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TAPE** pages
21-23
-Special survey

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8th February, 1961

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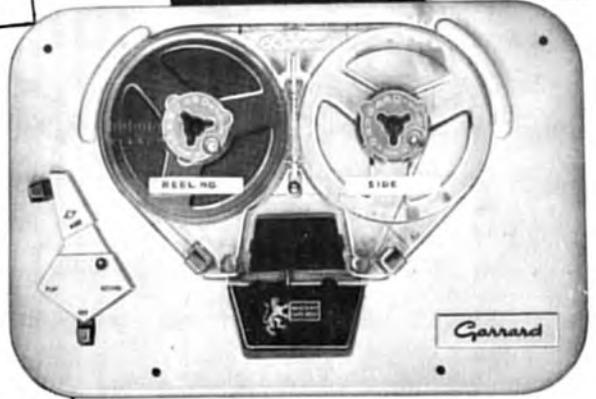


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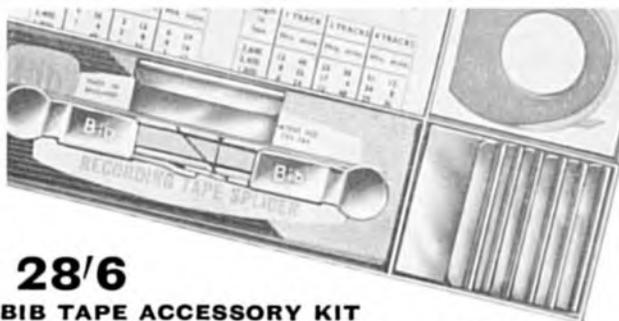
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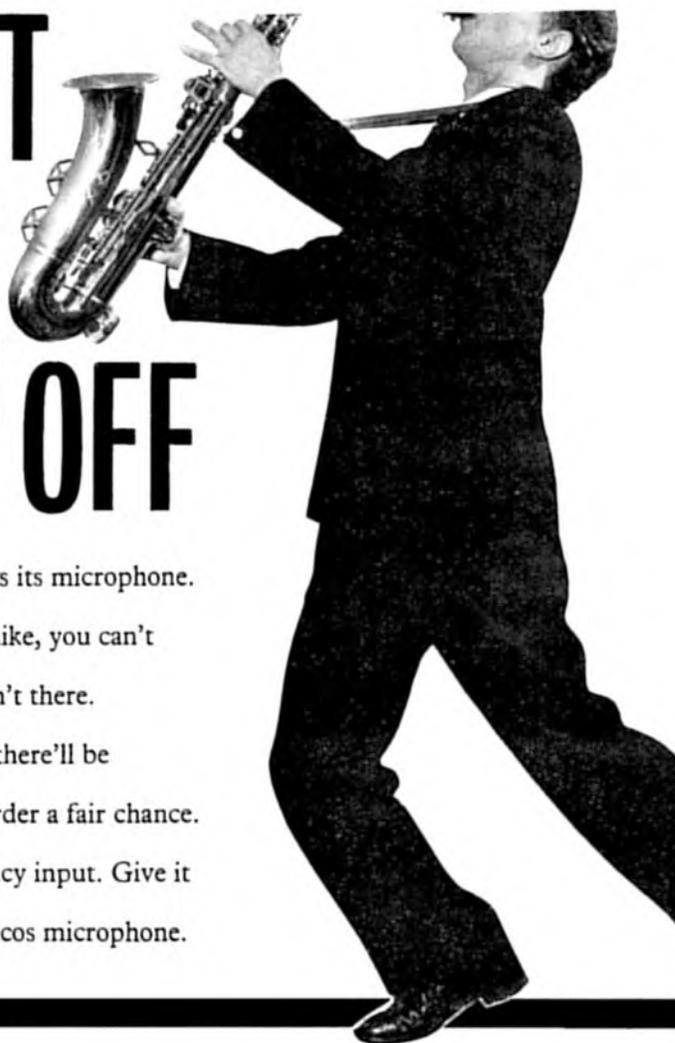
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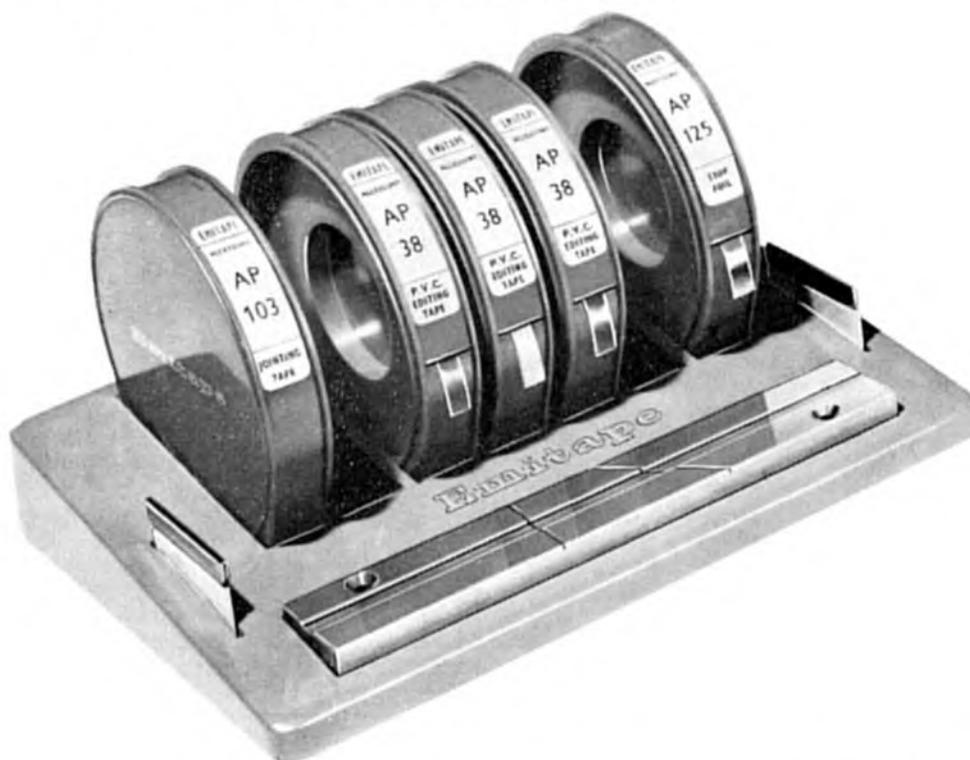


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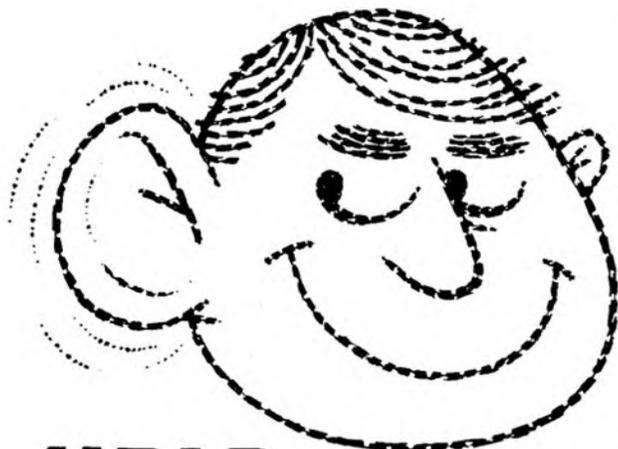
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TAPE

RECORDING
FORTNIGHTLY

Vol. 5 No. 3 8th February, 1961

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We take the view . . .

A DIGEST OF NEWS, COMMENT AND EDITORIAL OPINION

WHAT a stir that *Which?* survey has caused in the tape world! We have been bombarded with letters and 'phone calls and personal encounters. There seems to be quite a lot of strong feeling about it. The reactions fall into two schools.

One is typified by a letter which we print in this issue from a very experienced tape amateur, in which he praises the Consumers' Association for its work and, by implication, takes us to task for our failure to publish something similar. (*Letters, page 26.*)

The other can be summarised as the manufacturers' viewpoint, which is generally unenthusiastic and, in some cases, accuses the Consumers' Association of inaccuracies and unfairness.

Where lies truth in all this brouhaha?

We believe that the Consumers' Association set itself an impossible task when it undertook the testing and review of 16 machines out of 180 on the market, selected those 16 from a range stretching from £15 to £85, and then tried, first, to make valid comparisons and, second, to select one as the "best buy."

The truth, in the words of *Which?* itself, is that "it is not easy to pick out any one machine from those tested". Machines which may be good on sound quality may not be versatile. Much depends on the buyer's needs.

It is for these reasons that, in this magazine, we have never tried to compare one machine with another. What we do try to do, conscientiously and frankly, is to indicate the particular merits or demerits of each machine reviewed, so that readers, using their own knowledge, experience and intelligence, can set the established facts against their individual needs.

In our view, it is not possible for any specialist magazine of this kind to do more. Even if it were desirable that we did more, the laws of the land would limit our freedom; some of the contents of *Which?*—the circulation of which is restricted to the subscribing members of the Consumers' Association—would probably be actionable if published in a journal on open sale.

But this is not the only, or the principal, reason for our policy. We doubt the value of an exercise which goes beyond the established pattern of test-reviews published in the specialist journals.

Using the criteria set out by *Which?* in its report, it has doubtless arrived

at a fair conclusion in naming its "best buy." But if I were personally purchasing a new recorder at this moment I should not choose, for my particular needs, the model selected by *Which?* For me, it would *not* be the "best buy."

Others would probably be best suited by some other model than that selected by *Which?* or by me.

In addition to these general considerations, manufacturers have put other specific points to us which deserve consideration.

It is an accepted fact, of course, that a tape recorder may have a good frequency response and yet not produce high fidelity sound. It is less easy to understand how a machine can be rated as one of the two best in the subjective "quality of reproduction" listening test and yet be quoted as one of the two worst in respect of overall frequency response.

A manufacturer producing another machine reports to us that a preliminary report submitted to him by *Which?* prior to publication attributed to his model a wow and flutter measurement which was vastly superior to that which he claimed—and superior, in fact, to anything he considers practicable in a domestic machine.

Yet, in the printed tables, his recorder is quoted as being "poor" in this respect. It is also cited as one of the machines sold without a circuit diagram; the manufacturer tells us that the diagram is included with every machine, stuck to the inside of the case; i.e., it is not found until one removes the chassis from the case — which is the moment when it is likely to be needed!

The product of a third manufacturer is rated having a "poor" distortion and power output, though it was one of the best in the subjective listening test. Few people with knowledge of the machine in question could agree that it deserves this "poor" rating — unless the machine tested was an untypical one.

The Consumers' Association, of course, does

not take products direct from manufacturers, but buys them over the counter in retail shops. In the case of tape recorders—quite unlike crash helmets or baldness treatments or tennis balls (which were among earlier products dealt with)—this *could* mean that a machine was purchased which had been used for demonstrations in such a way as to leave it performing inadequately. Did the Consumers' Association ask to hear and to operate the machines in the shop at the time of purchase — as any ordinary customer would?

One final point: most of the models tested by *Which?* appear to have been bought at least a year ago. In several cases there have been improvements by the manufacturers in the interval, to smooth out difficulties that might have arisen when models were first introduced. Two of the machines tested, in fact, have since been entirely withdrawn.

All of these matters deserve to be kept in mind as the *Which?* report is studied. At the same time, it does provide information that deserves careful consideration. In the artificial ageing tests, for example, nine machines came through well; though the troubles with the others were not serious, they would doubtless have worried ordinary customers who might have bought these machines.

And seven irritated customers out of sixteen would not have been a happy score. The market is highly competitive just now and the customer must be treated as a very important fellow indeed!



GERMAN TEST CASE TO SEEK RECORDER TAX

THE West German Association for the Performance and Mechanical Reproduction of Music (G.E.M.A.) has filed two suits against Grundig in a West Berlin Court, according to a recent B.U.P. report.

The first suit demands a million marks (about £85,000) in lieu of lost royalties, and the second demands the names of persons buying tape recorders.

G.E.M.A. wants every tape recorder owner to pay a tax of ten marks (about 17 shillings) a year, on the assumption that each owner will at some stage copy music from the radio or from records borrowed from friends.

They have even worked out a way to collect the tax demanded. They propose the manufacturers be required

by law to report all tape recorder sales to retailers who, in turn, would be required to report the names and addresses of all private persons who purchase recorders.

Grundig contend that it is unconstitutional for a retailer to be required to name customers.

Five years ago, G.E.M.A. secured an agreement with tape recorder manufacturers, who agreed to pay an annual fee in lieu of royalties lost by the use of privately-owned recorders. This agreement, however, only lasted a year.

G.E.M.A. then won two suits against Grundig. These required manufacturers to include in the operating instructions a notice that copying of records was a breach of copyright.



Entranced by the white man's "Magic box," natives gather around a Fi-Cord miniature tape recorder in the Congo. The Fi-Cord was used extensively by the Cambridge Round Africa Expedition which travelled overland via Greece, Sudan, Ethiopia, Kenya and the Rhodesias to Cape Town. Object of the expedition was to photograph and record some of the problems of modern Africa against the background of primitive Africa.

B.I.R.S. lectures

THE lecture *What to record and how to record it*, organised by the British Institute of Recorded Sound for February 22 has been brought forward one week. Unavoidable circumstances have led to a change in plans, and the lecture, by Mr. John Culshaw, will now take place on February 15. Mr. J. W. Lambert's lecture on *Recorded Literature and Drama* will now take place on February 22.

Tickets already held for these two lectures will now apply to the new dates announced.

Other lectures in this series are: *Copyright and Performing Rights*, by C. Dawson Pane (February 8); and *The Documentation of Records* by Geoffrey Cuming (March 8). Admission to each lecture is 2s. 6d., and tickets are available from the B.I.R.S. at 38, Russell Square, London, W.C.1. The lectures start at 8 p.m.



WYNSOR ON THE HIGH SEAS

AS well as being shipped all over the world, Wyndor tape recorders are now becoming well known on the high seas.

The Wyndor Recording Company have just been informed by one of their main distributors that Wyndor tape recorders are serving on three famous luxury liners.

One is installed for the pleasure of the passengers of the *Queen of Bermuda*.

Another is connected up in the radio room of the *Andes* (at present on a Mediterranean cruise) where it is used for relaying news and entertainment throughout the ship.

The third one is in the "Pig and Whistle" bar of the *Mauretania*.

All these tape recorders were supplied by Messrs. W. S. Downer of 111, Bernard Street, Southampton.

HEARING about the Rushton Home for Blind Children, members of the A.B.C. Minor's Club at the Regal Cinema, Staines, immediately decided to organise an appeal amongst themselves to send the children at Rushton a present.

Appeal Secretary, Paul Dysart, wrote to Norman Wisdom and asked if he would record an appeal for them. Norman agreed, and so Paul and one of his helpers, 8-year-old Janice Stradling, came to London and visited the star in his London Palladium dressing-room.

They are pictured above with the four-track Stuzzi Junior 4M, their present to the blind children.

Happy birthday

THE arrival of the first tape from our new-found American tape pal brought nothing but joy to the Rogers household. Bill and I listened, fascinated by the deep, rich tones of Elmer's voice all the way from "Noo" York City, but as the tape rolled along, one thing became distinctly evident, Elmer was an awful lot higher up the hi-fi ladder than we were. Listening to him describing his equipment was like hearing a radio station engineer taking inventory.

FM tuner, mixer, speakers, turntables, filters, 278 reels of tape and 4 tape recorders nestled in his basement, which had been converted into what he called his "hi-fi" room.

One recorder was a small portable for on-the-spot recordings, and another a table model for general pur-

pose usage. The other two impressed Bill to the point of jealousy.

They were professional-type consoles that could record at any speed up to 30 ips on reels up to 14 inches in diameter.

However, Elmer seemed a really nice easy-going character, and I believed that we would enjoy many happy hours in the future taping with him. His suggestion that we followed his example and chatted on track one, leaving track two free to include some music representative of our country—Scotland—sounded fine to us.

At first.

Naturally, Bill and I wanted to give the impression that we had been making up hi-fi tapes since before we went to school, but we wondered how to coax a hi-fi recording out of a domestic recorder and a bedside transistor radio. Answer—you can't!

That left us with one alternative—TV, simply because we didn't have a record player. One local channel thoughtfully puts out an ideal programme every Tuesday evening and we wondered how we could best convey this to tape. At least we made that our target, allowing ourselves four days to perfect a method, not wishing to hold up Elmer's tape any longer than necessary.

|||||

With but two days left, all our attempts had proved unsatisfactory. We had fallen, of course, into the trap of trying to hold the microphone against the TV speaker, but this had its drawbacks. Apart from the fact that it made a lousy recording, it only needed the telephone to ring, a neighbour to call at the front door, or Napoleon, our energetic labrador to bound into the room in full voice to spoil it. Our dog is allergic to music.

Plainly, we had a problem. "Of course," suggested Bill, in the quiet voice I have learned to be wary of,

FRANCIS OF STREATHAM

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Ferroglyph 808	105 gns.	*Uher 4 Tr. Stereo	103 gns.
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A SHORT STORY

by JEAN ROGERS

"I could always get that fellow at the office to bring along his bagpipes."

I reached a decision in one second flat. "No! Def-in-ite-ly no!" I told him, well aware that there was every chance of ending up with the entire City of Glasgow Police Pipe Band in my living room.

He yawned. "Perhaps I'll think of something brilliant in the morning."

"Bill," I said, as an idea flashed into my mind, "Why don't we ———", then I paused, as the idea took root.

"Why don't we what?"

"It doesn't matter," I said casually. Remembering that Bill's birthday coincided with the TV programme we wanted to record, I decided to execute my idea in such a way that my husband would be, for once and for all, awakened to the fact that the field of tape recording was not restricted to the male species.

|||||

I planned my campaign methodically.

The first step was to make a discreet phone call to an old flame when Bill was at the office. Although I hadn't seen Harry for years, I hoped he still meant every word of the "Why, I'd do anything for you, Jean" line that he used to deliver so smoothly, considering he was now in the radio retail business somewhere.

Success will out and the second phase of "Operation Birthday" swung into action sweetly. This entailed my visiting Harry's place for the best part of Monday afternoon.

By Monday evening, my plans were complete. All I could do now was wait, and try to keep Bill in a good humour. This appeared to be necessary, as he arrived home with a coil of cable and a bright idea. Someone at the office had told him it was possible to take a tapping from the TV speaker terminals direct to the tape recorder.

For guidance, he flipped through some back numbers of *Tape Recording Fortnightly*, and I left him to it, whistling happily to himself.

About an hour later I returned to find he was no further forward. "Foiled again," he told me dejectedly.

"What's happened?"

"Read that." He threw me over one of the magazines. In the Advice Bureau column was a letter from someone in London seeking exactly the information Bill wanted, but the reply stated that it was a very dangerous thing to attempt this on an AC/DC set without a qualified service engineer being in attendance.

I smiled. "Oh, never mind, Bill, we'll just explain to Elmer that we don't have the equipment."

"Of course," he said eagerly, "there is a tuner on the market which picks up

When the challenge came from America, she had visions of a whole pipe band invading her living room. Feminine ingenuity produced a simpler solution —and, maybe, provides an idea for other tape enthusiasts to follow.

the three BBC FM stations and the sound of the two TV channels. . . . " He showed me the advert in one of the magazines, but when I saw the cost, I told him I could think of twenty-five good reasons why we weren't going to buy it, and each one was worth a pound.

Came Tuesday eventually, and I prayed that my prayers would be answered. If my plans backfired now, I knew I could never look a tape-recorder in the magic eye again.

I decided to make no mention of my husband's birthday at breakfast. He was in so much of a rush that it would probably be around noon before he remembered it himself.

|||||

The day dragged on, but at last five-thirty came around and Bill returned home to collapse wearily into a chair. "I suppose we'd better make up the tape for Elmer tonight. Maybe next time I can borrow a record player and ———" He paused. "What's this?" he asked, picking up a small package addressed to him.

"Oh, something that came in the mid-day post."

"Strange," he mused, "I don't recognise the writing, but it's a local post-mark." He tore off the wrapping paper. "A 3-inch reel of tape? I wonder who could have sent that?"

"Probably some girl who can't live without you."

"Very possibly," he agreed, but I think he was kidding.

He fitted the tape on the recorder, switched on and settled in his chair. An opening fanfare of trumpets died away then my voice came through as screechy as ever, "Bill Rogers, this is your wife!" Thanks to the plethora of hi-fi gear in Harry Smith's radio shop and some expert guidance, there followed some appropriate musical selections, including my off-key rendering of the "Happy Birthday" song.

Bill was surprised enough to be speechless. Even Napoleon forgot to bark.

I was very pleased with the effect I had managed to capture on the tape, but I was more than pleased with the effect it had on Bill. His expression was priceless. At last, he was fully aware of his wife's capabilities. He came over to me, took me in his arms and demonstrated his affection in the conventional manner.

"It's just as I said, Bill."

"What's that?"

"It was from a girl who can't live without you."

He didn't get a chance to continue the conversation. My taped voice from the recorder commanded his attention. "——— and now, Bill, have a look in the cupboard under the stairs." My voice drifted into music, and the music faded to nothing.

|||||

Bill walked over to the door, stopped, scratched his chin, looked questioningly at me, then left the room, returning almost immediately with a parcel. Testing its weight, he said, "It's heavy, I wonder what it can be?"

My heart was belting away like a trip-hammer. The moment of truth was at hand. To completely shatter my world, all he needed to say was, "Why, only today I asked old so-and-so about one of these." I'd then just slink away silently, leave home and become a beachcomber or something.

As he studied the contents, I had to close my eyes. The tension was just too much for me. Then he said what I had earnestly hoped he would say. "At the risk of sounding foolish, what is it?"

"Well," I told him, positively glowing, "it's really quite simple. You plug this first lead into the mains, like so, this other one into the tape recorder, like so, switch on and in a few moments the sound of the TV channel will come through loud and clear. I know, because I tried it earlier, so if you hurry up, you'll just be in time to make a recording for Elmer."

Later I'd explain about the idea that came to me out of the blue, of attempting to unearth an old A/C TV set with a broken or useless tube, and tearing out the sound tuner intact. I'd also explain that a few words with Harry told me that it was not only possible, but he had just the thing in his basement somewhere, and because of the very special occasion, he would fix it up neatly into a box for a fiver.

Now that I had had a sniff of the sweet smell of success, it seemed to me such a simple answer to our problem that I'm surprised that Bill hadn't thought of it first, but then, men are so stupid, aren't they?

Needless to say, the recording was an outstanding success. "Noo" York City, here we come! Noo? Noo!

SCHOOL EXCHANGES SOUGHT

THIS MAGAZINE IS receiving more requests from schools for exchange tapes with other schools in this country and abroad. We have decided to print these requests in future and to try to make some overseas contacts for you.

Mr. Gordon Pemberton, writing from Yorkshire, says that several schools in

his district would like to make an exchange. Two addresses are published on page 32.

He makes the very valid point that schools want to exchange with others from different environments in this country, or with overseas schools from whom they can expect a certain reply.

TAPE

What is the best length?

I QUITE agree with your comments (January 11 issue) on my overseas tapes regarding length of programme and necessity for script. I learned these things the hard way!

However, in the long run, tapes of 20 minutes duration are somewhat uneconomic of both time and tape. The children who devise the programmes want to include most aspects of school life, and this is difficult in a short space.

The two answers I have found by experience are:—(a) A "programme" tape with a mixture of information and entertainment can sustain the interest of Juniors up to a maximum of forty minutes, provided there is plenty of variety. (b) An hour's tape can be given two intervals, so that the receiving school can play it in three parts.

You see, from the school point of view, a really comprehensive tape, of fairly long duration, doesn't take much more time to prepare and record than a short tape. Moreover, a 7-inch reel doesn't cost much more to send by post than a 3-inch reel.

I think short tapes are good for exchange for schools in this country—where a reply takes a matter of weeks. But a longer effort seems preferable for overseas' exchanges, which may take up to a year to complete.

As you say, a script is essential! Goodly pieces of information are lost because of bad diction or unfamiliar accent.

GORDON PEMBERTON.
Waterloo School, Pudsey, Yorkshire.

AMERICANS SEEK NEWS of EUROPEAN PROGRESS

THE Office of Education, United States Government, has invited the National Committee for Audio-Visual Aids in Education (recently renamed) to undertake a survey of the research on the subject which has been and is being carried out in Europe. The aim of this is to ensure that existing work and new developments are more widely known and more effectively applied in education.

The survey will help to establish a central source for exchanging information between research workers in this field and avoid duplication in future research projects. It will have applications in the fields of education, information and publicity.

The entire cost of this survey will be borne by the Office of Education, United States Government.

* * *

Background music for Pudsey's Education Week

AT the end of February, the Primary Schools of Pudsey are holding an Education Week, with a big exhibition of work and material. The general idea is to show the public that the Primary Schools are not just child-minding institutions but real schools.

Whilst visitors are walking round the exhibition, they will hear background music supplied by the choirs and recorder groups of thirteen Primary Schools—on tape. The whole programme will last for two hours without repetition, and is being recorded by two Headmasters during the next few weeks.

Russian—by tape or book?

TEACHERS IN "CIVIL WAR"

ACCORDING to a correspondent of The Times Education Supplement, a "civil war" is apparently going on between teachers who mainly use tape recorders and those who stick to text books. So said Professor Yakobson at New York University in describing the teaching of Russian in American Secondary Schools.

The American magazine *Tape Recording*, in a review of 1960, says that the creative use of recorders, akin to the creative use of cameras, continued to lag in the United States while gaining abroad.

1961 AUDIO-VISUAL AIDS' CONFERENCE

THE 1961 ANNUAL CONFERENCE of the National Committee for Audio-Visual Aids in Education will be held at Whitelands College, Putney, S.W.15, from Thursday, 13th, to Saturday, 15th July.

A BOOK FOR THE ENTHUSIAST

"The Art of Radio" by Donald McWhinnie (Faber & Faber) 1959. 21s.

THIS is not an easy book to read, for two reasons. In the first place, we cannot hear the many scripts quoted in print. And secondly, McWhinnie cuts much deeper than the superficialities of production and acting techniques.

