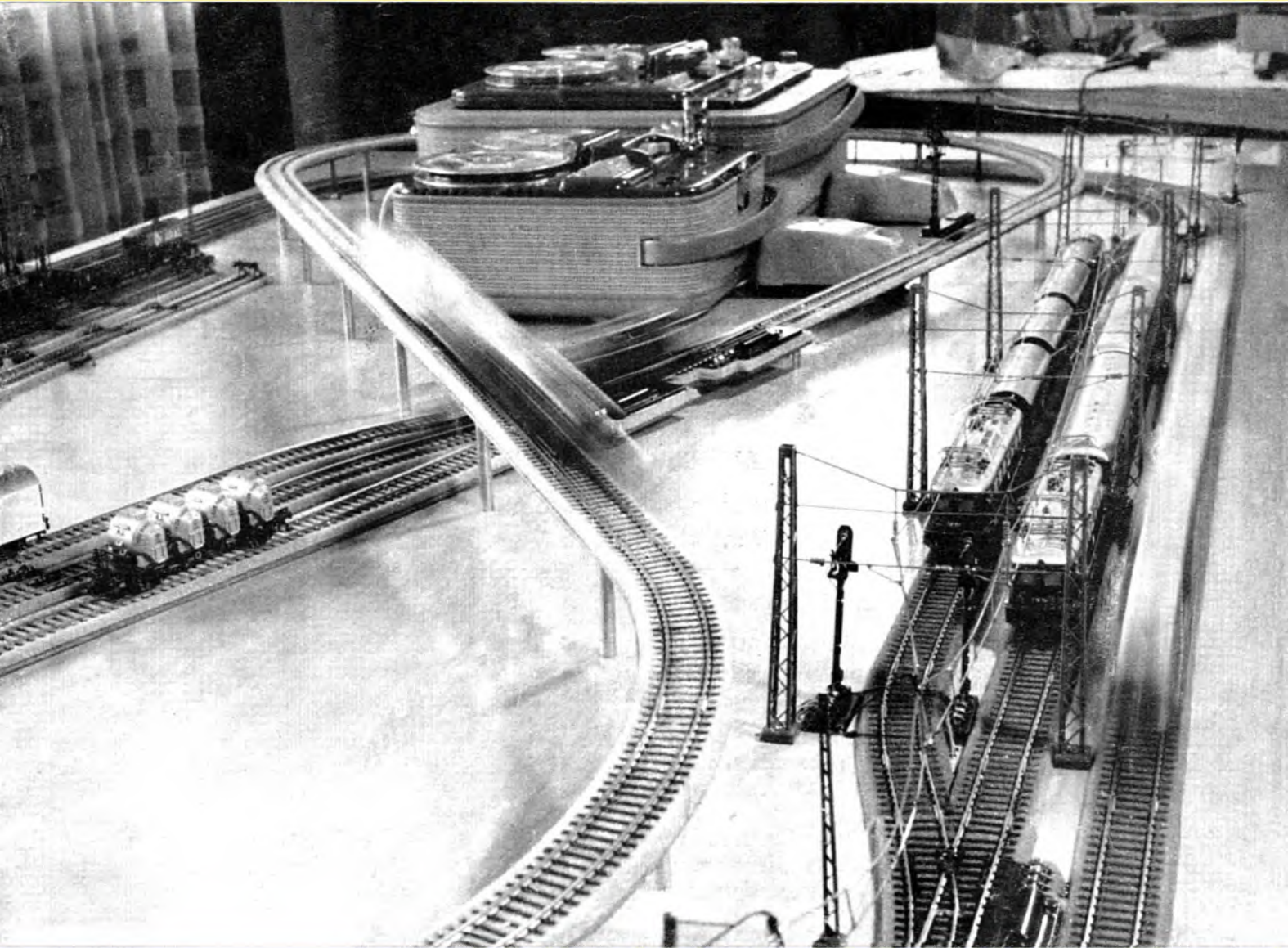


TAPE

RECORDING MAGAZINE

MARCH 1964



IN THIS ISSUE

- **Tape and a model railway**
- **Microphones and their uses**
- **Advice for newcomers**
- **Reviews of tape records**
- **Do-it-yourself feature**
- **Drama productions on tape**
- **Equipment tested**
- **News of new products**
- **Club news**

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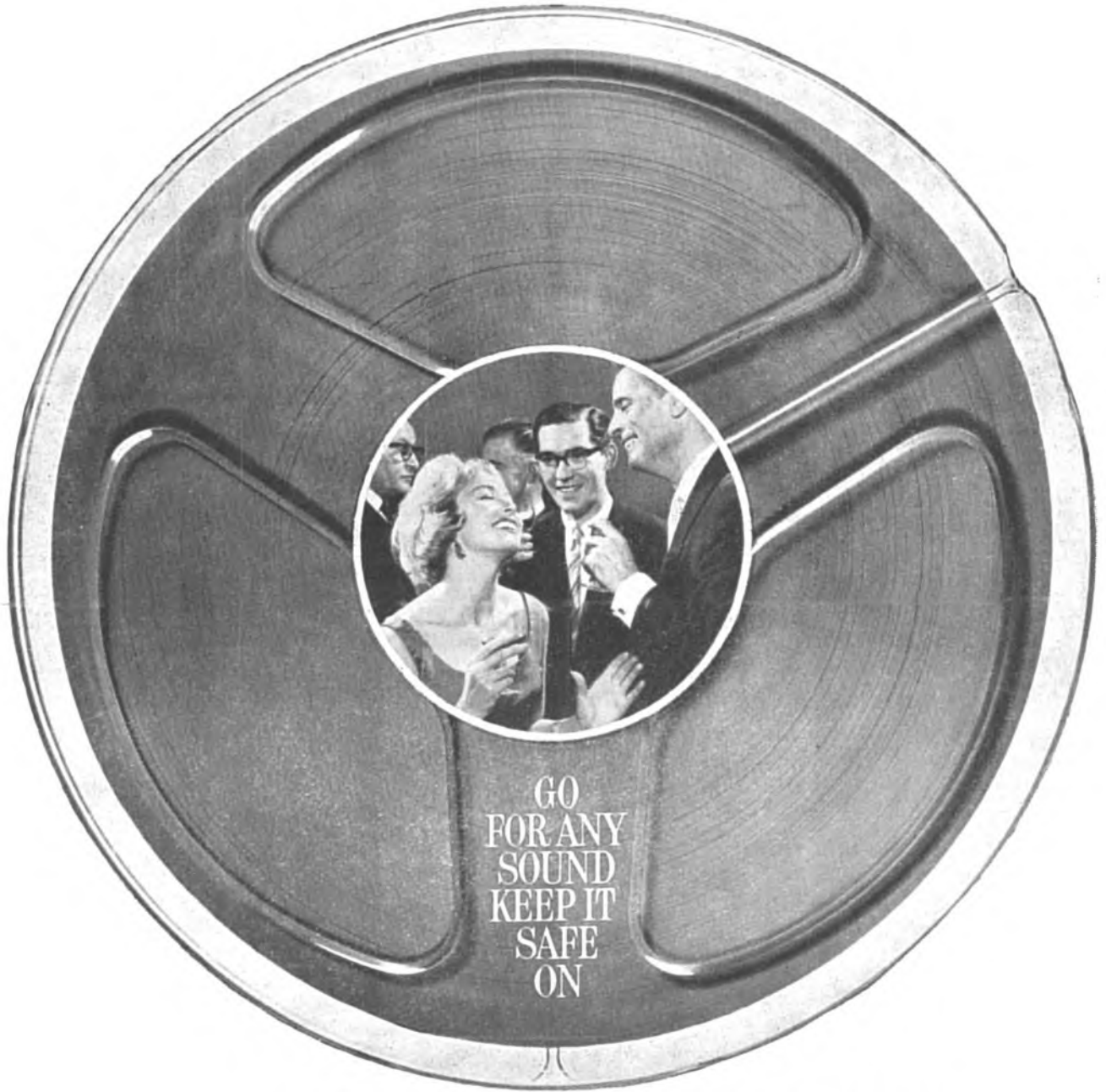
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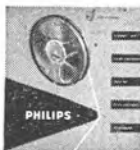
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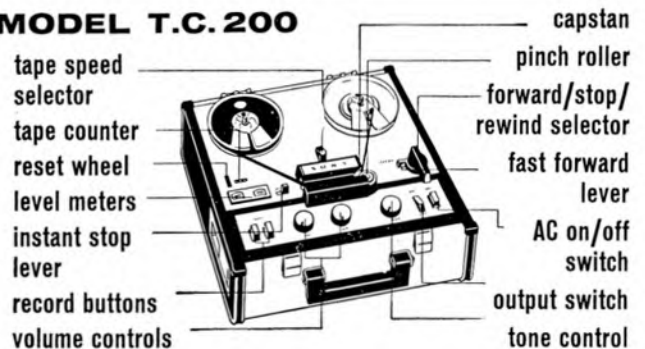
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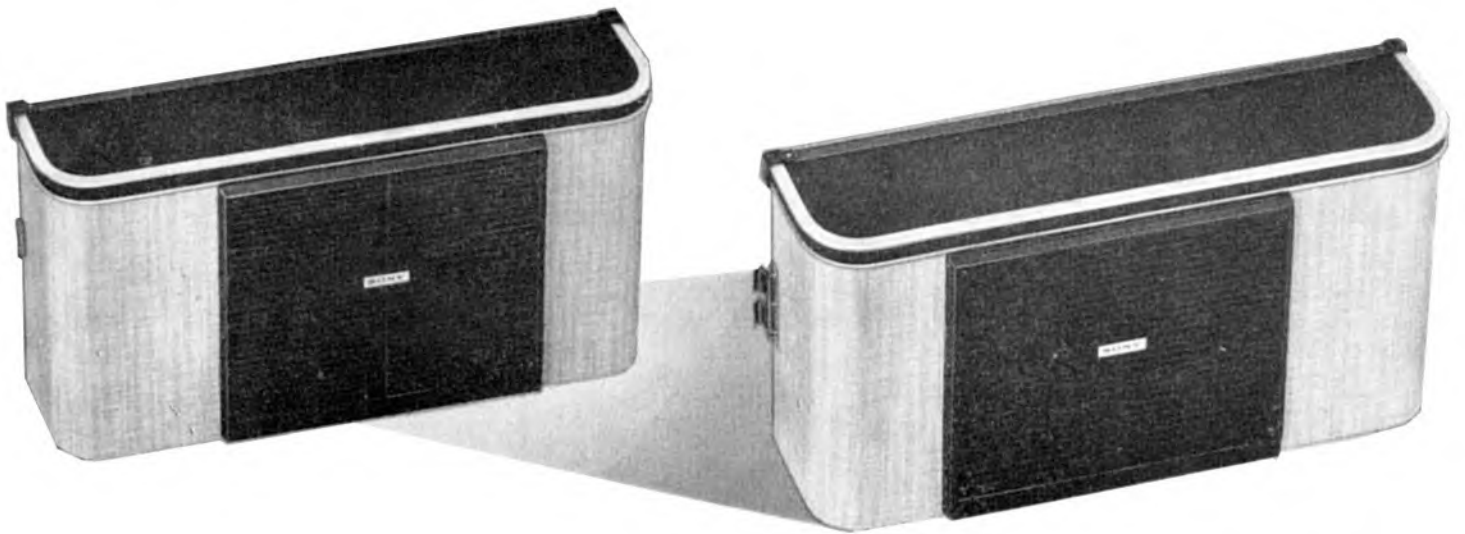


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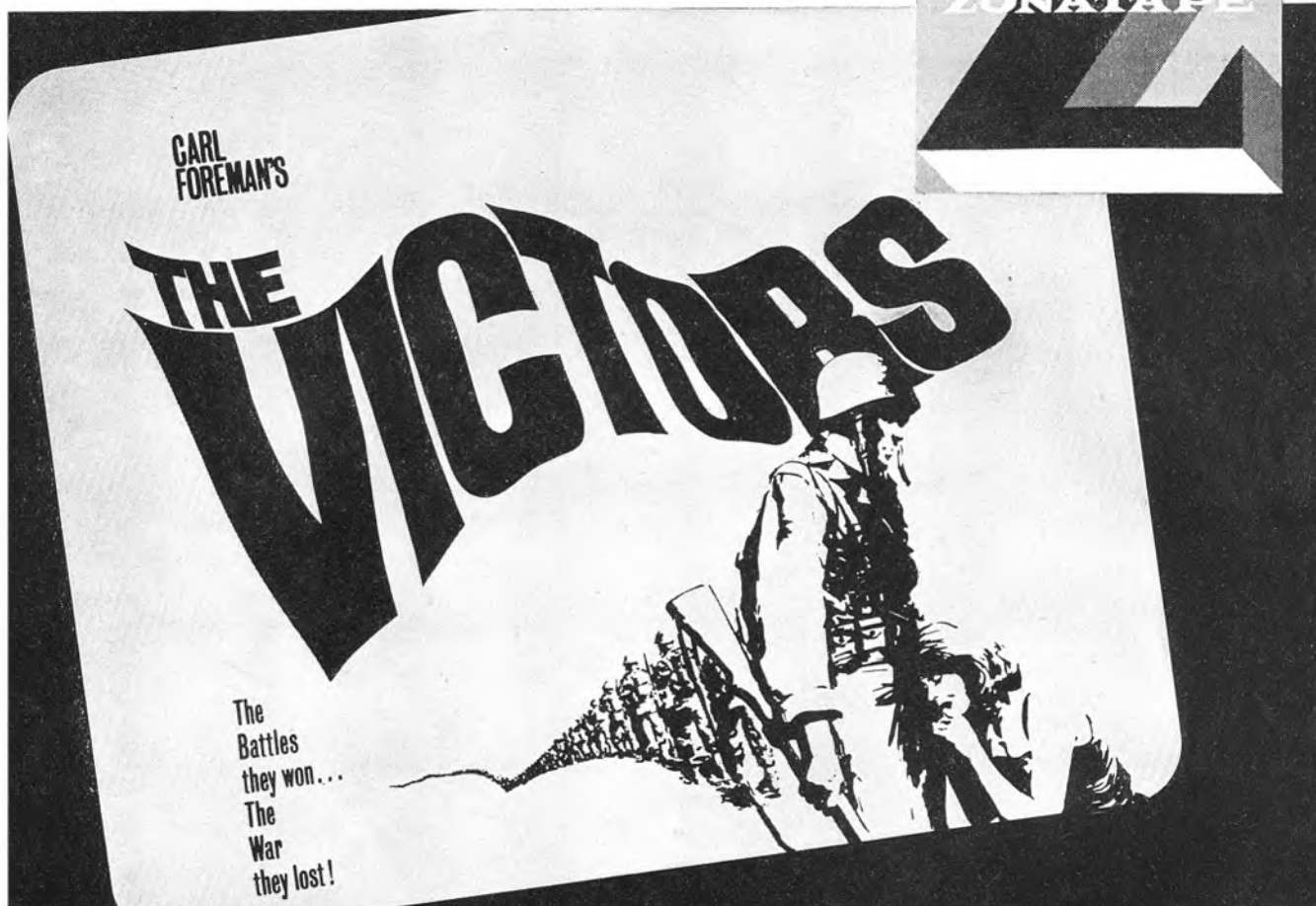
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4" 300'	13/6	5" 600'	18/-	5½" 900'	28/-	5" 600'	18/-
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5½" 900'	28/-	7" 1200'	30/-			7" 1200'	30/-
7" 1200'	35/-						
Long Play	Play	Standard Play	Long Play	Standard Play	Long Play	Standard Play	Long Play
3" 210'	9/-	5" 600'	20/-	4" 450'	14/6	3" 150'	5/9
4" 450'	14/6	5½" 850'	26/6	5" 900'	28/-	5" 600'	10/6
5" 900'	28/-	7" 1200'	32/6	5½" 1200'	35/-	5" 600'	21/-
5½" 1200'	35/-			7" 1800'	50/-	5½" 900'	28/-
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Double Play	Play	Standard Play	Double Play	Standard Play	Double Play	Standard Play	Double Play
3" 300'	14/-	4" 450'	13/6	3" 300'	14/-	4" 450'	14/6
4" 600'	25/-	5" 900'	26/6	4" 600'	25/-	5" 900'	28/-
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★Technical, creative and organised activity

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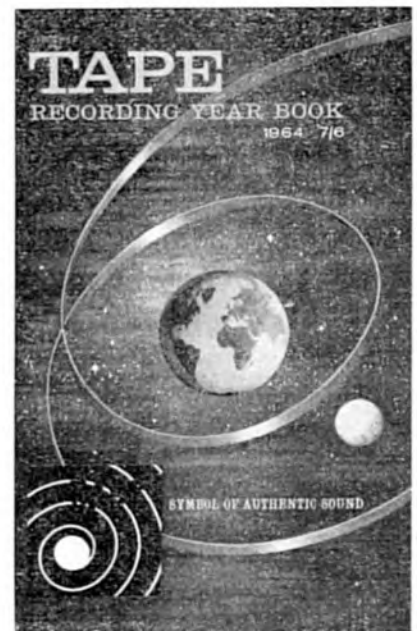
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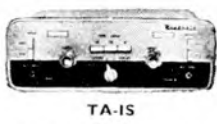
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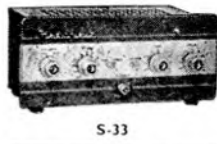
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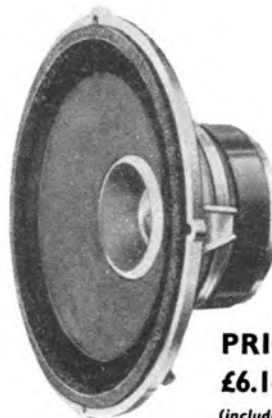
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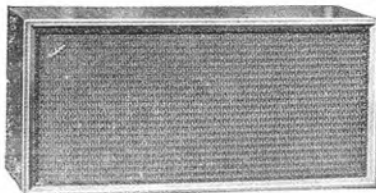
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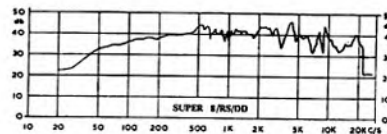


PST/8

Size 24" x 12" x 12". Weight 17 lb. cabinet only.

