect?

An extra control on the deck plate of the 4000 is a slide switch giving the tone facilities previously mentioned. It has two positions: one for "Flat" the other for "Bass". Ideally it would only be used in the Bass setting when listening via the built-in speakers.

External connection facilities are first-class. Phono sockets are duplicated by a

standard 5-pin DIN record/playback socket and extension loudspeaker connection is by GPO jack. We are a little concerned by the presence of a slide switch in the underside marked for 50 Hz. in one position and 60 Hz. in the other. This is an adjustment to accommodate the two standard frequencies of mains current and is intended for use in conjunction with another cycle conversion switch which appears, surprisingly, slap in the middle of the deck plate itself. Surely these are items which could have been suitably housed within the cabinet where there would be no danger of accidentally actuating them? If the owner should take a 4000 with him to America then he will be grateful for the convenience, but until that time these things are no more than useless encumbrances.

Our normal methods of user testing are by now so well known they do not need to be repeated. We use a variety of sound sources, all of known quality, and attempt a comparative assessment of efficiency based on convenience of use and performance. We have said before that the 4000 series of decks is not one of the easiest to use. This is part of the price we have to pay for the machine's relatively low cost. We would love to have press-button operation—instead we have rather stiff rotaries; we would like automatic compensation for equalisation when speed is changed—instead we have manual

switching. And this latter, by the way, can be overlooked and that will result in serious quality degradation. We should like the speed change itself to be mechanical. But all these facilities are offered by Akai—on other, more costly, models.

They are all things that one can live without. If you invest in the Akai 4000 then you will have to live without them.

There is not a great deal we need to say about quality. The equipment functioned precisely as might have been expected from our technical findings. In terms of frequency response there was found to be little advantage in working at the higher speed when dubbing off the air. Hiss is a little higher at 3¼ ips and wow and flutter at 0.2% could be audible in certain classes of programme, and for those reasons we would prefer to use 7½ ips for all recordings where utmost quality was necessary, but for all other uses the slower speed is more than adequate.

A judgement of audio quality from internal speakers is always very tricky. In the Akai the speaker grille is at the rear, which is rather odd. The machine can be used vertically of course, when the speakers will be angled upwards. If positioned horizontally the placing of the machine could be critical as the sound (two-channel but hardly stereo!) will come from the back. Either way the end product cannot be expected to compare

with what we would hear from the same recording if the output from the external speaker sockets was to be fed into a separated pair of "proper" enclosures.

We said that the 4000D was a good machine, and so it is. The 4000 is the same machine—equally good—but with the addition of simple, built-in amplifiers and speakers. We can therefore give the 4000 a recommendation as equally strong as we awarded the 4000D when used as a deck and pre-amp, but with the plus that it has the ability to produce its own stereo audio signals when required. In applications where the recorder has to be used away from a main hi-fi installation it offers a simple, low-cost solution through its increased versatility.

We regard it as being a most interesting addition to the Akai range available in the U.K., although in these hard times of increased costs due to purchase tax many users will prefer to confine their recording activities to the home base when the 4000D at its lower price would be quite adequate. But as soon as the owner wishes to take that machine out he finds he has to cart along great quantities of auxiliary equipment as well. With the 4000 he needs only his tape and a mains plug and he will be all ready to play. And for that convenience the extra price is just £37. 8s. It all depends on what one wants. But either machine represents very fine value for money.



NATURE NOTES FOR JULY

BY RICHARD MARGOSCHIS

NOTES MADE in my diary for 1969 remind me that the end of June and early July was quite an exciting time. At the end of May I had discovered a kestrel's nest on some old bales of straw in the loft of a barn which stands alone in the fields. The birds' access was through a slit in the stone wall but, with the farmer's permission and assistance, I was able to approach from the loft and place a microphone within a couple of feet of the nest. This, of course, was done while the adults were away hunting and without any disturbance of the two chicks in the nest; a long lead was brought down and the end hidden in a spot to which I had access although the barn was kept locked-up.

I visited the place as often as possible, plugged into the head, watched and listened. In this way I was able to get a series of recordings of the youngsters' cries for food and no disturbance was caused because the microphone was left in place until the nest was known to have been vacated. Although my observation spot was hidden I was never fortunate enough to be present when the parents arrived with food.

