

JANUARY 1962

TAPE

RECORDING MAGAZINE

16



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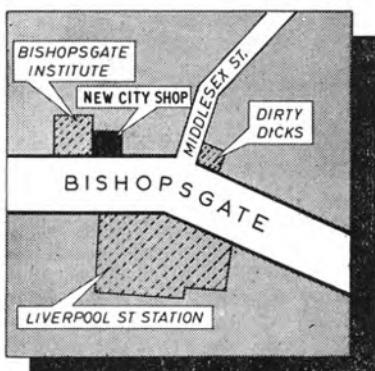


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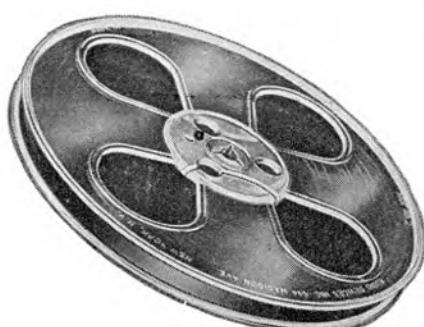


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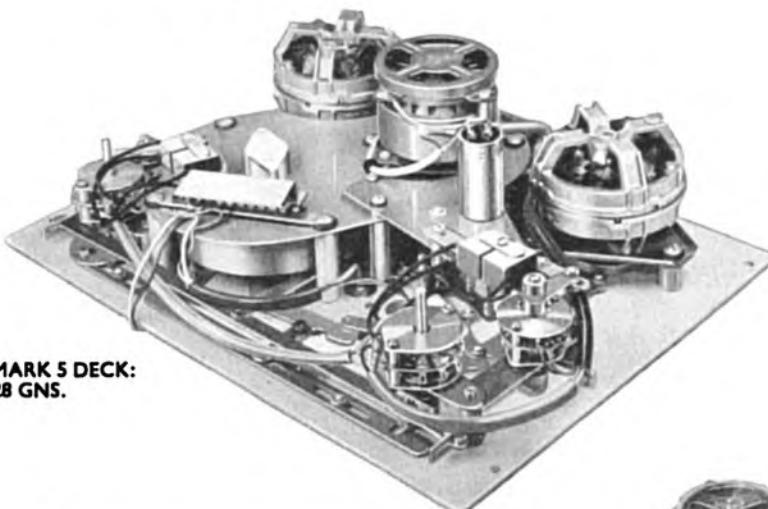
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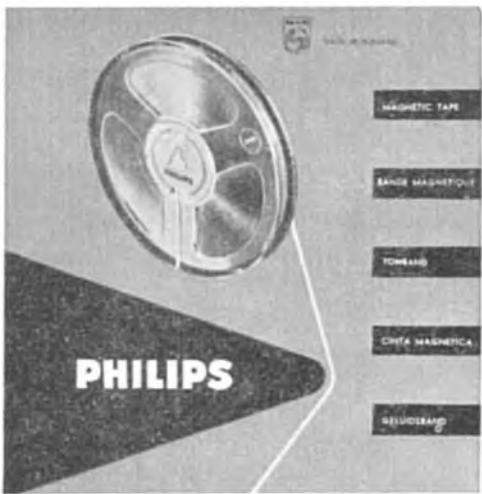
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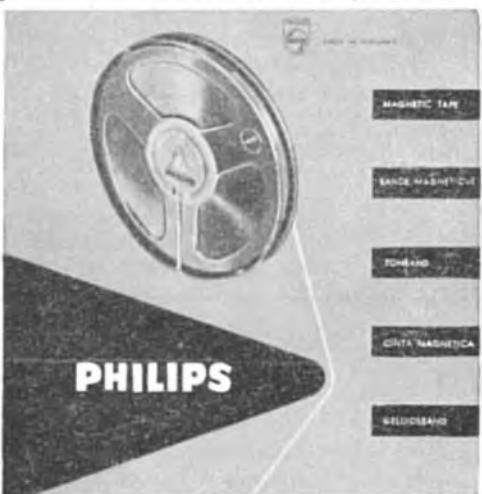
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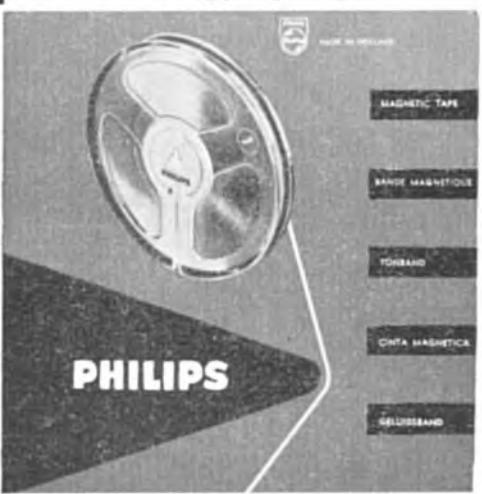
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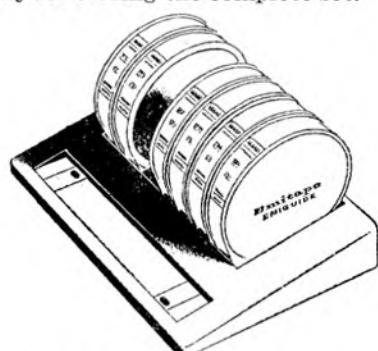
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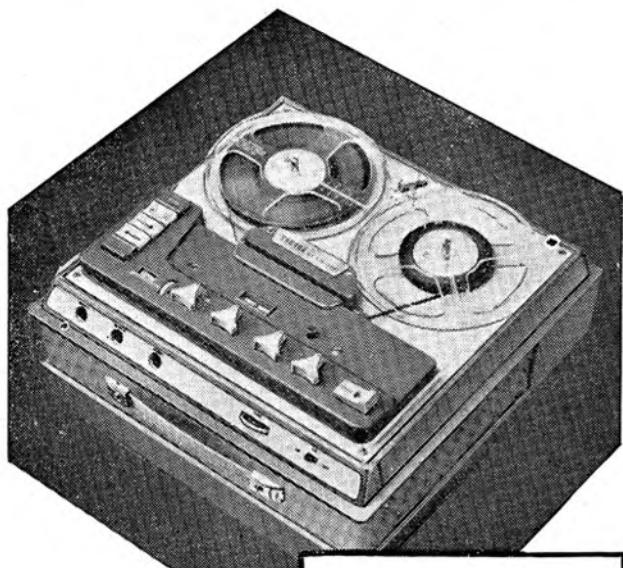
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Vol. 6 No. 1 January, 1962