This is a book by a man who loves radio and who has helped considerably towards the resurgence of radio drama in this country during the past few years. British broadcasting is considerably poorer through his decision to exercise his undoubted produc-

tion talents in other media as well as radio.

I recommend this book above any other to the schoolteacher who is attempting tape drama, because the author places such importance on the content of the plays and the writers. The tawdry must not be good enough for us, and he guides us very clearly towards the development of a proper critical faculty of radio work.

The chapters on the raw materials of radio drama: words, sound, silence—and their synthesis into finished production by the various participants have so many truths for schools.

IN THE SCHOOLS

GEOFFREY HODSON

edits the latest news
— and comments

ONE of the obvious uses of the tape recorder is to create the equivalent of radio drama. It is salutary to try, because you quickly find that professional finish is not achieved without considerable effort and experience—to say nothing of talent.

But not to worry. In the classroom, the trying and the finding out mean as much as the end product on the tape. If you can form a Tape Club out of school you can probably add more polish to the tape work, but in the classroom there will not be enough time for attention to the finer points.

Alec Nisbett has been writing about BBC studio practice in recent issues from the studio manager's point of view. If you haven't already read them, I suggest that you write for back numbers, because you will be fascinated with the professional's attention to detail.



BUT you can only translate professional techniques to the amateur field after you and your children have begun to come to terms with the elements of radio production, writing and acting. It is a mistake to rush into the complexities of mixer units, gramophones, and second tape recorders too soon. First, fire the children's imagination for tape drama. Realise together that this is a new experience and not simply an alternative to drama on a stage.

All teachers I have met who have had any success in this work have let the children find out for themselves what is possible in sound alone. They learn about microphone perspectives through moving away from a microphone and back to it again whilst talking to their neighbour, and then, hearing the playback. They learn for themselves how to translate visual effects into sound. And so on.

You will have to suggest various little scenes to them in this work, just as you do in classroom improvised drama. Otherwise you will have the wearisome round of mum and dad, pools, and gangsters.

Various people are going to fill in further details later in this series of articles, but I would like to start you off with some background reading. And I suggest three books:—

The Radio Play by Felix Felton (Sylvan Press, 1949, 10s. 6d.) is an extremely good grammar to radio production. You will find everything you require in it—except the mention of tape, because it was written before tape came into general use.

Val Gielgud's British Radio Drama, 1922-1956 reviews the history of the subject, showing how conditions and techniques have changed. Both books constantly remind you of the problems of appealing to the ear alone, but this one is particularly valuable because it goes back to the beginning of broadcasting. There is a parallel here with our present stage of development with tape in schools.

The third book, **The Art of Radio** by Donald McWhinnie, analyses in greater detail radio drama writing, acting and production. A review of the book is on the facing page.

There are other books on writing for radio published in this country, and quite a few excellent American books can be found in Foyle's Bookshop in London and elsewhere in the country, but the above three make an excellent foundation.



ONE of the most successful amateur practitioners I know in tape drama is Nigel Rees. Since Nigel won a prize in the 1958 British Amateur Tape Recording Contest, and as a result attended the first National Tape Recording Course at the Rose Bruford College as a guest student, I have followed his tape career with interest. At the end of every term he is asked to produce a short play on tape with his fellow students, and he has sent me the results.

During the summer I sent him a copy of an American script which commends itself to school tape work—both in itself and for the ideas it should spark off. Nigel's production has entertained over a hundred people already, and I hope he will let me play it to others.

RECORDERS WITH THE JUNIORS

Forthcoming articles for schools

"TAPE in the Schools" will in future appear in every issue. Geoffrey Hodson will contribute "News and Comment" monthly, and in addition there will be regular articles by experienced teachers and professional broadcasters who understand the special needs of schools.

In our next issue (February 22nd), Glyn Harris will write about the use of the tape recorder in the Junior School. A month later he will give

"Stilo inverso"

("with reversed pen")

—LATIN PROVERB
INDICATING THE
ERASURE OF A PASSAGE



The play is called *Inside a Boy's Head*, and the authors take an imaginative leap into a nine-year-old boy's head. A guide takes a conducted party round. They see the wool the boy has been gathering; dodge an idea passing in at one ear and out the other; watch the Automatic Functions Control Panel—digestion, breathing, heartbeat; they hear a history lesson being received very faintly through atmospheric; and they enjoy Imagination coming in strongly on the same wavelength when the boy enlarges on the basic fact of the lesson—King John signing the Magna Carta—and becomes the hero who forces the king to sign.

You will gather from this bald synopsis that this play is ideal for radio. Your class could write up scenes if necessary after improvising on this theme. I believe I have seen a little play about somewhere in which letters talk to each other in a pillar box? And I certainly heard a play a few years ago in which cars talked to each other in a garage and on the road. Even the passing road signs were great fun, too.

Stir the imagination—certainly with the sound effects. For instance, *Inside a Boy's Head* requires "SOUND: fountain pen taken from armour." Nigel had great fun with this in his production. There are lots of possibilities with drama on tape, but you must learn to think in terms of sound alone first.

Some suggested play books:—

Cameo books 14, 20 and 26 (E. J. Arnold).

Plays for Reading and Recording by T. S. Love and W. D. Cumming (Harrap), 6s.

some useful advice on the use of portable tape recorders on School Journeys.

Other articles have been commissioned from Jack Singleton based on his *Two of a Kind* series in the Home Service on Tuesday mornings; *Classroom Broadcasting in Aberdeen* by the city's Speech Superintendent; George Dixon on *Producing BBC Schools Broadcasts*; and an account of what is probably the first radio studio-control room to be built into a new school in this country.

FORTUNATELY for the recordist who doesn't own a mixer, it is often possible to introduce music links into a programme without using one—by editing.

But before cutting the music in, it will usually be necessary to copy the original recording in order to get the level right. And unless the music has been recorded specially, suitable in and out points will generally have to be selected and appropriate fades arranged. You may be copying from disc (mood music records, etc.) or from a tape which you have pre-recorded—in which case you will need a second machine for playback.

There are a number of points to keep in mind when you're doing this.

For a start: remember to keep the music level low, unless you are seeking a shock effect (a by-product of this low level is that the ins and outs will be easier to control). Often a fade-in of 4-6 dBs, or more, will make the start sound smoother. This is easy enough if the point at which you wish to start is also the beginning of the music: if it is not, then it will be necessary to check the point at which the first sound you want is recorded on the original, and mark it with a Chinagraph pencil. If the original is a tape, this can be done on the backing either at the head or at some reference point—a guide pillar, say. Set the tape far enough back for it to run up to speed by the time the mark passes its reference point—a pause control comes in useful here. If, on the other hand, the original music is on disc, a drop start technique may be employed.

If the fade-in adopted is a deep one, it may be cut as close to the preceding speech as the reverberation on that speech allows. Alternatively, the fade-in may be in two parts: a very sharp fade up to some point

FADING AND MIXING

SOME use of faders, other than to set levels and control a programme to keep it within a reasonable dynamic range, is necessary for all but the very simplest of productions—and even these may benefit from a slight fade-in of one sort or another. And adding together speech and music creates special problems for the recordist, whether or not he has a mixer: some of these are considered in this article—the second of three by Alec Nisbett on the subject of fades and mixes. He calls it “Speech plus Music.”

(say, 6 dBs) below the full required level followed by an “edge-in” the rest of the way. In this case the music cannot be cut quite so close to speech.

The fade out may be equally complex. Of the several ways of doing this, one, re-establishing a theme and fading under and slowly out behind speech, is not possible without a mixer. A more suitable type of fade would be the reverse of either of the two fades-in described above. At the end of a long deep fade the tape can be cut very close to the following speech. To the ear the result may actually sound like a slight overlap. But do not slice into the end of the music fade to “improve” on this effect—generally speaking, the result will be a rather ugly joint.

The other method, a two stage fade (slow and then sharp) is more tricky to get just right, as ending must be timed perfectly according to the music, and the last sound heard must be at such a level that the lack of reverberation is not noticeable. If by any chance there is a pause in the music, during which there is only reverberation, this can be very useful; a sharp fade out at the end of half a second of reverberation can sound quite reasonable.

Similar fade techniques and timing may

be used whether the music is copied and cut in, or mixed in either live or from a recording. Note that even when dealing with tape I have always recommended a “sharp fade” rather than a physical cut in the tape: in my experiences a fader is nearly always preferable to a razor blade in these circumstances.

In a single programme one piece of music—theme music or signature tune—may be used in several different ways.

Radio Newsreel, for example, is introduced by a tune called “Imperial Echoes,” and for the start of the programme the record is set up at a point about half-way through and brought in cleanly on cue. After two phrases the music is dipped for a few seconds and the programme announced over it. This opening fragment of music ends at a point where there is a short rest in the music. It is sharply cut after three-quarters of a rev. of reverberation (to avoid the next note), and the announcer is once again cued to go ahead.

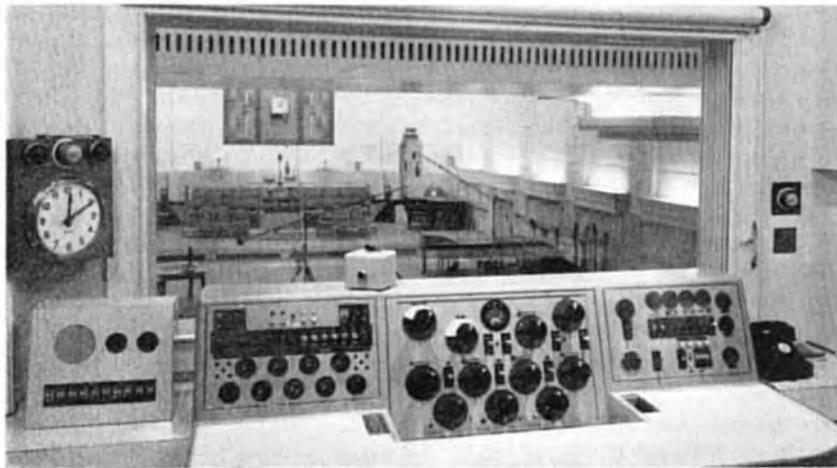
For the end of the programme the record is reset at the point at which it was last cut. From here to the end of the record is exactly 1 minute 17 seconds. So, exactly 1 minute 17 seconds before the scheduled end of the programme, the record is started, but not faded up. This is called *pre-fade*, and provides a buffer for timing purposes.

It is usually arranged that only about 15 to 30 seconds of the pre-fade is all that is actually needed; and this last remaining part of the record is faded up under the announcer's last words—or a little earlier if a suitable phrase presents itself (on headphones). Obviously, vocal music is not usually suitable for pre-fading, and is therefore rarely used for a closing signature tune.

The *Roundabout* signature tune, “Windows of Paris,” is used in almost exactly the same way—except on Fridays when Richard Murdock's regular “door shuts” gimmick prevents the use of a pre-fade.

Within a gramophone record programme there may be many different types of fade used. Taking a typical case of a “pop” vocal with a short instrumental introduction, here are some of the ways in which the transition from speech to music may be arranged.

“Straight”—or nearly so. But remember that the “intro” on the record is now no longer an introduction; it has become a music link between the preceding speech



The type “A” control desk in the Concert Hall, Broadcasting House. The faders: 1—main control; 2—group (all of the seven microphone channels below, pass through this); 3— independent microphone channel; 4—echo return. Most of the keys on the centre panel are for cue lights.

FADING AND MIXING

SOME use of faders, other than to set levels and control a programme to keep it within a reasonable dynamic range, is necessary for all but the very simplest of productions—and even these may benefit from a slight fade-in of one sort or another. And adding together speech and music creates special problems for the recordist, whether or not he has a mixer: some of these are considered in this article—the second of three by Alec Nisbett on the subject of fades and mixes. He calls it “Speech plus Music.”



In addition to mixers of its own design, the BBC has used this Marconi desk in studios for which the type “A” was too big, and the more versatile type “B” not yet available. The Marconi has five faders: 1—main gain; 2—various outside sources or additional microphones (switched); 3 and 4—microphones; 5—gramophones. At the desk is Harold Rogers who produces programmes based on the BBC Sound Archives; and on the right I. W. Jarman, the supervisor in charge of tape editors—well known to listeners to “Sound” on Network Three for his “Teaching Tape” broadcasts

and the vocal which follows, and its level can often be altered with advantage in order to match that of the speech rather better. After this has been done, the record may be faded (up or down) to a suitable overall level. The first notes of the intro can sometimes be emphasised to give “bite” to an unusual start.

Cutting the intro. The first word of the vocal follows the cue fairly quickly, as though it were a second voice in a briskly conducted argument (the exact timing being determined by the pace and inflection of the cue). It may be necessary to “edge” the record in a little.

Intro under speech. Here the start of the music is timed and placed at an appropriate point under the cue, which must be specially written for this treatment. The intro has to be played at a fairly low level, so that it does not distract from the intelligibility of the speech; and there may be a break in the cue in which the music may be heard on its own for a few seconds—when it is *established*. The fade up generally starts just before the final words and is then lifted to be at or near full volume for the start of the vocal, which should follow the cue by no more than a breath pause.

A similar range of fades could be listed for the transition from music back to speech. A link from one piece of music to another can be quite complicated—or very simple. The simplest case is of course the

segue (pronounced “seg-way” and meaning follow-on) in which the new number follows, either after a very short pause, or in the timing of the previous piece. Sometimes an announcement may be given over the intro at a convenient point, or over the join—though starting an announcement at exactly the same moment as the new number can be confusing sometimes, and as a general rule is best avoided, unless the continuity between the two pieces of music is perfect.

In some cases it may give a better result to avoid an ending or an intro by mixing from one number to another. This is a very tricky business indeed and the results could all too easily sound ugly (a simple tape joint almost certainly would). If the rhythm is strong in both pieces, perfect timing is essential. But it may be easier if the music reaches a point where form is not too clear to the ear, for example, where one number can be faded on a long sustained note, and the other brought in on a rising arpeggio or glissando.

One expert at compiling programmes which call for tricky effects like this is Alan Dell, who uses many ingenious operational techniques to maintain a smooth continuity. And it is all genuinely done by fading and mixing records (and not, of course, by dubbing and cutting on tape).

A segue or mix is only possible if keys are the same or suitably related. And

indeed, it may even be that keys which are nominally the same may not correspond closely enough in pitch for a transition to be comfortable without a slight adjustment of playing speed on one or the other. (Expert musical knowledge is not necessary for this; though a reasonably good sense of relative pitch is essential).

With an announcement between two items, even a very short one of five seconds or so, these difficulties over pitches will disappear—the ear will not register a dissonance if the two sounds are spaced out, and the attention distracted by speech. Happily, this means that programmes can be compiled according to content, with suitable contrasts of style and pace between items, and without worrying too much about keys.

But there is one special case of a linking announcement which does take key-change very much into account, and this is the technique adopted in record programmes by “Flotsam” (B. C. Hilliam). Taking up the key at the end of each record he “doodles” on the piano until at the end of his comments he finishes up in the right key for the next record. And in this case the adjustment of levels between live piano and record, in order to make the transition smooth, requires even more care than usual.

What I have been saying here applies particularly to record programmes, of course; but the same principles apply to any cases where live or pre-recorded music has to be linked together. And as regards fades and mixes, the treatment of music in dramatic or magazine programmes will be similar in many respects—subject to the rule that in such cases music should not be obtrusive, but at a much lower level than featured music would be.

In practice this means that almost every fade or mix is different and must be judged according to the individual needs of the situation. And for this you must take into account not just the immediate context, but the mood, pace and style of the programmes as a whole.



The apparatus cabinet which goes with the type “A” control desk. These amplifiers (gain 40/50 dB) have to be capable of handling a wide range of volume from microphones—a whisper, without appreciable noise, or brass, without overload distortion—and the same amplifier can be used either as a pre-amp, or as one of a pair before and after the main gain control. Testing one of them is a BBC maintenance engineer—one of a “flying squad” who are available throughout the day to deal with any technical fault which may arise.

particular politicians

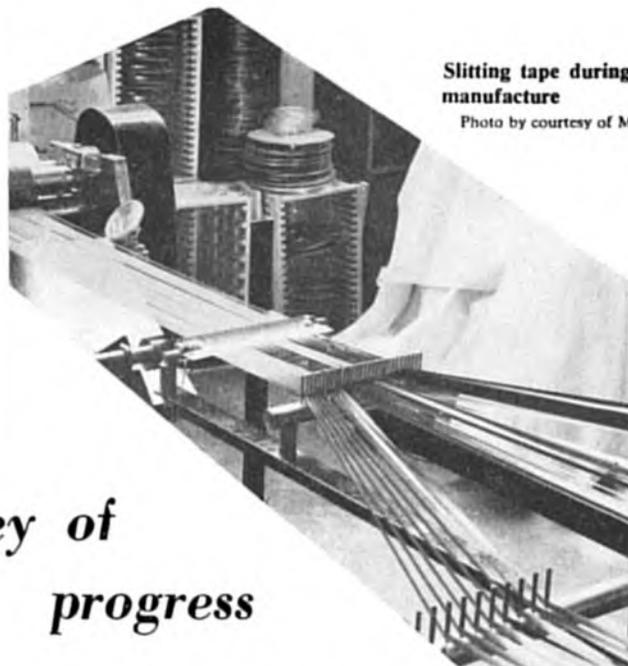


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BRAND
recording tape



WORLD'S LARGEST SALES OF MAGNETIC TAPE

MAGNETIC TAPE



Slitting tape during manufacture

Photo by courtesy of MSS

A survey of progress

It is still only a little over twelve years since the first magnetic recording tape manufactured in Britain was placed on the market. Though it is more difficult for the average enthusiast to keep in touch with technical development—much of which comes in the “top secret” category—there can be no doubt that progress has been at as fast a pace as in any other field associated with sound recording and reproduction.

The latest tapes produced for video recording and for use in computers is of a standard that was unthinkable a decade ago, and the work which has been done on these specialised tapes has brought direct advantage to the amateur recordist.

Four-track recording and playback calls for qualities which have been achieved in recent years as a result of much research. And the steady improvement in tape quality has been an essential link in the development of recorders operating satisfactorily at slower speeds.

This improvement has resulted from the discovery of new methods of manufacturing the iron oxide which coats the tape, new plastic base materials, and better means of bonding the two together.

The improvement has been achieved

at the same time as a steady reduction in tape thickness, so that standard tape was followed by long-play, and long-play by double-play. Though there are obvious limitations to progress in that direction, we may not yet have reached the ultimate.

The first tapes

The first magnetic tapes were produced in Germany. After the war, the Americans were quick off the mark and British manufacturers began soon afterwards. The first German product was not a coated tape, but a homogeneous mixture of PVC and iron oxide powder. At the end of the war, however, most manufacturers settled down on the two-layer principle and a number of different base materials were used in turn.

For a time there was some paper-backed tape and early enthusiasts in this country will have had experience of it. It lacked strength, of course,

and its noise level was high and sensitivity variable.

Other firms, already in the plastics business produced acetate tapes (for example, a number of the big international photographic film firms); others settled for PVC.

More recently, from America, there has come mylar tape, using a synthetic resin of this name manufactured by one particular American concern.

Polyester eventually opened the way for the thinnest tapes which we now have available.

All magnetic tape at present in use on domestic recorders in this country is 0.246 in. wide, within a tolerance of 0.002 in. Standard tape has a thickness of 0.002 in., long-play a thickness of 0.0016 in., and double-play a thickness of 0.000825 in.

Tape standards

All must meet certain agreed requirements in respect of stretch, absence of warping, smoothness of coating, sensitivity, background noise, frequency response and freedom from “print-through.”

Condition of tape edge is also an important factor, made more so by four-track and video recording. As the tape is first made in a width of up to two feet and then slit, the delicacy of the operation will be appreciated.

But the manufacture and dispersion of the tiny iron oxide crystals is the most difficult process of all and the quality of a magnetic tape depends

(Continued on page 22)



Left: The E.M.I. three-inch message tape container. This improved type of packaging is intended to facilitate transmission of message spools through the post. Also available for 3½-inch reels, they have coloured label guides to indicate which tape is contained—yellow for “44,” red for “88,” green for “99,” and black for “100.”



ENTHUSIASTS who give hours of careful thought to their recorders, microphones and speakers often take for granted the magnetic tape which is at the heart of the matter. In no audio field has technical research brought faster or more dramatic progress. The quality of reproduction now achieved at the lower speeds has only been made possible by the superior tapes produced in the past few years.

Left: An attractive display of the Garrard tape cassette, the unit which allows rapid change-over of spools, at any point of the tape, without spillage. The 4-inch reels are enclosed in a transparent plastic case, and a locking device prevents them turning when lifted from the deck. Right: The Philips continuous playback cassette. Designed for the Philips recorders, this 3½-inch unit can also be used with certain other models tape turntable in a stationary having facilities for locking the position during recording.



(Continued from page 21)

MAGNETIC TAPE PRICE LIST

STANDARD

Reel size (inches)	3	3½	4	5	5½	7	8½	8½
Tape Length (feet)	(150)		(300)	(600)	(850)	(1200)	(1750)	(1800)
AUDIOTAPE.....	6/-	...	10/6	18/-	24/6	39/-	...	...
B.A.S.F.....	8/-	...	13/6	21/-	(900) 28/-	35/-	...	...
EMITAPE.....	(175) 7/6	...	...	18/-, 21/-	24/6, 28/-	30/-, 35/-	57/6	...
BRAND FIVE.....	...	(175) 6/9, 7/6	...	16/-	...	25/-	...	...
GAVAERT.....	...	...	...	16/-	(820) 20/-	27/-	...	...
GRUNDIG.....	...	...	...	27/5	...	35/-	...	...
IRISH.....	4/11	...	...	17/-, 21/-, 26/-	23/-, 28/-	27/6, 45/-	...	...
MASTERTAPE.....	5/6	(250) 9/-	10/6	21/-	27/6	35/-	50/-	...
PHILIPS.....	...	...	13/6	21/-	(900) 28/-	35/-	...	...
SCOTCH BOY.....	...	6/9, 7/6	...	18/-	24/6	30/-	...	...
SONOCOLOR.....	8/-	...	13/6	21/-, 22/9	28/-, 30/3	35/-, 38/-	...	...
TELEFUNKEN.....	...	...	...	21/-	28/-	35/-	...	64/-

LONG PLAY

Reel size (inches)	3	3½	4	5	5½	7	8½	8½
Tape Length (feet)	(210)		(450)	(900)	(1200)	(1800)	(2400)	(2400)
AGFA.....	9/-	...	...	28/-	35/-	50/-	...	...
AUDIOTAPE.....	(225) 8/6	(400) 16/-	...	28/-	33/6	50/-	...	...
B.A.S.F.....	9/-	...	14/6	28/-	35/-	50/-	...	...
EMITAPE.....	(250) 9/6	...	...	(850) 28/-	35/-	50/-	(1750) 57/6	...
BRAND FIVE.....	...	...	...	18/6	23/6	35/-, 44/-	...	...
GAVAERT.....	(225) 7/-	...	...	28/-	(1150) 32/-	50/-	...	...
GRUNDIG.....	...	...	...	...	35/-	50/-	...	...
IRISH.....	(225) 9/-	...	...	(850) 28/-	27/-, 35/-	39/6, 50/-	72/6	...
MASTERTAPE.....	(225) 8/6	...	14/6	(850) 28/-	35/-	50/-	70/-	...
PHILIPS.....	9/-	...	14/6	28/-	35/-	50/-	...	...
SCOTCH BOY.....	(300) 9/6	...	...	28/-	35/-	50/-	72/6	...
SONOCOLOR.....	(200) 9/6	(360) 14/6	...	(855) 28/6	35/-	50/-	...	...
TELEFUNKEN.....	...	...	...	28/-	35/-	50/-	...	...

DOUBLE-PLAY

Reel size (inches)	3	3½	4	5	5½	7	7	7
Tape Length (feet)	(300)	(400)	(600)	(1200)	(1800)	(1800)	(2400)	(2400)
AGFA.....	14/-	...	...	...	60/-	80/-	...	...
AUDIOTAPE.....	...	...	...	35/-	45/-	65/-	...	...
B.A.S.F.....	14/-	...	25/-	42/-	(1600) 52/6	77/6	...	...
EMITAPE.....	...	17/-	...	45/-	(1700) 57/6	80/-	...	...
BRAND FIVE.....	13/-	...	...	37/6	...	60/-	...	...
GRUNDIG.....	13/6	...	...	...	62/6	...	...	...
IRISH.....	13/9	...	25/-	45/-	(1650) 52/6	80/-	...	...
MASTERTAPE.....	10/6	(350) 11/-	(650) 24/-	43/-	(1700) 57/6	80/-	...	...
PHILIPS.....	14/-	...	25/-	42/-	52/6	77/6	...	...
SCOTCH BOY.....	...	17/-	...	45/-	(1700) 57/6	80/-	...	...
SONOCOLOR.....	14/-	(460) 21/-	25/-	42/-	(1600) 52/6	77/6	...	...
TELEFUNKEN.....	...	...	...	40/-	50/-	75/-	...	...

very largely on the success achieved in this process.

When tape has been made, it needs to be polished and individually tested for imperfections (drop-outs).

Different makes of tape naturally vary somewhat in their magnetic properties and the bias current in the recorder should be adjusted for each tape if its full quality is to be achieved. As this involves fairly complicated tests, it is beyond the resources of the average amateur recordist.

What happens in practice then, is that the recorder manufacturer adjusts his machine to suit a particular brand of magnetic tape and a reel of this tape will normally be supplied with the machine. This can be taken to be the best—or, at any rate, one of the best—brands of tape to use with the particular machine. Very often, however, you may be unable to detect any substantial difference between the performance of one brand and another; it is commonsense to experiment if you think you are not getting the best.

Length of tape on a given spool size sometimes varies between manufacturers. The figure at the top of each column is that common to the largest number of companies. Variations are given in brackets throughout the table.

In some cases, more than one price is given for a particular reel of tape. Where this is not a result of varying tape lengths, the lowest priced tape would have an Acetate base, the next, P.V.C., and the highest priced, a Polyester base.



“TAPE BOOKS”

Each “book” shown above will hold two 7-in reels of tape. These are being marketed by M.S.S. at 7s. 6d. per book. The stand to hold six books costs 17s. 6d.

Spools or cassettes?