Luck, however, was with me in other ways. Knowing that the birds must be hunting in the vicinity, I kept my eyes and ears open whenever I was walking in the area and one evening my attention was attracted by

what can be described only as a terrible noise. My suspicion that a mistle thrush was involved was no sooner confirmed than the high pitched *K-week* of a kestrel drew my eyes skyward to reveal the cause of the commotion. For a quarter of an hour I sat and watched that hawk hovering just above the thrush's nest in the top of the tree; he called repeatedly and frequently dived in vain attempts to steal the young from the nest. The thrushes won the battle and I have it all on tape.

It was about this time that sounds from the microphone at the nest included wing flapping and I knew that it would not be long before the young were fledged. About a week later I arrived one evening to hear a lot of noise which I recognised as the youngsters, but it was coming from a tree; the parents were encouraging them to fly. I had a little chuckle to myself as one small bird clearly bumped his head on an overhanging branch as he took to his wings.

On my way back from the barn, one warm and sunny evening, I called at the farmhouse and, during a conversation with the farmer's wife, noticed that there were a lot of small bees around the yard. I must admit to some surprise when she showed me they were nesting in the walls of the house which is built of a fairly soft local sandstone. Subsequent investigation revealed that they were "solitary" bees of the species *Andrena*. Each female bee bores a hole into the stone, lays a series of eggs in it and leaves them, complete with food supply, to hatch out. Standing near to the wall I was able to hear the activity of the insects in their holes and eventually found one just starting to bore. She was so engrossed with her important work that she took no notice of my microphone coming up close behind and I was able to record the sound of her strong jaws biting away the minute grains of stone. What amazed me was how the pitch of the sound changed as different grains of stone were attacked.

About a dozen miles away, in open arable country, I got out of the car to see what was about and heard a song which I immediately knew was strange to me. It did not take long to identify the bird singing from the top of a tree as a corn bunting. The song, which is a rather raucous jangling, starts with a few slow notes then gathers momentum to tail off as a screech; it is very high pitched and great care must be taken to prevent distortion due to overmodulation. An identifying feature of the bird is its habit of bounding from one perch to another with its legs dangling.

I have just heard that the main prize in this year's 3M's Wildlife Sound Recording Contest will be an Akai X-V stereo portable tape recorder. Closing date for the Contest is November 30th. Reminder, also, that the closing date for the B.B.C. Competition is the 1st September.

Music

Musicassette Reviews

Consultant Critic Katinka Seiner

BEETHOVEN. Piano Concerto No. 1. in C Major, Opus 15 and Sonata No. 6 in F Major, Opus 10 No. 2. Claudio Arrau with the Concertgebouw Orchestra, Amsterdam, conducted by Bernard Haitink Philips CPC 0085. 49s. 11d. including purchase tax.

In this Beethoven bi-centenary year with its emphasis on Beethoven the composer it is easy to forget that in his younger days he liked to think of himself primarily as a virtuoso performer. As a pianist he felt obliged to compose in order to provide himself with pieces which would suitably display his own technique at the piano. The piano concerto which forms the major work of this album is an example of just such a composition.

One cannot help wondering how the great master himself would have rendered the solo part of this concerto. Not, I feel sure, as Claudio Arrau interprets it. Arrau is correct, utterly correct—and equally cold and unemotional. Here we have fine music lacking the spiritual quality that should be the very essence of its meaning. Music is not a mere mathematical expression of tonal relationships; it is a meeting place between the aspirations of humanity, the logic of harmony, the violence of discord, the measured tread of rhythm. But first comes humanity without which we cannot just as well relegate performance and composition to the machine.

In the review copy of this album there is an appreciable difference in quality and recorded level of the two sides of the cassette. Side 1 is undermodulated and so on playback the hiss obtrudes; so too does distortion. The second side is very much better, and I suspect that this discrepancy might well be peculiar to the review sample.

The *Sonata* on side two has some very pleasant piano tone, but for me this is spoilt by the rigidity of the performance. Much of the beauty of this work lies in its delicacy and this is the very quality that is missing.

Not one of the best classical albums from Philips.

CARNIVAL. Paco Peña with Los Maracuchos. Fontana Living Presence Stereo, LPC 13014. 47s 6d including purchase tax.

In this album we have the famous flamenco guitarist, Paco Peña, playing for us what the sleeve notes call his "off duty" music. Instead of the traditional flamenco melodies we have a selection of popular Spanish and Latin-American tunes, the kind of music that the artist plays himself for relaxation. And the result is an album of great interest, not to mention artistic worth.