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EDITORIAL

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R. DOUGLAS BROWN

ADVERTISING

Advertisement Manager,
KENNETH P. WILSON

Cover picture—Servicing night at the Liverpool Audio Society.

THE EDITORIAL VIEW

Contest-winning techniques

FULL details of the 1962 British Amateur Recording Contest will be published, with an entry form, in the February issue of *TAPE Recording Magazine*, which will be on sale on Wednesday, January 17.

One of last year's winners, D. J. Garrett, discussing the results of the 1961 International event, has raised an interesting point about technique. How far has the BBC idiom become a strait-jacket, rather than a stimulus, to amateurs in this country?

Mr. Garrett noticed that the Dutch tape which won the Compositions section in the last International resembled in many respects the sound tracks of Continental films, using a solo instrument to establish mood and many realistic background sounds to create atmosphere.

"It was so different in style from tapes made in this country that I cannot help wondering whether the 'BBC style' of presenting radio programmes is causing the stagnation of recording as an *art*," Mr. Garrett comments.

"To so many people, the ultimate is to produce a tape with long, deep fades to introduce and end scenes that are as long as those in the theatre; a minimum of sound effects, and those only when the action demands them—never to set the mood; and mood music only at the beginning and end.

"That this is the BBC's style is, I would say, because of the large number of plays it broadcasts that are primarily intended for stage. This is, of course, no reason why the amateur, who writes his own script, should adopt the style. I fear that, unless this is realised, we shall have difficulty in ever winning in the International Contest."

It is an extremely stimulating thesis. It is true that many of the plays broadcast by the BBC were first written for the stage; but a good deal of BBC documentary work shows the development of a specifically sound idiom. It is natural that other countries should evolve other approaches and other techniques. This is the reason why the link between the British and International Recording Contests is so valuable: it enables amateurs to exchange and compare experiences.