This unique cabinet is constructed with expanded polystyrene panels (patent no. 890886) and slotted back to reduce resonance to a minimum.

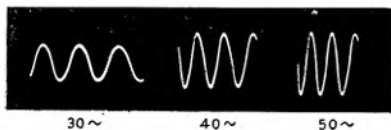
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APPLICATIONS

Mounted in the PST/8 cabinet shown above left, or the home made slotted back R1 (details free on request), the Super 8/RS/DD will do the following:

1. Improve tape recorder performance enormously.
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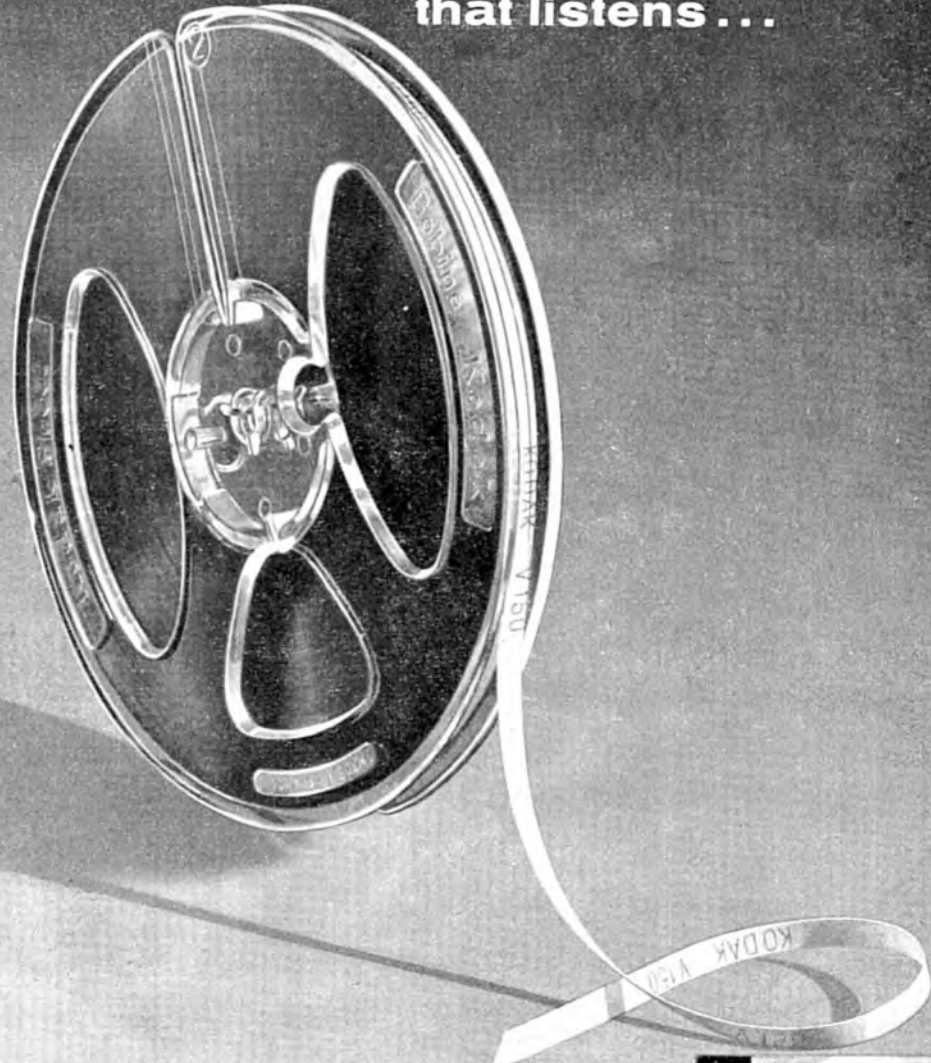
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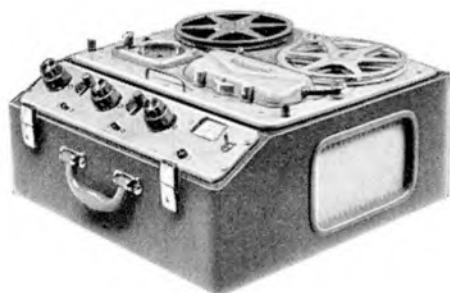
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TAPE RECORDING MAGAZINE

Vol. 8

No. 3

March 1964

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COVER PHOTOGRAPH: One of the most fascinating hobbies man enjoys is the operation of model railways. From the first clock-work models to the intricate lay-outs of the modern electric sets, hours of fun can be obtained. That is unless you are lazy, in which case you may follow the example of two tape recording enthusiasts whose experiments are described on page 113.

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EDITORIAL

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R. DOUGLAS BROWN
Assistant Editor, FRED CHANDLER

ADVERTISING

Advertisement Manager,
MISS PAMELA DURHAM

Tape trends and tape talk

By the Editor

THE BBC HAS announced a new opportunity for tape enthusiasts. It is to run a competition for recordings of natural sounds of British wild life. There are five classes: four for individual bird, mammal, insect and amphibian species and one for atmosphere.

The competition is being sponsored jointly by the BBC and the Council for Nature and there will be prizes of 25 guineas for the best entry in each class, with ten guineas for the runner-up.

Full information is available from the BBC Natural History Unit, Whiteladies Road, Bristol 8, to which address all entries must be sent by September 1.

* * *

THIS IS A WELCOME sign that some quarters at the BBC are developing a better realisation of the potentialities of tape in the hands of the amateur. I feel there is a great deal for the BBC still to do.

On the Continent, the French, Swiss and Belgian radio concerns give very great practical encouragement to amateur recording, and have done so for years. One indicator of their attitude is the award of prizes in the International Recording Contest each year. It is true to say that, without the closest co-operation with these radio concerns, the International Contest could never have been established and sustained. I should very much like to see the BBC associated with this event in the future—both in the prize lists and by official representation on the international jury.

The natural corollary would be a development of the Network Three programme, "Sound." I have had more correspondence about this programme in the last year than in any earlier period and there are signs that it is

now building up a firm audience of enthusiasts. I am glad to re-assure two correspondents who have written in alarm because they had heard a rumour that the programme was coming off; there is no truth in that report.

On the contrary, I have a very definite feeling that during the past year, the programme has developed and improved tremendously and begun to realise its full potentialities. George Angell, the present producer, has performed a major facelift.

I should like to be able to go further and to promise other important developments in the programme and I know that there are, within the BBC, some who would like to see this. But I know of no plans to break new ground.

Sound radio is fighting a tough battle with TV, and I believe that, in the long run, it is going to establish its claim to be quite as important a means of communication. No-one knows better than the amateur tape recording enthusiast the special virtues of the sound medium. No-one is better equipped to act as propagandist on behalf of BBC sound and, in some degree at least, to contribute creatively as well in the development of sound programmes.

* * *

THE DECISION TO broadcast "Sound" on Network Three fortnightly in 1964 was an encouraging move, but much of the value is lost by transmitting the repeats at the same time as the original broadcasts. I should like to see a limited experiment made by broadcasting special programmes of more general interest—the programme on the Radiophonic Workshop, "The Sound Makers," for example—at a late evening hour. I should like to see an experimental programme, too, broadcast stereophonically on a Saturday morning. No body of listeners better deserves a stereo transmission than the sound enthusiasts.

But the biggest single change I should like to see in the programme is a development on the lines proved successful by Jean Thevenot in France and by others in Switzerland and Belgium—the introduction of more amateurs and their work into programmes.

Programmes like "Any Questions" and "Down your way" have demonstrated the popularity of audience participation. Recording offers the possibility of a very special kind of participation.

If the BBC were positively to encourage amateurs to send their best work in so that representative examples could be broadcast and discussed, with the amateurs present to ask questions and describe their methods, it would make a type of programme that would not simply be interesting: it would be of greater practical value to other amateurs than any number of straight talks offering advice.

I should like to see a bold decision by the BBC to enter this field on the same scale as has Radiodiffusion Television Française. "Sound" could become a weekly transmission alternating between programmes featuring amateurs and their work and programmes featuring professional practice, but all aimed at a popular—not too technical—audience.

I have developed this theme at length because I know from conversations and correspondence that I speak for most tape enthusiasts. Perhaps Mr. Frank Gillard, who, as Director of Sound Broadcasting, is the main champion of sound as a medium, will be encouraged to call for a deeper investigation of the possibilities.

LAUGH WITH JEEVES



"When you've finished, could you mend the fuses, they blew this morning when I used the vacuum cleaner?"

Recording a drama production without a script

By ROBERT GUNNELL

IT was dark outside and there was a nip in the air. In the garden, standing on a box near to a window, stood a microphone. Sitting on either side of it were two teenagers. The cable snaked in through the bottom of the window, under the closed curtains and into a tape recorder standing on a table in the warmth and brightness of a communal lounge. On to the tape went a scene in a radio play, performed with a depth of feeling which would have been the delight of any producer of an amateur company. In it, the boy, who had not known the advantages of true family life and security, convinces his girl friend that she should return to her home which she had left the previous night in a bid for independence.

This episode was set in a park, and here, on the tape, was the correct open air acoustic, accentuated by the sound of an occasional car and the bark of an unwittingly co-operative dog. What was unusual, however, about the recording was that the two young people in the garden who had played out the scene which lasted about four minutes had done so without a script and without memorising their lines. The dialogue came spontaneously out of their own experience of life.

The tape recorder has been regarded for many years by Essex Education Committee as a useful tool for youth club work. Senior members—those with leadership potential—are encouraged to take part in two special weekend courses at Clarence House, a residential centre in the village of Thaxted. On the first weekend they become involved in such rudimentary matters as how to run a successful committee, but on the second they undertake special projects of relevance to club work under expert guidance. They split into groups of about eight and tackle such subjects as designing a youth centre, making your own music, painting a mural, photography, etc. Only two subjects have turned up in virtually every course over the past five years—compiling a club magazine, and making a production on tape. The session I have just described was part of an experiment on one of these courses.

Tape recording seems to be a very popu-

lar subject with the members at Thaxted. Few of the young people claim any knowledge of tape work and each course becomes a challenge for the students—and the tutor! The operation starts late on Friday evening and the job has to be completed by 2 p.m. on the Sunday afternoon. Although there are moments when one doubts if the race against the clock is going to be won, there has never been an occasion when a group has failed to be ready to play its completed tape to the assembled course. Over the years we have produced many documentary features, a strip film commentary and several sound magazines. The equipment we use is simple—two mains-operated recorders, a battery portable and a record player. All mixing is done acoustically and the main work is carried out in the large lounge of the centre.

It was whilst preparing a feature on smoking that we stumbled on the possibilities of what might be termed "spontaneous drama." The opening of the feature was a satirical comment on the one time traditional cigarette television "commercial." There was the jingle, followed by a boy-meets-girl episode in which the couple found satisfaction in a deep inhalation of a "weed" cigarette.

The setting was a youth club dance. The background chatter had previously been committed to tape and was played in from the second tape recorder. The record player provided the music. What struck me though, was the ease with which the two young people played out their short parts. They insisted it could be done without a script and then, with hardly any direction, achieved a natural sense of timing and expression which would have been hard to acquire normally without intensive rehearsal.

There was nothing, of course, particularly new in asking an individual or a group to act out a given situation using whatever words come into the mouth. Schools, drama groups, psychiatrists, students on training courses have all made use of similar techniques, although normally it has been done within a group for a specific purpose. Occasionally there have been public performances but the risk of failure is inevitably high. But supposing one combined this approach to drama with the advantages of the tape recorder, of being able to erase and record at will and to edit the final tape, could not something of quality be created?

On the next Senior Members' course, with a handpicked group of young people, we tried to see if the idea could be made to work. It seemed to me that part of the success of the original playlet was that the performers were acting out something within their own experience. To reach a similar standard the plot and the characters must thus be closely related to the lives of the young people taking part. Furthermore, before anything could be done in the way of recording, the group must come to identify themselves with the characters they were creating. They must believe in them and in the story which would involve them. The plot must certainly come out of the thinking of the group and should not be imposed—indicated perhaps, but not imposed.

On the Friday evening I merely explained to them what we hoped to do and asked them to start thinking about a suitable plot. Some ideas were present when we met again on the Saturday morning although there was little that could provide the basis for a play. So, for the next two hours or more, we did nothing else but talk about each other's lives, searching for points of conflict with others, or of similarity of experience amongst the young people.

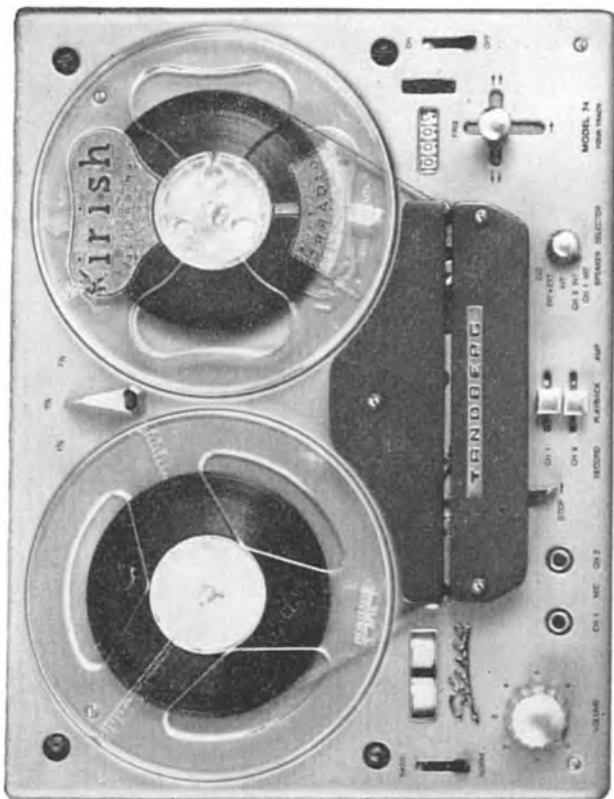
This, in itself, was quite illuminating and not without value to the young people themselves. Without realising it they were sharing their own personal problems with the group, and coming to appreciate that what to them originally may have appeared as a difficulty peculiar to themselves, had also been faced, and surmounted, by others. As they talked, too, they came to know each other more and the barriers of self-consciousness began to fall.

For the tutor (as I have subsequently confirmed) there eventually comes the moment of panic. Listening to the shapeless discussion one begins to feel that nothing can ever come out of these random thoughts. The talk goes on, but where is the plot? Time is short. With this group, one point, however, began to come across quite strongly—that of the problem of the second child in a three child family. The elder, it was agreed, is always regarded as sane and responsible, the younger is cosseted, but the middle one tends to get the worst of both worlds. To this was linked the reluctance of some parents to accept the existence of boy friends. Why then not set out to prove in the play that parents, sometimes, can be wrong?

Here then was the beginning of our plot. We envisaged a three child family and our heroine, Jacky, was the middle daughter. There was the paragon of an elder sister and a horror of a younger brother (the latter was subsequently dropped, mainly for reasons of casting, but it seemed to make little difference to the plot). So unhappy was Jacky that one night she failed to return home from the youth club. The worst was thought of her boy friend, Ted, a young apprentice at the factory where Dad was a chargehand and Jacky an office junior. Ted was also under a more general cloud because suspicion, unproved, had fallen on him over the theft of some tools. This was, of course, completely unfounded and his unwillingness to defend himself was only a reflection of his unhappy upbringing. It would be Ted who would lead Jacky back into the arms of the family and, of course, be accepted, at last, for doing so. The skeleton of the plot had been laid, now the characters had to be given substance.

Taking each in turn, the group created for them a mental dossier—name, job, spare time interests, temperament, etc. Here were

(Continued on page 101)



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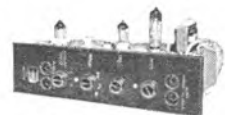


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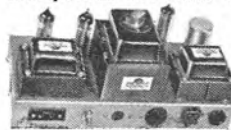
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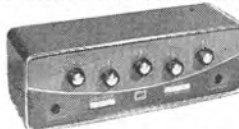
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DO-IT-YOURSELF

Starting tape?