When we reviewed a collection of Peña's work previously (*The Incredible Paco Peña*, November 1969) we gave him something approaching a rave review. This selection in no ways caused me to change my opinion. He is great guitarist in the Spanish tradition. No wonder his British appearances on radio and television have been so successful. When the tourist visits Spain for a short summer holiday he hears plenty of guitar music — none of it is

likely to have the superb performance quality that is now offered on cassette tape.

Perhaps too much nationalistic music is rather indigestible. Fond though I might be of the flamenco one can have too much of a good thing. So it was a happy thought to turn Peña's attention to more popular repertoire. We still have the masterly handling of the instrument with a skill and assurance that can leave one quite breathless, but this is now focussed on tunes with which everyone is familiar.

The album is made up of: *Madrecita, Carnival* (from "Black Orpheus"), *Valse Criollo, Danza Venezolana, Sombras, Tico-tico, La bamba, Caminando, Chorus No. 2, Yellow bird, Seis por Derecho and Ritmo orquidea.*

I was particularly interested to note the inclusion of *Chorus No 2* by Villa-Lobos, an item that one would not expect to find in a truly "popular" collection. Doubtless the choice was influenced by Paco himself, and this is one of the pleasing results of persuading a "classical" musician to produce an album of wider appeal — up to the surprising items that then acquire a popularity they would otherwise not have earned. In fact you will like *Chorus No.2* even if you have never heard of its Brazilian composer.

To check recorded quality I did a quick comparison with the earlier Peña cassette. In both it is quite excellent. The soloist is well in the foreground with a fidelity and lack of background noise that gives the lie to those who still insist that the slow tape speed of cassettes makes it impossible to take them seriously. I wish such critics could hear the latest review bunch from Philips, of which this is one. Sufficient to say that if you want to hear the Spanish guitar performed by a great virtuoso and recorded to the best standards of modern high fidelity then invest in this Musicassette. You will not be disappointed.

CRYSTAL ILLUSIONS. Sergio Mendes and Basil '66. AM CYP 1115. 47s 6d including purchase tax.

First reaction to this album was one of pleasure at the excellent recorded quality, soon followed by disappointment at the programme which, surprisingly, gave way to increased interest as the variety of treatments built up into a collection of no little fascination. As you might guess, a mixed bag. This is partly explained by the fact that Herb Alpert had a hand in the production, and production is the album's strong point. Unfortunately it is let down by the poor quality of the singer who wobbles precariously from note to note.

The programme gives us: (sitting on) *The dock of the bay, Viola, Song of no regrets, Salt sea, Empty faces, Pretty world, Dois dias, You stepped out of a dream and Crystal illusions.*

What a pity it is that so many of our vocalists spoil otherwise commendable efforts on record. Here *Empty faces* is probably one of the best, but even this betrays a lack of ability or talent.

This is hardly a collection for serious listening. As background music it might be acceptable, but I could not recommend it for other applications. Which is tragic in view of the fine recorded quality. Maybe it is, after all,

nothing more than an illusion. . .

BACH ORGAN FAVOURITES played by E. Power Biggs. CBS 40-72168. 47s. 6d. including purchase tax.

Here we have what are indeed Bach organ "favourites". There can be few who are not familiar with the *Tocatta and Fugue in D Minor*, a piece which gives every opportunity to the performer to display his virtuosity and command of the instrument. This begins our album. E. Power Biggs is one of the greatest American organists, whose reputation is acknowledged in Europe as it is in the States.

Unfortunately the sleeve notes give no information at all about the instrument, the Flentrop Organ in the Busch-Reisinger Museum of Harvard University. In fact it was built in 1958 and was constructed to the tonal and mechanical principles of classic organs. It is said that the reverberation time at Harvard is similar to that of St. Thomas' Church, Leipzig, where Bach himself played.

So it might be assumed that on this recording we would have an "approximation" of the authentic sound. After listening to this tape several times I cannot help feeling that in spite of the commendable efforts on the part of the organ builder and the performer something is lacking. This, of course, could be due to recording technique, which in this case tends to give a "hard" rendition to what should be an essentially "soft" sound. These are abstract qualities and therefore difficult to describe.