MOST tape manufacturers have devised special designs of reel and, though this may seem a minor consideration when choosing a brand of tape, there is no doubt that the ease of threading tape can colour the opinions of the user!

Most reels, however, now offer simple, swift threading and, once one has had a little practice, there should be no difficulty.

It is, however, in the belief that some people will always be deterred that much thought has been given to cassette or magazine loading. The Garrard magazine deck has had some considerable success during the past year, but there is no sign at present of any general movement away from orthodox reels to magazines.

A reasonable long-term forecast might be that we shall settle down with tape records in magazines, but that domestic recordings will continue to use separate reels. If this proves to be so, the great need will be for a machine that will accept both types of tapes.

THE PRICE OF TAPE

A manufacturer replies to readers

We have read with interest the correspondence on the cost of magnetic tape and think that it might be of some assistance to your readers if we were to set out some detailed information of the cost of production, selling, and distribution, at the same time indicating the increases and decreases of various costs over the past ten years.

	Production cost (per cent)	Increases over 10 years since 1950 (per cent)
Production Labour	9.4	71
Materials : Base film, oxide, solvents, etc.	38.4	-5
Overheads		
Indirect Labour	7.7	71
Depreciation	5.7	—
Maintenance of plant, etc.	4.9	71
Other expenses	6.4	—
	72.5	
Commercial Expenses		
Selling and distribution	5.1	50
Advertising	4.2	33½
Administration, etc.	9.8	55
Development and research	8.4	90
	27.5	
	100	

From this it will be seen that in spite of considerable increased costs a policy of ploughing back the profits into research, development, and more efficient production techniques, has enabled us to maintain prices and at the same time improve quality.

P. H. WETHERILL.

Sales Manager, Emitape Division.
E.M.I. Sales and Service Ltd.

CARE OF TAPES

YOUR tapes deserve proper care. Your equipment must be kept in first-class condition—pressure pads properly adjusted and record/replay heads clean and properly aligned.

Store the tapes in polythene bags (such as that, illustrated right, sold by Swains Papercraft Ltd.), and cardboard boxes or tin cans. It is very important that they should be kept free from dust.

If they remain unused for any considerable period, take them out and run them through the machine every six months or so.

Follow the manufacturers instructions when removing tape from the editing block.

See that they do not lie in bright sunlight—they may suffer from undue heat or cold.

They must be kept well away from



magnetic fields. One thing that particularly needs watching is that you do not keep them too close to your speaker.

And when you are proposing to re-use a tape after it has been stored for a considerable time, bulk erase it, if possible, before putting it on the machine.

TAPE RECORDS—What is their future?

IT must be admitted that the tape record has not established itself as quickly and as surely in this country as on the other side of the Atlantic (where, as early as 1948, over 100 new issues a month were being announced).

The catalogue today includes something over 100 monaural classical records and nearly 150 stereo classical issues.

In the popular field, there are about 115 mono and about 50 stereo.

And, of course, there are other tape records providing language courses or children's stories.

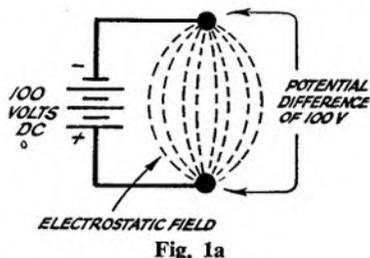
The first four-track tape records have been expected for some time past, but have still not become available.

It may be that four-track 3¼ ips tape

records in cassettes will become the eventual standard and that, once this is agreed, there will be a great spurt forward. But, to date, the manufacturers have not been able to agree on a standard and the customer has not had a chance in this country to decide whether sufficiently good reproduction is available on this basis.

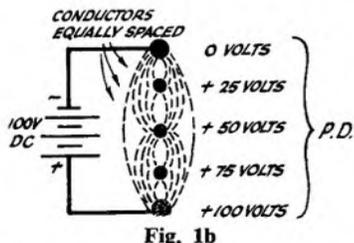
THE ELIMINATION OF HUM AND NOISE

IN Part I, I dealt with hum resulting from earth loops and magnetic induction, and it was shown how the magnetic field that surrounds mains transformers and motors could induce a current in the chassis or wiring of a



recorder, as well as directly into the tape head. Another way that hum can be caused is by induced voltages caused by the electrostatic field which exists between any two or more conductors that have a potential difference. As with magnetic hum, it is helpful to look at some diagrams in order to understand how hum is caused by these electrostatic fields.

Fig. 1a shows two conductors spaced apart and with a voltage applied to them. This applied voltage will cause a potential difference resulting in an electrostatic field in the space between the two conductors. If another conductor is placed half-way between these, the electrostatic field (or charge) existing will cause a voltage potential between this conductor and either of the others. As the voltage potential gradient is linear, Fig 1b, this conductor will have half the applied volt-

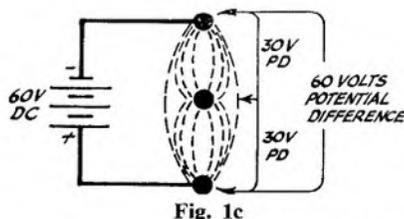


age between it and either of the others. For example, with 60 volts DC applied to the outside conductors an induced voltage potential of 30 volts DC will exist between the centre conductor and either of the others. Fig. 1c will make this clear.

Although the previous statements can be proved it is not intended to

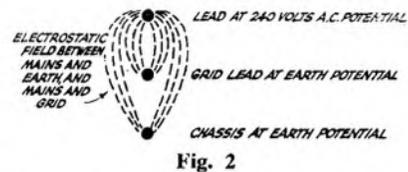
HUM AND NOISE ARE ANNOYING OBSTACLES TO GOOD RECORDING AND LISTENING, AND THEY ARE OFTEN DIFFICULT TO TRACE. IN AN AUTHORITATIVE SERIES, E. A. RULE DISCUSSES THE METHODS OF THEIR PREVENTION

go into the theory of electrostatics here, as considerable space would be required. Providing that the applied voltage is steady, the induced potential voltages will also be steady. Likewise, if the applied voltage is alternating, then the induced potential voltage will also alternate.



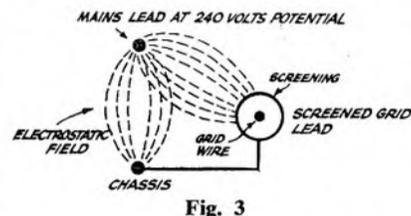
Imagine that the centre conductor in Fig. 2 is a wire in the input stage of a tape recorder feeding the grid of the first stage, and that one of the others is the mains input, which will have a potential of, say, 240 volts to earth. As the grid wire is near to the mains input, an electrostatic field will exist between the mains and grid wire, resulting in an alternating voltage potential on the grid which will be amplified with the signal. The amplitude of this induced voltage will depend on the impedance of the grid circuit to earth and the nearness of the mains lead. A low impedance grid circuit will have less induced hum voltage than a high impedance.

Although in the example, a mains lead was shown, any wire with an alternating voltage can induce a hum voltage into other wiring. Examples include: heater wires, anode leads to rectifiers or output valves, and, one



that is often overlooked, the unsmoothed HT lead from the rectifier, which has quite a large ripple on it. This ripple voltage may be at 100 cps due to the use of a full-wave rectifier and can cause very severe hum.

It is worth noting that although the mains frequency is 50 cps, it is not a pure sine wave, and contains many harmonics. It is the harmonics that are normally heard, as very few speakers and room combinations are capable of reproducing a 50 cps sound wave.



However, if the harmonics reach the ears, then they will insert the missing 50 cps fundamental due to a form of intermodulation within the ear. It is the harmonics that cause a differently sounding hum with a change of location. Each location has its own combination of harmonics, depending on the mains loading at the time.

To avoid hum from electrostatic fields, all audio leads in sensitive parts of the circuits must be screened, and

THE ELIMINATION OF HUM AND NOISE

the screen must be at earth potential. Keeping unshielded audio leads away from nearby mains and other wiring may not be a complete cure for hum, as some sources of hum can radiate large distances. The National Grid, for example, can radiate a 50 cps signal with its harmonics for many miles. Fig. 3 shows how screening prevents hum pick up from nearby mains wiring. It can be seen that an electrostatic field exists between the mains lead and earth, and between the mains lead and the screening round the grid lead. As the grid lead is enclosed by the screening no voltage potential can exist between it and the screening, or the mains and the grid. This prevents a hum voltage being induced into the grid circuit.

Even after all precautions with earth loops and screening have been made, a poorly designed power supply can cause hum by injecting hum voltages or currents directly into the various stages by way of the HT supply line. It is good practice to build the power supplies on a small sub-chassis as this will help to avoid hum from earth loops as well as simplifying the construction of the recorder.

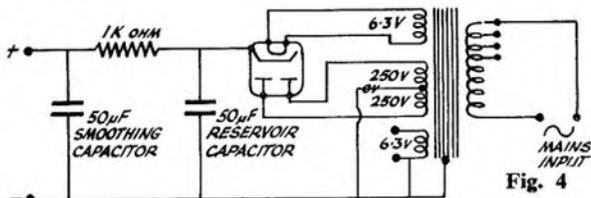
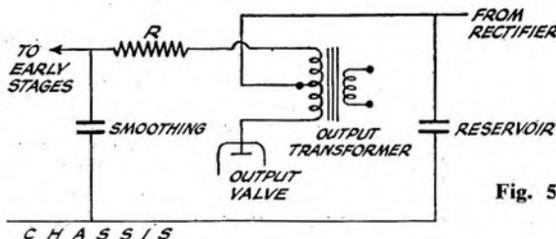


Fig. 4 shows a typical power supply circuit using a full-wave valve rectifier. The larger the capacitors, the lower the remaining ripple, but there is a limit to how large the reservoir can be and the valve manufacturers data should be carefully studied. The smoothing capacitor can be as large as possible and will also de-couple any audio signal in the HT line by pro-



SOME COMMON CAUSES OF HUM

Hum can be caused by any one or more of the following:

- Wiring loops.
- Earth loops.
- Direct magnetic induction into tape head.
- Unshielded audio leads.
- Valve mounted too close to mains

transformers or motors.

Heater/Cathode leakage, or heater emission (see text).

Poor HT smoothing.

Magnetic coupling between output and mains transformers.

Microphone valves (these can pick up the sound of loose transformer laminations, etc.).

viding a low impedance path to earth. Almost perfect DC output can be obtained if a low frequency choke is used instead of the resistor in Fig. 4 but this is seldom used in practice due to the higher cost. Hum levels of better than 60 dB can be obtained with a resistor but better than 80 dB are normal with a choke.

One method of smoothing that is becoming popular is shown in Fig. 5. This uses an output transformer that has a tapping on the primary winding. As can be seen, part of the winding is in series with the HT supply to the early stages and acts as a choke in reducing the ripple. As the HT current to the output valve anode is flowing the opposite way to the HT current to the rest of the amplifier, its effect on the transformer core is cancelled out, resulting in a higher power output and better bass response for a given size transformer. The resistor "R" is included to prevent the smoothing capacitors, which have a very low impedance to audio, shorting out the audio signal that is developed across the part of the winding acting as a choke, with consequent loss of power output.

The cause of high hum level in a tape recorder can often be quickly located by recognition of the sound. If the hum tends to be high pitched, for example, then it is most likely due to capacitive pick-up from nearby wiring. If on the other hand it is mainly at 100 cps, it would most

likely be due to poor HT smoothing. Some of the common sources of hum are listed in the table at the top of this page for the convenience of readers.

One source of hum that is not so well-known is due to the emission of

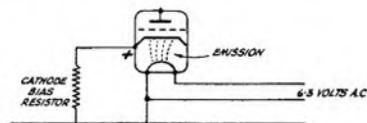


Fig. 6

electrons from the heater of an indirectly heated valve. The heater circuit is normally at earth potential and the cathode at some positive potential to provide bias for the valve. As some types of valve emit electrons from their heater, these will be attracted to the positive cathode which is acting as the anode of a simple diode, see Fig. 6. Since the emission will vary at a 50 cps rate, the current will also vary in the cathode circuit

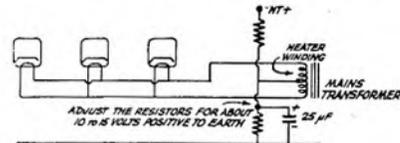


Fig. 7

causing hum to be introduced. The cure is very simple. If the heater circuit is made positive with respect to the cathode, no emission can take place and a method of doing this is shown in Fig. 7.

In my next and final article in this series, to be published in the March 8 issue, I shall be discussing the most common internal type of noise—HISS.

Included in this article will be a circuit diagram of a mains filter which can be designed to prevent electrical interference.

Hi-Fi
HARRY
by rich



**B.B.C. "Sound" Programme
6.40 p.m., February 13**

Peter Walker and Ralph West hold another of their lively discussions on audio topics.

*

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LETTERS TO THE EDITOR

Was WHICH? worth-while?

IN your issue of January 25 you refer to the report on tape recorders in the Consumer Association's magazine *Which?* I must emphatically endorse your misgivings about that report, even though I have the greatest respect for the Association's aims.

My company is one of the largest distributors of tape recorders in the country, and we stock *all* makes of recorders. I therefore write with detailed knowledge and with no axe to grind. It seems to me that the report in *Which?* fails to give the reader a full picture in several important respects:

First, and most important, *Which?* reviews only 16 models out of 180 on the market. There is no clear indication how these models were selected, apart from the fact that they are in the middle price range. No report that just picks out under one-tenth of all available instruments can hope to be comprehensive. What of the 164 recorders not tested? Surely, there might be some very excellent models amongst them.

In this connection, many manufacturers make more than one model. While criticisms in the report refer to specific models, it is perhaps not made clear enough that they refer only to the model, and not to all that maker's products.

In the actual testing, *Which?* considered subjective listening tests as the most important and gave them more weight. You yourself, sir, throw doubt on the value of such subjective test. What is more, the recordings tested were made with the different microphones supplied, and *Which?* says that with some of the poorer results "the quality of pre-recorded tapes, or tapes taken from radio or record player, might be better." In other words, *Which?* gives us test results for the comparatively rare case where music is recorded by microphone, but fails to provide data on the far more usual method of music reproduction.

The report gives the frequency responses *excluding* the characteristics of the loudspeakers. Yet the loudspeaker is often the true limiting factor to reproduction, and most of the recorders in the price range covered by the report are *not* used with external speakers. This is a bit like testing the top speed of family cars in a peak hour in Regent Street.

Artificial ageing tests can be misleading, and it is dangerous to assess the reliability of mass-produced articles on one single test sample. The reliability ratings just do not tally with our vast day-to-day experience of thousands of recorders. For instance, the counter on a model of world-wide renown failed, and the model was given a poor reliability rating. When the electric clock in a Rolls-Royce stops, is the whole car then unreliable?

You say yourself that "the only

danger now is that inadequately informed customers will close their minds to recorders other than the 'top six' in the *Which?* table. That would be a ridiculous attitude for anyone to take." What use, then, is the report in *Which?*

Together with other responsible retailers, my company's constant aim is to give the buyer accurate guidance, and we should more than welcome a well-informed survey, provided it is really comprehensive, for only then can it be valuable to the public, useful to the retailer, and—last but not least—a fair and useful pointer to the manufacturer himself.

P. LUBIN.

*Managing Director,
The Tape Recorder Centre Ltd.*

GIVE US MORE

I WAS interested to read two comments in the January 11 issue of your magazine. The first by the editor referring to the report by the Consumers Association in *Which?* on tape recorders, and the second by your reviewer G. H. Russell in which he says that of two British machines recently submitted for review, one was "unreviewable" and the other "had a fundamental fault so serious as to make an unqualified recommendation impossible."

I read the review in *Which?*, and it came as a breath of fresh air amongst the reviews which one reads in the usual magazines dealing with tape and "hi-fi" equipment. Here was no pandering to the manufacturer; no thought of advertising revenue; no bias; and no pulled punches. No; here was a genuine review based on objective and subjective tests with the results honestly and fearlessly stated. Even the "incomparable Ferrograph" revealed itself as being human!

But what of the machines referred to (alas, namelessly) by Mr. Russell? These will continue to appear in shops and will be bought in all good faith by unsuspecting individuals, ignorant of the trouble in store for them. It all really brings us back to the correspondence initiated by Mr. Dave Wiseman, of Acton, some months ago, asking why the customer cannot be given more protection against inferior quality products, and Heaven knows, there are enough of them in the field of electronics!

Could not more honest reviews be asked for—with the reviewer having the courage of his convictions and the magazine having the interests of its readers more at heart? I am sure that there are many readers of this magazine (and others) who would welcome many more "breaths of fresh air" such as that generated by the Consumers' Association review of tape recorders in *Which?*

SQDN. LDR. F. WESTCOTT.
Ashford, Middlesex.

COSSOR CR1602

by E. A. Rule



THE Cossor CR1602 is a four-track recorder of excellent design, built into a wooden cabinet covered in a washable plastic cloth with a detachable Polystyrene lid. It is supplied complete with a crystal microphone fitted with ten feet of screened lead, a five-inch reel of tape and a very comprehensive instruction book.

The main features of this recorder are: mixing facilities for radio/gramophone and microphone, provision for feeding into an external hi-fi system, outlet for monitoring with headphones, facilities for superimposing and many other useful features normally found only in more expensive recorders. The amplifier can also be used independently for gramophone, microphone or radio tuner.

After the CR1602 had been in use for a few hours, it was put through the normal electronic and functional tests, and passed with flying colours. It met every claim made by the manufacturers. (See specifications below.)

The hum level was the lowest I had heard for a long time.

There was some motor noise audible which could be picked up on the microphone if recording close to the tape deck, although on replay the noise was masked by the speaker even at low volume, and was not objectionable.

The mixing facility worked smoothly without any control noises and used in conjunction with the superimpose button quite a large number of effects could be obtained. The radio gain control is used for volume on replay with a separate tone control, the range of tone control was more than enough for all normal needs. Ample gain is available on record and replay and at no time did the control have to be worked "flat out."

Five valves are used: an EF86 microphone amplifier, an ECC83 voltage amplifier, an ECL82 triode pentode output stage or bias oscillator and an EM84 indicator for recording level. HT supplies are provided by an EZ80 rectifier and a large mains

transformer, there was no sign of overheating anywhere in the recorder.

A single motor drives the deck and it is cooled by a small fan. A 5½-inch flywheel holds the speed "rock" steady, no sign of wow was detected although some slight flutter was noticeable on a steady sine wave recording (a severe test). This may have been due to a pressure pad not set quite exact. On music or speech, however, there was no trace of either.

Five push buttons are used on the deck and are: fast wind, fast rewind, pause, play/record, brake. The pause control has a locking device which holds it in position until it is repressed (many decks require constant pressure). This feature enables the tape to be stopped and all controls and/or functions to be set up with the deck ready for instant use. Pressing the brake button cancels all others.

Two other push buttons are used on the amplifier side, one is a red record button and must be held down while the play button is pressed before recordings can be made. This double

action prevents accidental erasing. The other is a small white button for superimposing. These are also cancelled by depressing the brake.

The radio gain control is combined with a track selector switch, the tracks are numbered 1 to 4 top to bottom and the switch selects either 1 and 4 or 2 and 3.

Tape spooling was very good. Even on fast wind and rewind, the tape wound evenly, and the braking is the best I have seen for a long time. Only a slight pressure is needed on the button to stop the tape instantly without any sign of stretch, snatch, jerking or any of the other evils that are sometimes found on other tape recorders.

With the lid removed up to 7-inch spools can be accommodated and with double-play tape will provide up to eight hours' playing time. A removable panel on the side of the case opens a compartment where all cables and the microphone can be stored when the recorder is not in use. It is advised that this compartment is left open and empty while the recorder is in use as it is part of the ventilation system.

A bonus feature of the Cossor CR1602 is that if the track selector is set for tracks 1-4, stereophonic tapes can be played providing an external amplifier is used for the extra channel. It would have to have a sensitivity of about 2 millivolts at 1,000 cps and be compensated for frequency response, the output from the head using a fully modulated tape is 1mV at 166 cps and 4.5mV at 8,000 cps. It must be noted that only pre-recorded tape at a speed of 3¾ ips can be used.

The recorder is very simple to use and very attractive, at 37 guineas it is within reach of most pockets and can be recommended without reservation, in fact this recorder is one of the best buys on the market today.

Manufacturers Specifications

Dimensions: 15¼ x 12½ x 6¾ in.

Weight: 19 lb.

Mains consumption: 60 watts.

Frequency response: 50-14,000 cps.

Signal/noise: better than 40dB.

Wow and flutter: less than 0.3 per cent.

Output: 2½ watts.

Loudspeaker: four-inch.

Inputs: microphone, 3 millivolts at 100 k ohms. Radio/gram: 150 millivolts at 1 megohms.

Outputs: hi-fi amplifier, 2 volts at 50 k ohms; headphones: 100 millivolts at 1,000 ohms; external speaker: 2.5 watts 3-7 ohms; "Stereo," 1 millivolt at 166 cps, 4.5 millivolt at 8,000 cps at 1 megohms (from a fully modulated tape).

Makers: Cossor Radio and Television Ltd., 71, Endell Street, London, W.C.2.

Proof of the Stereo Pudding

STEREOPHONIC sound is still one of the most fertile sources of discussion and argument to be found nowadays. The number of people who refuse to believe in stereo has dwindled to a very small minority, but there are still large numbers who underestimate it, who arrive at a false conception of it by dubious routes and somehow fail to check their conclusions against practical reality.

If you get involved in an argument about why stereo is "not all its cracked up to be," my advice is to take a firm stand on practical, "proof of the pudding" lines and try to avoid the confusion that verbal explanations can lead to.

A young stereo enthusiast wrote recently to ask for my help because she had become involved in an argument with a much older person on the sub-

Stereo Notes

By D. W. GARDNER

ject of stereo versus mono, and eventually found his arguments so strong that she "began to doubt whether stereo was better after all."

I advised her to remember that, as yet, nobody knows enough of the underlying truths about sound, sound reproduction and the enjoyment of music to be able to settle any question concerning it by theory and argument alone.

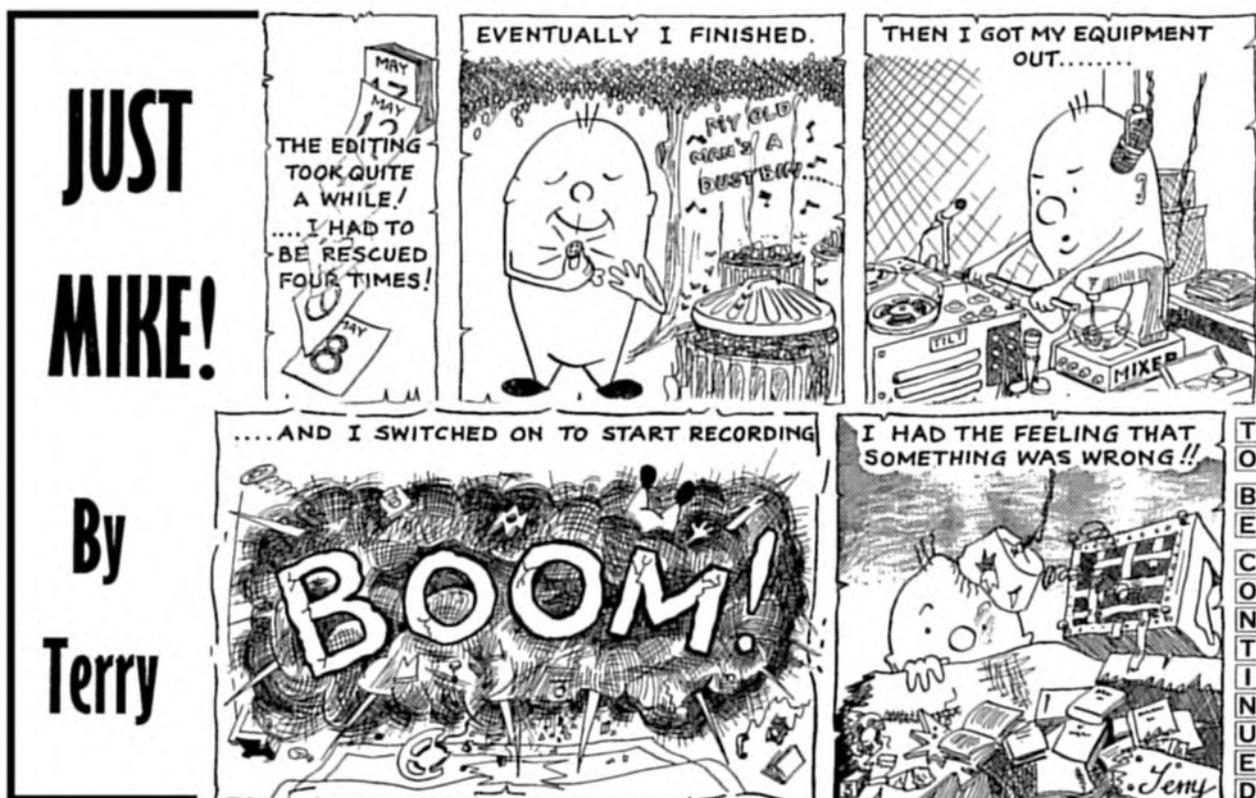
The basic assumptions and terms of reference need to be blurred only a little, deliberately or unwittingly, and we can follow a beautifully logical train of argument to a completely false conclusion.

Theories and arguments are essential stimulants to experiment, and valuable aids when it comes to attempting explanations of what our ears and eyes discover, but they are servants and not rulers of the truth.

Stereophonic sound is known to be a great advance on previous forms of sound reproduction, not by virtue of what the experts say about it but because the overwhelming majority of music lovers who have actually tried it out in their homes have found that it is better than anything they have heard before.

Against this established fact the arguments, however brilliant, of those who "won't have it" must be disregarded.

The proof of the stereo pudding is certainly in the eating, especially since nobody knows precisely the origin and nature of half of the ingredients.



New Products

TWO MORE RECORDERS BY CHITNIS

A CHANGE of headquarters has been announced by Chitnis Electronics Limited. Their new offices, as from January 23, are at 66, Bolsover Street, London, W.1. Coinciding with their move is the introduction of two new recorders to their range.

First of the new machines to appear under the Audiograph label is the KMS66, a four-track monaural and stereophonic recorder with a single speed of $3\frac{1}{2}$ ips.