VISITING some of the tape recording clubs during the past month I have been delighted to see the strength, the enthusiasm and the variety of activity. At Eastbourne, for example, I found all ages represented in the membership and a splendid percentage of women members. Interests ranged from interviewing holiday-makers on the prom to music therapy (using tape) for handicapped children.

The Club, like many others up and down the country is thoroughly integrated into the local community. When it was first started members with recorders were greeted with suspicion if they attended local events; today everyone from the Council official down hurries to give notice of meetings and ceremonies worth recording. At Coventry, which I have also visited recently, the local club has a unique record of activity in recording municipal life.

My old friend, Richard Margoschis, writes from Atherstone, Warwickshire, where he is a public health official, to relate how tape is playing its part there. He made a feature tape called "Horrible Habits," dramatising the dangers of spreading infection by carelessness in personal hygiene. I have heard it, and it is very well done.

And very effective it proved. It was played to 4,300 children in 18 schools in the district, in less than three weeks, as part of a Clean Food Campaign.

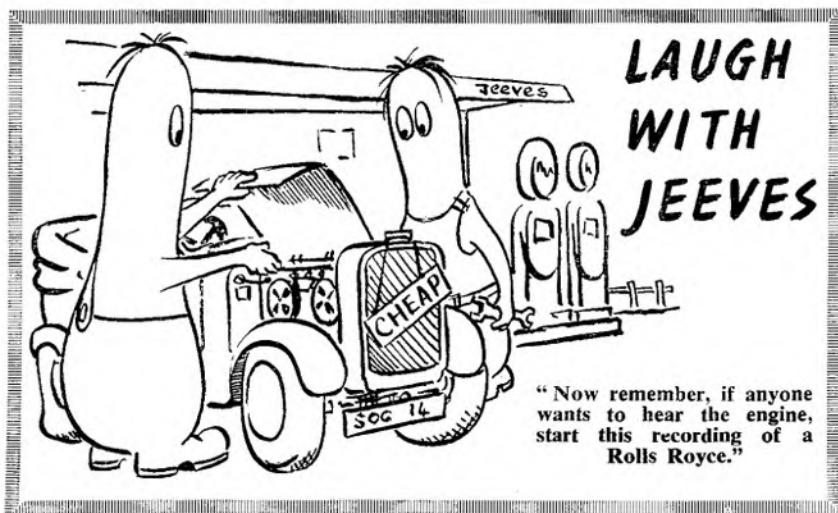
Now Mr. Margoschis has been asked to produce another feature on the same theme, suitable for the under nines.

WE hope that *TAPE Recording Magazine*, in its new monthly form, will appeal to our readers, and will attract a large number of new ones. Already there is evidence of a greatly increased demand for copies; if anyone has had difficulty in obtaining a copy of this first issue I shall be grateful if they will let me know by completing the form on page 42.

It is wise to *order a copy* regularly from your newsagents; this is the only way to be certain of getting it. A form for this purpose is also on page 42.

The annual subscription for a copy sent monthly by post is now only £1. Those who already have postal subscriptions which have not yet expired will have an adjustment made to take account of the change to monthly publication.

THE EDITOR.





ALAN EDWARD BEEBY'S

TAPE TALK

IN the course of my work, I listen to quite a large number of tape-recorded talks by amateurs. These items are mostly on the speaker's "pet" subject, of course, and, in the majority of cases, the material offered is interesting, informative, entertaining and original.

Nevertheless, the unhappy fact is that, all too often, nearly all fall down on the same thing. No matter how enthusiastic or well-informed the speaker may be, nine times out of ten, he or she fails to communicate this enthusiasm to the listener at the other end. I wonder how many otherwise promising tapesponding friendships, for example, may have withered prematurely for this very reason?

In the old days, sound-radio gave us many competent yarn-spinners who brought the technique of "talking to" a microphone to a fine art. The late John Hilton was one of them. Now we have television, and one speaker, I think, has emerged head-and-shoulders above the rest: Lieutenant-General Sir Brian Horrocks, whose recent "Great Captains" series on BBC Television—in which he simply sat at a table and talked—did very pleasant things to the viewing-figures.

Sir Brian was genuinely surprised when I approached him on behalf of *TAPE Recording Magazine* with an invitation to give advice to would-be raconteurs. "I'm afraid I'm very much an amateur," was his modest remark. Forgive me, Sir Brian, but the people who will disagree with you on that point can, I feel sure, be numbered in thousands!