I cannot help thinking of some of the Dutch organs I have heard, in particular the instrument in Alkmaar. Here we have a sound quality originating from some two hundred years ago and yet which surpasses that which the American builders of 1958 could achieve. At least, that is my feeling from listening to this cassette.

The other items included in the collection are: *Passacaglia and Fugue in C Minor, Toccata, Adagio and Fugue in C, Fugue in G Minor "The Little", and Fugue in G "The Jig"*. In each of these pieces we have the benefit of the brilliant interpretation of a remarkable performer. The sound quality has, to my ear, an unmistakably "American" ring about it; instead of the smooth purity of organ tone there is the harder transatlantic emphasis on what is there regarded as "high fidelity".

Another point that must be mentioned—organ recordings *must* be reproduced at rock-steady speed; the effect of wow can be even more objectionable with this instrument than when it is heard in the long, sustained notes of a piano. In this album there were traces of wow now and again. Not so much as to render the whole unacceptable but sufficient to offend the ear of a perceptive listener.

So we must regard this collection with mixed feelings. Having the deepest affection for what I regard as the queen of instruments I perhaps tend to be especially critical. There are aspects of this album that can be faulted, but on the other hand we have the benefit of really great performance. Once again the choice lies with the purchaser.

Music

8-Track Stereo Reviews

Consultant Critic Katinka Seiner

VIENNESE PROM CONCERT. The Hallé Orchestra conducted by Sir John Barbirolli. EMI Columbia 8X-TWO 180. 47s. 6d. including purchase tax.

Gold and Silver Waltz, Overture to "The Gypsy Baron", Thunder and lightning polka, Waltzes from "Der Rosenkavalier", Champagne polka, Radetzky march, On the beautiful Blue Danube and Perpetuum mobile.

Another collection of lighter classics with a dynamic range that could disturb. An excellent programme of thoroughly enjoyable waltzes, which, in themselves, provide first class driving music. Only query is that loud to soft difference. No problems with pitch or speed on this cartridge which goes to show that it is the individual cartridges that can sometimes give trouble.

THE WORLD'S MOST GLORIOUS MELODIES. Reginald Kilbey and his Strings. EMI Columbia 8X-TWO 181. 47s. 6d.

Minuet (from "Berenice"), Jesu joy of man's desiring, Largo (from Serse), Liebestraum, To a wild rose, Greensleeves, Air on the G String, Humoresque No. 7, Agnus Dei (Bizet), Minuet (Boccherini), Ave Maria (Schubert) and The lost chord.

The Kilbey strings at their most popular level. Both a speed wobble and drop in pitch on this one. Very disturbing. Again we have taken precautions to check, this time using two different playback machines in two different cars. Both gave the same result. Apart from this, a good album for medium speed cruising.

THE BEATLES. Sgt. Pepper's Lonely Hearts Club Band. EMI Parlophone 8X-PCS 7027. 47s. 6d. including purchase tax.

Sgt. Pepper's lonely hearts club band. With a little help from my friends, Fixing a hole, Being for the benefit of Mr. Kite, Lucy in the sky with diamonds, Getting better, She's leaving home, Within you without you, A day in the life, When I'm sixty-four, Lovely Rita, Good morning good morning and Sgt. Pepper's lonely hearts club band.

All so familiar there's little need to say much about this one. Some of this material is excellent for car listening, whereas other items can definitely produce distracting noises. Favourites: *She's leaving home* and *When I'm sixty-four*. A good collection for mobile use but be prepared for the unexpected.

MEXICAN CHAMPAGNE. Pepe Jaramillo and his Latin American rhythm. EMI Columbia 8X-TWO 255. 47s. 6d. including purchase tax.

Doce cascabeles, On a clear day you can see for ever, La felicidad, So nice, What now my love, Skylark, El Porompompero, Dream, So in love, Be true to me, Mexican champagne and The impossible dream.

A bubbling tape that lives up to its name, providing good background entertainment with a compressed dynamic range. Unfortunately a fractional drop in pitch was noted, but this would not worry most drivers. Essentially a cheerful programme that could have been de-

This month we are taking a first look at the new 8-track stereo cartridges. This will not be a regular feature but, for the time being at least, will be included occasionally.

These tapes are in form of an endless loop and can only be played back on equipment designed to accept the standard form of cartridge. Since the general application is for use in motor cars we have considered the albums from that point of view rather than attempting to comment on performance or musical merit. However a number of "home units" for the reproduction of these cartridges are now becoming available so the motorist can play back the repertoire he normally hears "on the move" under better home conditions if he so desires.

signed to kill frustration in the traffic jams.