Quoted frequency response is 30-16,000 cps ± 3 dB. Signal-to-noise ratio is given as 55dB, and crosstalk as 60dB. Papst heavy duty external rotor hysteresis type motors are incorporated, and the wow and flutter figures are given as better than .1 per cent.

Maximum spool size is $5\frac{1}{2}$ inches, allowing a maximum playing time of 90 minutes per track, using double-play tape. Six hours playing time is therefore available when used monaurally, and three hours for stereophonic recording.

As with other Audiograph models, West German Bogen heads are used. In this machine they consist of the UK205 record/playback head, and the BL216 erase head. Erase bias is 62,000 cps.

Twin inputs are provided for radio (2mV at 100K ohms), microphone (2mV at 5M ohms), and pick-up 100mV at 1M ohm).

Four watts total output is provided. Each channel supplies two watts through 15 or 5 ohm extension speakers, and two further outputs are provided for 500mV at 10K ohms.



The Chitnis Audiograph KMS66

Additional features of the KMS66 include fluorescent recording level indicator, digital rev. counter, facilities for superimposition and monitoring, pause control, fast forward and reverse winding (2½ minutes), connections at rear, and detachable lid with the second speaker built-in.

The valve line-up is three ECC83, ELL80, ECC81, EM84. Mains voltage: 110-240v at 550 cycles AC with fuse.

Self-locking devices prevent accidental erasure, and the recorder is automatically stopped at the tape end, or if the tape should break.

Covered in an attractive grey leather cloth, with a perforated plastic band, the case of the recorder measures 14 x 12 x 8 in. and the complete instrument weighs 20 lb.

Lock and key is provided, and the price, including a reel of tape, is 66 guineas.

The second machine is the Chitnis Audiograph AF42. This is a two-speed

recorder, $3\frac{1}{2}$ and $7\frac{1}{2}$ ips, incorporating the completely new design Chitnis AF deck.

Quoted frequency response for this four-track monaural recorder is 50-16,000 cps ± 3 dB at the top speed, and 50-16,000 cps ± 3 dB at $3\frac{1}{2}$ ips. Signal-to-noise ratio is given as 45dB, and wow and flutter as within .15 per cent RMS.

Maximum spool size is 7 in., pro-



The Chitnis Audiograph AF42

Modifications to Easysplice Unit

IN our last issue we reviewed the tape splicers currently on the market. It has been brought to our notice that, since the review was written, the Easysplice Co. have introduced a modified version of their splicer.

The new model can now hold adhesive tape up to half-an-inch thick. This is possible by the addition of an angled cutaway section wherein the adhesive tape will lie. Another modification concerns the tape-cutter guide. The angled slot along which the cutter is run, now has a vertical wall along its left-hand side.

Patents have been taken out for this design which the manufacturers claim will allow blind users to make a neat cut. The price for the modified splicer remains the same at five shillings.

Easysplice Company, 30, Lawrence Road, Ealing, London, W.5.

TRUVOX INCREASE

THE price of the Truvox Model 7 tape recorder has been increased to 82 guineas as from January 20. Announcing this increase, Truvox Ltd. add that owing to the large number of orders on hand they require four to five weeks delivery against new orders. Old orders will be invoiced at the previous price.

Truvox Limited, Neasden Lane, London, N.W.10.

Tape and cine splicer

THE price of the Metro-Sound tape and cine film splicer, which we regret was omitted in our special review, is fifteen shillings. This includes film emulsion scraping tool and spare cutting unit. Further spares are obtainable from the makers.

Metro-Sound Manufacturing Co. Ltd., 19a, Buckingham Road, London, N.1.

viding a playing time of just over two hours per track at the lower speed.

Two inputs are provided for microphone and radio/pick-up. Outputs are incorporated for extension loudspeaker (15 ohms), and external amplifier.

The 7 x 4 in. elliptical loudspeaker provides a total output of 3 watts, and consumption is rated at approx. 50 watts.

Features include facilities for monitoring with the volume control acting as tone control on playback, recording level indicator, digital rev. counter, joystick operation, fast forward and reverse winding (2½ minutes), and safety erase lock.

Valve line-up includes two ECC83, EBF89, ECL82, and EM84. The mains supply is 200-240v, 50 cycles, AC with fuse, and models are also available for 110 volts.

Overall dimensions are 15½ x 13½ x 6½ in. and the weight is 21 lb.

The price, including crystal microphone, reel of tape and recording lead, is 39 guineas.



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News from the Clubs

THE Tape Recording Course scheduled for the New Year by members of the **Warwick and Leamington** club began last month. Designed to introduce the newcomer to the hobby, and to increase the technical knowledge of the older hands, the first two of their series of special lectures and demonstrations were held at their meetings on January 18 and February 1.

First item on the agenda concerned *Buying a tape recorder*. This title covered the field showing what specifications to look for, the advantages of various facilities, and a general round-up of the points to put to a retailer when making a purchase. With some 160 machines currently available on the market, their task must have been a difficult one.

The second lecture was entitled *How a tape recorder works*. Here the technical experts were very much at home, and much useful knowledge was imparted. Outlined for their future meetings are *Microphones, speakers and mixers* (February 15); *Tape, and how to use your recorder* (March 1); *Making and editing programme tapes* (March 15).

The final lecture will include a résumé on the work completed, and a general discussion on the future trends of tape recording. This meeting will be held on April 5.

The courses are being held at the club's meeting rooms at the Town Hall, Leamington Spa. Anyone interested is welcome. Further information may be obtained from the secretary Brian Race, c/o 55 Kennan Avenue, Leamington Spa, Warwickshire.

From past experiences of tape clubs, notably the club in Rugby, this initiation of the tape recording technique in the form of organised courses is one that should spread to the majority of clubs.

I understand that the **Coventry** club is also considering something of the kind. At their meeting on January 5, members were informed that if enough interest was shown, a course of lectures might be arranged to instruct in the maintenance of machines, and the correct and incorrect method of recording. The show of hands which followed was very encouraging.

The opening discussion of the evening brought to light the news that the club has had to move its headquarters. Chairman Bill Tisdale, following a very active prowling during the preceding weeks looking for a suitable site, announced that he had found an ideal meeting place

at the Queens Hotel in Primrose Street. The new rooms, the first meeting was held there on February 2, has accommodation for 90 persons, and should be just the job for this unusually large club.

Mr. Tisdale followed his good news with a short demonstration tape which had been produced in the form of a skit on musique concrete. This was followed by a tape Henry Hopfinger had recorded at the local Rotary Club.

An interesting microphone comparison was next on the list. Peter Warden played a tape he had recorded using a crystal microphone, and a 40 shillings, Japanese microphone recently introduced to the club by Frank Gibson.

Two new members were enrolled during the evening, taking total membership to the 66 mark. With the presence of two enthusiasts who expressed the intention of joining the club, it looks like the move to the Queens Hotel was not much before its time.

Some idea of the length to which club members go to capture the sounds needed for a documentary tape of their local area is provided by the members of the **Dartford** club, a club now in its sixth month. These members are currently compiling such a tape, and it would seem they are expecting the "sound picture" of Dartford to be some time in the making. They are already making preparations to record the opening of the Dartford/Purfleet Thames Tunnel—and that is not scheduled until 1962.

Meanwhile, however, they are pushing ahead with the historical aspect of the town, and the secretary, H. E. Foreman, is keen to hear from any person who has access to recordings of trams and trolley buses of the type used on the Woolwich-Dartford lines. Tapes or letters should be addressed to him at 117, Westgate Road, Dartford, Kent.

Not all their powers are being spent on this project. Other activities include the organisation of hospital and blind services. They are also hoping to start a personal tape exchange scheme in the near future.

Demonstrations of recorders held include the latest Grundig four-track, and the Elizabethan FTI recorders. These

were demonstrated by Mr. Glover, a local dealer.

Some while back the members recorded a message to the Jersey club, and, to add a touch of ceremony to the occasion, they lost no time in asking their local Mayor if he would like to add a greeting. This he agreed to do, and our photograph below shows them in the Mayor's Parlour during the recording session.

Film shows have also been included in their meetings. Their December 26 meeting produced two 16mm. sound films, presented by Messrs. Mullard Ltd. The first, entitled *Modern Magnetic Materials*, gave a detailed account of the process of tape manufacturing. The second film, slightly more technical, dealt with the manufacture of transistors.

The **South-West London** club have announced their affiliation to the Central Wandsworth Evening Institute. This means in effect that the society will now function as a combined club and evening class, meeting every Wednesday night at Mayfield School, West Hill, S.W.18.

This is believed to be the first tape recording class to be organised by the London County Council, and the members would like to thank Mr. Geoffrey Hodson, our *Tape in the Schools* Editor, for his interest and co-operation in completing arrangements for this affiliation.

The future programme of the society includes talks for beginners on tape recording, technical construction work, tape drama, taping, and documentary productions.

Prospective members are invited to contact the secretary, Mrs. Vivienne Killick, at 6, Disraeli Gardens, Fawe Park Road, S.W.15.

R-E-S (Coventry) Limited demonstrated some of their latest machines at the January 12 meeting of the **Rugby** club. Equipment on show included the Korting four-track stereo recorder, one of the American Ampex recorders, a cabinet containing a Tandberg four-track tape and disc FM unit, the Uher Universal, and a Ferrograph.

Tape records, highlighting music from the early beginnings of recording up to the present day high-fidelity standards including stereo, were demonstrated using the Ampex unit.

Other impressive demonstrations included stereophonic recordings of a train pulling out of a station, and of a low-flying DC7 aircraft, and an example of the ease to be enjoyed showing slides changed automatically by the Uher recorder.

(Continued on page 33)



Members of the Dartford club record the Mayor of Dartford's message to the Jersey club. Left to right are: Reg Walley, Secretary Ted Foreman, G. A. Arthur, F. R. Brown, J.P., Miss Judith Foreman and Les Coates, Chairman



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 Advertisement Department, "Tape Recording Fortnightly," 1, Crane Court, Fleet Street, London, E.C.4.

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FERROGRAPH 4 A/N's-808's, VORTEXION WVA, WV.B, SIMON SP4, REFLECTOGRAPH A-B, etc., always in stock and ready for immediate delivery, as well as over 200 latest 1960 recorders at London's Largest Tape Recorder Specialists. The best, lowest H.P. terms, and finest selection of new and s/h recorders, from £18. Generous P/E allowances. Essex Tape Recorder Centres, 2, Maryland Point Station, Stratford, E.15, and 205, High Street North, East Ham, E.6.

Tape Recorder Service by L. Bishop, Ltd., 1708, Bristol Road South, Longbridge, Birmingham. Grundig Specialists.

GRUNDIG sales/service in your area: High Wycombe phone 457, Newbury phone Thatcham 3327, Wallingford phone 3083, Orpington, Kent, phone Orpington 23816, New Malden phone Malden 6448, Watford phone Garston 3367.

SITUATIONS VACANT

Technical Representative required in London with experience in the sale of magnetic tape. Apply in writing, giving qualifications, to the Sales Manager, Gevaert Limited, Great West Road, Brentford, Middlesex.

TAPE EXCHANGES

TAPE recorder owners who would like to make contact with others of similar interests to exchange news and views by tape are invited to send their name, address, sex, age and special hobby or interest (but only one, please) for this special new section.

It will be assumed that all tape contacts will be made using a speed of 3½ ips, on half-track tape. If space permits, additional speeds, or track usage will be published. Maximum spool size only is given.

Fieldhouse, Tom, 524, Stanningley Road, Stanningley, Pudsey, Yorkshire. Writing and recording short stories.

Hannah, Arthur A., 17, Blundell Street, Blackpool, Lancs. Do-it-yourself. 7 in. spool, 7½ and 1½ ips.

Howse, John (46), 27, Blenkarne Road, London, S.W.11. General interests.

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Iredale, J. D. (Male—32), 9, Ingfield Avenue, Dalton, Huddersfield. Motoring. 1½ ips.

Jones, Richard LL (27), 71, Penrhos Avenue, Llandudno Junction, N. Wales. Pop music. 5½-in. spool, 1½ ips.

Kidman, Michael R. (31), 11, Crown Road, Muswell Hill, London, N.10. Irish Ceili music. Prefers 3-inch reel exchanges.

Lingwood, Tom (28), 19, Belsize Park, London, N.W.3. Opera. 2- or 4-track.

Lowsley, Robert S. (39), 78, Gladstone Street, Loughborough, Leicestershire. Tape play productions, 7½ and 1½ ips.

Miller, Kenneth (53), 1500, Grand Concourse, New York 57, New York, USA. Active use of battery portables.

Seaden, Edwin (36), 11, Hereward Road, Tooting, London, S.W.17. Country and western music.

Taylor, Peter (28), The Old Smithy, Stoke Poges, Slough, Bucks. Motorcycle scrambling. 5½ in. spools.

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News from the Clubs

(Continued from page 31)

The January 20 meeting of the Acton club commenced with their second AGM. Only one member was missing and two new members joined.

A committee was elected and comprised chairman Len Gore, secretary Dave Wiseman and treasurer Anthony Bryden. During the general discussion following, an "Overseas section" was formed with the election as honorary members of Bill Orman (Tennessee), Ed Burdick, Ralph Trautman, and Mike Rice (Michigan).

Future meetings will be recorded and dubbings will be sent to each of these American members.

A tape from Mike Rice was played after the business of the club was concluded and some excellent electronic music recordings were enjoyed by members.

Secretary Dave Wiseman has indicated that he would appreciate information from, or about, any manufacturers willing to demonstrate their products to the club.

A visiting lecturer and an excursion provided the highlights of the January meetings of the South Devon club.

The visitor was Mr. A. S. Heather, lecturer for the Torbay School of Arts evening tape recording course. He took along his Ferrograph and a large selection of personal recordings, and demonstrated the varied uses of a tape recorder.

His demonstration came to an end with examples of correct and incorrect methods of live recording, and advice

on editing and storing tapes. Mr. Heather is now expected to join the club.

The excursion, on January 16, was to the Torbay Amateur Cine Society. There, the members were entertained to a lecture on "Sound and synchronisation" presented by Mr. Donald Aldous, Technical Editor of the *Gramophone Record Review* and President of the South Devon Club. During his lecture slides were shown to illustrate the various methods of synchronising tape with cine film. Afterwards the K.G.M. Cinecorder was demonstrated.

Film again formed the basis of the following meeting on January 24, when Mr. Wilson of F. A. Hughes Limited showed the B.A.S.F. tape film *The Magic Tape*.

The February 1 meeting was to include a demonstration by Peter Perry on the qualities obtainable from various loudspeakers.

The Ipswich club members have received a large slice of publicity recently through the newspapers and even by way of television.

Their local newspaper published a photograph and a detailed report, and Anglia Television produced a news feature showing their hospital service in operation, when two members of the club boarded the Cork Lightship, three miles off Felixstowe, to record interviews with the master and crew. The interviews and greetings were played back to patients in the Ipswich and East Suffolk hospital.

Their other activities have included a "link-up" with the American section of

the local YMCA. It is hoped this will lead to arrangements being made for the club to furnish material for the US Air Force broadcast programmes at the Bentwaters Base. A tape exchange between the American YMCA and the RAF Base at Coltishall, Norwich, is also being arranged, with members acting as a go-between.

A demonstration of the Uher Stereo tape recorder was given by Mr. J. Finlayson at one of the latest meetings of the Bournemouth club. The enthusiastic reception which greeted the demonstration was hardly surprising considering this machine sells at £108.

Another recent popular demonstration was given by Tape Recorders Ltd. of Westbourne, who put the Steelman Transitate battery portable tape recorder through its paces.

At the following meeting, January 10, one of the lady members showed how a tape recorder could be used in conjunction with a puppet show which she presented to the members. The usual quiz tape was held and Miss Ward, who gained most points, was awarded a three-inch long-play tape.

A number of members visited the Highcliffe home of Mr. Albert Tutchings, the designer of the Gramdeck. The purpose of the visit was to see his new design—a portable tape recorder powered by a clockwork motor. The demonstration impressed members who voted the sound quality equal to machines in the £40-£50 class.

Two plays, produced and recorded by a handful of members, have proved so successful that further productions are to be attempted in the near future.

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This is a special service for readers of TAPE RECORDING FORTNIGHTLY. It enables you—without cost—to get fuller information about those products in which you are particularly interested. Fill in one coupon below for each inquiry, writing in your name and address in each case. Then cut out the whole of this half-page, following the dotted line, fold as indicated, and post to us.

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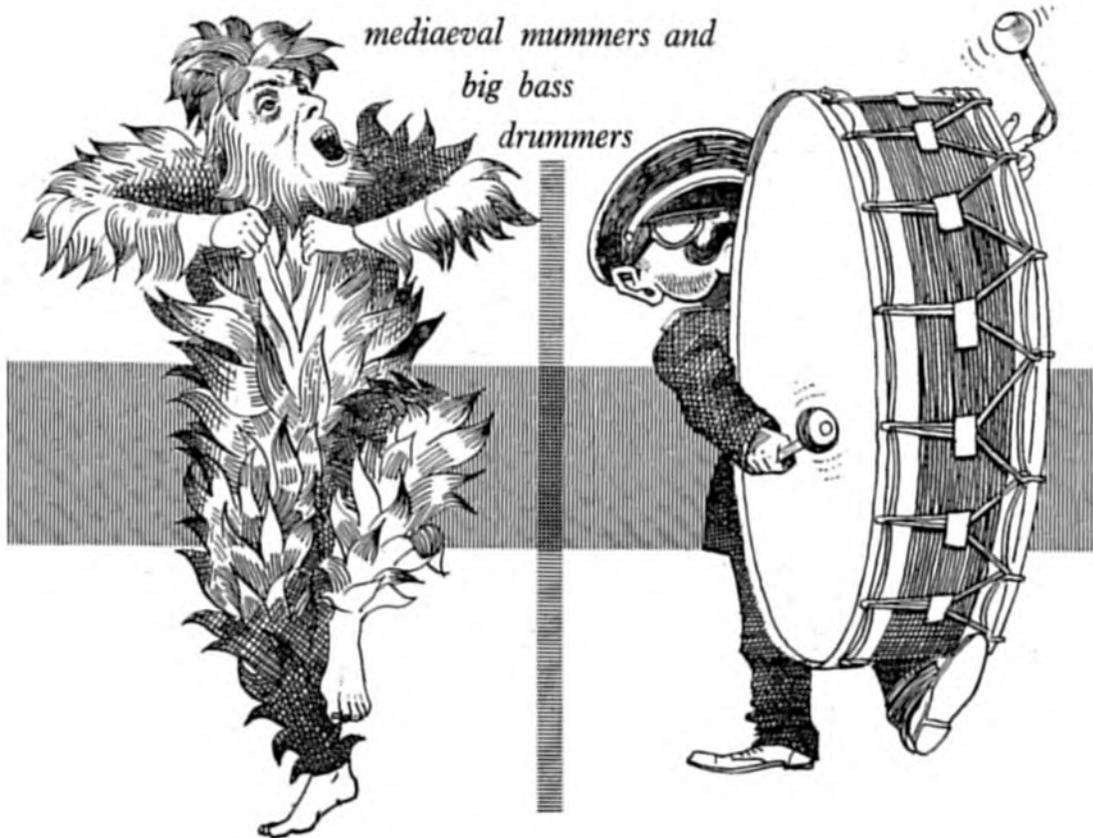
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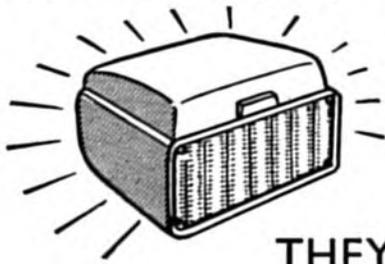


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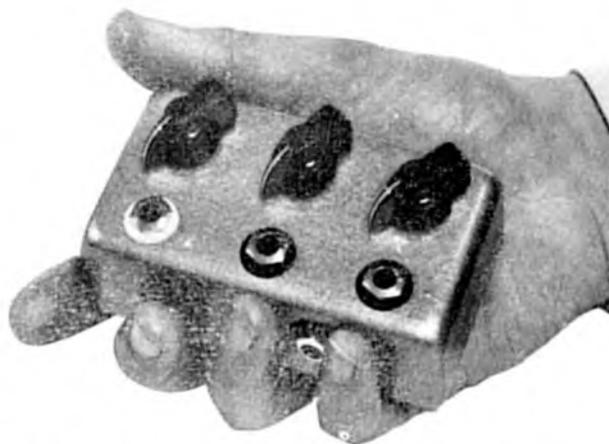
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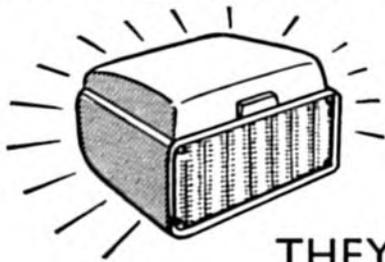
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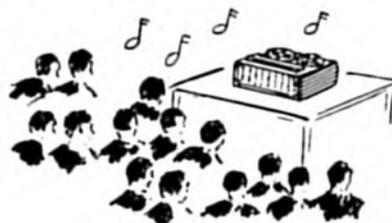
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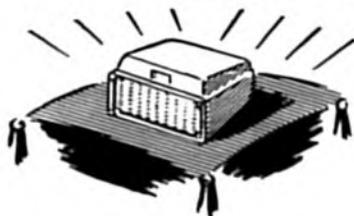


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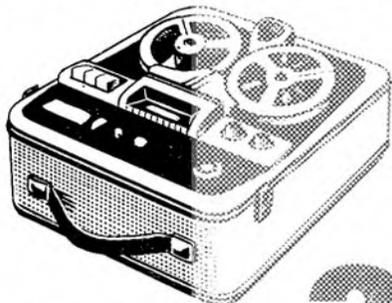


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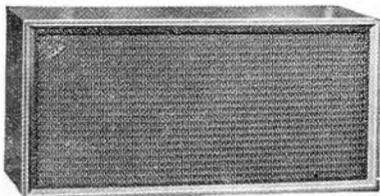
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Vol. 5 No. 4 22nd February, 1961

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The Editor is always glad to receive articles, news items, illustrations, etc. intended for publication. When not accepted, material will be returned if a stamped addressed envelope is enclosed, but the Editor cannot accept responsibility for the safety of such material.

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EDITORIAL

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We take the view . . .

A DIGEST OF NEWS, COMMENT AND EDITORIAL OPINION

THERE is no shortage of bright ideas about tape recording amateurs. Two notable projects have been brought to my attention recently.

David Lazell, a popular contributor to our columns, tells me of the formation of a group known as the Tape Crusaders, who will produce a tape-recorded magazine on a co-operative basis for distribution among church, youth and social workers. The first issue should be out in March or April and it is hoped to bring it out quarterly after that.

Circulation is intended to be among those who, for whatever reason, whether temporarily or permanently, are denied the opportunity of a fully active life.

Mr. Lazell is appealing to anyone interested to help with this project. "Some useful submissions might," he tells me, "include personal experiences, meditations, interviews with local personalities, brief talks by ministers, contributions from social workers—in fact, any item that will be of use to those who are concerned with the contemporary scene from a Christian point of view."

Anyone who feels able to assist should write, in the first place, to Mr. Lazell at 25 Wheatland Drive, Leicester Road, Loughborough, Leicestershire.

The magazine will be recorded on 600 feet of tape on a 5-in. reel and copies will be dubbed on to tapes sent in for the purpose or on to new reels of tape which will be supplied at the usual cost. A nominal fee of about a shilling per tape will be charged for dubbing and as a contribution to running costs, but the organisers intend to rest upon the generosity of users.

It is a fine venture and I wish Mr. Lazell and his collaborators well. There have been so many attempts to produce a regular magazine on sound and few of them have become firmly established at a high standard. Perhaps this effort will signal a new phase in this kind of tape activity.

"Tapesounds"

THE second bright idea came to Mr. Holmes Tolley, of Stratford-on-Avon, one of the earliest contributors to this magazine whom I was delighted to meet again in a recent BBC "Sound" programme.

Over the years, Mr. Tolley has been doing an increasing amount of tape recording on a professional basis—for the BBC, the Central Office of Information, and others. Naturally he has built up a substantial library of recordings.

He has now gone into business to supply recorded sound effects and actualities for theatrical, cine and sound feature purposes. In his first catalogue he lists

several hundred basic "Tapesounds", as he calls them.

All are available on tape only, at either 7½ or 3½ ips, at 12s. 6d. per catalogue item. Each sound has an average playing time of from 30 to 60 seconds. Mr. Tolley announces that where an item is not in the catalogue, he will undertake to get it—at an extra charge.

His address is 14 Hathaway Hamlet, Shottery, Stratford-on-Avon.

That £5 speaker

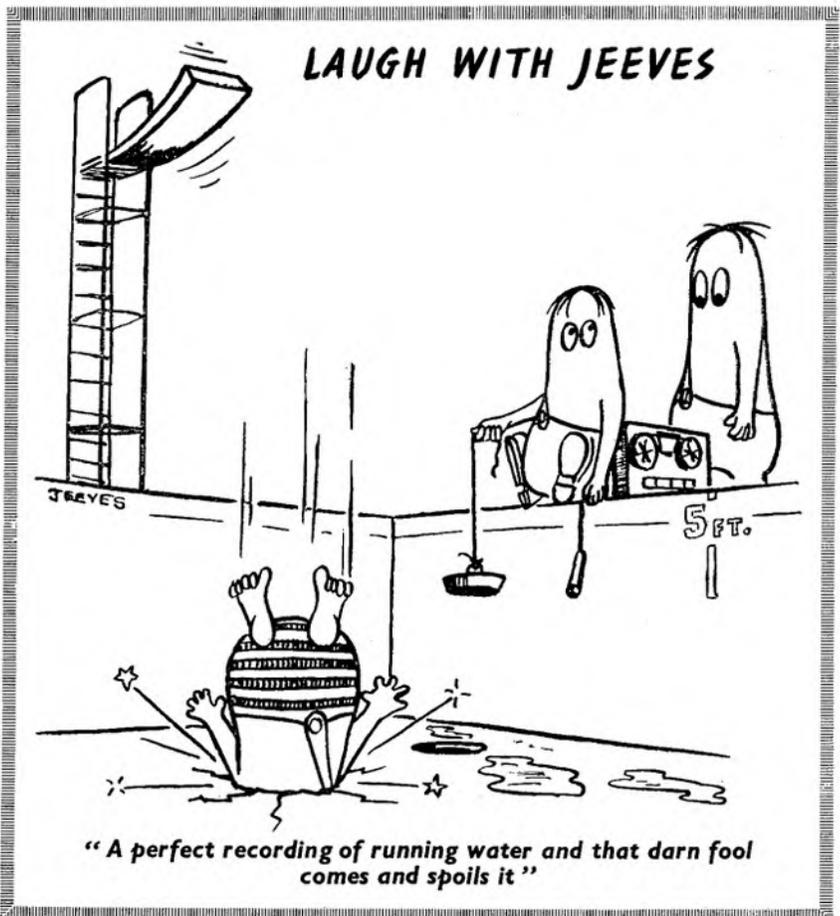
I HAVE now had the chance to hear the new speaker enclosure, designed by two Welshmen, which caused so much stir in the national Press. As announced, it costs £5, without drive unit and unfinished. Veneered and polished, the cost is £10.