By N. A. BARGERY

THE "do-it-yourself" enthusiast who resolves to assemble his own tape recording equipment faces a variety of interesting problems. First, of course, he must decide whether he requires a quality job with all the facilities or just a plain, reliable, single-speed machine for use wherever there is a convenient mains plug.

The first category sub-divides into "fixtures" and "semi-portables"—the latter for use in conjunction with quality amplifiers, but which can be

taken to different localities and used for "on-the-spot" recordings.

"Fixtures" are recorders which are "built-in" to existing equipment. They consist of a tape deck and record-play amplifier. Weight is usually not a problem. On the basis of my own personal experiences, I can recommend the following decks and amplifiers: the Brenell Mark V, the Truvox 80, or the new outstanding 90, and the Magnaxov "Studio."

I have placed these decks in my own order of preference but I would add that the last-named deck achieves extremely good results and comes into the "high-fidelity" class.

Tape drama without a script

(Continued from page 99)

all the facets of a personality which enabled them to see the individual as a person they could recognise from, again, their own experience. This done, parts were allocated and the work of recording began in earnest.

Our first scene was the early morning. Mum and Dad at breakfast. Enter elder daughter and with her the news that Jacky's bed had not been slept in. Consternation! Attitude of parents to both daughters, the existence of the paragon's perfect boy friend and the heroine's less perfect one, firmly planted. The scene was recorded, listened to and criticised. Spot effects and perspective were improved and the recording began again. So it went on until the group were satisfied with Scene One.

Partly for experience, we set the next in a moving car. We decided that here the suspicions about Ted would be introduced. Dad was taking a young relative to work in his car (he normally took his daughter as well) and they spotted the boy friend at the bus stop. Dad subsequently rings the works office to discover that his daughter has not come in. Telephone bells and distort by courtesy of the GPO—at the cost of a few pennies expended in a local call-box. Father then accosts boy friend on the shop-floor. Some grand background noises here with the aid of a vacuum cleaner and other tools. Girl-friend telephones boy-friend (recorded at same time as first sequence to save pennies) and then comes the discussion between the two in the park. In the evening Ted and Jacky return to the family—the daughter only agreeing to come in if her friend comes as well. Eventually Mum and Dad begin to see that they were over-hasty in their judgment of Ted and the couple are now shown to be on better terms with the parents. Enter elder daughter, distraught, having had scrape with police. Perfect boy friend has turned out to be car thief. Closing music.

The whole play lasted about 15 minutes. Although the bare bones of the plot were there at the start of recording, much of the detail was filled in as the work proceeded. Occasionally, it was found necessary to record additional, unplanned, scenes to fill in some essential part of the story. Some sequences were recorded almost at the first attempt, whilst others needed reshaping and polishing time and again before completion. On playback the attention of the audience was held throughout and the group seemed well pleased with what they had created in so short a time.

At the back of my mind, however, there still remained the nagging thought that this could be a mere flash in the pan, that the idea would not prove to be workable with a more typical group. But it was. Some months later, using the same technique, another group produced a play of similar length built around the problems of the first job. So successful was it that the tape is now being used in Essex for school leaving lectures.

This is clearly a technique with great possibilities but which needs patience. There are no short cuts in the early stages and a very firm grip has to be kept on the plot as the recording proceeds. The dialogue which results is often very authentic. The problems of timing, inflection and emphasis which frequently take so long to overcome with amateurs, seem largely to solve themselves.

My impression is that it is not a method of working that should be used over a period of time. Enthusiasm and interest need to be sustained at a high pitch. It is difficult to rekindle the flame once it has been allowed to die. Certainly the results are very satisfying and the benefits to the members of the group go, I suspect, far beyond the pride in achievement of a radio play that is different to something much deeper.

Wiring up the decks to their associated amplifiers is usually a simple matter and makers supply all relevant data. Spacing of erase and record leads may sometimes be necessary to reduce hum level, but this is a matter of trial and error.

Now we must consider the "pre-amplifier." This is a "record amplifier" with a small amplifier for playback without an output stage, designed to feed into the main amplifier and thence on to the speaker. Such pre-amplifiers can, therefore, be used for portable recorders, but playback has to be done "at home."

I can recommend Stern Radio's version of the Mullard "C" pre-amplifier, which can be bought as a kit of parts, or made up. Construction, where decided upon, is straightforward, thanks to well-edited construction sheets. From the same source it is possible to obtain at modest prices a kit of parts to build a complete portable three-speed tape recorder with cabinet.

The attraction of the semi-portables, of course, is that they can be used with excellent results in conjunction with an existing "hi-fi" set-up or just on their own. I can recommend two amplifiers here—the Heathkit TA1M in kit form (the "kit" a novice can assemble) and the Stern Radio version of the Mullard "A" amplifier in kit or assembled form.

The latter is compact and can be modified for a variety of decks. The separate power-pack enables the constructor to place it in the position where hum pick-up is at a minimum. It can also be used as a straight quality gram and radio amplifier.

Loudspeakers should preferably be elliptical for ease of mounting. I have used Elac's speaker units and found them very satisfactory.

The small lightweight single-speed portable has its uses. The B.S.R. TD2 tape deck is particularly suited to this type of recorder, and is reasonably priced, light and reliable. The same firm produces a circuit of a record-play amplifier for this deck, which is attractive and economical. The response of this deck is very good at 3½ ips.

Martin Recordakits produce an amplifier kit for this deck.

Should one wish to build a cabinet for a home-assembled recorder, this can be done with ¾- or ½-inch plywood, with the led of hardboard.

Using a Truvox deck, Stern amplifier, and Elac speaker, I managed to house the complete equipment in a cabinet of overall size 17 in. x 15 in. x 8 in. and weight approximately 30 lb. This is perhaps rather hefty for true portability, but the reproduction from this set-up is very good even without feeding into my permanent reproducing equipment.

Before designing such a cabinet, I strongly advise most careful measurements of the equipment to be housed, to make sure that sufficient clearance exists inside. The bottoms of tape deck motors have a nasty habit of fouling amplifier valves. Remember, too, that a vent, approximately four inches square, is needed in the bottom of the cabinet. Mount rubber feet on it, so that cool air can enter from underneath whilst the recorder is in use. Output and rectifier valves generate a surprising amount of heat in a confined space.

It is also good practice to arrange for narrow gaps underneath the tape deck edges to permit escape of heat. If the deck is mounted on rubber buffers this occurs as a matter of course.

All the manufacturers I have mentioned are most helpful to users of their products. When writing to them for advice please mention this magazine and article.

John Borwick asks:

THE Editor having asked me to contribute an occasional round-up of news and views on tape recording matters, I have decided to tackle the job by asking a few questions. Here goes with the first question: **Does the keenness of tape clubs increase as you get farther from London?**

My travels in recent weeks have taken me to a number of tape clubs up and down the country. The Dundee club meeting was packed from 7.30 to 11 p.m., and two people had even driven over from St. Andrews for the occasion. The West of Scotland Club in Glasgow, not content with once-a-week meetings, have rented a room full-time. They are painting, wall-papering and furnishing the room themselves and can pop in there at any time to record or mess about with tapes or hi-fi.

The Middleton club, near Manchester, turned out in strength for my Emitape talk, and were genuinely disappointed that I mostly kept off technicalities and had not brought a full rig of stereo high fidelity amplifiers and loudspeakers which they could listen to and compare with their own fine equipment.

Contrast all this provincial enthusiasm with the numbing lethargy one meets in London. In our capacity as Judges of this year's National Tape Recording Contest, the Editor and I reported at the Russell Hotel supposedly to hear a public playback of the winning entries and face a barrage of questions from hundreds of tape club members.

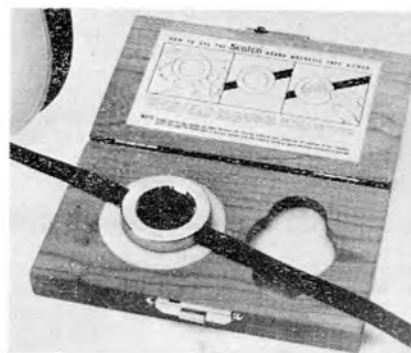
We found rows of empty seats and a knot of people that you could get inside quite a small tape loop—despite the fact that Roger Aslin of the Federation of British Tape Clubs admitted to me that he had personally notified no less than 42 tape clubs in, or reasonably accessible to London.

I suppose the answer is that people near London can find outlets and answers to their questions about hobbies from well-informed dealers, or they can even telephone manufacturers, magazine editors and so on. Therefore they don't place the same reliance on getting together with

people of similar interests to themselves. You tell me: or better still, tell the Editor of *TAPE Recording Magazine*.

* * *

HAVE you looked at any good recordings lately? No, I don't mean just having a casual butcher's at reels of tape. It is possible these days to make the actual recorded wave-form on tapes visible. The conventional method is to brush on to the tape a small deposit of a special liquid which contains magnetic particles in suspension. (My bottle is labelled Indicord, distributed by H.P. Freeman, 271-3, Archway Road, London, N.6.) The tiny black particles crowd together at points where the tape magnetisation is a maximum, so you get a series of vertical black lines. The position of these lines helps you to locate certain peak sounds, and their length marks out for you the width of the track which has been recorded.



Now the 3M Company (Minnesota Mining and Manufacturing Company Ltd.) have just announced an improvement on this idea. It is the "Scotch" Magnetic Tape Viewer No. 600 and consists of a circular, glass-topped container. This again contains magnetic particles in suspension, and you simply place it on the tape and tap lightly for the magnetic field pattern to appear. The viewer costs £20.

* * *

THE third question (from you to me this time): **Who wants to see a tape recorded waveform?**

Well, that's a good question. The short answer is anyone who wants to demonstrate the relationship between recorded wavelength, frequency and tape speed—for educational purposes. And, more important, editors of videotape who have to cut on a frame synch pulse every time; servicemen who want to check head alignment, track placement or find out quickly whether tools, heads, guides, etc., are magnetised.

* * *

HAVE you ever thought of joining the B.S.R.A. or the B.K.S. (British Sound Recording Association and British Kinetograph Society)?

These two organisations have only occasionally been mentioned in this magazine. Although both have a sprinkling of amateur members, the general level of their lecture meetings and the papers published in their respective journals has tended to be on too technical and specialised a level to attract the wider audience of tape recording enthusiasts.

Latest news, however, is that the two groups are planning a merger, with the object of producing a new Association covering all aspects of audio and visual science and techniques. All being well, the

result should be an active organisation with a part to play in the sound, cinematograph and television fields. As a former Editor of the *B.S.R.A. Journal*, I am naturally following developments with great interest and shall keep you informed, through this column.

* * *

DO you share my view that tape is the most versatile programme medium?

I got myself involved with a trade promotion show recently which made striking use of tape—and could not have been done through any other sound recording medium.

The promoters were possibly the most famous makers of tape recorders—hence the appropriateness of their reliance on tape. The entertainment demonstration was a full-scale stage presentation on three successive evenings to audiences of 700 plus. The stars of the show, which contained a nice mixture of comic sketches, audience participation and mono/stereo demonstrations, were Peter Murray, the disc jockey and Bill Kellie of "Candid Camera."

My job was first to record and piece together more than sixty different bits of music and sound effects, and then play them in time with the action from a tape machine set up in the stage wings. Helped by my good friend Bill Walton, who directs the Stagesound Studios in King Street, Covent Garden, I was able to collect all the sounds called for in the script. These included such delights as "a fly walking across a newspaper," "a coffee-vending machine as heard from inside by Tom Thumb," and "a heartbeat that tracks in stereo across the stage and speeds up as a pretty girl appears." Needless to say, we changed the show round and added new gimmicks for each evening's performance, with me splicing furiously as the audience assembled. Just try doing that with disc or film! Three cheers for tape.

* * *

HOW do you sell tape recorders successfully in the United States?

The answer, as I found on a recent tour of the new Elizabethan Tape Recorders factory at Romford, Essex, is quite simple. You do what Elizabethan do: while realising that the Americans can and do make recorders themselves, you go over there and make an intensive study of this tough market. Then, having found where the gaps are, you design and manufacture machines with just the right specification, appearance, etc.

Elizabethan, I was told, are the only British company to tackle this important area seriously. Alongside the production lines turning out hundreds of the familiar Elizabethan recorders for this country, I found some of the 400 employees making four different machines for boxing up under American names.

One of these is a full stereo model with detachable speakers, and another basically mono recorder, recognises the plentiful supply of four-track stereo tape records in the USA by incorporating twin speakers and stereo playback facilities.

Elizabethan have a different kind of Transatlantic venture planned. In June, they are going to fly a party of their wholesaler friends to Miami, Florida, for a twelve-day holiday. A busy, well laid out new factory, and lots of satisfied customers on both sides of the Atlantic. That's a formula that ought to give a deserved boost to British industry in all its aspects, whether the product is whisky, cars or tape recorders. Congratulations, Elizabethan.

Dramatape

miscellany

By PERSPECTIVE

A DRAMATAPE is a play on tape, produced (usually) by amateur actors. But you can produce a "family dramatape" *without* acting. The only acting is done by you, the recordist; and then in a very limited sense.

You start by recording domestic conversation. But don't switch on the recorder and say, "Come on, everybody—talk!" There's no better way of ensuring silence. Start with action. *Do something*—even if it's only opening a bottle of wine. It gives people something to discuss; and it gives rise to further action. Perhaps you can't find the corkscrew. . . .

Warn people (beforehand) not to split into chatting couples. "Just keep the talk general," you must say; "otherwise, we'll get a useless babble." Five voices are about the maximum you'll need. Push any supernumeraries well into the background "for atmosphere" (e.g. at a party). Do this by installing your "unit" in a corner; then close-in on the microphone and decrease the gain.

Never be in a hurry to stop the recorder. A lot of takes are spoilt that way. Example: you're recording the kids in the garden. They're playing motor-boats in the lily-pond; and Mother opens a distant door and calls them to lunch. Don't switch off! Get the sounds of their Wellingtons departing up the path. Wait until the distant door is shut and silence descends. . . .

Similarly, try to start every take in advance of the action. Example: the new car approaches from the distance (i.e. from silence) and Pa yells at Uncle to "Open that garage door!" These touches of perspective "round off the take." They also aid the final construction of your dramatape.

Let's say you've made a rustic seat. The family come outside to "test" it—and a nearby microphone picks up their comments. This, by itself, is fairly dull stuff: no plot, no twist. So you precede it with an especially-made tape section . . . of the timber being sawn and assembled. An opening narration runs over these sounds. "Everyone wants me to make a rustic seat," you say. "All day I've been at it. I'm aching all over . . ." Raising your voice, you yell, "All right, everybody—it's finished. Come out and inspect it!"

Make this tape-section, if possible, in the same location; then splice it to the start of the original recording. It will all seem like one take. We'll hear voices and footsteps approaching from indoors; the family sit on the seat, etc.; then they depart. Your use of perspective enables you to "blend" the two takes—and to add another for the twist.

The narration might continue: "Now that they've all gone, I think I'll have a rest . . ." You sit down with a grateful sigh. We then hear a rending crash as the seat falls to pieces.

You can evolve many amusing dramatapes from this simple method; but the number of extra tape-sections depends on your ideas. Example: you record all the callers at your front door—the talkative salesman; the laundry-man; the shifty pamphleteer; the insolent market-research girl.

They'll be taken aback by the microphone; but all you say is, "I'm making some experiments . . . just ignore it." And they do.

Strung together, these recordings can form a stream of interruptions to some hobby or chore. Whitewashing the kitchen-ceiling, for example. All the sounds can be made on the effects-bench and, as before, your narration will run over them. You must, of course, incorporate perspective when your footsteps hurry between kitchen and front-door. It's fascinating to work out such moves—try it and see. One simple way is to have the microphone "accompanying" the footsteps to and fro. And you must edit the door-step takes to "blend" with the opening of the door.

Give the episode a twist. Perhaps you decide to ignore the last ring of the bell. We hear your brush-strokes continuing their work—with the distant bell ringing furiously. Fists then hammer on the door and it is finally broken down with an axe. You leave the kitchen to investigate; then you return . . . "I'm sorry to say," your narrative ends, "that my wife had forgotten her key."

I'd be happy to answer any problems arising from this article, but please enclose a stamped envelope if you want a postal answer. I hope to return to the subject of family dramatapes in a future issue, giving examples of interpolation and other tricks.

Two-minute tape sketch by David Haines

THIS month's recording exercise is a slightly more advanced example of "aural mime." (See *January issue*.)

No spoken words are used, other than a clear announcement of the title. The narrative is conveyed through a succession of stylised sound-effects.

Perform your effects at relative microphone-distances to achieve perspective. Build them consecutively—but don't worry if you cannot avoid pauses between them. This surplus can always be cut out to tighten up the sequence.