THE BEST OF FRANK SINATRA. EMI Capitol 8X-ST 21140. 47s. 6d. including purchase tax.

Put your dreams away. From here to eternity, All the way, In the wee small hours of the morning, Witchcraft, Only the lonely, Young at heart, Hey jealous lover, Chicago, High hopes, Come dance with me, Nice'n'easy, I've got the world on a string and South of the border.

Sinatra all the way here. Good, relaxing repertoire without any crashes or bumps. All old favourites, many of them liable to encourage a song from driver or passengers on the road. Which is not such a bad idea.

This is the kind of programme at which 8-track excels with the automatic changing calling for no attention at all. Suitable for all mobile occasions, especially that romantic drive through the twilight. An album to which few could take exception.

STEREO SHOWPIECES. Bournemouth Symphony Orchestra conducted by Constantin Silvestri. EMI Columbia 8X-TWO 221. 47s. 6d. including purchase tax.

Pavane pour une infante défunte (Ravel), L'apprenti sorcier (Dukas), In the steppes of Central Asia (Borodin), Danse macabre, Opus 40 symphonic poem (Saint-Saëns), A night on the bare mountain (Moussorgsky) and Finlandia Opus 26 No. 7 (Sibelius).

A programme of popular light classics with what would normally be regarded as a commendably wide dynamic range. For mobile use, however, it is found that the differences between the loudest and softest passages are so great that it does not make for comfortable listening. Beware of increasing the level on the quietest parts—loud sections will then be liable to make you jump out of your seat.

LEGEND OF THE GLASS MOUNTAIN. Ron Goodwin and his Orchestra. EMI Columbia 8X-TWO 220. 47s. 6d. including purchase tax.

Intermezzo from Escape to Happiness, Warsaw concerto, Dream of Olwen, Theme from

Limelight, Tara theme, Rhapsody on a theme by Paganini, Theme from Way to the stars, Theme from Moulin Rouge, Cornish Rhapsody, Theme from Legend of the glass mountain and Spitfire prelude and fugue.

An acceptable collection of show-time music. Again the dynamic range could be disturbing, although the differences are not so great as in Stereo Showpieces. Interesting and pleasant listening that will help to pass away many a mile.

BLUE WATERS. Manuel and the Music of the Mountains. EMI Columbia 8X-TWO 131. 47s. 6d. including purchase tax.

Quizas, quizas quizas, Tara's theme, Somewhere my love, Serenata, Blue waters, Autumn concerto, Tabu, Autumn in Venice, El Cumbanchero, The man who loves well, Amanda and Strangers in the night.

Very pleasing collection that offers suitable background music without too much distraction. Even so some of the percussive sounds can make the driver wonder if his engine is developing a fault. Usual Manuel performance and sound quality which comes over rather well in the car.

FRANK POURCEL. The Importance of your love. EMI Columbia 8X-TWO 222. 47s. 6d. including purchase tax.

The importance of your love, The lark, Rain and tears, Les cerisiers sont blancs, L'oiseau, Le ruisseau de mon enfance, A man without love, Hernando's hideaway, Congratulations, If I only had time and La la la.

Typical Pourcel sound. Popular items plus interesting orchestrations with emphasis on the string section. A good variety of tempi here, unlikely to send the driver to sleep. Again the odd percussive sound should be anticipated. Could be a good cartridge to play during evening drive when there never seems to be anything appropriate on the radio.

TCHAIKOVSKY. Nutcracker Suite, Opus 71a, and Suite from The Sleeping Beauty, Opus 66. Royal Philharmonic Orchestra conducted by Sir Adrian Boult. EMI Columbia 8X-TWO 183. 47s. 6d. including purchase tax.

One of the disadvantages of the cartridge system lies in the fact that in spite of using a tape speed of 3¼ ips wow can be induced through individual faulty cartridges. In some of the worse cases there can be pitch instability as well, and then the notes appear to "bend both ways". The state of the car battery might well affect overall speed, so the cartridge should not be blamed too quickly.

With this album we were troubled by both these effects, and some care was taken to listen when we were quite sure that the car battery was charging. Still speed instability present. It is believed that this is caused through difficulties in loading the endless loop in the cartridge.