An eight-inch speaker is mounted near the top, directed upward, but at an angle rearward towards the lid of the enclosure, which is fixed in a

raised position. In this way, sound is reflected from the lid and spread widely. Sound waves from the back of the cone pass through ports at the foot of the enclosure into two side cavities, via which they reach the inclined lid and so are reflected outward.

The angle between speaker and lid is critical, of course. The cost of a complete unit depends on the drive unit employed. Using one which costs about £8 (total cost with enclosure, £13) the standard of reproduction was at least as good as, and perhaps better than, anything I have heard from a unit of comparable price.

But it would be unwise to suppose that, when you hear the new unit, it will be startlingly dramatic or that its advent represents a revolution in hi-fi. It may, however, open up profitable new lines of investigation in speaker design.



EXCITING NEWS FROM AMERICA

"A do-it-yourself espionage kit"

ADVANCE information has reached this country about a remarkable new box of tricks which an American firm is proposing to market over here in the near future. This is a combined attaché case cum tape recorder that has a built-in secret microphone and a "secret wireless control" that "turns the recorder on and off without any suspicious movements of the operator."

Leaving aside for the moment the moral questions involved in the use of such a device, let's consider the manufacturers' claims for the performance of the microphone system. This, it is said, "records normal conversations up to 15 feet away . . . speaking towards it or away from it."

Now in a quiet room, quite cheap equipment will give you an intelligible (but very boomy) recording of such a set-up. But with many conditions in which the case might be used, the background would be such as to make this pretty well impossible without a directionally selective microphone system.

I had a word with the manufacturers about this, and they told me that they hesitated to publicize details of the new microphone system—though the case itself is the subject of a patent application. Simply as regards sensitivity this is consistent with the performance of, say, a crystal microphone having an omni-directional type of pick-up. Any further meaning that might be read into the claim will have to await the opportunity of a field test. And, by the way, the term "wireless" as it is used here, means "no visible wires, no buttons and no levers", and, I take it, in the more usual sense of the term, no wireless. In fact, at the present time it is difficult to decide which is the more exciting, the publicity or the case!

The recorder used with this case is the West German Minifon which has been chosen in preference to cheaper Japanese models of similar size. Several difficulties arise here, the first being that in this country the Minifon is regarded solely as a dictating machine (and marketed as such by E.M.I.). Two types are available, one with wire and the other with

tape; and of the two the wire recorder is the more expensive and has the wider frequency range (over five octaves, as against four for tape) and will run for five hours. Both are fully transistorised and weigh only 2 lb. 6 oz.

With tape, the signal-to-noise ratio is better. A cassette is used and at 1½ ips gives a total of thirty minutes' playing time. Although this is a highly efficient little dictating machine, no claim is made to a high quality recording and so the results will not be suitable for programme purposes.

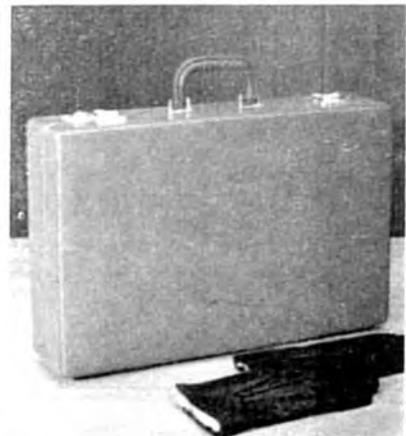
by Alec Nisbett

Tests with the Minifon have shown that this like any other recorder gives better results when used for a relatively close speech balance than when used to record, say, a board meeting—which purely for reasons of acoustics, may give inadequate results, even from the point of view of complete intelligibility.

Besides the recorder, the American case is fitted for a sub-miniature camera and flash-bulbs, as well as a four-pocket file for papers, a "writing desk," and a compartment for books. Its very name—the "U9"—suggests a do-it-yourself espionage kit. Without the recorder, but including the hidden microphone and secret switch it retails in the US for about 90 dollars. E.M.I. have the UK rights on the Minifon recorder and unless an agreement is reached with them the U9 cannot be sold complete with the recorder, as a package, in this country.

But here I must return to the moral question posed by the hidden microphone technique. The whole idea of this can, I think, be condemned pretty well out of hand. The results of such recordings can be embarrassing to the victim, to say the very least; and could be positively mischievous or even dangerous. Only the person who enjoys seeing others at a disadvantage will wish to make a habit of using such methods—others will prefer the more honest approach of asking for consent and co-operation.

I am strongly of the opinion that such consent should be sought in advance in all but the most exceptional circumstances; and that the subject should have the right of veto of part or whole of what has been recorded (again, except in special circumstances—such as where a contractual obligation holds). Incidentally it may be that if an unauthorised recording were to damage the reputation of the speaker (even though the sub-



Two views of the recently produced American U9 attaché case recorder

stance of the reading were both genuine and truthful), he could claim compensation in law for libel or slander.

Nevertheless, the U9 and other recorders which can be concealed are bound to fascinate many people—it appeals to the worst instincts in all of us. I know that there have been occasions in my own career as a motorist when I would have dearly loved a U9 to record the words (and tone of voice) of people who have seemed to me to have been excessively authoritarian!

The American manufacturers list a large number of unexceptionable uses for the U9 but it should be noted the Minifon alone could be used equally well for most of these. But there are cases where a very obvious microphone, and a ceremonial start to a recording can put a speaker, or an interviewee, right off. In such cases it may work much better to start and stop recording as it suits the recordist without making any fuss about it—but again, never without the foreknowledge on the part of the subject that a recording is to be made; and always respecting his right to speak "off the record."

News of the U9 prompts two thoughts for the future. One is that there is likely to be an increase in secret recordings in the USA and that this may also happen here. And considerable discredit to tape may lie in this.

The other thought for the future is a much happier one: that sooner or later a really small high quality "midget" recorder will be available that will be cassette loaded. It is my view that the future of tape lies in that cassette.

TAPE TALK

REVOLUTIONARY development in any industry creates an immediate need for the laws governing the public's enjoyment of that industry's services to undergo some form of modification or adaption in order that both parties may continue to . . . Beg pardon? Oh, all right, let me put it this way:

How much longer are we tape recording enthusiasts expected to grope, wallow and thrash about in the hopelessly-antiquated bog of present-day Copyright Laws?

Let's begin with a simple example: I have a small handbook at home on tape recording. On one page is a chapter telling the reader how to make recordings from a radio set. Further on is a paragraph which points out that, to do so, renders the operator liable for prosecution under Section 12 of the 1956 Copyright Act! Shall we dance?

Here's another angle: Last week, an acquaintance of mine bought a new LP record and straight away transferred the contents to tape. He broke the law. So what?

His record-reproducing set-up consists only of turntable and pick-up; he has to use the tape recorder amplifier when he wants to listen to any of his discs. So he chooses to place the item permanently on tape in order to by-pass the tedious business of hooking-up every time.

According to the Copyright Bods my acquaintance must either have borrowed a disc to transfer to tape, or propose selling or giving away a copy of one of his records. They refuse to see any other reason for copying.

Stalemate: They can't prove that they are right and we can't prove that they are not! They *could* obtain a search-warrant to enable them to enter his home and look for the illegal recording, which he has erased inside two minutes with the aid of a bulk eraser while they've been ringing the front-door bell!

Ah, you say, but supposing there was more than one recording: one couldn't remove all the evidence in time. Agreed: so what do they do? Confiscate the illegal recordings, *and* the original disc, *and* the record-player, *and* the recorder to prevent one from repeating the offence in the future.

The guinea-pig offender in such a proceeding would, of course, be prosecuted. And his colleague next door?—because he's been at it as well! And the bloke two doors from him who does the same thing? *And* two more chaps in the next street . . . the truth is, there's thousands of us in cities, towns, villages and hamlets throughout the country, we're *all* at it!

I should like to be able to offer a gleam of hope that some far-sighted legal bigwig may come up with an answer pretty soon, but I think it's most unlikely.

Why? Because in England it's a lot easier to pass a new law than to get an existing one revised or repealed. After all, this is 1961 . . . and you can *still* be tried for witchcraft. . . !

I HEARD recently of someone who paid 35s. for a pre-recorded tape containing orchestral selections from two well-known musicals. The item was described as being a 5 in. tape. This turned out to be not strictly accurate. It was certainly a 5 in. spool . . . but only half full of tape!

Note to the manufacturer: Here, sir, for your information, is a short and simple description of the two items. **TAPE:** Brown stuff on which the recordings are made. **SPOOLS:** Round, plastic containers for same. That should iron the bugs out!

LAST week-end I tried at six different shops to obtain a 7 in. reel of double-play recording tape . . . but in vain. "Sorry," they all told me, "we don't stock that size. There's no call for it, it's too expensive."

This is a new one on me, but perhaps I'm just unlucky. Any manufacturer or dealer care to comment?

THIS next story isn't pretty, either. A young couple were in a shop recently, purchasing their first tape recorder. Having settled on a model costing around 40 guineas, they asked to hear it in action.

The dealer placed the machine on an inlet-shelf behind the counter, placed a pre-recorded tape on the deck and switched on. The reproduction was absolutely first-class in every way; so good, in fact, that the young couple decided there and then that this was the machine they were looking for. They handed over the 40-odd quid, thanked the dealer for his assistance, and left happily with the tape recorder of their choice.

I have since had to tell the two people concerned, that the sound they were listening to so rapturously was not coming from the tape recorder-speaker at all, but from a three-speaker assembly concealed behind the grilled rear wall of the inlet-shelf behind the machine!

It was the work of a few seconds for the dealer to cut the recorder's internal speaker and to slip one of the two tell-tale leads lying at the back of the shelf into the outlet socket. The sound-source, of course, was close enough to the recorder to over-ride any suspicion from the spot, 4 ft. away, where the customers stood.

Introducing children
to tape recording

ALLOW THEM COMPLETE FREEDOM

A VITAL, imaginative teacher wisely uses everything within his grasp in his important task of education, for any teaching aid which can be used to encourage children to work is a tool of inestimable value. He is most fortunate today to be able to draw on so much outside help. The BBC, through radio and television, provides admirable programmes for classroom use, and most schools now have access to film projectors and film libraries providing visual material on a wide variety of topics.

All these aids, however, are impersonal and aim at the mythical "average child," and can only be used to supplement the basic work carried out by the teacher. The latest recruit to teaching aids, the tape recorder, has the supreme advantage of versatility; it can be used by the teacher in so many ways to supply the exact material he needs for a particular group of children.

I make tremendous use of the tape recorder in my Junior School and very broadly the work I do can be placed in three categories. It will probably help to show how the recorder has become a vital and integral part of our school life if I deal with each of these categories in turn.

First, there are the recordings which involve children and adults, and into this category come interviews. We have many interesting visitors to our school, and at some point they find themselves confronted by a child and a tape recorder and an interview is recorded in full. Mr. Geoffrey Hodson, who edits *Tape in the Schools* in this magazine, on a visit to the school, was faced with a nine-year-old armed with many searching questions about his work—questions thought up

BY GLYN HARRIS

Deputy Headmaster of a London School

by the interviewer herself and other children in her class.

The list of victims is endless. We had a most successful interview with our own headmistress when a group of six children fired questions at her, including: "Do you really *like* children?" There was the Chinese lady who was asked by an 11-year-old the heart-felt question: "Is there an eleven-plus examination in China?"; and the rather dashing Casanova-type musician who found himself slightly at a loss as to how to reply to: "And what do you do in your spare time?"

With interviews, the technique is to allow the children complete freedom to work out their own questions and have sufficient faith in them to let them go ahead without even asking what the questions are. In this way, a good adult/child relationship is encouraged. It is as well to have one or two questions ready in case of a "dry," but I have rarely found it necessary to use them.

When the child has finished the interview I find it rewarding to say: "Would you like to ask our visitor if he has a message for the children of this school?" It usually forms an excellent meaty conclusion for the interview and gives the interviewee a chance to fill in with anything vital he may feel he has left out in his spontaneous answers to the original questions.

The interview technique can also be used for excellent propaganda purposes. For example, the caretaker is asked in the course of an interview if he has any comment to make on the behaviour of the children in the school, and he can plead for less litter and tidier classrooms; the cook can appeal for less waste at dinner times; the secretary for prompt dinner money payment, and the visiting library organiser can air her views about the ways in which she hopes the school library is being used and so implant her ideas through the medium of the recorder.

Secondly, there are the wholly adult recordings and, apart from straight talks, two particularly successful ones come to mind.

One day in the spring of last year I had to make an early morning trip to the Midlands which meant leaving my home in Kent in the early hours of the morning. When I got up I set my Grundig TK8 by the open bedroom window and left it running in order to record the Dawn Chorus which was about to begin. Later, I edited this into a short item for the children, and they were able to hear the wide variety of sounds going on around them as they



The author with some of his schoolchildren. They have been presented with a dramatic situation and are being encouraged to act freely.

slept—traffic on the road in the distance, the far sound of ships on the Thames—even the alarm-clock ticking on the bedside table, and the way in which these sounds were gradually blotted out by the wonderful songs of the birds.

The other recording was made at our Harvest Festival Service in 1959. My own machine, a TK830 (successor to the TK8 stolen from the school just three days before Prize Day, complete with all the items for that occasion!) was placed in the hall in order to record the whole

on the past. What other teaching aid could bring this experience to children? How else could one capture the spontaneous reminiscences of these old people other than by using tape?

In the third and final section are those recordings made by children alone. Into this category come the reports made by the children on various school activities and school visits. For instance, I remember a group of first-years going to the Zoo, and when they got back to school seven or eight of them talked most uninhibitedly about their day. This was edited into an extremely lively item, linking with their follow-up work of writing and modelling displayed in the library.

Of course into this section comes what I feel is the most exciting and experimental work done with the tape recorder, and this is in the field of spontaneous drama, for in the hands of a sensitive teacher the tape recorder can become a really creative instrument.

So much for the actual recordings themselves. How are all these recordings brought to the children in the school? At my school we broadcast them in the form of a monthly radio magazine programme. Lasting from 15 to 20 minutes, this is relayed over the school amplification system to the children who listen in their own class-rooms. This means that children are listening with others from their own age group and older children are not then disturbed by the fidgets of younger ones whose period of concentration is less.

I think that in the tape recorder we teachers have a machine which might have been designed with us in mind and it is up to us to harness its vast potential to our own ends. Used imaginatively and with discrimination, it can be a most valuable addition to the number of aids available. It is not merely a passive instrument for imparting information or techniques—it affords so much opportunity for active and creative work by the children themselves. The one serious drawback, as I see it, is that the desire for perfect reproduction and technically-perfect tapes can become the predominant aim of the teacher, obscuring the recorders chief value in the junior school as a creative instrument.

TAPE IN THE SCHOOLS

of the actual service. The school machine, at that time a Brenell, was set up in the Head's room. We invited some old people from a local Old Folk's Home to our service, and I could see as they watched our happy, lively children enjoying their service in a modern "palace" of education that their minds were dwelling on how very different this was from their own school days.

As soon as the service was over, we took the old folk into the Head's room and asked them to recall their own days at school. The experience of watching our obviously well-dressed, well-fed, contented children triggered off a flow of fascinating reminiscences which required very little editing. Over and over again came the same words, "but the children look so happy, we never were," "we were always afraid," "we often went hungry," "my teacher walked round with a cane in his hand," "I had to leave school when I was eleven"—and so on—words which made our own children realize how fortunate they were to be going to school now instead of 60 years ago.

Although the final edited tape for playback was indeed a mixture of the two recordings, the children's voices singing their harvest hymns merely provided the link between these fascinating comments

THE NATURE OF SOUND

THE author has been closely linked with the design and production of loudspeakers for some years. He began his career in 1952 as a junior engineer producing pick-ups and tape reproducers, turned for a time to amplifier design, and then returned to the general field of hi-fi sound.

His development work on loudspeakers began in 1956 and he has been associated with the design of some of the most highly successful loudspeaker units.

Last year he joined Cosmocord and so completed a full circle by returning to the design of pick-ups.

In this new series, he will deal with the general subject of sound and electroacoustics with the accent on loudspeakers. Readers are invited to submit queries on any of the elements of acoustics that puzzle them. Mr. Milton will discuss the points raised, in future articles.

THERE is a certain aura of mystery surrounding a loudspeaker. "Just how," one asks, "can a piece of paper and coil of copper re-create the sound of a full orchestra?"

This series of articles has been planned in an attempt to answer this

question and to discuss sound and loudspeakers generally. It is hoped that the reader will be enabled, through this series, to choose a loudspeaker which exactly fulfils his needs, and which is just as important, he will be able to use it to its best advantage.

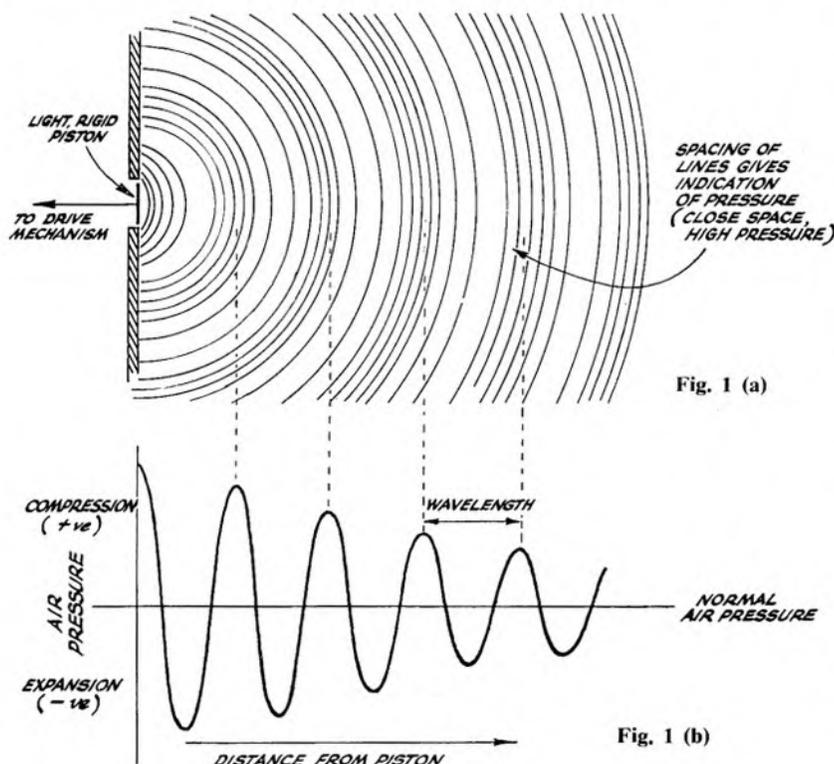
Sound is always due to the vibration

of some "system." It may be a vibrating diaphragm, a column of air in an organ pipe, or even the "nice juicy squelch" that recently worried *The Guardian*. This vibration is communicated to the air in contact with the system, through the air from the source to the ear. Thus there are three aspects of sound to consider; the behaviour of the source, the transmission through the medium and the characteristics of the ear.

Imagine a light but rigid piston which is vibrating rapidly, set in a large wall Fig. 1 (a). When the piston moves forward, the air immediately in front of it is compressed and when the piston moves back the air in front of it expands to fill this space. Air is an elastic medium and these alternate compression and rarefactions move outward in all directions.

Next imagine a long line of closely spaced barometers extending from the piston. The pressure at each point would be seen to vary at the same rate as the vibration of the piston, but not necessarily in step with it because a certain time is required for the variation in pressure to travel outwards. It is important to realise that it is a periodic variation in pressure that we are considering. This is not a wholesale movement of air but an oscillation of the individual gas molecules about a fixed position.

Let us carry this imaginary experi-



THE NATURE OF SOUND

By

P. R. Milton

Table of Density and Sound Velocity for Various Substances.

Substance	Sound Velocity (metres/second)	Density grammes/cubic centimetres
Aluminium	5,100	2.6
Copper	3,560	8.9
Lead	1,200	11.3
Steel	5,000	7.7
Concrete	3,100	2.6
Brick	3,700	1.8
Marble	3,800	2.6
Ash	4,500	0.64
Mahogany	4,000	0.67
Oak	4,100	0.72
Pine	3,600	0.45
Air 20°C.....	344	0.00120
Air 0°C.....	331	0.00129
Sea Water.....	1,490	1.025
Ice.....	3,200	0.92

ment one stage further and take the readings of all the barometers at the same time. The results could be presented as a graph where pressure is represented on the y, or vertical axis and distance from the diaphragm on the x, or horizontal axis. This would give the curve in Fig. 1 (b). Note that as the distance away from the piston increases the pressure variation is spread over a wider area and consequently the amount of variation decreases.

The regular movement of the piston gives us the first working definition. Each compression and rarefaction repeated, identical in form to the preceding one is termed a *cycle*. It obviously takes time to complete a cycle, and so the *period* is defined as the time required for one complete cycle of a recurring quantity. It is also useful to know the rate of vibration of the piston and for this purpose we use the term *frequency*, which is the number of cycles occurring in unit time. The unit is the cycle per second (cps).

The *amplitude* of the wave we are considering is the maximum deviation of the pressure in either direction from the mean pressure. We will return to this point in a later article.

Broadly speaking, sounds may be divided into two classes, musical and unmusical. The former, for convenience, we may call *notes* and the latter *noises*. The extreme examples can easily be recognised, but it is not so easy to draw a hard dividing line between them.

For instance, the wind noises of an organ pipe and the odd clicks of a harpsicord are inseparable from a musical performance. On the other

hand, if continuity and pitch are to be our criteria, then what is the status of the blare of a megaphone exhaust? Lord Rayleigh, who did not have our modern composers to contend with, considered that a musical note has a certain continuity and smoothness. Moreover, by striking a number of notes simultaneously an approximation to a noise may be obtained, whilst no combination of noises could ever blend into a musical note. But then he lived before the days of *musique concrète*.

It is probably fair to say that a musical note has pitch whilst a noise merely has frequencies. This is rather like saying that America has climate and England has only weather, since a musical note is composed of a set of variations having a definite relationship with each other, whereas noise is merely a collection of vibrations of random frequency and intensity.

Pitch is the characteristic quality of a sound by which we describe it as "high" or "low," and we could tighten the definition by saying that the pitch of a sound determines its position in the musical scale. Thus pitch is only a relative quality and only recently has been assigned a definite frequency by fixing the note A in the treble clef (á) at 440 cps. The lack of standard pitch caused a lot of trouble to the musicians of the past.

In the year 1511 the frequency á was 377 cps (Church Pitch, Heidelberg), but Schnitger's organ in Hamburg was tuned to 489 cps in 1688. Handel's tuning fork in 1751 was 422.5 cps. This was the pitch generally adopted for about two hundred years and covered the period of Handel (1685-1795), Haydn (1732-

1809), Mozart (1756-1791) and Beethoven (1770-1827).

The development of the military band caused a rise in pitch when it was found that by playing at a higher pitch, a much more brilliant effect could be obtained. Consequently at Vienna, the standard pitch of á had risen to 456.1 cps by 1858.

Returning to Fig. 1 we can see that there is another property of sound to be described, namely wavelength.

The wavelength, as its name implies, is the distance between identical parts of two successive cycles, and this depends on the velocity of the sound in the medium through which it is travelling.

Sound can be transmitted, to quote standard textbooks, "through any elastic medium." This can be either a boon or a bane depending upon whether one is using echo-sounding equipment at sea or trying to prevent radiation from the rear of a loudspeaker passing through the walls of a cabinet.

The fact that sound can readily be conveyed by solids can be illustrated by using two match-boxes and a piece of thread or wire. Pierce each inner container and fasten one to each end of the thread by passing it through the hole and knotting it on the other side. This device may now be used as a telephone provided the thread is taut and it is touching nothing.

A table of the velocity of sound in various media is given and the relationship between velocity, frequency and amplitude is simply:

$$\text{Velocity} = \text{wavelength} \times \text{frequency.}$$

In the next issue we will consider the transmission of sound through the air.



LOOKING back over the month of January I'm surprised that I was able to accomplish as much as I did. I hate the cold, wet weather of winter when an idle chair by a warm fire is so much more inviting than the prospect of even the pleasantest of tasks. However, I had promised to take some recordings at a party for the children of the RSPCA's Battersea branch of the Animal Defenders, so out I trudged.

I had been warned that the premises were very small and that the power supply was fairly inaccessible so I simply took along a little battery machine which slings comfortably over my shoulder and slipped a microphone into my pocket.



The Animal Defenders proved to be a very lively bunch of eleven- to fifteen-year-olds who were sitting expectantly in front of a table loaded with jellies and sandwiches when I

My Diary

arrived. The room was so small that I could do little more than stand in the doorway, microphone outstretched hoping for the best.



Some of the youngsters spoke up quite brightly about their pets and I wouldn't have missed the comments about the alligator who swallowed a spoon for anything! The best organised games to record are always those which include singing—rarely tuneful but nearly always spontaneous. My recordings could easily have been better, but it had been a jolly, if noisy, afternoon.