THE APPRENTICE FIREMAN

WE fade in on a clanging fire-station bell—a throaty, urgent bass. It fades down slightly. We are on the upper floor of a fire-station. A nearby door opens and five firemen come dashing out across the wooden floor. There is a pause while limbs are shoved into water-proofs—we hear the hasty crinkle of the material.

One by one, the firemen dash to the adjacent pole and slide down it. We hear a departing *whish* . . . followed by a distant *plonk!*—five times in succession. Each set of footsteps then clatters briefly over a stone yard below us.

A waiting fire-engine then revs up and departs into the distance, its bell clanging. The station-bell also dies; and there is a moment's dead silence.

We are still upstairs. Footsteps then

come hurrying towards us—as if through a series of distant interiors. This latecomer is progressively shutting doors—ending with the fourth and nearest one. Like the other firemen, he crosses the wooden floor. Like them, he pauses and dons water-proofs—but with a struggle.

We accompany his slow, very long *whish* down the pole . . . terminating in a cautious *plonk*. We are now (with him) on the echoic ground floor.

He runs away across the yard, as if after the fire-engine; but he stops outside and falters to a standstill. Suddenly, he returns. We hear him pick up a bucket. A tap is twisted open and the bucket is carefully filled. He even adds a precise, extra drop. Staggering slightly, his footsteps then trot happily into the distance.

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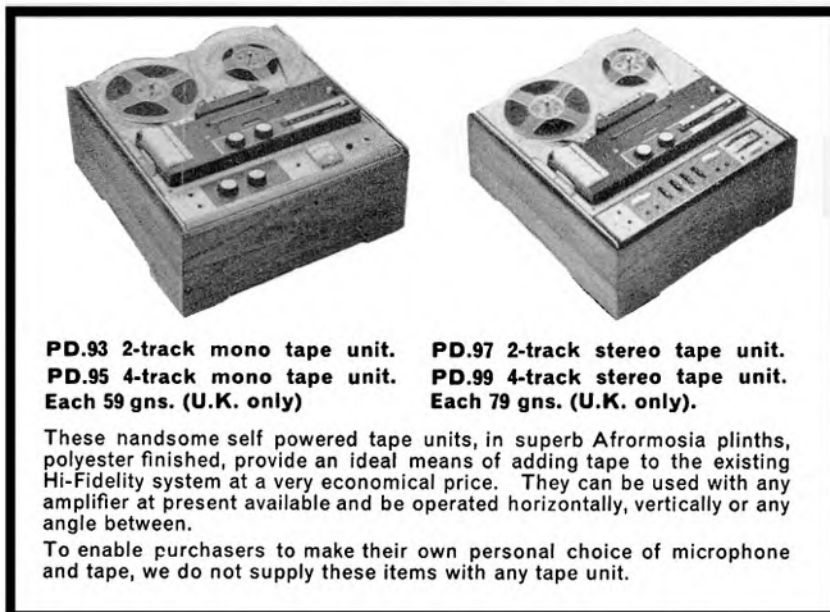
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MICROPHONES

Their types and uses—part 4

By J. A. MOIR

USING A MICROPHONE

MAKING the best use of a microphone is largely a question of understanding the advantages and limitations of the particular type being used and of having a little knowledge of room acoustics. Our own two-eared listening system allows us to ignore sounds we do not need or wish to hear and to concentrate on listening to the sounds we wish to hear.

Even the best of current microphones do not have this facility, though the tubular microphones discussed earlier, are getting close to it. In consequence, a recording made in a room where the reverberation is hardly noticeable to the recording engineer, may sound as though it were made in the local town hall or the public baths. The

noise of birds, passing traffic or aircraft, sounds that were hardly noticed when the recording was being made, stand out most obviously in the recording.

Moving the microphone closer to the speaker increases the signal level, allowing the recorder gain control to be turned down and thus reducing the loudness of the incidental noises. Room reverberation effects are similarly reduced by the reduction in gain. A limit to the advantage that can be obtained is set by the performance of the microphone, by a characteristic of sound waves in general and by the performance of the speaker himself.

When the microphone is close to the lips of the speaker, it responds to the sub-audible low frequency puffs of air that accompany all speech, the puffs modulating the higher frequency components of the speech and introducing obvious distortion. Microphones of the piezo type having an

attenuated bass response used with amplifiers having the bass response attenuated in the early stages, are least susceptible to trouble of this type. The addition of a screen of close-meshed fabric or sintered metal in front of the diaphragm can be of considerable assistance in attenuating the unwanted low frequency noises. Close-talking or lip microphones are designed to be free from this trouble, though generally at the expense of some loss in the other aspects of sound quality.

Microphones of the pressure gradient type of which the ribbon microphone is the best known example, achieve their directivity by responding, not to the sound pressure, but to the sound pressure gradient. When the source of sound is small in size, the mouths of speakers for example, the sound pressure and sound pressure gradient differ, resulting in an increase in the bass response when a pressure gradient microphone is used. This increase in low frequency response becomes less marked as the spacing between microphone and speaker's lips increases and is hardly significant at more than twelve inches from the source. The change can be compensated by using a "bass cut" in the recorder amplifier circuit but if one is pedantic, the amount of bass cut needs to be adjusted to suit the microphone-lip spacing being used.

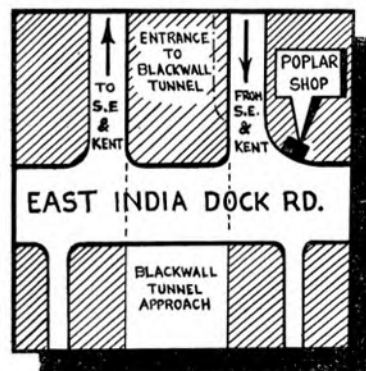
These unwanted effects limit the amount by which external unwanted noise and room reverberation effects can be reduced by moving the microphone close to the source of sound. Nevertheless, the microphone should always be used as close to the speaker as possible; how close, has to be found by trial and error and experience but anything less than twelve inches should be suspect.

Some types of microphone have the fre-

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quency response that the designer intended only when the speaker talks directly to the face of the microphone, while many others are designed to have the speaker talk across the face. Practically all the stick microphones are of this latter type. In general, a microphone that has been designed for talking across the face, will have an excessive high frequency response when it is addressed "face-on." Sibilants will be over-emphasised and S's will be "spitty."

A microphone designed to be directly addressed will have a considerably reduced top response when "talked over," the speech sounding dull and flat and lacking intelligibility. Unfortunately there is no way, other than reading the instruction book, of knowing the designer's intentions but five minutes spent in recording some speech with the microphone in various positions will resolve the question.

For indoor use on the simple domestic tape recorder, the small piezo types have the advantages of low price, acceptable performance, robustness and small size. The attenuated bass response may be a limitation when recording music but it is a great advantage when attempting to record intelligible speech in poor acoustic conditions. Long leads or leads having a high capacitance, reduce the output voltage available but it has little effect on the frequency response. When a long lead is unavoidable, a low capacitance type such as a television down lead, should be used. The small P.V.C. insulated leads generally supplied with the small piezo microphones are light, flexible and inconspicuous but have a high capacitance per foot length and should generally be avoided if a long extension is to be added.

Where a microphone must be used outdoors, satisfactory results will be secured more frequently if the accent is placed more on robust construction than on a particularly wide frequency range, or on an ideal shape of polar diagram. The piezo or moving coil microphones are generally the best choice, piezo microphones where the tape recorder can be close at hand and moving coil microphone where top quality is desired or the microphone must be used at more than perhaps twenty feet from the recorder.

Ribbon microphones are not quite so

robust as the other types and are troubled more by wind produced noise. Condenser type microphones, though capable of the highest quality in suitable surroundings, are less satisfactory than the others when exposed to the elements and the rough handling that is inescapable on an outdoor assignment.

Room acoustics are always a problem. If one room is consistently used for recording, it is well worth while making a dozen or more trial recordings in order to find the best position for the microphone. Some general guidance is possible, thus a position in the geometrical centre of the room or in any corner is likely to be unsatisfactory. Microphones in alcoves or window bays should be avoided, particularly if the alcove or bay is semi-circular as these shapes tend to focus the sound or produce unwanted echoes. In general, the best position is one on a room diagonal and about one-third the distance in from the corner.

MICROPHONES FOR STEREO

A stereo recording requires two separate signals from two microphones but these two signals may be obtained by several different techniques each requiring its own type of microphone.

The simplest microphone technique is merely to use two ordinary microphones, one on either side of the speaker or instrumentalist and feed these into the two input circuits of the stereo recorder. Two ordinary types of microphone will give some semblance of stereo illusion but it needs some experimental work to determine the best positions and angles for the two units. If the source of sound is relatively large, a grand piano for example, then the two microphones need to be spaced about six feet apart. Too small a spacing and the stereo illusion is poor, too large a spacing and you have two half pianos separated by a large gap. For a single artiste, three feet spacing is generally a good starting point for the experimental work.

Two microphones with well defined figure-of-eight polar diagrams are capable of excellent stereo but some preliminary work is still necessary to determine the best position for both microphones. They can be spaced apart without the hole-in-the-centre effect being so obvious as it is with omnidirectional microphones. Careful angling of both units is essential, a good starting point being to arrange the two units at the extremes of the sound source and looking in over it with the beams crossing at ninety degrees.

An alternative is to mount both microphones on the same stand but only six to ten inches apart, the units being angled outwards to include all the instrumentalists. Blumlein used two microphones having figure-of-eight polar diagrams mounted one above the other to bring the active elements as close together as possible. The current professional technique is to use two cardioid condenser microphones mounted one above the other and as close together as possible in a single housing, but some studio operators prefer two ribbon type units, particularly for recording a pianist.

Money spent on a good microphone is well spent but the important factor is not a particularly wide frequency response, it is the polar diagram. One should look for a figure-of-eight cardioid or super cardioid response that is maintained over a wide frequency range, at least from 150 cps to 8,000 or 10,000 cps. The cheaper microphones may have high directivity at high frequency but they will have no directivity at low frequency, a performance to be avoided as soon as your bank manager will allow.

Castle



SOUND EFFECTS ON TAPE OR DISC

MF-1 Mixed (14 effects)

Lion roaring; Aircraft landing; Building falling; Road drills; Ships sirens; Steam Train departure; Steam Loco and whistle; Cell door and keys; Police Car Chase and bell; Police launch and siren; Steam goods train; Storm at sea (thunder, gulls; etc.); Tube train, arrive and depart.

MF-2 Mixed (17 effects)

American Police car and M/c sirens (4 different); Applause; Orchestra tuning up; Car crash; Glass breaking (repeat); City Tube train, arrive, depart; Footsteps (various); Workmen hammering, etc.

MF-3 Horses (10 effects)

Trotting, walking, jumping; Pigs, cows cats, Blacksmiths shop. Side 2: Composite recording Foxhounds Hunting calls and horns, etc.

AFX-1 Wild Animals (15 effects)

Lions, Tigers, Chimps; Gaboon Viper; Alligator; Rattlesnake; Bellbird; Fish Eagles; Elephants; Puma; Sealions, etc. Jungle background.

TFX-1 British Railway Trains (11 effects)

Steam, diesel and electric (arrive, depart, passing, etc. with whistle); Goods trains; Express and local passenger, etc.

EFX-1 Electronic Music and Sounds (15 effects)

Electronic Music two recordings; Space ships; 10 different electronic sounds.

HMX-1 Haunted House and Mystery (11 effects)

Storm, Mystery, Electronic Music (2); Spooks; Creaks; Dungeon; Ghouls; Frigate; Ghosts; Maniac laughter, etc.

MPX-1 Military Parades and Warfare Sounds (5 effects)

March past with Guards band and cheering; Royal Salute; Drums and Pipes; Aircraft attack (bombs, machine gun, etc.); Artillery (tanks, rifle, shells, etc.); Mixed tracks.

ABX-1 Bells and Sirens (10 effects)

Fire engines (British and U.S.A.); s.s. Queen Mary siren; Factory siren; Big Ben; Telephone; Clock chime; Bow Bells, etc.

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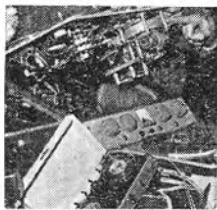
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TRUVOX R92

By H. Burrell Hadden

TRUVOX was one of the first firms to produce a domestic recorder in the early days after the last war. Their latest machine, the R92, is, in fact, one of a series of recorders and tape units which the firm calls its "Series 90," the complete range including quarter and half-track machines, both monophonic and stereophonic. The instrument reviewed is a half-track, monophonic, portable recorder, attractively styled in a grey leather cloth, with a white plastic loud-speaker grille.

The machine will accommodate spool sizes up to seven inches in diameter, and the tape speeds available are $7\frac{1}{2}$, $3\frac{3}{4}$, and $1\frac{1}{4}$ ips. The drive system uses three motors, the capstan motor having the now familiar external motor, together with a heavy balanced flywheel. Exceptionally fast wind and rewind are available, the time taken to rewind 1,200 ft. of standard tape was 55 seconds. Considering the high speed, the wind was surprisingly smooth. An "end of tape" stop is provided, but this does not operate on fast wind or rewind, only on normal play or record.

Input and output connections are by means of the standard "tip and sleeve" jack plug. Two input and two output sockets are provided, the inputs, for microphone and radio on the left hand side of the machine and the two outputs for external amplifier and external loudspeaker on the right-hand side. It is a pity that the now familiar DIN socket is not provided for use with radio sets and similar equipment. So many of these are provided with this socket these days that its omission seems unfortunate.

The controls of the machine are exceedingly simple. The tape transport mechanism is operated by five "piano key" type buttons which control stop, forward wind, rewind, and record. A safety interlock on record is provided by a further knob which must be turned after the record button is pressed, before the machine can be set in motion. These buttons automatically return to the play condition when the tape is stopped, thereby preventing accidental erasure of valuable recording.

The second knob on the deck unit is the speed selector and carries an "off" position

which switches the whole equipment off and withdraws the pinchwheel thereby preventing the formation of undesirable flats. The amplifier controls are few and simple. From left to right there are three knobs. The first of these controls the microphone input whilst recording, and the playback volume on replay. The second knob controls the radio input giving mixing facilities for microphone and radio during recording. The third knob controls the volume fed to the monitor speaker whilst recording, and acts as a tone control during replay. Two



small slide switches are provided, one enabling the erase voltage to be removed so that superimposition is possible and the other switching off the internal loudspeaker.

Record level indication is by means of a "VU" type meter operated from a valve circuit, and a screwdriver slotted control is provided to ensure that the zero of this meter is correctly set. The tape position indicator is of the digital type with a simple push-button reset operation.

The machine was subjected to the usual practical and technical tests. In both cases it performed extremely well. Wow-and-flutter figures were well within the manufacturer's specification and good music recordings were possible at $3\frac{3}{4}$ ips. At $1\frac{1}{4}$ ips music recordings were hardly possible but the results were perfectly satisfactory on speech. The record/replay characteristics at the three speeds are shown in the accompanying graph and it will be seen that they conform almost exactly to the manufacturer's specification. The response at $7\frac{1}{2}$ ips was exceptionally good and if this speed is used for music recordings really high quality results are possible. The signal-to-noise ratio, including hum measured on the machine sent for test was 45 dB. The manufacturer's specification quotes two figures:

45 dB for hum and 50 dB for noise. It is not quite clear whether this method of specification is of any great use in domestic equipment, a figure of total noise including hum would surely be more useful. The figure of 45 dB measured in this case was good for a domestic machine.

The moving coil microphone supplied with the machine, though capable of giving good results, cannot be said to give a response equal to that of the machine at $7\frac{1}{2}$ ips. A better microphone is called for to realise the full potentialities of the machine.

The machine is provided with an excellent instruction book, and can be recommended as a good buy at 69 guineas.

Manufacturer's Specifications

Speeds: $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{1}{4}$ ips within one per cent.

Drive: Three motors, including external rotor capstan motor driving a heavy, balanced flywheel. Drive completely disengaged in "off" position.

Brakes: Mechanical, compensated.

Fast wind: 1,200 ft in 60 seconds.

Wow and flutter: Better than 0.1 per cent at $7\frac{1}{2}$ ips; better than 0.5 per cent at $3\frac{3}{4}$ ips; better than 0.25 per cent at $1\frac{1}{4}$ ips.

Frequency response: 30-20,000 cps ± 4 dB (40-17,000 cps ± 2 dB) at $7\frac{1}{2}$ ips; 40-12,000 cps ± 4 dB (40-10,000 cps ± 2 dB) at $3\frac{3}{4}$ ips; and 60-8,000 cps ± 3 dB at $1\frac{1}{4}$ ips.

Hum: Better than 45 dB; signal to noise: better than 50 dB.

Inputs: Microphone (1.4 mV at 2.2 M ohms); radio/pick-up (150 mV at 500 K ohms).

Output: Across 100 ohms.

Power output: Four watts into 15 ohms.

Loudspeakers: 8 x 5 inch high flux magnet. Valves: EF86, ECC81, ECC82, ECC83, and ECL86. HT Rectifiers: EC25.