It is worth mentioning that this is far more objectionable in classical repertoire than in the lighter pop music. In really bad cases the cartridge should be returned to the dealer for exchange.

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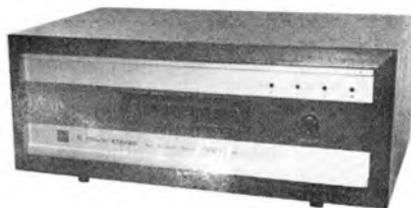
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NEW PRODUCTS

MANY NEW ITEMS IMPORTED FROM TOSHIBA

AS REPORTED last month in our Sonex feature a number of new items by the Japanese firm of Toshiba are now being imported by the British distributors, Hanimex (UK) Ltd. These include:

KT 80, an 8-track stereo cartridge deck. A "home unit", the KT 80 provides a link between the domestic hi-fi and mobile reproduction of repertoire; through its use the cartridges played in the car can now be reproduced via an existing audio installation.



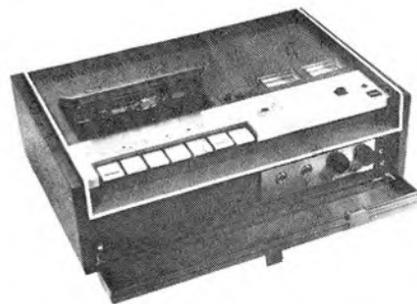
The equipment has a built-in solid state pre-amplifier, features easy load cartridge operation and automatic repeatable four-programme playback. Tape speed is the standard 3¼ ips of this system and the output is quoted as 0.5 Volts per channel. Replay response is claimed to be 50 to 12,000 Hz. Record facilities are not included. Cost of the KT 80 is £49 19s 9d.

KT 81 is an alternative model of similar specification but including a claimed 10 Watts RMS per channel of audio output. It is stated that the KT 81 can also be used as an audio amplifier when it could be connected to a record player or AM/FM stereo tuner. Recommended price is £63 4s 4d.

A new four-track, two-speed (3¼ and 7½ ips) stereo tape deck, reference PT-850SA, has a 2-micron record and playback head, large VU meters and automatic tape/power shut-off. The machine accepts 7-inch spools and is fitted with a standard DIN socket.

Claimed frequency response is 20 to 20,000 Hz., wow and flutter 0.12% or less and signal to noise ratio 45 dB or better. Sockets are provided for Microphone, Aux. and DIN In/Out and Line Out. Cost of the PT-850SA is £94.

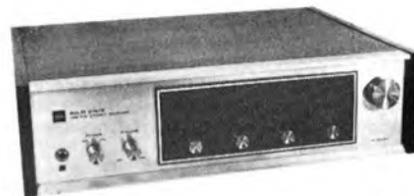
In the Compact Cassette field Hanimex announce the Toshiba KT-43D stereo record/playback deck. Designed to record and play in conjunction with an existing hi-fi installation it features easy cassette



loading, piano key controls, large VU meters and a 3-digit counter. An input jack allows recording from the radio and a stereo headphone jack permits private listening.

Frequency response is given as 50 to 10,000 Hz., signal to noise 40 dB (weighted) and wow and flutter 0.3% RMS. Suggested price is £61 9s 9d.

An integrated stereo tuner/amplifier has a claimed total output of 30 Watts and a built-in AM/FM multiplex tuner. It features automatic stereo switching and has inputs for ceramic and magnetic cartridges. Radio frequencies are: AM 530 to 1605 kHz. and FM 88 to 108 MHz. Frequency response is said to be 50 to 25,000 Hz. Controls include: Power On/Off, Tuning, Balance, Volume, Treble and Bass.



Styled in charcoal and brushed silver and supplied in a satin finished wood cabinet the SA-2600M tuner/amplifier costs £62 10s.



What is claimed to be a "brilliant new development" in light-weight stereo headphones is featured in the Toshiba

HR-50 headset. The listener has the choice, at the press of a switch, between "crossfield" and "binaural" listening. In the crossfield mode some of the right-hand channel signal is fed to the left-hand ear-piece and *vice versa*; binaural is the usual stereo separation with left-hand channel to left-hand earpiece etc. Crossfield listening is said to give a more natural and realistic stereo effect when used on headphones.