My search for talent and interesting personalities led me into a basement

coffee bar in Chelsea, an establishment renowned for its somewhat bizarre clientele. The place was lit by candles stuck into empty bottles and I doubt if the sharpest knives could have cut into that smoky atmosphere. The only music was from disc so I lingered long enough to drink my coffee before making a hurried dive for street level and fresh air. I'll go there again, but next time I'll take a really deep breath before I go in.

A couple of visits to the local tape club both ended in an argument on the vexed question of quality in recording. How far should one go and how much should one spend in getting the quality one desires? Surprisingly enough it was the ladies who were accusing the men of being insensitive to the quality of their recordings, and we finally decided that better microphones and, above all, better microphone techniques were far more important than better recorders.



During February I'm going to visit one of the principal ladies in the cast of the Windmill Theatre. This will be a new experience for me and I'll tell you about it in a month's time.

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Make way for the

LADIES

A new regular
monthly feature

Edited by
Vivienne Gooding

HOW are you all getting on. I wonder, those of you who are just beginning to get the feel of a tape recorder for the first time? Not letting the men give you an inferiority complex, I hope! If they are, let me tell you quite truthfully of one poor fellow I met the other day who honestly didn't know that his machine would record on track two as well as on track one.

Ever since the end of December he has been happily recording on one side only and was beginning to worry about the cost of tape! I don't blame him, but I do blame the people who sold him the machine for leaving him in such a state of abysmal ignorance.

Molly Hobson who also had a new recorder at about the same time is not likely to make such a silly mistake. When I called to inquire of her progress the first thing she told me was that her machine had developed an erase fault and had to go back to the shop. As it was returned to her in perfect working order within forty-eight hours she felt considerably cheered and since then she has produced quite a number of tapes, some of which are really remarkable.

One of Molly's neighbours is an old lady of over ninety, and she persuaded her to recite a short piece of poetry and record a message to a friend living in the north of England. Apparently the old lady had never even heard of tape recorders, but nevertheless she did her little piece. Molly said that when she played it back to her she was so moved by the sound of her own voice that she broke down and cried. Listening as I did to that voice, ringing with character and determination, I could only congratulate Molly on such an inspiring achievement.

To me that is part of the wonder of tape recording. A small thing, easily done by a person with virtually no technical knowledge, and yet the impact of the result can move a listener to tears. That is the power that we have in our hands as the spools revolve on the tape deck. Let's not waste it!

Personality of the month.—2

Mrs. OLIVE LEE

HAVE you ever been told that the jungle of hi-fi is a man's world? Don't you believe it! To prove the point I've just been having a very interesting discussion with Olive Lee, attractive wife of Edgware Road audio equipment dealer Kenneth Lee. Full of vivacity and enthusiasm she told me the fascinating story of how she has not only helped to build her husband's business, but even more important how she is giving it a distinct character by making the woman's viewpoint a special feature.

"The truth is," explained Olive with great emphasis, "although the man might foot the bill for a recorder it's the woman who has to live with it. She has to listen to it, dust and polish it; even more important she probably has to look at it all day long while her husband's out at work. If the room is festooned with wires and decorated with naked electronic horrors she'll loathe it, apart from which such an installation is hardly likely to be very efficient. . . ."

It was a pleasure to listen to such down-to-earth commonsense from Mrs. Lee so I asked her how she went about trying to ensure that harmony from the speaker did not cause discord in the home.

"Sometimes it's easy, sometimes difficult," Olive admitted. "Whenever possible I like to visit the customer's home, talk to his wife to see what style of furnishing and decoration the new equipment will have to blend with, and try to weigh up the acoustic properties of the room and, of course, discuss the precise use to which the equipment will be put. Then we can all put our heads together and rough out a design for suitable cabinets and at this stage the ladies are usually thrilled with the whole idea."

Olive Lee certainly has a busy life. She's at the shop first thing in the morning to look after all the secretarial work,



keep the books, deal with the telephone and help the customers. When the shop doors are closed at about 6.30 in the evening she can't just go home and relax because that's the best time of the day for her to see her clients in their homes. And when she does finally arrive at the front door of her house in Wembley she is greeted with chores in her own home.

"Is it worth it?" I asked.
"Of course it is. I wouldn't live in any other way. We've not been in this house very long, but my husband is already fitting up one of our rooms so that we can demonstrate tape recorders, amplifiers and speakers under normal domestic conditions. It will be properly furnished just like any ordinary living room but we shall have a selection of different kinds of apparatus on shelves and linked to a control panel. We'll have several speakers and then the visitor can switch from one combination to another and all the time the sound will approximate what he might expect to hear in his own home. We're working on this now, but when it's ready I'm afraid we shall only be able to offer the use of it by appointment."

Her ambitions for the future? To be able to continue to make friends rather than customers and some time in the distant future to be able to give up just one evening a week to amateur dramatics.

CHILDREN'S CORNER

DO you believe in magic? I do. There's lots of very special magic about a tape recorder. Mine has got a magic eye, has yours?

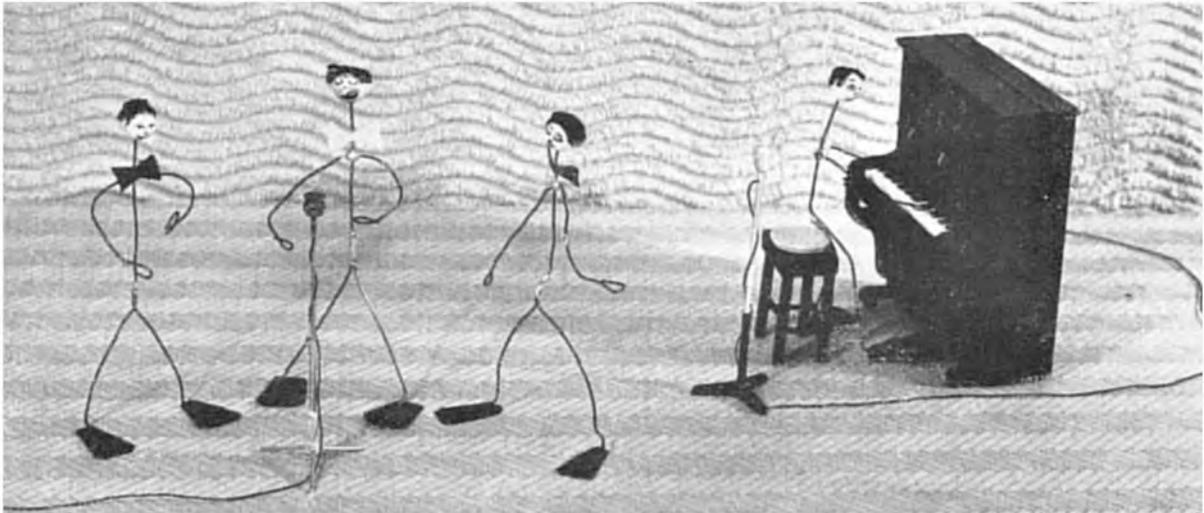
You can make it even more magic if you try. Do you run to the door and say "hello" to Daddy when he comes home in the evening? And do you tell

him what you've been doing all day? If you recorded all the things you usually say to him, Mummy could play it back while you open the door and won't he be surprised to hear your voice when he can see you aren't talking!

When your friends come to see you why not say "hello" to them before they arrive? There are all kinds of things you can tell them about what you've done and what you want to do, and if you happened to be hiding behind a big arm-chair when they came into the room

they would be quite sure it was magic!

If it's a wet afternoon and you don't want to go out and you don't really know what to do, why not make all the tables and chairs in the room have a conversation? They all could, you know, if you made them. Of course, you'll have to say what the old chair is thinking when you sit down too heavily, and perhaps Mummy will help the table to reply. Then before you know where you are everything in the room will be chattering away nineteen to the dozen!



MICROPHONE POSITIONING

The first of an entirely novel series describing the problems faced by recording enthusiasts. With the help of models, representative problems of microphone placing will be created, described, and advice offered by NAOMI ARCHER.

WHERE is a better place to start serious amateur recording than in the home? Serious? Yes, yet not in mood in this case, but in the practical way of making a recording which, apart from being clear of hum, hiss, and other extraneous noise, could impart the "presence and personality" of the performer, and justify the patience and care of the recordist who endeavours to produce a replica "sound-picture".

A group of singers with a piano will provide an excellent exercise for simple mixing and sound composition, using two microphones.

At home, it is not always feasible or convenient to acoustically adjust the room for recommended conditions and generally if there are one or two pieces of soft furniture, carpets, and not too much echo present, the use of two microphones can counteract the absence of further room damping material.

The models represent a technique which I have used both on the stage, and in my lounge which is a little reverberant.

In using the close microphone method, the signal is picked up by the microphones before the reflected

sounds from shiny and hard surfaces can interfere undesirably. When an illusion of depth is favoured, care should be taken in experimentally positioning microphones at a distance.

A separate microphone for the pianist allows for complete control on the mixer in getting the desired balance between the group and the accompaniment. It can be "brought in" at a higher level for the "piano introductions", while the group microphone is "faded out" and "brought in" again after their cue. It is surprising how much unscripted sound can be heard out of all perspective when performers are temporarily "off record". Paper rustle, coughs, comments, foot tapping, laughs, are but a few of the noises which can mar a recorded performance.

Test recording always proves worthwhile more especially, perhaps, when mixing is involved. When the harmony group has included a comedy turn, I have noticed how comedians who are not accustomed to being recorded tend to turn and converse with each other and speak off axis to the microphone. It might also be worth bearing in mind that the less verbose comedian who relies on gesticulations is poor material for sound recording

and is better left to the video recordist.

A recent recording of harmony singers with piano accompaniment was staged before an audience and the microphones were mounted on special foam rubber based stands to eliminate foot noise, which is accentuated on hollow flooring. The ribbon microphones are more prone to "blocking" from floor vibrations. Both microphones, being of the bi-directional pattern, were highly sensitive to the tremendous applause which followed the acts and this sudden intake was quickly faded to an acceptable level.

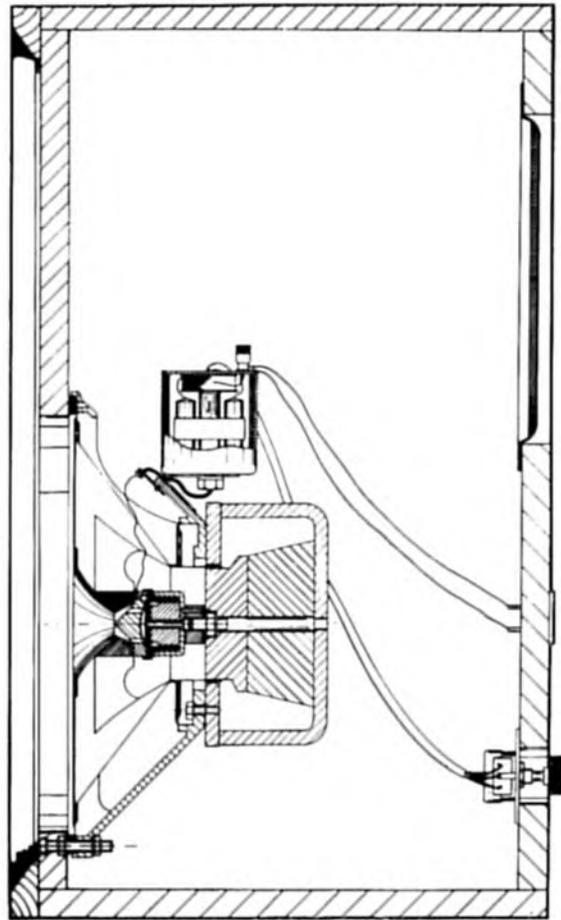
Continuity is yet another facet of high-class recording and the presence of mind to restore the performers' microphones before their next act is essential.

In home recordings, such problems hardly exist. Nevertheless, a number of intervening household sounds would immediately label the recording as "domestic" and not of studio quality. Since the "serious" enthusiast is versatile at eliminating those fire crackles, clock tickings, telephone bells, chair and door squeaks, etc., there seems little else to worry about in this vein, except the neighbours and their pets—bless them!

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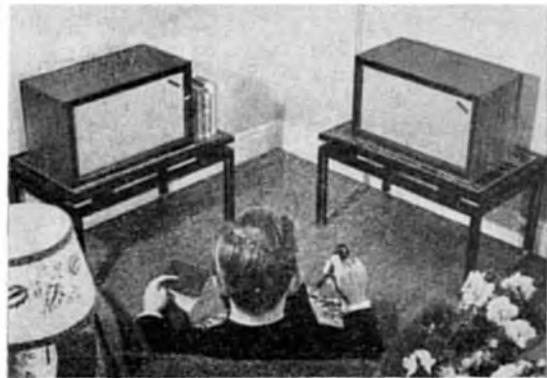


A.L/120 incorporates a 12" triple element loudspeaker. Power Handling Capacity: 15 Watts. Frequency Range: 35-20,000 c/s. Total Flux (main gap): 129,000 Maxwells. Impedance: 15 ohms at 400 c/s. Enclosure loading: Acoustic Resistance. Crossover filters: L.C. type, and mechanical. H.F. Control: Constant Impedance L-pad.

(Price applicable in U.K. only) **Price £29.10.0**

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stereo section

UNTIL fairly recently the average tape enthusiast has left the stereophonic field largely unexplored—mainly on the grounds of expense. Although the price of stereo equipment has not suddenly lowered, he now realises that the cost of compiling a complete set-up is not so prohibitive as first thought, and the extra enjoyment obtained through this medium makes the outlay well worth while. This is apparent by the fact that more stereophonic experiments are being carried out by club members.

On the following pages, therefore, we feature the first of a regular series with a particular stereo bias. This section will appear in future at roughly two-monthly intervals. The section in this issue includes the continuation of our special series on building a stereo mixer; a review of a new stereophonic recorder; Star selections, by top record reviewers, of the current stereo disc issues; and our regular feature "Stereo Notes."

Below an experienced instructor on stereo recording techniques presents an article on adapting studio microphone methods to home conditions.

Recording methods for Stereo

By H. Burrell-Hadden



THERE are two basic principles of microphone technique used in stereo. In simple terms, these are, firstly, two pressure type, omnidirectional microphones, spaced some distance apart in front of the sound source (Fig. 1), and secondly, two directional, usually figure-of-eight microphones placed at 90 degrees to each other, as close together as possible in front of the sound. (Fig. 2). Both systems are capable of good, though different, stereo results.

In the case of the spaced microphone system, which has been developed from the experiments carried out in the American Bell Telephone Laboratories, in the "30s," a good spacial distribution of sound can be achieved, with what might be termed "Area Stereophony." This means that whilst, say, the various sections of an orchestra, woodwind, brass, or strings, can be easily located in the reproduced sound picture, it may not be possible accurately to locate individual instruments within these sections. This may be all that is required, and some very satisfying sounds can be reproduced in this way.

There is a further difficulty, however, in that sounds in the centre of the stage tend to appear to be reproduced at a greater distance from the listener than

those at the sides, and if moving sounds are recorded, they may appear to move in an arc, and not straight across. (Fig. 3).

The co-incident microphone system works in a rather different way. This system has been developed from work done, again in the "30s," by A. D. Blumlein of E.M.I. This work culminated in the filing of British Patent No. 394325.

This remarkable document not only described this microphone technique but also outlined a complete system of stereo

on disc records, which is the basis of all discs commercially available today.

To return to the co-incident microphone system of stereophony. Whereas in the spaced microphone system the differences in output between the two microphones is due to their physical separation, in the co-incident microphone system the differences are due to their directivity. The combined polar response of such a pair of microphones is shown in Fig. 4, and it will be seen that a sound at a position within the combined angle

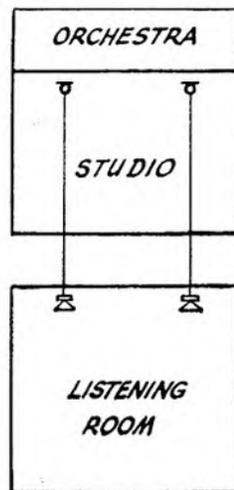


Fig. 1 Two spaced microphones

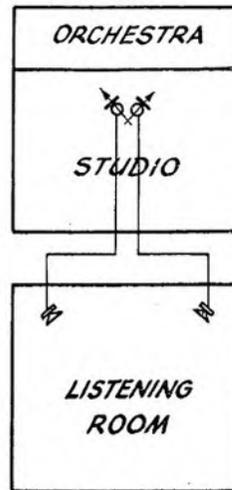


Fig. 2. Co-incident microphone system

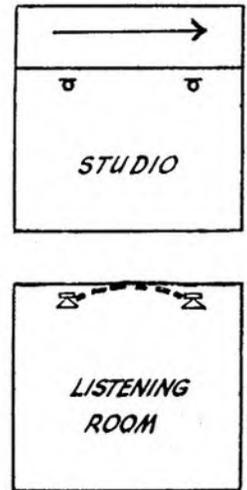


Fig. 3. "Hole in the middle" effect

stereo section

of the two microphones will produce outputs whose amplitudes will vary in relation to each other depending on the angular position of the sound.

The total output from the two microphones remains constant whatever the position of the sound, and so no recession of central sounds will take place. The positional information given by the system is likely to be more precise than that given by space microphones, so more accurate location of sounds may be possible.

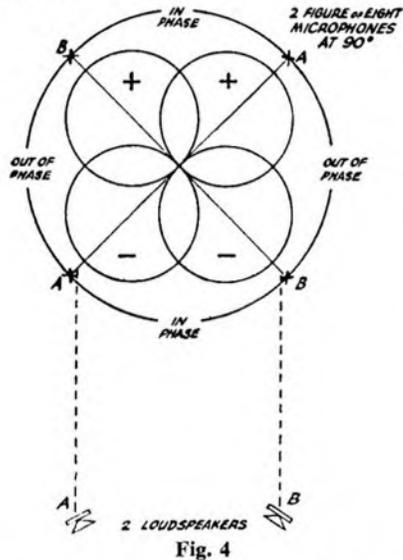


Fig. 4

From the point of view of the amateur recordist, it is much easier to mount two microphones in one place, or to use a stereo microphone, which is really two microphones in one case, than to mount two spaced ones, especially when slings are involved, and so for the remainder of this article and series we shall be considering the coincident microphone system only.

Let us consider first a simple recording session at which only one stereo microphone is necessary. This will be the case for most of our recordings and so some discussion of



Fig. 7

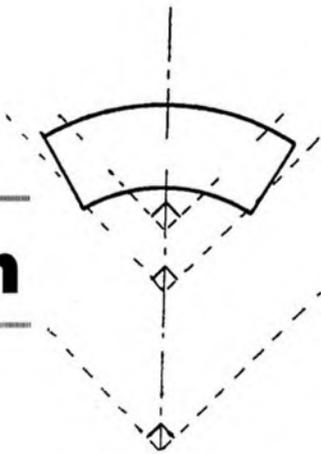


Fig. 5

where the microphones should be placed would be an advantage.

Suppose, for example, that we wish to record the local church choir. In this case the microphone would be set up on the centre line of the choir as shown in Fig. 6. If this were a monophonic recording, the microphone would be in a similar position, and the distance from the choir would be chosen to give the most favourable direct/reverberant sound ratio. In other words, the most favourable compromise between clarity of diction and well-blended sound. The same is true, of course, of the positioning of the stereo microphone, but in this case there is another factor to be considered, namely, the width of the reproduced sound picture.

Because of the nature of the system, any sound on the axis of the left-hand microphone of the pair will be reproduced on the left-hand speaker, and any sound on the right, on the right-hand speaker, no matter what the distance from the microphone may be. Hence, for our choir to be reproduced just filling the space between the speakers there is only one correct distance away. Farther than this, the choir appears too small, closer and the outside members will not be properly in the picture. (Fig. 5).

Some latitude is available, of course, since it is always possible to have the reproduced choir slightly smaller than maximum in order to get a pleasing acoustic effect, should this be necessary. Generally speaking, for the same amount of reverberation, the position for the stereo microphone will be nearer to the sound source than that of a monophonic microphone picking up the same source. This is because the rear of the stereo microphone looks at a larger amount of the room acoustic than does the mono one. Some electrical control over the width of the reproduced picture is pos-

sible with suitable apparatus. See the current series in this journal on "Building a stereo mixer."

A single stereo microphone used with care is capable of producing excellent results; indeed, many professional recordings are done in just this way. Patience is necessary to find the most rewarding microphone position and this can take some time, but the results will well justify the time taken. However, there will be occasions when with one microphone only something is found to be missing.

Such an occasion, to return to our choir, might occur when a solo part was involved. The soloist would be in the correct position in the reproduced picture, but might not be loud enough. In a monophonic recording it would be a simple matter to mix in a second microphone near to the soloist to such a level as to restore the correct balance. In stereo this can also be done, but some consideration is necessary.

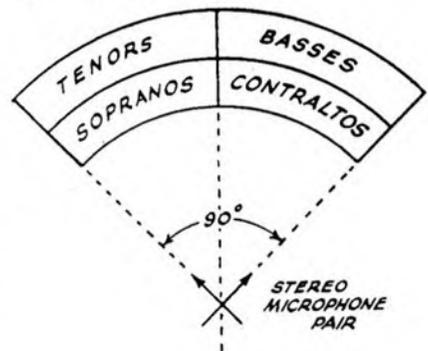


Fig. 6

A second stereo microphone is not suitable, since this would have the effect, due to the 90-degree acceptance angle, of producing a soloist the full width of the picture. (Fig. 7). A monophonic microphone should be used, with suitable apparatus so that its output can be fed into the system thereby producing an image which will coincide with the weak image on the stereo microphone. Such a device is called a Panoramic Potentiometer, or Pan Pot. (Fig. 8).

Having arranged that the images from the two microphones coincide, the gain control of the second microphone is adjusted as in the monophonic case. Equipment for performing this function is also described in the articles on the stereo mixer.

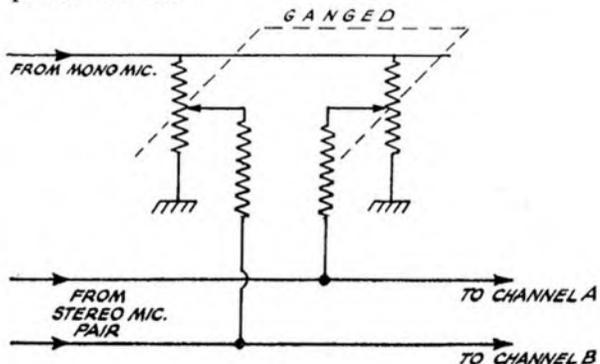


Fig. 8

TANDBERG STEREO SERIES 6 DECK

THE Tandberg model 6 stereo tape recorder incorporates a three-head, four-track system and is primarily intended for use by those who demand the best possible sound quality. It has been designed for use with external hi-fi power amplifiers and/or control units, and is supplied complete with a 44-page service manual which contains complete circuits and simplified circuits as well as detailed instructions for maintaining and servicing all parts of the recorder. A twenty-page instruction book, a spare tape reel and audio leads suitable for connecting up to external amplifiers etc. are also provided. The maximum reel size is seven inches. The price is 110 gns.

As can be seen from the table below,

it has quite an imposing specification and note, unlike many manufacturers references, i.e. within so many dB's, etc. are given. So often these days one sees a specification of frequency response of, say, 40-16,000 cps without any mention as to how level it is.

With a recorder in this class the detailed specification is a guarantee of the minimum standard of performance

expected and not the best; compare my test figures with those claimed for distortion and frequency response.

Before dealing with the test results some details of the electronics and mechanical sides may be of interest.

The amplifiers for the upper and lower tracks are the same and in the following description only the upper track is dealt with. All the valves except the ones for the oscillator and the indicators have DC filament heating to keep hum to a minimum in the recorder. The recording amplifier is divided into two parts, pre-amplifier, and record amplifier.

MANUFACTURER'S SPECIFICATIONS

Inputs

Inputs	Sensitivity	Impedance
Two microphones	0.00125 volt	5 meg ohm.
Two high level	0.05 volt	1 meg ohm.
Two low level	0.005 volt	100 K ohm.

Playback outputs, with the output set to maximum = 1.5 volts (from a cathode follower).

Frequency response, NARTB Equalisation.

7½ ips, 30-20,000 cps (plus/minus 2dB 40-16,000 cps.)

3½ ips, 30-14,000 cps (plus/minus 2dB 40-10,000 cps.)

1½ ips, 50-7,000 cps (plus/minus 2dB 55-5,000 cps.)

Distortion

A recording level 10dB below maximum results in 0.2 per cent distortion of a 400 cps signal when played back.

Recording amplifier distortion: ½ per cent at maximum recording level.

Playback amplifier distortion: 0.2 per cent at 1.5 volts output into 10,000 ohms.

Bias and erase current distortion; 0.4 per cent.

Noise Level: -55dB below maximum recording level.

Bias and Erase frequency: -80 kcs. common to both channels.

Wow and Flutter: 0.15 per cent RMS at 7½ ips. 0.2 per cent RMS at 3½ ips; and 0.3 per cent RMS at 1½ ips.

Speed Accuracy: Plus/minus 0.2 per cent or plus/minus 3.6 seconds in 30 minutes. Plus/minus 1 per cent absolute speed tolerance.

Four Track stereo record head. Gap width 0.00052 inch.

Playback head gap: 0.0012 inch, also four-track stereo.

Cross talk rejection: better than 60dB.

Power requirements: 65 watts, 110-245 volts AC at 50 cps.

Dimensions: 16 inches long, 12 inches wide, 6 inches high.

Weight: Instrument alone, 25 lbs. With carrying case 30 lbs.

Valve Complement: Six-ECC83. three-ECC82. two-EAM86. and two Selenium rectifiers.

Electronic section

The pre-amplifier: Both channels have three inputs, high and low level suitable for radio or crystal pick-ups and microphone. The high and low level input go through a voltage divider before feeding into the first grid, but the microphone is connected directly. A series resistor in the grid circuit and the grid to cathode capacitance of the valve form a filter to radio frequencies and these are rejected from the recorder (sometimes a source of trouble with long microphone leads).

Programme mixing is possible through the high and low level inputs but when a microphone jack plug is inserted these are disconnected. The pre-amplifier is a simple two stage one using an ECC83 twin triode, the record gain control is located between the two stages.