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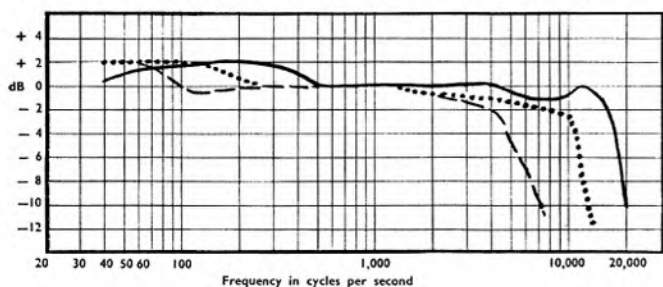
By H. Burrell Hadden

THE TC 500 is the latest in the series of tape recorders made by the Sony Corporation of Japan. As with all the equipment made by this firm, it is a quality product, designed for the discriminating user. It is a stereophonic machine, operating on the four track principle, and will record and playback at $7\frac{1}{2}$ and $3\frac{3}{4}$ ips.

The earlier stereophonic machine produced by this company suffered from a disadvantage that the two loudspeakers were mounted within the body of the machine, and the sound deflected forwards by means of two reflecting wings attached to the sides of the cabinet.

The TC 500 carries two separate high quality loudspeakers which can be moved some distance apart so that a much better stereophonic effect can be obtained. These two loudspeakers together form the lid of the equipment when it is packed for carrying purposes. Each loudspeaker is provided with its own captive lead, carried when not in use in a pocket at the back of the box, and the same pocket also serves to carry one of the two moving coil cardioid microphones supplied.

Ample storage for the mains lead, auxiliary input leads, and servicing kit, is provided in a compartment at the rear of the machine proper. The servicing kit is of special interest, firstly that it is provided at

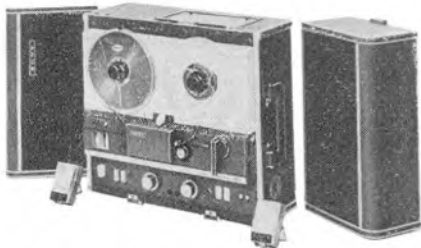


Record/replay characteristics of the Truvox R92

$7\frac{1}{2}$ ips —————
 $3\frac{3}{4}$ ips
 $1\frac{1}{4}$ ips - - - - -

all, and secondly that it is so comprehensive. It contains two screwdrivers, a pair of scissors, some oil, a polishing cloth and some splicing tape. In addition there is a spare capstan and pinch wheel for use on a 60 cycles mains supply. The whole equipment is attractively produced in a grey imitation leather, with aluminium strips protecting the edges.

Input facilities are provided for two sources at high impedance on each channel, one for microphone, with the sockets on the front of the machine, and the other an auxiliary input, with the sockets in the storage compartment at the rear of the machine. The microphone sockets are of the miniature jack plug type, and the auxiliary sockets of the "phono" plug type. All other connections are made on the panel in the storage compartment. The mains input connector is here, together with the fuse and a switch to select 50 or 60 cycles supply.

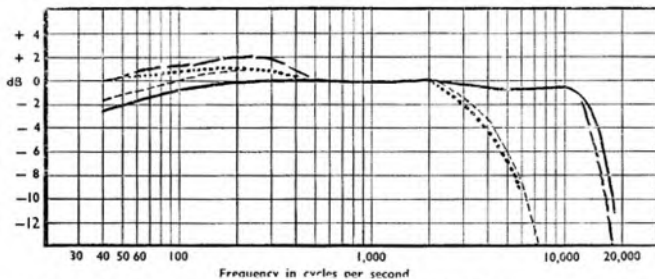


There are also two mains supply sockets, one switched, useful for the connection of, for example, external high power amplifiers. Two preset "hum balancing" controls are also located here, one for each channel.

The storage compartment panel also carries the two loudspeaker sockets, taking jack plugs, and the two "Line" output sockets, accepting phono plugs. The line output is fed from a special transformer

Overall record/replay characteristics of the Sony TC500

Left-hand channel
 7½ ips ———
 3¾ ips - - - - -
 Right-hand channel
 7½ ips ———
 3¾ ips ······



winding, at an impedance of 600 ohms. A further DIN type socket enables the machine to be used with equipment fitted with this type of record/playback connection.

CONTROLS

The controls are exceedingly simple. Tape motion is controlled by one selector giving play, stop, and rewind, and in conjunction with this lever gives fast forward. These controls are on the right-hand side of the machine, leaving the left hand free to operate one or both of the record buttons. These are interlocked with the play control in such a way that it is impossible to erase a recording accidentally. As a further safeguard, two red indicator lights, one for each track, light when the machine is in the record condition.

Two pairs of concentric knobs are provided, one for each channel, giving mixing facilities for the microphone and auxiliary inputs. Two further small slide switches are located at the right-hand side of the control panel. One switches off the loudspeakers to prevent howl round while recording from microphone; the other

introduces approximately 8 dB of bass boost to improve the reproduction quality from the small, though otherwise very good loudspeakers. On the right-hand edge of the machine there is a socket for a "tip, ring and sleeve" type jack plug, to feed a pair of stereophonic headphones for monitoring purposes.

Record level indication is by a pair of edge type "VU" meters, and the "mains on" pilot light illuminates these. The tape position indicator is of the digital type, with a single press button zeroing device.

PERFORMANCE

On practical test, the TC 500 performed very well. It made an excellent showing when reproducing tape records, and the flexibility of the separate loudspeakers made it possible to position these for the best effect. Stereophonic recordings were made, using the two cardioid microphones supplied as a coincident pair, and excellent stereo, of quite good quality, with no hole in the middle, was easily possible.

The machine was also used for "sound on sound" single channel recording, using the facility of dubbing from track to track, adding the additional inputs using the input mixer.

The usual technical tests were made and the record/replay characteristics are shown in the accompanying graph. From this it can be seen that at both speeds the two channels are accurately matched; this matching no doubt contributed to the excellent stereo performance. At 7½ ips the frequency response was well within the manufacturer's specification but at 3¾ ips, as can be seen, it fell somewhat short at the high frequency end. The signal-to-noise ratio at 48 dB was close to specification and very good for a domestic machine.

As has often been mentioned before the two microphones provided with this machine, though of good quality, do not

really match up to the frequency response, especially at 7½ ips, and again I wonder whether it would not be better to sell a machine of this quality without microphones but with suggestions as to suitable microphones for use under different recording conditions.

The signal-to-noise ratio measured on the machine sent for test fell below that specified, but at 42 dB the noise was not troublesome, and better than a number of machines on the market.

In spite of the slightly substandard response at 3¾ ips this machine is of a high standard and can be recommended as a good buy at 106 guineas.

Manufacturer's Specifications

Speeds: 7½, 3¾, 1¾ ips within one per cent.
 Frequency response: 30-18,000 cps (50-14,000 cps ±2 dB) at 7½ ips; 30-13,000 cps at 3¾ ips.

Signal-to-noise ratio: 50 dB per channel (NARTB).

Wow and flutter: Less than 0.15 per cent at 7½ ips; less than 0.20 per cent at 3¾ ips.

Harmonic distortion: Less than 2 per cent at 3 dB below rated output.

Output level: Monitor speaker, three watts per channel.

Tube complement: Two 12AD7 (or 12AX7), two 6AU6, two 6AQ5, one 12AB7A, one 6CA4.

Power requirement: 100, 110, 117, 125, 220, or 240 volts, 110 watts, 50/60 cycles.

Weight: Approximately 55 lb.

Dimensions: 18½ x 16 3/16 x 12¼ inches.

Agents: Tellux Limited, Gallows Corner, Colchester Road, Romford, Essex.

International Audio Festival and Fair 1964 . . .

THE 1964 International Audio Festival and Fair is to be held at the Hotel Russell, London, from April 2-5, is clearly going to be another record-breaker.

Among the trade names to be seen at this annual highlight of the audio field will be Allan, Akai, Ampex, A.K.G., Armstrong, Agfa, B.A.S.F., Brenell, Braun, Brown, Butoba, Beyer, Celestion, Chapman, Clairtone, Connoisseur.

Decca, Design Furniture, E.M.I., Electroimpix, Fane, Fi-Cord, Ferrograph, Grampian, G.K.D., Goldring, Garrard, Gavaert, Goodman's, Grundig, Instrumatic, Kodak, K.E.F., Kelly, Læwe-Opta, Lansing, Lowther, Lustraphone Leak, Luxor.

M.S.S., Metro-sound, Mullard, Ortofon, Philips, Peto Scott, Pye, Pioneer, Planet, Radford, Record Housing, Reslosound, Rogers, Revox, Scotch, Shure, S.T.C., S.M.E., Sherwood, Stuzzi, Sony.

Tannoy, Tandberg, Trio, Truvox, Telefunken, Thorens, Vitavox, Vortexion, Whiteley, Williman, Wilson stereo library, Wharfedale, Worden, and Zonal.

The Federation of British Tape Recording Clubs will be repeating their success at last year's show by once again presenting some of the prize-winning tapes from the British Amateur Tape Recording Contest and its International equivalent. Members of the committee will also be on hand to answer club members' queries. *TAPE Recording Magazine* will be there again, in lounge 346, to meet old and new friends.

. . . and Radio Show

THE Radio Show will be back in 1964, too, but with a heavier emphasis on private trade viewing. So far as the public is concerned, the Radio Show will run from August 26 to September 5.

New Language Laboratory

RANK Audio Visual are to install a Rank Language Laboratory at the City of Westminster College during the Spring. This particular unit, first announced late last year, will be the first installation to be carried out. It will consist of sixteen student booths with a tutor control console. The console has three inputs—three-speed Truvox tape recorder, radio tuner, and microphone. The Laboratory, including installation charges, will cost £2,450.

The new laboratories are the result of four-way collaboration: by Rank who carried out research and marketing in the education field; by Raymond Hart Associates Ltd, who designed and developed prototype equipment; by Intra Design Ltd, with furniture design, and by Truvox Ltd, who manufactured the tape equipment and control console.

Two heads are better than one

By J. M. PITCHER

"TWO heads are better than one" is a saying that applies as well to tape recording as to other fields of activity. In tape recording the saying has a dual meaning and the purpose of this article is to describe the fitting, and use, of an extra playback head. In which case two heads are better and much more fun.

The owner of a machine with a Collaro "Studio" deck can easily add an extra head in the space provided by the manufacturer for the purpose. The only problem is to fit a jack socket in some accessible position well away from the mains transformer. Owners of other machines may like to consider the method I used.

As can be seen in the photograph the extra head is mounted on a brass plate which is fixed to the deck mounting board. The angle at which it tilts, and the packing strips, were found to be necessary during azimuth adjustment and may not be a necessary part of all fixtures.

The first step was to find a piece of brass plate which could be cut to size to form a support. Iron or steel should be avoided because there is a danger of increasing the hum field near the head, but needs must when the devil drives, if you cannot find a piece of brass use steel. All will probably be well.

The diagram shows how the mounting plate can be marked out for a Collaro head. The tape guides were made by taking some distance pieces from a Yaxley type switch—these fit very snugly over a long 4 BA screw. The distance pieces, or tubes, need polishing with Brasso to a very smooth finish followed by a washing thoroughly in paraffin to remove every last trace of abrasive. The tubes can be fixed securely by means of a



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Pair extension speakers for above	£31.10.0
*Telefunken M97—7½, 3½ and 1½ ips	£99.15.0
*Tandberg Series 7—7½, 3½ and 1½ ips	£97.13.0
Sony 464 CS—7½ and 3½ ips	£98.14.0
Philips EL.3534—7½, 3½, 1½ and 15/16 ips	£96.12.0
OUTSTANDING TWO TRACK STEREO RECORDER TELEFUNKEN M98—SEPARATE RECORD/REPLAY HEADS—ALL FACILITIES	£99.15.0

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*Ferrograph 422 U, 2 track 7½ and 3½ ips	£115.10.0
*Ferrograph 424 U, ½T playback 7½ and 3½ ips... ..	£115.10.0
*Tandberg Series 6, 2 or 4 track 7½, 3½ and 1½ ips	£115.10.0
Sony 464 (one replay amplifier) 7½ and 3½ ips	£75.12.0

FOUR TRACK MONO TAPE RECORDERS

*Telefunken M.96—7½, 3½ and 1½ ips	£72.9.0
Philips EL.3549—7½, 3½, 1½ and 15/16 ips	£65.2.0
Philips EL.3541—3½ ips only	£37.16.0
Philips EL.3541/H—3½ ips only	£44.2.0
Elizabethan LZ.29 (illustrated)—7½, 3½ and 1½ ips	£37.16.0
Elizabethan Popular 400—3½ ips only	£26.5.0

TWO TRACK MONO TAPE RECORDERS

*Reflectograph Model A (3 head system)—7½ and 3½ ips	£110.5.0
*Vortexion WV8 (3 head system)—7½ and 3½ ips	£110.3.0
*Vortexion VWA standard system—7½ and 3½ ips	£93.13.0
*Ferrograph 5A/N (modernised)—7½ and 3½ ips	£89.5.0
*Telefunken 85 "The Classic"—7½ and 3½ ips... ..	£87.3.0
*Telefunken 95—7½, 3½ and 1½ ips	£61.19.0
Elizabethan LZ.30—7½, 3½ and 1½ ips	£33.12.0
Optacord 403 (with monitoring)—3½ and 1½ ips	£47.5.0
Elizabethan Popular 200—3½ ips only	£23.2.0
Sony TC.103—7½ and 3½ ips with built-in medium wave radio	£66.3.0
*Telefunken "Automatic" with automatic modulation control	£52.10.0

ALSO AVAILABLE— BATTERY RECORDERS

*Butoba MT.5—3½ and 1½ ips	£69.6.0
Optacord 414 (inc. Mains)—3½ ips only	£49.7.0
Philips EL.3585—1½ ips only	£25.4.0
Stella ST.470—1½ ips only	£26.5.0

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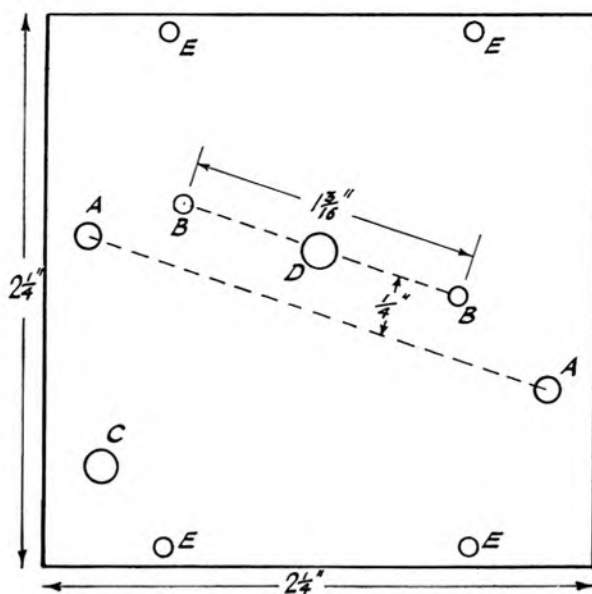
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- KEY TO HOLES**
- A: 4 BA clearance
 - B: 8 BA tapping or clearance (see text)
 - C: $\frac{1}{4}$ -inch for socket
 - D: $\frac{1}{8}$ - $\frac{1}{4}$ -inch for head lead
 - E: Size to give clearance for wood screws



washer and nut, for they should not rotate. The washer acts as a further tape guide controlling the position of the tape with respect to the gap in the extra head and feeding the tape into the centre of the take-up spool.

The azimuth adjustment screws on the head will fit an 8 BA thread so that the easiest way of fitting them is to drill and tap two holes in the position shown. An alternative, and quite satisfactory method, is to drill a clearance hole for the screw and solder a brass nut to the mounting plate immediately underneath. The trick in this case is to hold the nut in position with a screw, being careful not to solder the screw in as well.

A miniature socket is mounted on the brass plate and the head leads connected to it. Miniature jack sockets and plugs should be in stock at most component dealers but can be ordered through a dealer from Messrs. Radiospares.

Azimuth adjustment can be carried out using a pre-recorded high frequency signal, making adjustment of the non-spring loaded screw to give maximum output. Alternatively, mix a microphone with the extra head and record yourself hissing through your teeth while you monitor through headphones. Each hiss will be echoed and the head should be rocked to give the cleanest reproduction on the third or fourth echo. This seems to me to be a very accurate method of setting the head up, for the ear is not very reliable as a guide to the maximum sound from a pre-recorded signal.

In the left to right, top track state a pressure pad is not needed. In the other direction treble response can be improved by a small sponge or felt pad held against the tape as it passes the head.

Two points need clarifying. In the left-to-right transit the take-up spool does not rotate smoothly (for Collaro decks) with the result that playback from the head suffers from flutter. A very light pressure pad had been tried but to no avail, the flutter is due to slipping in the pulley wheels driving the take-up spool and inherent in the design of the machine. I am of course referring to playback from the extra head and not the one normally used. The latter precedes the capstan which gives a very smooth drive. The extra head is used for top track working, mainly for echo and editing purposes, and in these applications the flutter is not objectionable.