Impedance is 4 to 16 Ohms, claimed response is 20 to 20,000 Hz. and each earpiece has two drive units with a crossover frequency of 400 Hz. The price is £12 15s.

Hanimex (UK) Ltd., Hanimex House, 15/24 Great Dover Street, London, S.E.1.

WHARFEDALE 100.1 STEREO RECEIVER

WHAT IS CLAIMED to be "the most powerful British high fidelity receiver", the Wharfedale 100.1, is to be marketed on a world-wide basis. Its quoted main technical features include: 35 Watts per channel continuous into 8 Ohms; distortion at 1,000 Hz at any output up to 35 + 35 Watts better than 0.07%; FM tuner sensitivity 1 microvolt for 30 dB signal to noise.



The power and distortion figures are said to be due to the exclusive use of a new current driven output stage, the current being low level quiescent. This eliminates cross-over distortion and its basic design is the subject of a patent application. Performance of the 100.1 is claimed to be unequalled in any receiver of comparable price and the manufacturer claims to have adopted an entirely new approach to the domestic styling of electronic apparatus.



Front panel controls include: Volume and On/Off, Tuning, Bass, Treble, Balance, Input Selector, Wave-band Selector, VHF Mute Switch, Low Pass

Filter, Local Speaker Switch, Remote Speaker Switch, Tape In/Out Socket (5-pin DIN) and Headphone Jack.

Recommended retail price of the 100.1 is £131 5s.

Rank Wharfedale Ltd., Idle, Bradford, Yorks.

AKAI X-5000 AND NEW CARTRIDGE RECORDER

FROM AKAI the X-5000 is a four-track stereo/mono recorder operating at three speeds, 1 $\frac{7}{8}$, 3 $\frac{3}{4}$ and 7 $\frac{1}{2}$ ips with 15 ips as an optional extra. Using the Crossfield head system the machine is fitted with 1 erase head, 1 record/playback head and 1 bias head. Wow and flutter is claimed to be less than 0.12% at 7 $\frac{1}{2}$ ips and less than 0.16% at 3 $\frac{3}{4}$ ips. Distortion at 0 VU is given as 2% and signal to noise better than 50 dB.



The X-5000 is a complete machine with a claimed 6 Watts of Music Power per channel and a pair of built-in elliptical speakers. Tape transport is controlled by a pair of rotary levers and the recorder will accept 7-inch spools.

Alternative finishes are available, wood or leather-cloth, and the cost is £177 19s 6d.

Also from Akai the CR80 cartridge record/playback machine offers full fastwind for Stereo-8 cartridges as well as recording facilities. Response is claimed to be 50 to 16,000 Hz within 3 dB and wow and flutter less than 0.25% RMS. The CR80 has a claimed 12 Watts Music Power per channel and a signal to noise ratio of better than 47 dB.

This very unusual machine, which will not be available until mid-August, is priced at £115 0s 6d. A deck version, CR80D, available at the same time, will



cost £95 0s 5d.

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Thumbs up. Your tape patching days are over.

And your stereo pleasure just beginning. The all-new Sansui SD-7000 stereo tape deck, rich in tape protection devices, is here to put an end to all the awkward patching that until now seemed an inevitable drawback to owning a quality taping unit.

The end product after 10 experimental models and three years of research, the 3-motor 4-head SD-7000 goes to great lengths to save you most of that irritating splicing and fumbling. For example:

It precludes tape breaking or slack in going from either Fast Forward or Rewind to the Stop and the Play modes. It prevents the tape stretching that results from excessive tension. It minimizes resistance during Fast Forwarding. It ensures proper "pull" speeds, and it makes accidental erasures or reversing impossible.

No comparably priced tape deck on the market, in fact, offers so much in the way of tape protection. The SD-7000 wins. Hands down.

But Sansui gave it a lot more very attractive features as well. Like Automatic Rewind, Reverse and Repeat by either recorded 20Hz signals or sensing strips. Like a self-locking Pause control,

Sleep switch, spring-lock reel clampers, responsive pushbutton controls, and separate volume controls for two line inputs and another for headphones.

The tonal quality is unsurpassed. Frequency response is 15 to 25,000Hz, the S/N ratio is better than 60dB, and wow and flutter is less than 0.06% at 7½ ips.

The SD-7000 will be available soon at authorized Sansui dealers, and it will pay you to check it out more fully. Unless of course you want to go on playing patch-up stereo.



Sansui

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