The record amplifier: This is also a two-stage amplifier but has negative feedback from the anode of the second stage to the cathode of the first. Capacitors are switched into this feedback loop to equalize the record frequency response for each tape speed. Input to the record head is taken from the anode circuit of the last stage. Some of the signal is also fed to the level indicators.

Indicators: The indicator valve is an EAM86 which is a diode, triode, and indicator rolled into one. The signal is rectified, amplified, after which it is "smoothed" and adjusted to give a fast rise/slow decay indication. The eye is fully closed when the tape distortion reaches 3 per cent (on test the distortion

SERIES 6 DECK



was only 0.9 per cent total harmonic measured at 900 cps.

The replay amplifier: This is a four stage amplifier using two double triodes, one each of ECC83 and ECC82. The output of the playback head is connected to the grid of the first stage via an equalizing circuit to correct for head losses at high frequencies.

Positive feedback is used from the cathode of the third stage to the cathode of the second to boost the base frequencies to NARTB standard. Speed equalizing is obtained by varying the amount of *negative* feedback from the output of the third stage to the cathode of the second. The third stage is fed via the gain control into the cathode follower output.

Erase and bias circuits: The oscillator is of the push-pull type using the double triode ECC82, the frequency is set to 78,000 cps. The oscillator is connected directly to the lower erase head and through a capacitor to the upper one.

stop is fitted and functions when tape fitted with metal coating at the ends is used. This causes a magnet mounted on the operating lever to actuate breaking the motor current by means of the switch otherwise operated by the lever.

Controls: On/off switch, four digit tape revolution counter, speed selector, tape

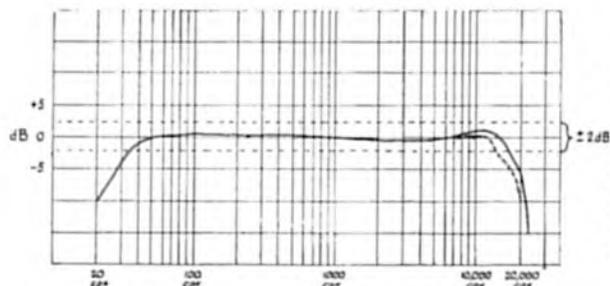
motion in record or replay mode after the operating lever has been set to play. This enables the large fly wheel to reach maximum speed before recording (takes about five seconds). Play back buttons three and four place recorder in replay or monitor mode and button three also controls tracks one and four.

Dual record gain controls are mounted on the left of the deck next to the microphone jack sockets and dual replay gain controls are mounted on the right of the deck near to the operating lever. The digital rev. counter is on the right above the lever and the two record level indicators are on the left just above the record gain controls.

Although the details above may seem somewhat lengthy they are in fact cut very short. The versatility of this recorder has to be seen—it's really a case of "you name it and it can do it". Mention must be made however of the "sound on sound" switch. This switch enables a recording made on the top track to be re-recorded on the lower track, at the same time mixing in any new sounds. It also enables a direct comparison to be made between what is going on to the tape, with what is coming off (A-B comparison).

The braking is very good and using the stop/start button enables the tape to be set in motion without any delay or wow.

(Continued on page 24)



Frequency response, at 7½ ips, with optimum bias for and using BASF double-play tape. The dotted line is the response of another well-known tape used without altering the bias.

This capacitor in series with the inductance of the erase and record heads will cause damped oscillations when switching and only negligible residual magnetism will remain in the heads. The oscillator is compensated so that the output is constant when only one track is used.

motion lever, and five push buttons. The record push buttons one and two are interlocked with the control lever. Button one controls tracks one and four and button two controls tracks two and three. These have to be held down while the motion lever is set to the play position, the tape will not move until the stop/start button is pressed.

Stop/start button; stops or starts tape

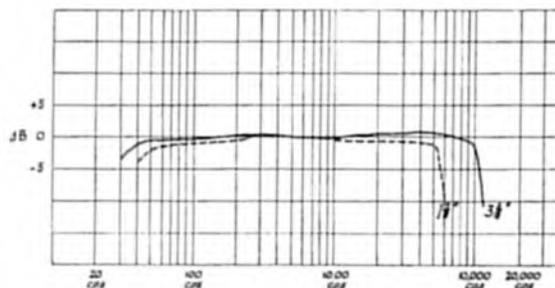
Mechanical section

The motor is a Papst multi-pole synchronous hysteresis type with a heavy dynamically-balanced outside rotor. The driving mechanism has three main functions, fast rewind, fast forward and play. These functions are controlled by a "joystick" lever which when in the neutral position mutes the replay amplifiers (unless they are being used as a straight-through amplifier).

The whole operation is simple and the motor is switched off when the lever is in the neutral position. An automatic

Frequency response at 3½ and 1½ ips using optimum bias and BASF double-play tape.

At all speeds channel "A" was within ±1.5 dB of channel "B" between 40-16,000 cps at 7½ ips; 40-10,000 at 3½ ips; and between 55-5,000 cps at 1½ ips.



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By ROBERT GOWER

Paul Desmond and friends. Warner Bros. WS 8020.
In the unaccustomed company of guitarist Jim Hall, bassist Percy Heath and drummer Connie Kay, this fluently lyrical alto player (whose normal milieu is the Dave Brubeck Quartet) produces an almost overwhelming—and apparently limitless—flow of beautifully swinging ideas.
Woody Herman's big new herd at the Monterey Jazz Festival. London SAH-K 6100.
Impressively recorded in California's open air, Woody's latest orchestra offers thrilling ensembles and high quality solos, notably from vibraharpist Victor Feldman, surely the most talented jazzman yet produced from Britain.
Pete Fountain salutes the great clarinetists. Coral SVL 3011.
In a jazz era that has perplexingly and foolishly neglected the clarinet, Pete Fountain and a jumping big band pay gorgeously played tributes to some of his instrument's most famous exponents.



THE CLASSICS

By EDWARD GREENFIELD

The Art of the Prima Donna. Joan Sutherland with the Covent Garden Orchestra conducted by Molinari-Pradelli. Decca SXL 2256-7.
Sixteen fearsome coloratura arias from Handel and Arne through Bellini to Verdi and Delibes showing Sutherland as a prima donna to rival in mastery and beauty the very greatest singers of the past.
Brahms, Symphonies 1-4. Academic Festival and Tragic Overtures with Bruno Walter and the Columbia Symphony Orchestra. Philips SABL 181-4.
Walter gives mellow, mature performances which will stand for ever as models of Brahms interpretations.
Sibelius, Violin Concerto. Jascha Heifetz and the Chicago Symphony Orchestra conducted by Walter Hendl. R.C.A. SB 2101.
Heifetz, a prince among violinists, knows better than anyone how to bring out effortlessly the warmth and brilliance of this work.

Tandberg Stereo Deck

(Continued from page 21)

The electronic side is fully fused and printed circuit boards are used. These are of a very high quality and should give years of service without trouble.

Workmanship is also of a very high standard, the wiring is neat and all components "fixed" in position. Apart from the microphone sockets all connections are brought to a small panel at the back and are most clearly marked. Controls are in just the right position and are easy to operate. In fact, after only one hour of use I was quite "at home" and making good recordings without mistakes.

The recorder can be used for the following functions. Playback mono or stereo, record mono or stereo, record mono and sound on sound and used as a stereo or mono amplifier with the tape stopped.

When used as a mono recorder on, say, channel one the controls on channel two can be used to mix channel two inputs into channel one. The output when on mono can also be fed into one or both main amplifiers. By connecting the output of channel one into the input of channel two and recording mono on channel one it is possible by mixing to produce some very good echo effects.

Test results

The frequency response for record/replay at $7\frac{1}{2}$ ips using BASF double-play tape (with optimum bias setting) was within 1.5dB 40-16,000 cps; -4dB at 17,000 cps; and only -6dB at 20,000 cps. The maximum frequency response was 24,000 cps. At both the other speeds it was within the manufacturers claims.

A record replay distortion test made at 900 cps at maximum level showed only 0.9 per cent total harmonic.

The only thing which did not meet the claims was the microphone sensitivity which on the model tested was four millivolts and not 1.25 millivolts. However, I do not think this was of importance as on a test stereo recording using either a single stereo microphone or two spaced microphones there was some gain in hand and good recordings were made.

The recorder was fed into two Armstrong A.10 amplifiers and two Wharfedale W3 speakers. No hum could be heard at any time and was in fact too low to measure. Some tape hiss was audible but only with the gain turned well up, when the volume would be much too loud for normal use.

On live FM transmissions comparing the recordings with the original failed to show any loss of quality. The measured noise was -52dB below the maximum recording level.

This recorder is made by Tandbergs Radiofabrikk A/S, Oslo, and is sold in this country by Elstone Electronics Limited, Leeds. It can be unreservedly recommended to all who want to make consistently high quality recordings.

BUILDING A STEREO MIXER

By H. Burrell-Hadden

IN this instalment we shall be considering the construction of the micro-pre-amplifier and mixer sub-units. As was mentioned in the last article, *January 25 issue*, these are built on identical chassis $9 \times 2\frac{1}{4} \times 1$ in.

Drilling dimensions for these chassis are given in **Figs. 1 and 2** respectively. It will be noted that one chassis is drilled to the dimensions shown in **Fig. 1**, and four are drilled to the dimensions shown in **Fig. 2**. Another two are drilled with the dimensions shown in **Fig. 2**, but on the alternative "hand," so that when one such chassis of each hand is placed side by side the appearance is as in **Fig. 4**.

The main components can now be mounted. **Fig. 3** shows the lay-out of the pre-amplifier chassis, and **Fig. 3a**, the lay-out of the mixer chassis.

The order of assembly is as follows on all types of chassis. First the valve holders, taking particular note of the valve pins in relation to the chassis, and then the electrolytic condenser, which should be mounted on an insulating plate, to prevent its can earthing on the chassis. This can will be earthed later by a wire connection. Failure to insulate it may cause an earth loop, a potential source of hum. After these components are mounted, the two lengths of single tags should be fixed, with $\frac{1}{4}$ in. spacers between them and the chassis.

The heater wiring is made next and this should be a tightly twisted pair taken through the hole near the valve holder over the top of the chassis to the other valve holder. The lead

out to the power tag strip also goes through the hole to the top of the chassis. This precaution also helps in the prevention of hum.

Next in order of assembly should be all wires crossing from valve holders to tag strips. These should be taken under the tag strip by as short a route as possible. No screening should be necessary, but P.V.C. insulated wire should be used.

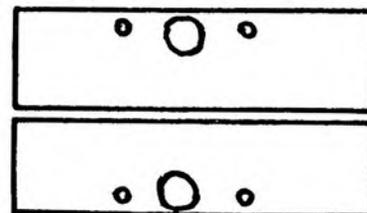


Fig. 4

Following this wiring the small components can be mounted between the tags taking care not to break their wires since some of them will need to be cut rather short. Special care should be taken in the soldering of these in order that no damage to the component may occur.

It will be noticed that in the mixer unit two components are mounted diagonally across the tag strips; it is best if these are mounted first, underneath the tag strips, using sleeving on their wires if there is any danger of them shorting in the wrong places.

In the next article the front panel layout and connections will be given, together with dimensions of the main frame for assembling the complete equipment.

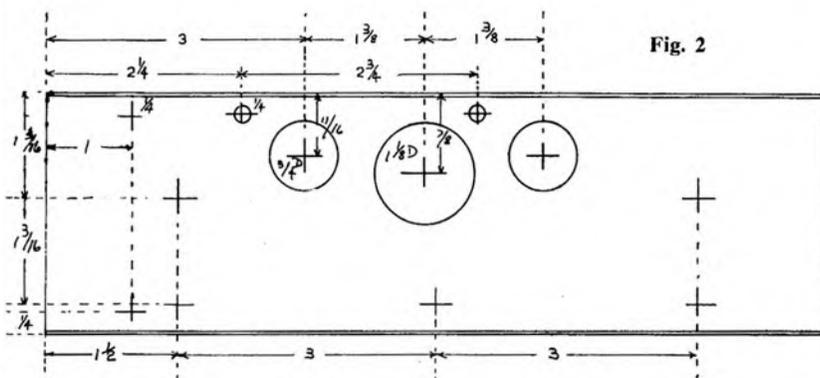


Fig. 2

BUILDING A STEREO MIXER

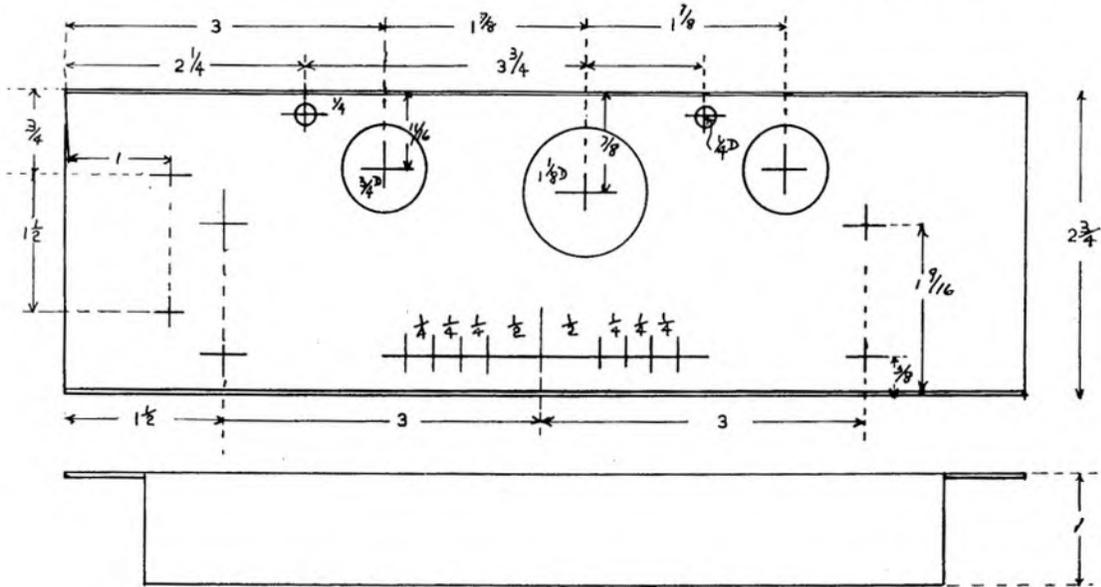


Fig. 1 (above). Drilling dimensions for the chassis of the mixer sub-unit. Only one chassis is drilled to these dimensions, four are drilled to the dimensions shown in Fig. 2, and another two to those dimensions on the alternative "hand" (see text).

Directly below (Fig 3), is a diagram of the underside view of the mixer showing the chassis lay-out. Beneath that (Fig. 3a) is the lay-out of the pre-amplifier chassis.

The chassis components are as follows: Valveholders: 2 B9A PTFE per chassis; Tag strip: two lengths, 11+11 tags, quarter-inch spacing; Two rubber grommets; and five quarter-inch spacers for tag strips.

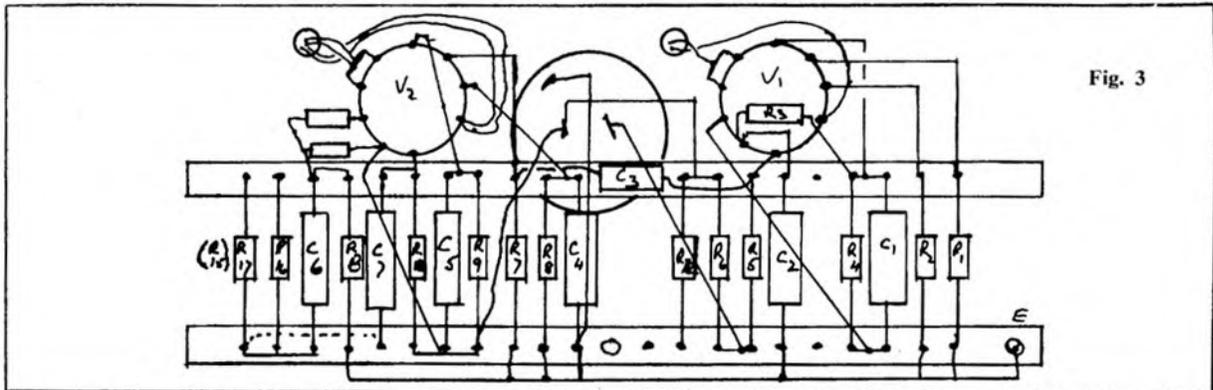


Fig. 3

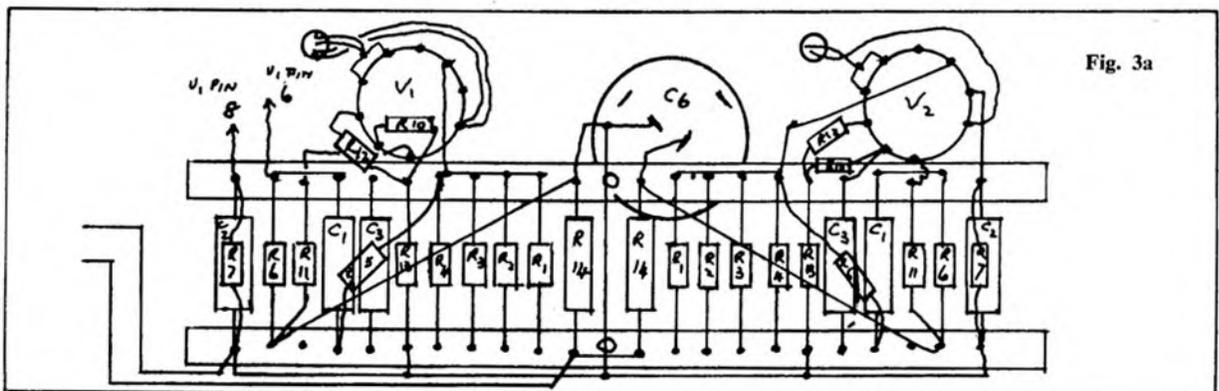


Fig. 3a

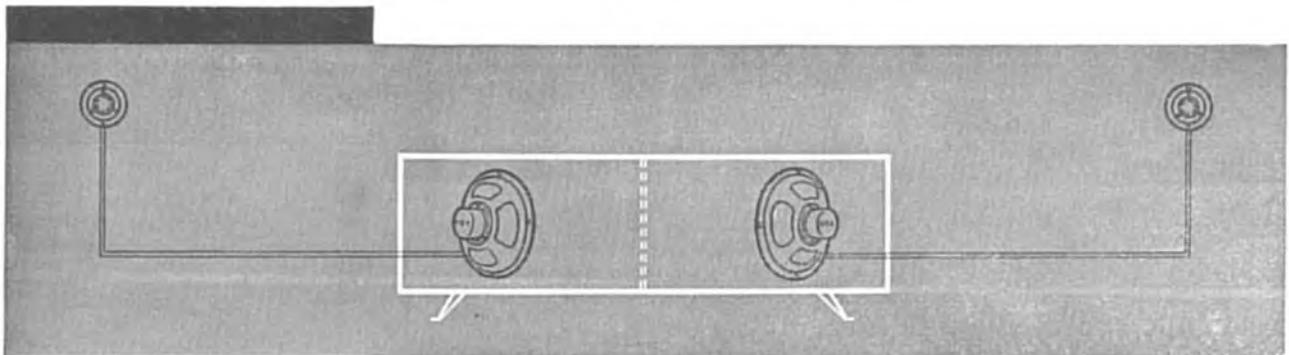
CELESTION

MODEL G44/1300

FULL WIDTH STEREOPHONIC

LOUDSPEAKER SYSTEM

The complete answer to the demand for a reasonably priced high quality speaker system for the reproduction of stereophonic recordings in the home. Utilising two very small pressure type direct radiator units for the higher frequencies and two 12" reproducers for the lower, the equipment covers a response which is substantially level from 35-15,000 c/s, with true stereophonic effect.



The price for two HF.1300
and two G.44 units, complete
with enclosure details is:-

£18:10:0

HIGH-NOTE PRESSURE TYPE UNITS

Designed and developed in CELESTION Laboratories this class of unit has been manufactured for special purposes over the past five years. A new unit, Model HF.1300, has been introduced for the new stereophonic system and its smooth response and wide dispersion ensure an exceptionally high standard of reproduction of the higher frequencies.

LOW-NOTE REPRODUCER—G-44

This new 12" Loudspeaker has been designed specially to work in conjunction with the HF.130. A skilfully balanced voice coil and cone assembly with correct cone edge termination result in a level and clean low frequency response.

COMPLETE SYSTEM

The system uses only one enclosure, 15" high x 42" wide x 18" deep, having a central dividing partition with one G.44 unit mounted at each end. The enclosure should then be positioned near the centre and against one wall so that the speakers are facing outwards and are about 2' 6" from the floor.

The two HF.1300 units should then be placed near the corners of the room, one on each side of the enclosure and approximately 4' above the floor. The width of sound will very nearly correspond to the distance between these two units. No elaborate cross-over networks are required and the system is completed by a 12 Mfd. capacitor in series with each high note unit.

Designed and developed by

CELESTION

Celestion Limited •

THAMES DITTON •

SURREY •

Telephone: Emberbrook 3402/6

Are reviewers unfair to stereo?

THE more stereo music I hear and the more I hear what other people think and say about stereo the more convinced I become that the way ahead is through collective effort. I do not mean just the organised type of collaboration but a widespread readiness to learn, question, think and discuss. The exact opposite, in fact, to the attitude of sitting tight wherever one happens to be, as a technician, a critic or an average listener, and passively accepting whatever may come along.

A lot of collective work does go on, of course; but not enough of it, I think, at the receiving end. The worst form of unenlightened acceptance is that which causes people to hear inferior stereo outfits, or inferior stereo recordings, and passively assume that such results are all one can expect.

If the public as a whole, and the reviewers who serve them, for example, fail to take a really keen interest in effective stereo then the suppliers will be tempted to slacken their efforts accordingly. Stereo is here to stay, but it will take much longer to reach its complete fulfilment in terms of established home listening if most of those who stand to benefit from it wait for it to catch them by the heels.

Reviewers of recorded music are carrying a particularly heavy responsibility, I feel, in their work of assessing the desirability of different recordings. Their attitude to the differences between mono and stereo versions that come to them can influence the public very strongly on the question of the degree of superiority of stereo over mono *in general*. This is something they may not intend to do, but I think they cannot escape the onus.

Some reviewers occasionally mention that their stereo equipment is "not very expensive", and may go on to excuse this by saying that it does represent the type of equipment that large numbers of listeners do, in fact, possess.

This, I insist, is quite shameful. Modest equipment may be satisfactory when one is comparing one mono with another mono recording, for the conditions are more or less equal for both; but when a comparison is being made between a mono recording and a stereo version of the same recording then the

most frightful injustice can be done to the stereo version if the equipment is such that the stereo properties inherent in the recording cannot be heard properly by the reviewer.

Many reviewers have been, quite sensibly, devoted for many years to the principle that, by and large, the musical content of a recording is more important than its technical excellence "providing the technical quality is of a reasonable standard"—and for reviewing on this basis modest equipment will have served them well enough. But some of them have not yet got round to realising that if they start to compare mono recordings with their stereo counterparts they are, at that point, dealing with a vital matter that is exclusively related to and dependent on technical excellence—including excellence of reproduction. What the public is entitled to know is how much better the stereo version is, or is not, when the sounds in the groove are made as effectively audible as they are intended to be.

It is a complete dereliction of duty to report, for example, "the mono and stereo versions were equally good" when the reviewer really means: "As I listened to the stereo version on a player with speakers only about three feet six inches apart I could not tell whether it possessed anything to enhance the performance. I do not consider this important, however, because many people who buy stereo records also play them on equipment that does not really utilise the stereo potentiality."

I have not checked up on the established reviewers enough to know how many of them have proper stereo equipment and how many are doing the best they can on less than satisfactory machines, but I do know that several of them occasionally admit to deficiencies but carry on comparing mono and stereo versions as though it did not really matter.

And there are many reviewers who, quite obviously, are able to hear the stereo that the stereo versions contain and deal at proper length with the special points that emerge, such as the placing of instruments and spatial balance.

The sooner all of them accept the need for effective stereo equipment the sooner will the public absorb the facts of life about mono and stereo and the sooner will buyers of recorded music learn to play their part in recognising and demanding sustained quality of stereo recording.



VICTOR THOMAS, Press Officer for Philips Electrical Limited, left for Holland last month to take up an appointment with the Press Office of N.V. Philips Gloeilampenfabrieken, Eindhoven.

Among other duties, he will be concerned with the editing of the company's international house magazine, *The Announcer*, which is printed in English and which has a circulation in more than 60 countries.

A former free-lance journalist and scriptwriter, Victor Thomas joined Philips in London in 1948 and has been in the Press Office since 1952.

M. R. L. A. NORMAN, assistant sales manager of Stella Radio & Television Co. Ltd. has been appointed sales manager.

During the 32 years that Mr. Norman has spent in the radio industry he has become a well-known figure. He joined Philips in their radio sales office in 1928, and after serving in the R.A.F. from 1941 until 1946, re-joined the company in charge of the Century House showroom.

Shortly afterwards he "took to the road" and represented Philips radio and television in South-East and South-West London and the West End.

ROBUK Electrical Industries, who recently announced their Robuk RK3, have appointed Mr. S. J. Robinson as their Sales Manager. Mr. Robinson is well known to the radio retail trade as a former Sales Manager of Simon Equipment Ltd.

COLONEL H. A. Lewis has relinquished his appointment as Managing Director of E.M.I. Sales and Service Limited, to take up the appointment of Managing Director to Newmark (London) Distributors Limited.

THE board of E.M.I. Limited announce that Mr. J. E. Wall has been appointed Managing Director of the Company.



NEW BOOKS

The Walter Tape Recording Book, by Joseph M. Lloyd. Focal Press, 12s. 6d.

FOR anyone who possesses a Walter machine or is thinking of buying one, or even would like a comprehensive explanation of the "works" of a recorder, this book is a very useful piece of reference.

The reader is taken step by step through the various factors by a writer who is both technically qualified for the job and also adept at getting the information across in a manner easily assimilated by the newcomer.

The book can be divided into two broad sections. The Walter models and their facilities are examined minutely in one section, while the rest is devoted to general principles of recording and how the Walter fits in with these principles. It is this latter section which gives the book its wider appeal and takes it completely away from the "just-another-handbook" type of publication.