The second point is that the Transcriptor deck will play in both directions so the additional head can be used to transfer from the top track to the bottom via the microphone socket. In this case the head precedes the capstan and smoothness of tape transport is achieved.

APPLICATION OF THE EXTRA HEAD

Editing. Readers who have progressed sufficiently with tape recording will see at once the possibilities of editing. Another amplifier is needed to amplify the signal from the head, the tape deck is used for driving the tape. If you are the lucky owner of a machine with amplifier facilities an extra amplifier is not needed. Do not worry unduly about frequency correction circuits and the like, any high gain amplifier will do, for you are chiefly concerned with the position of sounds and not their quality.

The accessibility of the head is an enormous advantage in this respect and it is possible to mark the precise position of the beginning or end of "ums" and "ahs" or notes of music. A Chinagraph pencil is used to mark the tape.

Echoes. Some very interesting echo effects can be produced by feeding from the extra head to a mixer during recording. The spacing is such that a considerable delay occurs, especially at slow running speeds. Up to one hundred repeats of "Moo" have been obtained at a running speed of $3\frac{1}{2}$ ips. Which is all right for anyone who likes that sort of thing!

As has already been mentioned, top track working produces a little flutter. This is accentuated by repeated re-recording giving a considerable tremolo effect which can be useful in music concrete.

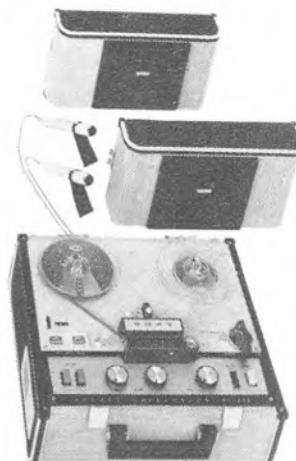
Special effects. With the ability to record from right to left using the Transcriptor deck a number of novel effects are possible. The top track now passes the extra head backwards relative to the recording on it, so if you plug the head into your microphone socket, you get a backward track. The spools can now be reversed to put the reversed sounds on the upper track, wind the tape through and play right to left to reverse the backward track. The signal now comes out the right way round from the extra head and can be mixed with other signals to make a new recording on the lower track. Try playing music and bird-song backwards and you are well on the way to producing music concrete. Mix in some more sounds and you are almost home and dry.

Monitoring. This is not recommended, unless you find that the quality is more acceptable than that found by myself.

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READERS' LETTERS

ONE USE FOR MY RECORDER

AS a regular reader of *Tape*—the article on Dramatape Miscellany in the January issue certainly interested me above the ordinary.

My own keen interest in recording is to put on tape—on the spur of the moment—an extemporised melody or composition on the piano. Other readers may find that a melody or an idea can be generated in one's musical mind, and without the ability to put the basis of such ideas on paper, it is gone for ever!! (I cannot read a child's primer in "C" correctly, except to pick out the notes one at a time!!)

For my purpose I have a Series 2 Ferrograph on the left of my piano, underneath which is a Leak Point One Amplifier. An Axiom "80" mounted in a heavy one-inch mahogany cabinet is in the far corner of the room. All plugs are instantly to hand on my left. The ribbon microphone, being directional, is placed under the piano in a position to secure the correct bass/treble proportion. It always has a thin plastic cover over it and I have found by experiment that this does not affect its efficiency. At first I kept the microphone in its box, but when I wanted to "capture" my thoughts I often found that the thought had gone by the time I had fixed things up!!

Under the arrangement described I have found the greatest pleasure in recording an instantaneous musical idea—maybe for three minutes or so or even fifteen or more minutes. Then there is the pleasure of sitting in the chair and listening to yourself. At times of course—"Oh well, rub the thing out"—but at other times: "I wish I could have been able to put that on paper."

A series of half a dozen ideas, recorded maybe weeks apart, can give some pleasure to others. In any case the interest in listening to something which you have been playing yourself a few minutes earlier is an incident beyond the ordinary.

Incidentally I have a Clavioline attached to my piano and if the mood wills one can accompany oneself while playing the violin or 'cello, etc.—again extemporising—and recording the result.

All this wonderful pleasure is available

without having been taught to play. What little ability I possess has been by careful study on the piano itself, the harmonies, modulations, and relation of the keys.

J. BAMFORD-SMITH.

Redhill, Surrey.

After-sales service

OVER the past months I've read with interest the letters in praise or otherwise, of various firms and the way they service tape recorders. From most I get the idea that they are nearly new recorders. If these firms are that good, why do these recorders need attention? Is it that these days recorders are in need of a service every hundred miles?

In June last year I took delivery of my fourth recorder to be used for special jobs only. Running less than 200 hours between June last and March this year, it was returned to the makers having developed a capstan fault.

It arrived back "repaired," the advice note said: Oh, yes, the capstan ran OK, but in the process of repairing it, the rev. counter had been broken. It had been noticed as the broken glass had been glued back in. The works under the deck were adrift.

I'm afraid to send it back again with this kind of service, who knows what I might get back. I do know this is not good for sales.

Thank you for a very good magazine. The best of a good bunch.

T. L. BULLOCK.

Urmston, Lancashire.

Why no 'warp-free' spools?

FOR some considerable time I have experienced difficulty in obtaining tape spools which are not warped when purchased as new. I have, over the past four or five years, returned several defective spools to the manufacturers requesting replacement. When received I find that these, too, suffer a similar defect. The sizes most commonly affected in this manner are the seven- and 8½-inch spools.

The manufacturers always seem to be keen to improve the quality of the tape that they produce. Perhaps a little of this energy should be directed towards the production of a "warp-free" spool and thus help preserve the life of the tape a little longer.

COLIN R. PYLE.

Margate, Kent.

NEXT MONTH

•
Stand-by-stand
survey of the

INTERNATIONAL AUDIO FESTIVAL AND FAIR

•
Building a small
microphone reflector

•
Test Report on the
new Stereomaster
tape recorder

•
And all the usual features
On sale March 18
PRICE 2s. 0d.

Federation presents Contest tapes, playback

COMPETITORS and judges in the British Amateur Tape Recording Contest met to discuss matters of common interest at a one-day study course organised recently by the Federation of British Tape Recording Clubs.

Members of several clubs in the London area were present.

Discussion concentrated on possible ways of stimulating interest in the Contest and in the club movement.

Alan Stableford, who presided, contrasted the development of the amateur movement here and on the Continent. In Europe the stimulus had usually come from a strong central patron or organisation. In Britain interest had developed at the periphery—in local clubs—and co-ordination in a national effort had posed the biggest difficulties.

Specific proposals to improve the position were discussed and are to be followed up.

During the programme, those present heard a playback of the winning tapes in the 1963 Contest.

Arrangements for the 1964 Contest will be announced in our next issue.

TAPE RECORDING HANDBOOKS

ADVICE ON BUYING A TAPE RECORDER

By J. F. Ling 2/6 (post free)

Designed to help the newcomer through the maze of technical terms, specifications and facilities found in manufacturer's literature, with a chapter on the important features to check during an actual demonstration of a recorder.

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BOOK REVIEW

HUMOUR AND INFORMATION

MODERN TAPE RECORDING AND HI-FI. By Ken Peters. Published by Faber & Faber Ltd., 247 pages. Illustrated. Price 30s.

TAPE recorders are afflicted with a strange hibernating instinct a few months after purchase, writes Ken Peters in the introduction to this latest book to appear on tape recording. Manufacturers have "tried many cures including vertical styling so it won't fit under the bed."

Saying so, the author then proceeds to give numerous examples for the novice of how and when he can put his tape recorder to good use.

The choice of a machine, understanding the specification, first steps in recording, and using a microphone, are the first of eighteen chapters which also dwell on tape clubs, tape exchanges, hi-fi and stereo, and interviewing techniques.

The humorous mood of the introduction is maintained throughout the book, and for this reason should provide pleasant reading time for those entering the hobby for the first time.

Much useful information is imparted, and the book is well illustrated with photographs of a wide range of tape recorders. Explanatory diagrams are well-drawn, and ideal for the layman.

TANDBERG REVIEWS

THE second edition of the booklet on Tandberg technical reviews is now available free upon request to anyone interested in the Tandberg Series 6 and Series 7 tape recorders.

Elstone Electronics Limited, Edward Street, Templar Street, Leeds 2.

Trains that follow the tape

THE model railway seen on our front cover this month is a completely automated layout controlled by the two Telefunken tape recorders.

These transmit operating signals via a Telefunken Diachron to the tracks and trains and also provide sound effects. It will even move the trains to and from sidings, and rearrange the wagons into different sequences.

The system was designed by two German engineers who had been experimenting to find out how many uses they could find for their tape recorder in the home. They designed an automatic telephone answering device, similar to that used by the post office. They also used the machines as musical alarm clocks. After waking the household with soft music instead of the harsh ringing of a normal alarm, the recorders proceeded to give instructions on how long the bathroom should be occupied; gave reminders that the eggs are "done"; and eventually ordered father out of the house in time for the office.

Later the inventors bought a model railway for their tape recorder—so that it had something to play with, or rather, something to automate.

They started from the fact that a slide projector can be operated by signals recorded with the Telefunken Diachron on tape. The tape recorder gives orders to the slide changing mechanism, and they decided those orders should be able to operate a railway too.

Model railways have relays which stop the trains at certain fixed points. The railway operator then has to move a switch before the train can go again. Such relays are normally used in signals so that trains cannot pass when they show "halt." Our two experimenters wanted to give the train the go-ahead by tape as well. They succeeded in that; but the novelty soon wore off. The next problem was to operate the points automatically—from signals on tape.

From this moment the railway ceases to be just a plaything—it became serious work. With slide-rule and paper they sat for nights, finding solutions only to reject them as unsuitable. The problem seemed impossible to solve using only one recorder—the Diachron and normal railway accessories.

To operate the train via the Diachron, the tape recorder uses only one sound. Of all the impulses which can be stored on a tape, the Diachron operates only at 100 cps, ignoring any other frequency. But that is only half the problem. The 100 cps tone would actuate all the track points at the same time, and chaos could and would result.

So they bought a second tape recorder, the four-track Magnetophon 77. They reorganised the layout of the railway and modified the switching so that trains moved when the tone came from track one of the tape. When the tone stopped, the trains halted.

On the second track of the recorder they recorded the orders to operate the railway points; and the third track was used to move the train backwards or forwards.

Track four was used for sound effects including train sounds, station announcements and train guard orders.

On paper, and to some extent in practice, the problem was solved. But to be able to build a railway with all these refinements the two had to go to Nuremburg to visit a model railway manufacturer. There they were introduced into the secrets of the model trains.

They saved much hard work and time, but still had many nights without sleep trying to find ways to emulate the real railway systems.

The professional railway had hump marshalling yards where the wagons were detached, run down and sorted on different lines, and then reorganised in different sequences. This shunting, they felt, had to be included in their model layout—and, of course, operated by the tape recorder.

After many months they succeeded, and the trains were eventually running automatically. They had so streamlined their original experiments that they have now tried to get their set-up protected by patents.

Twenty leads—100 combinations

A RECENT addition to the range of spares and service aids produced by Tape Recorder Maintenance Ltd. are the interconnecting leads—a selection of which are illustrated right.

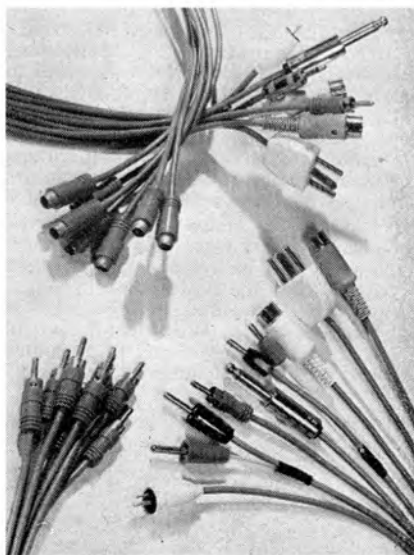
These are divided into two groups, output and input, with any output lead linking into any input lead via a phono lead connection. The ten different output leads provide connections for wander plugs, banana plugs, three types of jack plugs, continental reversible loudspeaker plug, phono plugs, two three-pin continental plugs (for pins 1 and 2, or 2 and 3), and a plug for two round and one flat pin.

Any of these output leads will link into any of the ten input leads giving a hundred different combinations from the twenty leads.

The leads can be purchased individually and vary in price according to the plug combinations. A complete set of twenty leads costs £6 6s. A six feet extension lead (10s.) is also available to extend the overall length to twelve feet.

Also available are a wide selection of plugs, earphones and drive belts.

Tape Recorder Maintenance Limited, 323, Kennington Road, London, S.E.11.



Some of the combination leads



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Tape records reviewed

You will play this tape again and again

CLASSICS



By Edward Greenfield

AT THE DROP OF ANOTHER HAT. Michael Flanders and Donald Swann. Parlophone (TA-PMC 1216), 3 1/2 ips, mono. 35s.

The first Flanders and Swann show "At the Drop of a Hat" produced one of the most successful of all funny records (tape as well as disc). It was a record that actually seemed funnier the more you heard it, and some of the items have already become classics.

I admit that my first reaction to this collection from their new show was that it achieved the old standard only in parts. Nonetheless, *Ill Wind*, the patter song based on Mozart's famous horn concerto, is as brilliant as anything they have ever done, and there is something extraordinarily haunting about *Slow Train*, far more than just a crack at Beeching, in its beautifully-judged sentimentality.

But, as with the first disc, each item seems better at each hearing. It is curious that, though at first hearing the pay-off lines seem rather weak, one minds about that less and less and instead comes to enjoy the relaxed irrelevancy. This is something to play again and again, and you cannot always say that about comic records.

The recording is first-rate, particularly good when you remember that the recording was done live at the Haymarket Theatre and not in a studio.

DVORAK, Carnival Overture; MENDELSSOHN, Scherzo from "A Midsummer Night's Dream"; VERDI, Prelude to "La Traviata" Act 1; SMETANA, Polka from "The Bartered Bride"; TCHAIKOVSKY, Waltz from String Serenade; Overture 1812 (with the Band of Royal Marines) Philharmonia Orchestra conducted by George Weldon. Columbia (TA-33SX 1570), 3 1/2 ips, mono. 35s.

This was the last recording that George Weldon ever made and one of his very best. Every item shows the positive joy in music-making that he took. In *Carnaval* Weldon underlines the brassy confidence of the opening but then treats the middle lyrical section more romantically than usual.

The other trifles are beautifully done, too, with some wonderfully delicate playing in the Mendelssohn Scherzo and the Smetana Polka. The *1812 Overture* gets by far the best performance yet available on tape. The cannons and bells at the end are magnificent, not as obtrusive as they sometimes are but still most impressive. A highly enjoyable collection, very well recorded indeed.

MUSICAL MERRY-GO-ROUND. Sinfonia of London conducted by Robert Irving and Douglas Gamley. HMV (TA-CLP 1409), 3 1/2 ips, mono. 35s.

I remember when this came out in stereo disc form the EMI engineers tried the gimmick of having the Carousel waltz go round and round out of one speaker and back into the other and round the back. It was not exactly a successful experiment, and this mono tape avoids any suspicion of it.

What makes it a highly attractive selection is the choice of music, light but interesting, and the outstanding recorded quality. You get some most unexpected items such as a *Clown's Dance* by Ibert and a waltz by another French composer, Sauguet. It is also good to have Stravinsky's *Circus Polka*, written originally for Barnum and Bailey's Circus for a substantial fee but hardly the sort of thing you would expect in the Big Top.

Other items range from Moussorgsky's *Gopak* from "Sorotchinski Fair" and Smetana's *Dance of the Comedians* to the waltz from "La Ronde" and a piece written and conducted by Douglas Gamley, *Prater Fest*.

ENGLISH FOLK SONGS arranged by Vaughan Williams. Purcell Singers/Rosamond Strode/Patrick Shuldham Shaw/Jean Stewart/Daphne Ibbott directed by Imogen Holst. WRC (TCM 46), 3 1/2 ips, mono. 29s.

This is a really delightful collection sensitively performed and superbly recorded. Vaughan Williams's approach to setting folk-songs was exactly opposite to that of Benjamin Britten but equally valid. While Britten takes the dangerous course (impossible for anyone but a musical genius) of anchoring each song firmly to his own composing style, Vaughan Williams was completely self-effacing. These settings are far simpler than Britten's but their very unpretentiousness is often most moving. I think specially of such items as *An Acre of Land* and the lovely carol *On Christmas Night*.

Imogen Holst, as well as being closely associated with the work of Britten, is the daughter of Vaughan Williams's closest friend, the composer Gustav Holst. Her conducting in the choral items reveals her unflinching musicianship, and in some instrumental settings for viola and piano, played by Jean Stewart and Daphne Ibbott, one is again reminded how many fine British artists have been neglected by the record companies. Rosamond Strode and Patrick Shuldham Shaw, experts in folk-singing, have somewhat colourless tone, but you could argue that that suits the settings.