As with other Focal Press publications, the book is illustrated with the usual boldly-defined line drawings which amply assist the reader to understand the points made in the text.

This is a worthwhile publication and an absolute must for any Walter owner.

Letters to the Editor

How can we improve the stereo illusion?

THE basic idea when listening to stereo, as I understand it, is to re-create the live performance so that the final sound is as close as possible to the original.

Stereo is partly an illusion, and I believe that if we listen to a recording of an orchestra made in acoustically perfect studios, whether an audience is present or not, the resultant sound may be "stereo" (where the orchestral spread puts every instrument in true perspective) but it will not be an *absolutely true* picture of the original.

I realised this after I had been to several performances of "Cinerama," which uses "near-perfect" stereophonic sound.

At these performances, with the eyes closed, as soon as the sound came through the loudspeakers, one experienced the feeling of being present within the scene being depicted by sound and vision.

Practically all the stereo discs or tapes begin as soon as the stylus comes into contact with the groove, or the tape starts. Surely if we were given a minute or so of "atmosphere" preceding the commencement of the material to be recorded, even if only the sound of people breathing, a much more realistic illusion of presence would be created.

In a recording with announcements, such as the Peggy Lee/George Shearing LP "Beauty and the Beat," it is almost impossible to imagine being surrounded by 2,000 disc-jockeys in the confines of a domestic listening-room, but the "atmosphere" and the illusion of being in a large space is quite apparent.

Listening to a BBC broadcast of an orchestral concert, one can hear the relaxation of tension of the musicians between each item. If only we had stereo radio, this would be even more evident.

To me, the majority of records begin and finish much too abruptly, and unless one is present at a recital of records on tapes, properly organised with between item announcements, I think that even

with first-class reproducing equipment and "near perfect" stereo, we must be really honest and admit that although the performance is quite "true to life," it does not *really* give us the illusion of being *definitely* at the original performance.

One final word, I can only repeat this letter's heading, omitting the first word. J. HONE.

London W.12.

WORDS OF PRAISE

I HAVE been a keen reader of your magazine since its first issue, and congratulate you on a difficult job well done. It arouses considerable interest among the boys of the school who receive all my back numbers. They devour all the technical articles, and are particularly interested in the "How the BBC do it" type of feature.

We feel we have a lot to learn, and perhaps a little to teach, and the "don'ts" in these features are therefore of great value.

W. J. HAYES.

St. Egbert's College,
Chingford, London.

I HAVE been reading your most helpful magazine for about six months now, and have nothing but praise for it.

You no doubt receive many letters from readers asking to change this or that feature, or to print this or that article. But please leave it as it is. I'm sure you have found the correct recipe.

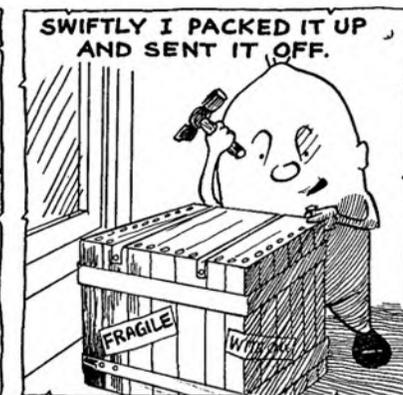
T. WOODWARD.

Manchester 9.

MAY I compliment you on turning out a first-class tape magazine. I have been taking *Tape Recording Fortnightly* now for a long time, and I think it is the best in this field. Keep up the good work.

Liverpool, Lancs.

G. WIEBENGER.



Have you an idea, a complaint, or a bouquet to hand out? Write to us about it. Letters not for publication should be clearly marked

B. A. T. R. C.

Where can we hear the winning tapes?

THE STUDIO QUALITY OF CONTEST TAPES

I BELIEVE that I am right when I say that practically all the entrants competing in the British Amateur Tape Recording Contest use their lounge or living room as the "studio."

We all endeavour to obtain a "studio quality" sound to our finished product, but in the majority of cases this is difficult.

I am sure that newcomers to tape recording and especially those people with domestic recorders would be pleased to read about the quality of sound required to make a winning entry.

Is a technically perfect recording, but with a boring theme, more or less likely to succeed than a "not so well recorded" tape containing material that is continuously interesting?

JOHN HONE.

London, W.12.

EDITOR:—Neither the quality nor the content is the decisive factor. Both are given due weight in reaching a decision. Points are awarded by the judges for the basic idea behind a tape (imagination), for the treatment (scripting), for ingenuity in collecting recorded material, for skill in splicing, mixing, and fading in editing, and for the quality of the sound (involving microphone technique and recording level, among other things).

It has happened that tapes based on brilliant ideas have won prizes, although the recording quality left a lot to be desired. It has also happened that brilliantly conceived tapes have missed prizes because of the poor quality of sound. Superb sound, without a worthwhile idea behind it, is unlikely to win, however. Competitors must aim at all-round excellence!

THE presentation of awards and playback of winning tapes is a function which should stand entirely on its own, divorced from the Radio Show.

When I suggest that a separate function should be held I may be referred to the rather poor attendance in 1959. In that year we learned on the day of the presentation that the idea of any playback had been dropped until the prize winners, in which we were included, pressed for it. The evening chosen, in November, turned out to be one of the foggiest of the year, but to my mind the function was not ad-

vertised in anything like the way it should have been.

Those who have not attended the presentation are lucky to hear anything of the tapes beyond extracts on radio. Co-operation between the organisers and the BBC is obviously improving but we can not expect all tapes to be used in their entirety, and there must be many who would like to hear the runners-up as well as the winners. Last year, even at the presentation, we heard extracts only from two of the winning tapes.

I think that consideration should be given to the possibility of holding a special function for the replay of as many of the entered tapes as possible and I feel that, provided it was advertised sufficiently, it would be well attended.

Such a function would, no doubt, be held in London and so make it difficult for many enthusiasts from other parts of the country to attend. But we now have a network of tape recording clubs and in them lies the possibility of many more people hearing the tapes.

Is it not possible for copies to be made of all the winning tapes, and perhaps runners-up, and for these to be available for clubs for a small hire fee?

I have thought of the possibility of the formation of a BATRC Winners' Club. If copies of winning tapes were not available to clubs from any other source then perhaps such a club could provide them. I am sure it would be of interest to hear the view of clubs and individual winners on my above remarks.

RICHARD A. MARGOSCHIS.

Atherstone, Warwick.

EDITOR:—Readers—particularly club spokesmen—are invited to express their views, which will be of value in arranging the programme for the 1961 Contest. Complete playback of winning tapes in their entirety would take about 70 minutes—which is a lot of listening, in one session.

POSTAL CHARGES: MORE COMMENT

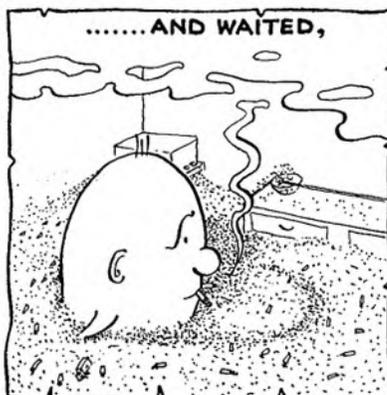
I WAS interested to read E. G. Woods' query about postal charges (*January 25 issue*). I have found that if the tape contains a current and personal message it is chargeable at letter rates. These are as follows: by sea: 3d. for the first ounce and 1½d. each additional ounce. By air: 1s. 6d. an ounce.

If the tape contains recordings of music, public speeches and such like, the rate is as for small packets—10d. up to ten ounces and 2d. for each additional ounce, by sea; and 7d. per half ounce, minimum charge tenpence, by air.

In all cases the post office requires the tape to be enclosed in strong protective covers. Rates vary for other countries.

A. C. BURTON.

Plumstead, S.E.18.



TO BE CONTINUED

New Products

GRUNDIG ANNOUNCE SECOND PORTABLE RECORDER

A NEW portable battery-operated tape recorder has recently been announced by Grundig. The new machine, the TK1, is a fully transistorised half-track recorder accommodating three-inch reels running at a constant speed of $3\frac{1}{2}$ ips, total playing time available using double-play tape is thirty minutes.

Quoted frequency response is 80-8,000 cps, and the power output is rated at 250 mW. Powered by six high capacity type batteries, the TK1 will operate for at least twenty hours before new batteries are required.

The magic eye, DM1, recording level indicator receives its anode potential from the bias oscillator section of the machine, and the bias frequency is 40,000 cps ensuring distortion-free recording.

In addition to the magic eye, seven transistors are used on a printed circuit.

Operation of the controls is simplified by two switches. First there is a four-position selector switch on the left of the machine, for stop/start, playback and rewind, recorder level and volume control. Monitor volume and tone control is operated by the right-hand switch.

A record safety button is fitted to prevent accidental erasure and there is a lockable temporary stop control to allow immediate stop or start.

A storage pocket for the microphone, and facilities for the connection of an external motor supply are also provided.

Weighing only 8 lb., and measuring $11\frac{1}{4} \times 7 \times 4\frac{1}{2}$ in., the TK1 is finished in cream grained plastic with gilt fittings and slate grey deck.

It is supplied with a full set of high capacity type batteries, microphone, spool of tape, empty spool and two connecting cables. The price complete is 29 guineas.

Grundig (Great Britain) Limited, 39/41, New Oxford Street, London, W.C.1.

Reflectograph

AS a result of the recent National Engineering Award, Multimusic Limited announce that they have no alternative but to increase the price of their Reflectograph Tape Recorders.

Whilst all orders already received will be executed at existing prices, retail prices of new orders will be—Model "A" 105 guineas, Model "B" 115 guineas.

There is no reduction in trade discounts and these will be maintained at the same level as before which are believed to exceed those given for other professional equipment.

Multimusic Limited., Maylands Avenue, Hemel Hempstead, Herts.

The Grundig TK1



New four-track stereo by Körting

THE latest in the range of Körting tape recorders, distributed in this country by Technical Suppliers Limited, has recently been announced.

The new machine, the Körting MT157, is a four-track, two speed, $7\frac{1}{2}$ and $3\frac{1}{2}$ ips, stereophonic recorder, with two record and playback heads allowing a variety of special applications.

Outstanding feature is the incorporation of a second record/replay head. This allows the signal to be monitored from the tape. This facility is also an aid for multiple superimposition of synchronised recordings. A signal previously recorded on track A can be monitored while a second signal is recorded on track B. If the two signals are then satisfactorily synchronised, track B may then be dubbed direct on to track A. Normal mixing facilities are also provided, plus the ability to create echo on a tape.

Quoted frequency response is 30-20,000 cps ± 3 dB at $7\frac{1}{2}$ ips, and 40-15,000 cps ± 3 dB at $3\frac{1}{2}$ ips. Wow and flutter is given as less than 0.2 per cent at the top speed, and signal-to-noise is rated as better than 40dB.

Maximum spool size is 7 in., providing a total monaural playing time of nine hours at the slower speed using double-play tape.

Valve line-up includes two transistors OC44, two ECC85, three EL95, and one EAM86. Power output is three watts per channel through the 6 x 4 in. elliptical loudspeaker. Only one speaker is incorporated in the machine, but there are two sockets for external units.

Inputs include connections for microphone (two mono or one stereo), radio or pick-up.

Other features include pause control, magic eye recording level indicator, digital rev. counter, separate bass and treble selector. Should the tape break during play, an automatic cut-out switch stops the function in use.

The MT157 measures $16\frac{1}{2} \times 13 \times 7\frac{1}{2}$ in. and weighs 29 lb. The price is 85 guineas.

An additional feature to the previous Körting models is the two independent gain controls during record or playback.

Earlier models simply had a balance control only operational during playback.

Technical Suppliers Limited, Hudson House, 63, Goldhawk Road, London, S.W.12.

Scotch Brand booklet

A TWENTY-PAGE booklet dealing with many of the problems faced by recording enthusiasts has been published by the Scotch Brand tape manufacturers.

Entitled *The how-to-do-it booklet of tape recording*, the new publication contains sections which include care of tapes, instruction on threading tape. Explanations are given on how half- and quarter-track system works, and the techniques of editing and splicing are described.

Copies are available free, direct from the publishers.

Minnesota, Mining and Manufacturing Co. Limited, 3M House, Wigmore Street, London, W.1.

Four-track—26gns

A FOUR-TRACK version of the Fanfare 60 has been announced by Peto Scott. Their latest addition, designated the Fanfare Super 4, provides a total playing time of $1\frac{1}{2}$ hours per track using double-play tape on the $5\frac{1}{2}$ in. reels accommodated.

As with their earlier machine, the deck is the BSR Monardeck, and the specifications are therefore the same.

Features include inputs for radio or microphone, magic eye recording level indicator, and an output of three watts into a 7 in. elliptical loudspeaker unit, or to the extension loudspeaker socket.

The cabinet, covered with Vynil and Vynair, measures $14\frac{1}{2} \times 12\frac{1}{2} \times 6\frac{1}{2}$ in., and weighs 20 lb. Accommodation for mains lead and the crystal microphone is provided.

Included in the price of 26 guineas of the Fanfare Super 4 is microphone, tape and spools.

Peto Scott Instruments Limited, Weybridge Trading Estate, Surrey.

News from the Clubs

THE Federation of British Tape Recording Clubs is formed from members of the various locally organised tape clubs scattered throughout the country. It serves as a general sorting house of ideas for tape enthusiasts, through their clubs, and is open for membership to any club in the British Isles. It meets officially only once a year, at the AGM, when members of the technical and national Press and manufacturers are invited to attend. The committee members keep in close contact, however, and meet if current trends make this advisable.

On January 22, such a meeting of the committee members was held. First on the agenda was the regretful acceptance of the retirement of their chairman Sqdn. Ldr. F. Wescott, and the appointment of Mr. Alan Stableford, secretary, to fill the vacancy until the AGM, which is scheduled to be held on Saturday, June 10, at the Hotel Russell in London.

The committee then went on to discuss the problems of copyright—a sore point among club members generally.

From a paragraph in their newsletter, issued after the meeting, it is apparent that the Federation is still doing all it can to get this matter settled, and are continuing to wage a cold war to keep their purely amateur hobby strictly free from professional interference.

The paragraph referred to says:—

“Among the more avid readers of the tape recording magazines we must now number the agents of the Mechanical-Copyright Protection Society. Any reference, in the club news column, to the recording of music, is certain to elicit a letter from that organisation. The writer ‘assumes’ that the music which

has been recorded was copyright music, and requests a list of composers, etc., in order that arrangements may be made to grant a licence.

“The Federation has made it quite clear that amateur tape recording clubs do not indulge in the recording of live performances of copyright music for any reason other than the demonstration of equipment or in order to teach recording techniques. Members’ clubs are advised to adhere strictly to the provisions relating to *public* recording and performance of copyright material and to obtain any necessary licences.”

The report finished with a plea to clubs to make available to the Federation any letters referring to club activities.

Now that is strong enough. I believe, to prevent club secretaries from being worried by any copyright guardians. However, for the benefit of those new clubs not familiar with the Copyright Act as it stands at present, it should be pointed out that the Act forbids the recording of copyright music in any shape or form. The fact that the recording so made is for personal use, or even if it is never played again, has no bearing at all on the matter. The actual act of depressing the record button is enough to leave the person concerned open to legal proceedings.

It is not only in this direction that the Federation looks after the interests of its member clubs.

Last year they proposed a Trade Associates alliance, the purpose of which was to bring together the manufacturer and the consumer. Grundig (Great Britain) Ltd. were the first to see the worth of such an alliance, and they have now been joined by E.M.I. Sales and Service Ltd., Lustraphone Ltd and Walter Instruments Ltd.

This kind of association, serving the interests of every tape enthusiast, screams out for more backing from the new clubs, as well as other manufacturers.

Another aid to the enthusiast, put into effect by the Federation is the issuing of introduction cards. These are being made available to and have been greatly appreciated by member clubs.

The idea is for the cards to serve as a form of identification and introduction.

They are of particular importance for recordists who wish to carry out interviews, and are only issued to bona fide members of clubs who have been vouched for by the secretary.

Further details on any of the three points referred to above, or on general points relating to the function of the Federation may be obtained from the Secretary, Mr. Alan Stableford, at 9, Normandy Terrace, London, E.16.

An example of the friendly activities of club members is provided by the Walthamstow club, which was recently responsible for a recording ultimately destined for playback 7,400 miles away in Thailand.

The recording, the result of a request asked of secretary Ken Perks, concerns Poomchai Lamsam, an 11-year-old Thai boy in England for schooling. His English guardian is soon to travel to see Poomchai's parents and report on his progress. He thought it might be worthwhile to take with him a recorded description of the boy's impression of his new home, in addition to the cine film and photographs already scheduled for display.

His request was eagerly answered, and for seventeen minutes Poomchai talked happily of his first term in an English school, of a visit to a South Coast resort, and of his first Christmas away from home, with every musical-sounding word being recorded by the Walthamstow members.

The members of the Enfield club of North London, are spreading their wings as a result of their recently acquiring a regular club room. Their new headquarters are at Bush Hill Park School, in Main Avenue, Enfield, and meetings have been arranged for alternate Wednesdays. The next meeting will be on March 1.

Membership of this club now embraces a wide area, and new members are welcomed from any of the surrounding districts. Details of membership are available from the secretary, Richard Collinson, 30, Ridler Road, Forty Hill, Enfield, Middlesex.

The January 26 meeting of the Cotswold club mainly consisted of the playback of members' tapes to select a number of sound effects. These are to be presented to a Science Fiction Convention to be held in Gloucester in May.

A variety of machines ranging from a Ferrograph to a Fi-Cord were used for the recording and playback of these effects which included electronic “space” noises, the roar of a lion, the yelping of a pack of dogs, and “water dripping into a sink full of beer bottles.”

A change of secretary is announced
(Continued on page 33)



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TAPE recorder owners who would like to make contact with others of similar interests to exchange news and views by tape are invited to send their name, address, sex, age and special hobby or interest (but only one, please) for this special new section.

It will be assumed that all tape contacts will be made using a speed of 3¼ ips, on half-track tape. If space permits, additional speeds, or track usage will be published. Maximum spool size only is given.

Fieldhouse, Tom, 524, Stanningley Road, Stanningley, Pudsey, Yorkshire. Writing and recording short stories.

Hannah, Arthur A., 17, Blundell Street, Blackpool, Lancs. Do-it-yourself. 7 in. spool, 7½ and 1¼ ips.

Howse, John (46), 27, Blenkarne Road, London, S.W.11. General interests.

Iredale, J. D. (Male—32), 9, Ingfield Avenue, Dalton, Huddersfield. Motoring. 1¼ ips.

Jenkins, Jim. (30), 6, King Edward Road, Birchington, Kent. Ballroom dancing. 7½ and 15 ips, 7-inch spool.

Jones, Richard Ll. (27), 71, Penrhos Avenue, Llandudno Junction, N. Wales. Pop music. 5½-in. spool, 1¼ ips.

Kidman, Michael R. (31), 11, Crown Road, Muswell Hill, London, N.10. Irish Ceili music. Prefers 3-inch reel exchanges.

Lingwood, Tom (28), 19, Belsize Park, London, N.W.3. Opera. 2- or 4-track.

Lowsley, Robert S. (39), 78, Gladstone Street, Loughborough, Leicestershire. Tape play productions, 7½ and 1¼ ips.

Midgley, Jack E. (35), 1, Peterborough Terrace, Undercliffe, Bradford, 2. Colour photography and Opera music. 5-inch spools.

Miller, Kenneth (53), 1500, Grand Concourse, New York 57, New York, USA. Active use of battery portables.

Schofield, John. (50), 8, Fortress Road, Kentish Town, London, N.W.5. Collecting Commonwealth stamps. 2- and 4-track, 7-inch spools. (U.K. contacts wanted).

Seaden, Edwin (36), 11, Hereward Road, Tooting, London, S.W.17. Country and western music.

Taylor, Peter (28), The Old Smithy, Stoke Poges, Slough, Bucks. Motorcycle scrambling. 5¼ in. spools.

Tomlinson, William J. (47), 62, Beacon-tree Avenue, London, E.17. General interests. Commonwealth contacts wanted. 5 in. spool.

Wilcock, Thomas (27), 9, Grosvenor Crescent, Arksey, Doncaster. English speaking French contacts wanted.

Young, P. R. (29), 24, Cavendish Gardens, Ilford, Essex. Motoring.

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Send details to "Tape Exchanges," *Tape Recording Fortnightly*, 7, Tudor Street, London, E.C.4.

News from the Clubs

(Continued from page 31)

for the **Leeds** club. The new official is Mr. R. Crossby of 96, Stainbeck Road, Leeds 7. The members have also managed to find new meeting rooms. These are at 21, Wade Road, Leeds, 2, and the next meeting to be held there has been organised for March 3.

Talks and demonstrations on script-writing, sound effects and documentary tapes have filled every spare moment of the **Dundee** club's recent meetings. These sessions are helping to get the members down to the fundamentals of tape recording in preparation for their entry in this year's B.A.T.R.C.

A special beginners class has been formed, dealing with any points on which members require advice. One of the first subjects is simple assembly work, and members are currently engaged on building a small mixer unit. The established members are soon to commence work on a complete recorder, for which they already have a tape deck and minor units. Power supply, bias oscillator, pre-amp and amplifier are among the units to be built.

Fortunately the club can boast a number of qualified technicians amongst its members, including several from the G.P.O. Their chairman, Walter Coupar, is a laboratory technician with Vidor Batteries; Harry Ayers is a works chemist with the same firm and vice-chairman Ernest Keith is an electronics engineer. Nearly all of them have at one time built recorders, FM tuners or mixers, etc., so they should be well qualified to give lectures to the beginners.

The **West Herts** members are continuing to exploit the humorous side of recording, judging by their activities at their January 14 meeting.

For the occasion, members divided into two groups and each group armed with recorders, microphones, etc., set to record their interpretation of Chairman John Grainger's previously scripted ghost story. A narrator read the stories while the remaining members introduced at appropriate moments sound effects of clanging chains, slamming doors, and howling winds. Great fun is reported, and, as is usual with such projects, it was difficult to decide who were the producers of the best tapes.

On January 9, John Grainger and Jean Stern visited the Hemel Hempstead Blind Club and played them a tape entitled *Highlights of 1960*, a tape produced from extracts of the recordings made by members during the past year.

Another club for London has been announced. On January 13, the first meeting of a club was to be held at The Risley Evening Institute, Rowland Hill School, Lordship Lane, **Tottenham**, N.17. Meetings have been arranged for every Friday, and prospective members are invited to contact Mr. R. Finch, the Principal, on any weekday evening.

One of the greatest problems for clubs is to find sufficient members who can be relied upon to regularly attend their meetings. Of course, even in the best and most active of clubs there will always be the unfortunate member who cannot attend every meeting due to other more important commitments. Now for a club—no matter what size—to have a regular attendance of every member is

an unusual thing, and so the next step should be to get enough members that, even if only 50 per cent attended, there will be enough persons present to get down to some really worthwhile recording.

Here again the location of the club is an important factor and I would like to close this issue with news of a club which first saw the light of day only four months ago. Of course, their situation is rather fortunate, but the members of the **Southampton** club must have some active member-seeking individuals among its ranks. Since its inauguration last October the club has managed to hold regular bi-monthly meetings and have pushed the total membership to forty. Their secretary tells me that new members are joining practically every meeting.

They do not seem to go in for any particular activity so far remote from other clubs, and this should encourage smaller clubs to rethink their recruiting drives and produce interesting, lively meetings—the sure way of encouraging new members. The latest of the society's plans is to record one of the local hospital pantomimes, and extension of this is their proposed hospital tape service. Also lined up for the future are visits to the BBC Studios, and the recording of a tape play, effects to be produced by members.

They have the usual tape exchanges, and a reply to such a tape received from the **Bournemouth** club, recently, is currently receiving attention. For those interested in contacting the club, the secretary is L. G. Wallbridge, and his address is 110, St. Catherine's Road, Bitterne Park, Southampton.

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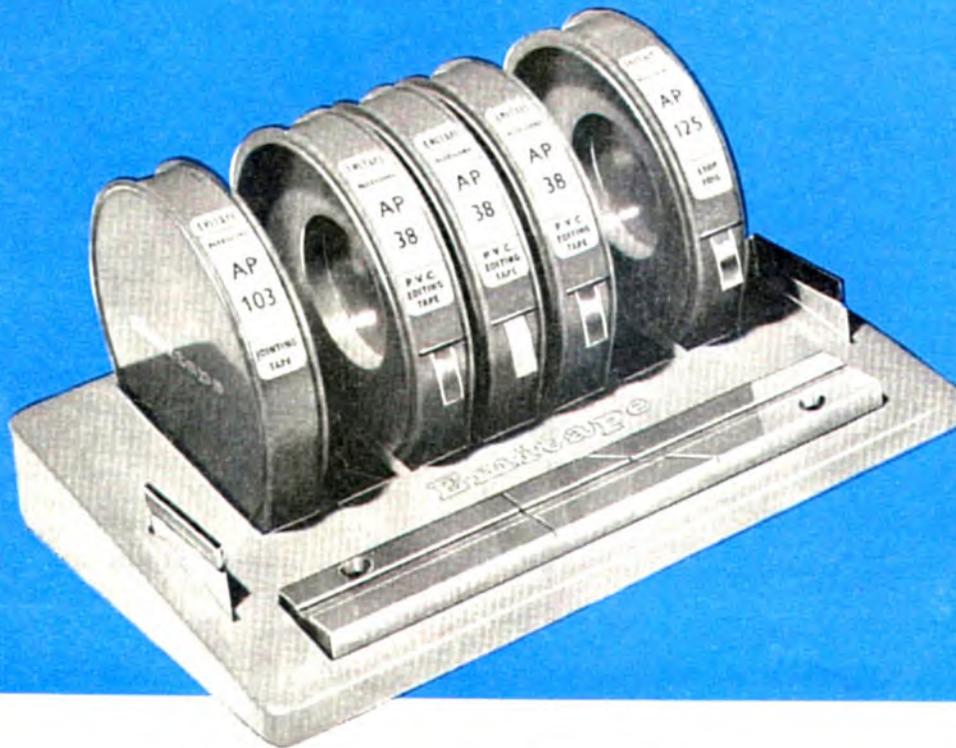


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