I welcome World Records' decision to include notes in the box (the same as the





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sleeve note in the disc version) and this is to be the general rule with their issues in future.

POPULAR



By Fred Chandler

'Any old iron' is now a samba

ON TOUR WITH THE GEORGE MITCHELL MINSTRELS. Tony Mercer, Dai Francis, John Boulter, Don Cleaver. HMV (TA-CLP 1667), 3½ ips, mono. 35s.

The same highly successful mixture as before is this fourth tape in the series issued by HMV. "On Tour" is yet again slick and nostalgic.

The Minstrels can do almost as they wish with the oldies; and on one of the tracks, "Let's all go to the Music Hall," they present *Any Old Iron* with a samba rhythm.

Their tour takes in Spain with tunes including *Torero*, *Granada*, and *Lady of Spain*; America (*Chattanooga Choo-Choo*, *The Great American Railway* folksong, and *Take the A Train*); Ireland (*Dear old Donegal*, *If you're Irish*, and *Mick Milligan's Ball*); Scotland (*I belong to Glasgow*, and *Wi' a hundred Pipers*); and the West Indies for a series of calypso tunes including two of Harry Belafonte's hits *Cocacanut Woman* and *Scratch, scratch me back*.

Some forty-five tunes in rapid succession. It is difficult to see how they can fail with this one, considering the success of their three earlier albums.

* * *
LISTEN. Billy J. Kramer with the Dakotas. Parlophone (TA-PMC 1209), 3½ ips, mono. 35s.

Billy has traced very much the same steps as his townsmen The Beatles; both are managed by Brian Epstein, who also handles Gerry and the Pacemakers.

Following the loss of his guitar in a Liverpool Dance club he took over as a vocalist with his group (The Coasters); and progressed from "just practicing" to obtain some regular dates. They eventually met Mr. Epstein and turned professional at the beginning of last year. The Hamburg Star night club was their date for a month, then a tour of the provinces preceded the cutting of their first disc with the group renamed.

This is their first LP, issued on disc late last year. It is another genuine, let-everything-go pop album featuring some past hits by other artists. *Da Doo Ron Ron* (The Crystals) and *Great Balls of Fire* (Jerry Lee

Lewis) spring readily to mind. These are interspersed with less successful numbers including Presley's *Anything that's part of you*, and—one of Billy's singles on the flip side of his hit "Bad to me"—*I Call your name*. Beatles Lennon and McCartney wrote this number and their magic shows through the artist's interpretation. I felt I would like to hear the Beatles own arrangement of it.

As with the next three listened to, these albums are an acquired taste. Even so *Beautiful Dreamer*, as arranged here takes some getting used to. I cannot imagine that screen gorilla becoming attached to this version as he did the original in the film "Mighty Joe Young."

* * *
RICHARD CHAMBERLAIN SINGS. MGM (TA-MGM 923), 3½ ips, mono. 35s.

Richard Chamberlain achieved a phenomenal stardom when BBC-TV began the Dr. Kildare series. Fan letters reached 11,000 a week within six months, and his studio claimed nothing like it since the heyday of Clark Gable and Robert Taylor.

He studied for three years at the Los Angeles Conservatory of Music and then made his singing debut as a guest star on American television.

His first single over here, the Dr. Kildare theme *Three stars will shine tonight*, made the best selling charts. It is included here in his first album with the chorus and orchestra conducted by Jimmie Haskell.

Shades of Sinatra can be detected. The smooth singing is a delight for late-night listening; the girl-friend should love it.

Most are familiar tunes including Cole Porter's *True Love*, Presley's *Love me tender*, *All I do is dream of you*, and *A kiss to build a dream on*.

* * *
HOW DO YOU LIKE IT? Gerry and the Pacemakers. Columbia (TA-33SX 1546), 3½ ips, mono. 35s.

The Liverpool dance club, Hamburg night spots, and then a provinces tour is a familiar round and again is the story behind Gerry and the Pacemakers. His infectious grin and happy personality can be felt on this his first album.

You'll never walk alone from the Rodgers-Hammerstein "Carousel" was his third and consecutive disc to make the number one spot in the charts. This is the only one of the trio included in this album, which mainly features hits recorded by other artists. *Jambalaya*, *Maybellene*, and the Porgy and Bess number *Summertime* all receive his distinctive pop treatment.

Gerry's own composition *Don't you ever*, and his arrangement of the traditional *The Wrong Yo Yo*, are included in a total of fourteen items.

The tapes reviewed this month are issued by the following companies:

"HMV," "Columbia," "Liberty," "MGM," "Parlophone"; EMI Records Ltd., 20, Manchester Square, London, W.1.
"WRC"; World Record Club, Box 11, Parkbridge House, The Little Green, Richmond, Surrey.

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NEW PRODUCTS

ANOTHER STEREO RECORDER FROM TELLUX

A NEW four-track two-speed stereo tape recorder is announced by Tellux Ltd. The new machine, TC200, is a smaller version of the TC500 reviewed on page 108 of this issue.

The quoted frequency response at 7½ ips is 50—14,000 cps, signal-to-noise rated at 46 dB; and wow and flutter is given at less than 0.19 per cent at 7½ ips, and less than 0.25 per cent at 3½ ips.

The TC200 (illustrated right) will accommodate up to seven-inch reels, providing a playing time of 64 minutes per track using standard-play tape.

Among the features are separate controls on each channel for playback and record; pause control, automatic tape lifters to reduce wear on fast rewind; manual cueing; two meter recording level indicators, and a digital rev. counter. Facilities are available for superimposition, sound on sound recording, and loudspeaker monitoring. Two speakers are enclosed in the lid, which is detachable, and in two halves.

Two Sony F-96 dynamic microphones are included in the price of 79 guineas.

Another recent announcement from Tellux stated that they have been appointed sole UK distributors for Bryan Amplifiers Ltd. Full details of the range available are still to be announced. Servicing of the equipment, which is supported by a five-year guarantee, will continue to be provided by the manufacturers through Tellux.

Tellux Limited, Avenue Works, Gallows Corner, Colchester Road, Romford, Essex.

CASTLE SOUND EFFECTS NOW ON TAPE

THE series of sound effects recently issued on Castle discs (described in our December 1963 issue) are now available on magnetic tape. The effects and timings are exactly as those on the discs.

The effects are recorded on B.A.S.F. standard tape at a speed of 3½ ips only, full



track, to accommodate any recorder owner, and are direct copies of the master tapes. Castle tapes are supplied with leaders on three-inch standard hub spools in boxes, and have the same code numbers as the disc records. Details of each effect and duration are included with every tape. They will cost 18s. 6d. each (post free).

The first tape MFX1-T contains fourteen effects including lion roaring, aircraft landing, building falling, road drills, ships' sirens, steam train departures, cell door and keys, police car chase and bell, police launch and siren, steam goods train, storm at sea (thunder, gulls, etc.), tube train, and steam loco and whistle.

Another mixed effect tape is MFX2-T which contains seventeen effects. Separate titles are Horses (ten effects) on MFX3-T; Wild Animals (15 effects) on AFX1-T; British Railway trains (eleven effects) on TFX1-T; Electronic Music and sounds (15 effects) on EFX1-T; and Haunted House and Mystery (illustrated) on HMX1-T. Their latest release is of Military Parades and Commands and Warfare sounds (MPX1-T).

Recorded Tuiton Limited, 174, Maybank Road, South Woodford, London E.18.

THREE-SPEED TAPE DECK BY BSR

BIRMINGHAM SOUND REPRODUCERS recently announced their latest tape deck. This is the Model TD10, a three-speed unit with accommodation for seven-inch spools.

The TD10 operates at 7½, 3½, and 1½ ips, and is available with half or quarter-track mono or stereo heads. Space is available for a third monitoring head. Fitted with a three digit rev. counter, it features the customary BSR three-position joystick control principle for start, wind and rewind, and



a central stop position. A further control provides selection of record or playback. These are fully interlocked to prevent accidental erasure.

RMS figures for wow and flutter are given as better than .15 per cent at 7½ ips; .25 at 3½ ips; and .35 at 1½ ips. The motors are suitable for all voltages, 50 or 60 cycles available.

Overall measurements are 12¼ x 8½ inches with a total depth of 5¼ inches (motor protruding 2 3/16 inches).

Birmingham Sound Reproducers Limited, Monarch Works, Old Hill, Staffordshire.

NEW STEREO RECORDER FROM DENMARK

AVELEY ELECTRIC LTD. have recently introduced the Bang and Olofsen Stereo-master transistorised tape recorder manufactured in Denmark.

The Stereomaster, illustrated below, is a three-speed, two-track recorder with a four-track version available at the same price. The table model costs 105 guineas, and the suitcase model with two monitor speakers in the dividable lid, costs 108 guineas.



The quoted frequency response is 30-20,000 cps (40-16,000 ± 2 dB) at 7½ ips; 30-16,000 cps (40-14,000 ± 2 dB) at 3½ ips; and 50-8,000 cps (50-6,000 ± 2 dB) at 1½ ips. Signal-to-noise ratio is given as better than 50 dB at a recording level producing 3 per cent harmonic distortion, and RMS wow and flutter figures as within 0.075 per cent, 0.11 per cent, and 0.18 per cent at 1½ ips. Channel separation is given as better than 45 dB.

Among the many features of the Stereo-master is a three-channel mixing panel, Papst synchronous motor, separate recording and playback heads, before and after recording quality check, two VU recording level meters, and three dual-input channels with slide-potentiometer adjustment.

It will accommodate seven-inch reels, providing a playing time of 96 minutes per track using long-play tape (1,800 ft.) at 3½ ips. Rewind for such a length is approximately 120 seconds.

Other features include pause control, separate bass and treble control, automatic tape end stop, digital rev. counter facilities for monitoring, echo, multiplay and slide projector synchronisation.

The measurements of both models are 17½ x 14 x 7½ inches high (suitcase model with lid loudspeaker in place; 10½ inches deep; and weighs 33 lb.

Simple switching arrangement provides a selection of supply voltages for 95, 110, 125, 205, 220, 235 volts, AC 50 cycles. Can be supplied for 60-cycle operation. Power consumption for the motor is 27 watts; amplifier; no signal eight watts; full volume twenty watts.

Aveley Electric Limited, Ayron Road, South Ockenden, Essex.

FERGUSON ANNOUNCE THEIR LATEST RECORDER

A NEW two-track recorder, model 3206, is announced by Ferguson. This single speed (3½ ips) recorder is designed to replace the 3200. The improved design includes moving the microphone socket to the front of the machine for easier access.

The quoted frequency response is 60-10,000 cps. It will accommodate 5¼-inch spools, providing a playing time of 45 minutes per track using standard-play tape, rewind being achieved within 2½ minutes. A 7 x 3½ inch loudspeaker is incorporated providing a power output of three watts.

The Ferguson FTD3 tape deck manufactured by Thorn is incorporated. This has piano-key controls for forward and reverse wind, pause, stop and start. Two rotary controls provide volume and tone selection.



Other features include digital rev. counter with reset button, neon recording level indicator, safety erase lock, and earphones.

Inputs are provided for microphone (1.5 mV into 10 M ohms), radio (1.5 mV into 22 K ohms), and pick-up (75 mV into 1 M ohm). Outputs are for radio (500 mV into 22 K ohms), and extension loudspeaker (three ohms).

The 3206 measures 13½ x 12 x 6½ inches, and weighs 18 lb. It costs 26 guineas, including microphone, spool of tape, spare spool and recording lead.

Ferguson Radio & Television, Thorn House, Upper St. Martin's Lane, London, W.C.2.

SLOW SPEED TAPES BY MUSIC-ON-TAPE

LAATEST additions to the Music on Tape series of tape records are to be issued at 1½ ips and 3½ ips. The new Minitape series, each containing four titles, will cost 10s. 6d. at 3½ ips, or 6s. 11d. for the 1½ ips version, both wound on three-inch reels.

Among the first releases are four quarter-track stereo issues including Stan Kenton Showcase; Duke Ellington Highlights; Lord Trad and his Saturday Knights; and Star-maker One. Other titles are Terry Burton sings world hits; Harry Geller's Orchestra with Aziz Mahmood; Leo Chaulic playing continental film hits; Hugo Montenegro's orchestra with Rosemary June; West of the Pecos; Jean Faustin's orchestra playing great instrumental hits; and Music by Aziz Mahmood (including Lolita Twist and Twist Arabesque).

A change of address is also announced by M-o-T, who moved on February 1.

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News from the Clubs

BATH

The fortnightly meetings of the Bath society were temporarily suspended recently to carry out mopping-up operations following the flooding of their basement studio when the river Avon burst its banks. Fortunately, they had had warning of the danger and the equipment had been removed to a safe place.

Their first meeting in the New Year was scheduled to include a discussion of their proposed Hospital's Broadcasting service in conjunction with Toc H. Half-hourly programmes are envisaged, and these are to be transmitted over G.P.O. lines to two local hospitals.

Secretary: R. J. Empson, 17, Lucklands Road, Weston Park, Bath, Somerset.

CLACTON

A new secretary has been elected for the Clacton Society. The office is now filled by Bryan Beales whose address is 3, Cotswold Road, Clacton-on-Sea, Essex.

COVENTRY

Inter-club visits have been a feature of the recent meetings of the Coventry society. On December 4 they welcomed representatives of the Britwell, Slough, club who presented a tape/slide show of London Airport. The hour-long show was photographed by Mr. Hall; sound effects were provided by the Britwell members, and the commentary and final recording was done by Mr. Hall and Mr. Smith, using a Ferrograph recorder. During the evening Peter Warden gave another tape/slide show which he had received from Bob Coote, U.K. Representative of the Voicespondence Club. This presented Charles and Melva Owen, the founders of the American-based tape exchange organisation.

During November, Coventry members visited the club at Hinckley. Mr. Frank Parrington of BASF Chemicals Ltd. was presenting *The Magic Tape* and a new production *The Rainbow Makers*.

Also present at Hinckley were members of the Warwick and Leamington society.

On November 6 the members were hosts to the Coventry Film Production Unit who presented several of their productions including an award-winning film *Frankie and Johnny*. Demonstrations of lip-synchs and the Cinecorder tape recorder were also part of the programme.

Another of their November meetings saw Ron Atkins giving a stereo demonstration with his Tandberg recorder, a Heathkit S88 amplifier and two speakers of his own design. After an interval Ron completed his evening's programme with his competition tape—a commentary upon the techniques of space travel with the appropriate sound effects. A demonstration of one of the new Truvox recorders was then given by a visitor to the club.

The Coventry Committee for International Understanding has requested the club to investigate the possibility of preparing a tape record of Coventry suitable for presentation to city's "twin towns" overseas.

Members recently sent a programme giving examples of their various recording activities to the Ipswich club. An exchange tape is now being prepared for the Coventry members.

Secretary: L. S. Day, 41, Moseley Avenue, Coventry, Warwickshire.

ILFORD

Members of the Ilford tape society recently co-operated with the Barking Cine Club to provide a sound-track

for the Barking Carnival film for the second year running. Members gathered to view the resulting film during an evening devoted to cine. Among the machines used in the compilation of the sound track were the E.M.I. battery portable, Fi-Cord 1A and 202, and the Philips battery machines. Following the film's presentation, members learned that the previous year's version was in the Council's archives.

Afterwards, members saw some of Charlie Chaplin's silent films with music added to suit the mood of the scenes. A two-reel version of the unforgettable "Shoulder Arms" was shown to the accompaniment of a piano recording made by secretary Dave Bolton, whilst the pianist watched the action on a monitor screen. Music for one of the films shown was provided from suitable discs, the synchronisation provided manually by Colin Weightman.

The latest member's equipment night saw two Fi-Cords and a Sony tape recorder among the units displayed. Also shown was the £625 E.M.I. TR 90.

The society has been advised by the Borough Council that details of the club is to be included in the next edition of the Ilford Handbook. Also, the Civil Service Council for Further Education will be including a reference to the society in a booklet entitled "Leisure and Learning."

Among the recent meetings has been a programme on "Tape Recording and Tape Recording Faults," which was presented by Noel Ta'Bois on December 6. Topics discussed and illustrated with example recordings included erase noise level, decibel changes, wow and flutter, print-through, and harmonics.

At a later meeting two entries were heard for the contest to find the best Christmas tape. Ron Powell's four-minute tape included Big Ben, Bow Bells, Horse and Trap, Choir, Bells Playing a Carol, and the sound of genuine Swiss Sleighbells.

Fred Faulkner's recording attempted to show what quality can be obtained with the suitable equipment, by recording from speaker to microphone. His tape contained a recording of the Ilford Choral Society's carol concert at a local church.

Secretary: Dave Bolton, 99, Seventh Avenue, Manor Park, London, E.12.

MIDDLETON

Documentary tape production has been among the most recent activities of the Middleton tape club members. In November they completed a programme on the work of the Fire Brigade. This was applauded by both the local Brigade and the head office at Preston.

Later they began work on a tape/slide show on the history of Middleton. At the close of the year they received a visit by TAPE columnist John Borwick who spoke on tape recording in general. He was to have made a second visit in the new year to speak about hi-fi. In spite of gale force winds and rain nearly seventy persons attended John's lecture including members of the clubs at Rochdale and Stockport.

Among the ventures planned for the first half of 1964 are inter-club visits, members' recorder demonstrations, and demonstrations by local dealers. They also plan a number of live musical recording sessions. Their first programme for an Old Folks' Home has been produced and presented, and they are now hoping to extend this service.

Secretary: John R. Writts, "Field-vue," 119, Heywood Old Road, Rhodes, Middleton, Manchester.

PLYMOUTH

A series of visits were organised by the members of the Plymouth tape club during the closing weeks of last year. First on their list was the South Devon Society where they heard that club's president, Donald Aldous, Technical Editor of *Audio and Record Review*, give a lecture on sound and video recording.

On December 11 they visited the local BBC Studios where they saw sound and television recording equipment.

A week later the club held its Christmas party which included a free meal and dance.

Scheduled for February 29 is an "at home" to be held at the Scott Lecture Theatre in the Plymouth Central Library. Members will arrange their equipment for public display and demonstration, and present some of the recordings they have made during the past year.

Secretary: M. A. Glendinning, 44, Budshhead Road, Ernesettle, Plymouth, Devon.

VOICESPONDENCE

An unusual use for a tape recorder was recently discovered by Bob Coote, UK Rep. for The Voicespondence Club. Working on the roof of his Bexleyheath home he realised his greatest problem would be the acquisition in the right order and quantities of tools, water and cement for the job.

He threaded a microphone lead from the roof through the chimney, and this was connected to the recorder set to "amplify" in the living room. This enabled him to call for supplies of water, etc., which were raised to the roof by rope from the garden.

His wife, at the other end of the proceedings, laced up a spare tape and recorded the grunts and curses, as Bob worked on the chimney stack, for later transmission to Voicespondence members. However, the plot was discovered and swift action with a bulk eraser saved Bob's day.

UK Representative: Bob Coote, 27, Royal Oak Road, Bexleyheath, Kent.

WALSALL

The Walsall club members have at last found themselves new headquarters. The studio, a converted cellar, is at 19, Midland Road, Walsall. Members have already built a glass window partition to divide the engineers' room from the sound-proof recording room. Heavy drapes and decorated egg boxes helped to achieve the sound-proofing. Among the equipment available are Tandberg, Brenell, Ferrograph and Philips recorders and mixing facilities for up to twelve channels are provided.

Secretary: P. W. Browne, 19, Midland Road, Walsall, Staffordshire.

WALTHAMSTOW

A tape recording marathon was the description afforded a one-day course organised by the Walthamstow club members early in November. The course, presented by eight members of the club, covered seven subjects allied to tape recording and lasted 4½ hours.

In the audience were youth club leaders from London and the Home Counties who are to encourage their own members to produce plays, features, and documentaries. Among the items in the programme were the introductory talk on the possibilities of tape recording given by Ken Perks, who also covered tape editing; getting the quality right (Don Cooper); Microphone technique (John Wells); outdoor recording (Gerry Beaton); trick recording and sound effects (Tony Norton); producing feature tapes (Terry Pittman); and writing scripts (Vi Burnett).

Further social services were provided later in the month when members recorded and provided PA equipment for a reception given to the British Red Cross Society who are celebrating their Centenary Year.

Eamonn Andrews, the *This is your Life* team, and Anna Neagle were among the personalities present. Tony Norton and Don Cooper had the tables turned on them during the evening when Eamonn Andrews interviewed them.

Secretary: Tony Norton, 22, Lechmere Avenue, Chigwell, Essex.

WINDSOR

Confusion regarding the secretary of the Windsor tape society. Peter Streamer is the secretary, and his address is Flat 1, 87, Clewer Hill Road, Windsor, Berkshire.

Meetings are being held fortnightly at Marshall's Music Store, St. Leonard's Road, Windsor.

TAPE EXCHANGES

TAPE recorder owners who wish to contact others with similar interests, to exchange news and views by tape are invited to fill in and return the form on page 120, giving their name, age, address, special hobby or interest for this section.

Details given here also include speeds and spool size to be used, name of recorder, and special area to be contacted.

Nichol, Ridley (26). 23, West Street, Wallsend, Northumberland. 8mm cine photography, badminton, motorcycle racing. 3½ ips. 7-inch spool. Cossor CR1604. UK, Europe, Far East.

Nowell, Sgt. Christopher (25). Royal Signals Det., R.A.F. Gatow, BFPO 45. Humour. 7½, 3½, 1½ ips. 7-inch spool. Grundig TK46. UK and overseas.

Pain, G. E. (34). "Junedale," Blandford St. Mary, Dorset. Photography, D-I-Y carpentry, car repairs. 7½, 3½, 1½ ips. 5½-inch spool. Civic T62, and Ekco RT366. New Zealand, USA. Letters not required.

Payne, Mrs. Betty (31). Box 612 Picton, Ontario, Canada. Travel, car rallying, Brownies. 7½, 3½, 1½ ips 7-inch spool. Philips, four-track.

Peake, Geoffrey H. (20). "Heavertree House," Littabourne, Pilton, Barnstaple, Devon. Literature, languages, music. 3½ ips. 7-inch spool. Philips EL3541. South Africa, USA. Male contacts only.

Proctor, Ken (22). 134, North Marine Road, Scarborough, Yorkshire. Reading, music, Russia. 3½ ips. 5½-inch spool. Elizabethan, four-track.

Rajak, Miss Ethel (Edna) (30). 4, Parkhill Road, Hampstead, London, N.W.3. Literature, dramatics, cinema, classical music. 3½, 1½ ips. 7-inch spool. Cossor CR1604. USA, New Zealand, Canada, Switzerland.

Richards, Harry (20). 78, Hillbrook Road, Leyland, Lancashire. Electronic organ construction. 3½ ips. 4-inch spool. Philips EL3541, four-track. No letters required.

Richardson, A. (29). 85, Forest Road, Romford, Essex. C/w music. 7½, 3½, 1½ ips. 7-inch spool. Cossor, Collaro deck. USA, England.

Robinson, Alan (29). 10, Westfield Terrace, Leeds 3, Yorkshire. Tropical fish, cars, c/w music. 7½, 3½, 1½, 15/16 ips. 7-inch spool. Philips EL3549. Australia (Brisbane and Perth).

Rosen, N. (20). 26, Ollerton Road, New Southgate, London, N.11. 3½ ips. 7-inch spool. Stella, four-track. English speaking contacts in France.

Savegar, D. S. (40). 8, Easton Gardens, Boreham Wood, Hertfordshire. 35mm, 8mm, cine photography, gardening, all music. 3½ ips. 5½-inch spool. Bush TP50, four-track. France, Australia, USA, Canada.

Somerville, William (20). 1, Newlands Street, Lanark, Scotland. Architecture, angling, music. 7½, 3½, 1½ ips. 7-inch spool. Elizabethan. Sweden, Brazil, Iceland.

Steadman, Barrie (26). 96, London Road, Romford, Essex. Humour, music. 7½, 3½, 1½ ips. 7-inch spool. Robuk RK3. Male contacts only in UK. Letters first please.

Tash, Stanley (45). 1, Birch Villas, Wellington Place, Sandgate, Kent. Psychology, languages. 3½ ips. 5½-inch spool. Philips.

Terrell, Peter (25). 2, Upland Court Road, Harold Wood, Essex. Travel, books, fast cars, pop music. 3½, 1½ ips. 7-inch spool. Cossor CR1604, four-track. UK, USA, Italy. Male contacts only.

Tipper, David (23). 74, Bellevue Road, Sheldon, Birmingham 26. Drama, radio, writing. 7½, 3½, 1½, 15/16 ips. 7-inch spool. Philips, four-track.

(Continued on page 120)

CLASSIFIED ADVERTISEMENTS

Rate.—Sixpence per word (minimum 5s.); Trade, ninepence per word (minimum 10s.); box numbers, one shilling extra. Payment with copy. Copy should be sent to Advertising Department, "Tape Recording Magazine," 7, Tudor Street, London, E.C.4.

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HIGHEST CASH PRICES offered for good quality Tape Recorders and Hi-Fi. See our advert page 118 this issue. R.E.W., 266-8, Upper Tooting Road, London, S.W.17.

TAPE EXCHANGES

(Continued from page 119)

Upfold, Arthur E. (46). 20, Branch Road, Ilford, Essex. Spanish language, travel, all music. 7½, 3½, 1½ ips. 7-inch spool. Philips EL3538A.

Wallace, Miss Kay (34). 99, Ashcroft Street, Parr, St. Helen's, Lancashire. Photography, films, 7½, 3½, 1½ ips. 7-inch spool. Elizabethan LZ29. Female contacts preferred in Ireland.

Wilson, George (39). 23, Highfield Street, Cemetery Road, Pudsey, Yorkshire. Theatre, motoring, films, 7½, 3½, 1½, 15/16 ips. 7-inch spool. Philips EL3549. Male contacts only.

Wood, Denis (33). 73, Aireville Road, Frizinghall, Bradford 9, Yorkshire. Hiking, camping, drumming, classical and modern jazz music. 15, 7½, 3½, 1½ ips. 8½-inch spool. Brenell STB1, stereo. Grundig TK20.

Woodruff, Peter (24). Personal Services Sqdn. (Catering), RAF Khormaksar. BFPO 69, Aden. 8mm cine photography, cinema, music, 7½, 3½, 1½ ips. 7-inch spool. National four-track. Female contacts preferred.

Wymore, Philip (32). 60, Edinburgh Gardens, Windsor, Berkshire. Photography, theatre, books, music. 7½, 3½ ips. 5-inch spool. Philips recorder. UK. Male contacts only. Letters first please.

TEENAGE EXCHANGES

Appleby, Stephen J. (16). 100, Cats-hill Road, Brownhill, Staffordshire. Guitar music, football. 3½ ips. 5½-inch spool. Fidelity Playmaster. Wales, Scotland. Letters first please.

Cox, Graham E. (16). 40, Ashmore Grove, Welling, Kent. Photography, cycling, pop and classical music. 3½ ips. 5½-inch spool. Walter Metropolitan battery/mains. UK, USA.

Dews, Peter (19). 419, Green Meadow Road, Northfield, Birmingham 29. Radio, records, dancing. 3½ ips. 5-inch spool. Grundig TK20. Letters not required.

Egginton, Alan (19). 123, Sandringham Road, Birmingham 22B. Still and cine photography, humour, music. 15,

8 mm. Home Movies. Send 1s. for fully illustrated catalogue. (Dept. 31), Mountain Films Ltd., 1, New Burlington Street, London, W.1.

LEE ELECTRONICS, The Tape Recorder and Hi-Fi Specialists, can now undertake Wow and Flutter Tests with their latest "Gaumont Kalee" Wow and Flutter Meter. Test Report Supplied. 24-hour Service. Price 25s. 400, Edgware Road, Paddington, W.2. Paddington 5521.

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7½, 3½, 1½ ips. 8½-inch spool. Brenell Mk 5M.

Fox, Stanley (17). 45, Hornbeam Road, Manchester 19. Light entertainment, pop music. 3½ ips. 5½-inch spool. Ferguson. England only.

Hodgson, David (16). 30, Birkhouse Lane, Moldgreen, Huddersfield, Yorkshire. Geography, classical music. 7½, 3½, 1½ ips. 7-inch spool. Robuk RK3.

Howell, Barry D. (18). 69, Windsor Road, Cambridge, Cambridgeshire. Photography, films, driving, pop and jazz music. 7½, 3½, 1½ ips. 8½-inch spool. Tandberg Series 6, Vortexion WV series 4. Female contacts only.

Matthews, Robin (17). 6, Williams Road, Westville, Natal, South Africa. Hi-fi, mechanics, music. 3½ ips. 5-inch spool. Philips, four-track and Ferrograph. Letters not required.

Raymond, David (17). 6, Belgrave Gardens, Stanmore, Middlesex. Fencing, films, pop music. 3½ ips. 5-inch spool. Philips. Female contacts required in Leeds and London.

Richard, Paul (15). 11, Appledore Road, Walsall, Staffordshire. 35mm photography, pop and classical music. 7½, 3½, 1½ ips. 7-inch spool. Robuk RK3. Sweden, Norway, USA. Female contacts, same age, preferred.

Rogers, Miss Margaret (18). 29, Gordon Road, Leigh-on-Sea, Essex. Science fiction, art, pop music. 7½, 3½ ips. 7-inch spool. Grundig TK20 and TK60, stereo. Europe and UK.

Shenton, Miss Sally (19). 5, Grantham Lodge, Hadleigh Road, Leigh-on-Sea, Essex. Humour, all music, except mod. jazz. 3½ ips. 5-inch spool. Philips EL3541, four-track. Europe, UK.

Smyth, Alistair (17). "Strathleven," Toome Road, Ballymena, Northern Ireland. 3½ ips. 5½-inch spool. Sobell Festival. Letters not required.

Stockton, Alex (18). 6, Bewdley Street, London, N.1. Judo, electronics. 3½ ips. 7-inch spool. Philips EL3541H. Female contacts preferred in Australia and Europe.

Trigg, Tony (18). 74, Lockingwell Road, Keynsham, Bristol, Somerset. Photography. 7½, 3½ ips. 7-inch spool. Truvox R62. Female contacts only in UK.

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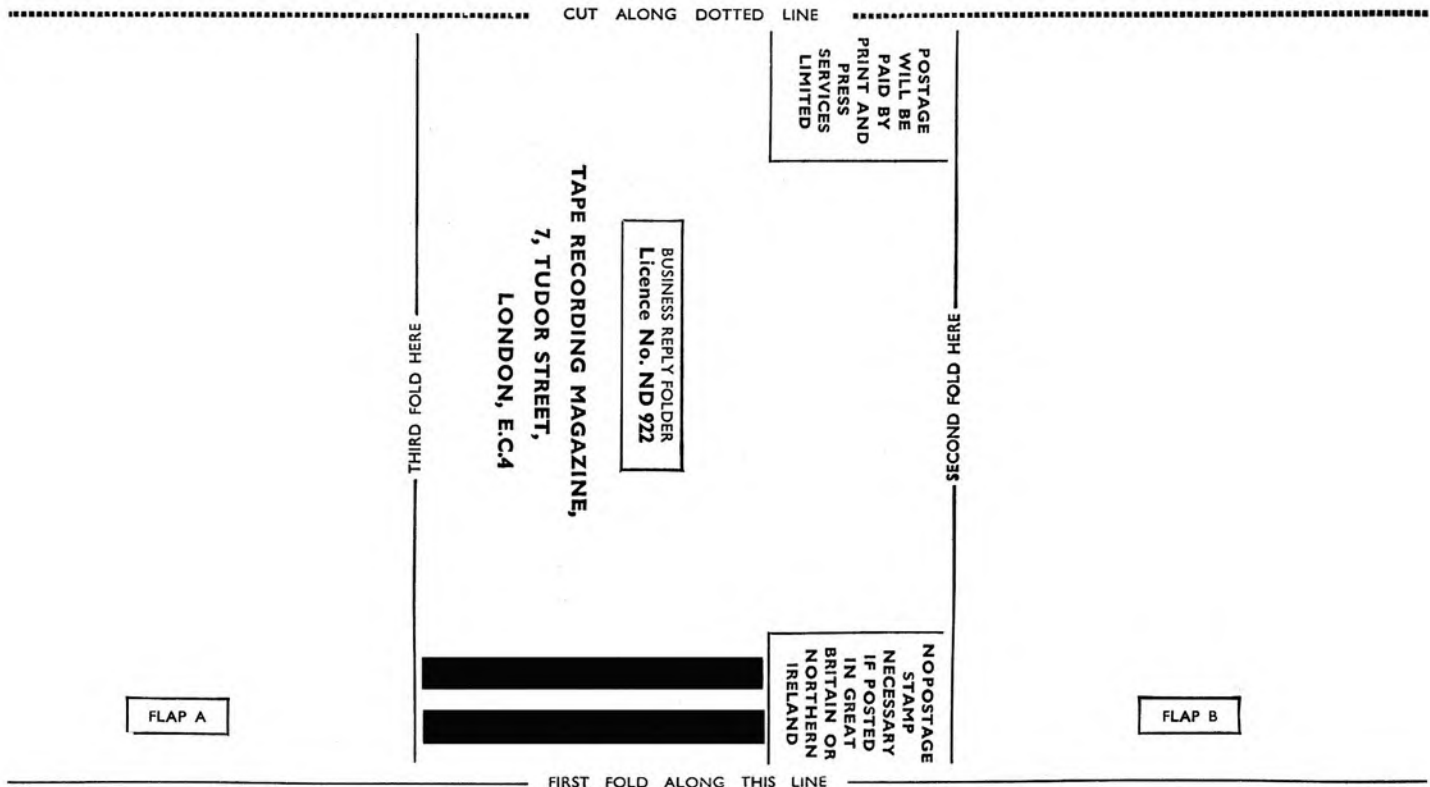
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