As the first essential to the effective relating of a story, be it fact or fiction, he specified enthusiasm and a thorough knowledge of the subject in hand. Then he gave his views on microphone-technique:

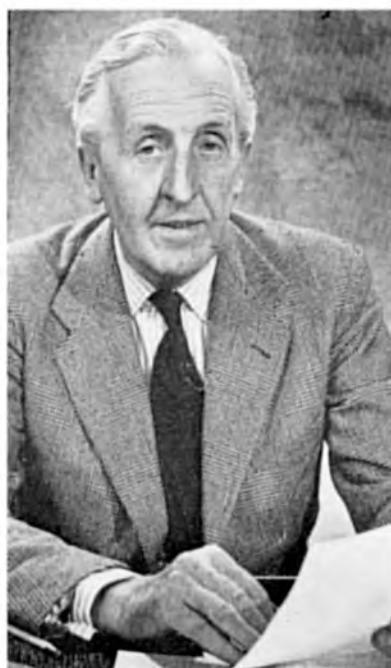
"Everyone treats the microphone in a different way," he said. "Some lecture it, some are frightened of it, and some get angry with it. The wise man will try and make a friend of the microphone, and imagine it is simply another person sitting in a chair by the fire, listening—and talk to it accordingly."

I suggested to him that one bad mistake made by so many amateurs was that of trying to adopt a "cultured" voice, thus giving a stilted and false impression to an otherwise good talk. This was something about which Sir Brian obviously had strong feelings. "Quite right," he agreed. "There's nothing more awful than the so-called 'Oxford' accent. People should talk in their own voices, and not attempt to put on accents which are foreign to them."

Then he gave a warning: "Be very

careful of humour. This so easily turns into facetiousness." Was humour not, then, permissible? "Yes, but I think it must come naturally or not at all. There's nothing worse than the laborious process of inserting a funny story which bears no relevance to the text."

Finally, I asked Sir Brian for his views on the thorny, old problem of editing a talk. Where to, and where not to cut?



Lt.-Gen. Sir Brian Horrocks talks to "Tape" readers

"At all costs, avoid verbosity," he advised. "I have found, from bitter experience, that the 'tighter' a script, the better the story."

In other words, don't digress? "Exactly. So many people, when telling a story, are inclined to ramble away from the point. In my case, recording talks for television was a good corrective, because I soon learned that time was my master!" He smiled. "It used to break my heart having to cut and cut again, but, believe me, the final product was invariably better and much more effective than the original."

Wise words, from a man who knows what he's talking about—and who takes great pains to make certain that you do, too. That, I suggest, is the secret of his success.

A LETTER from a reader in Reading suggests that we should appoint someone to operate a "Candid Microphone" project (similar to ITV's "Candid Camera") in which unsuspecting people are lured into making asses of themselves in front of a hidden microphone, and the results published in the magazine "for a real good laugh."

It is not, by any means, the first time that this particular idea has been put to me, but I hope it will be the last. Regular readers of my column already know my own feelings about "Candid Mike" gags: they are, to my mind, completely and utterly pointless and, at times, even downright offensive.

Whilst I have no wish to be branded as a kill-joy or a wet blanket, I think, perhaps, it might be as well to remind my correspondent that the policy of "TAPE Recording Magazine" is directed, primarily, to the advancement of creative tape recording. And by no stretch of the imagination can futile stunts of this sort earn for themselves the companionship of that all-important adjective.

■■■■■
I'VE listened to four complaints over the past month concerning the HMV Sound-Effect disc No. 7FX14, entitled "Glass-crashes". The complaints came from people who had bought the record under the mistaken impression that the sounds contained on the disc were those of window-smashes—which is a very different thing altogether.

How about issuing a disc carrying a selection of window-smashes, HMV? This item seems to be in great demand, judging from all reports.

■■■■■
"S.O.S." Can anyone possibly oblige with the loan of Victor Sylvester's version of his signature-tune, "Dancing On My Heart"? The appeal comes from a dramatic society who tell me that the 78-disc of this number seems to be unobtainable. Replies to me c/o the magazine, please.

■■■■■
DENTAL DEPARTMENT: I see that some dentists are experimenting with the idea of playing taped music to patients during treatment as a cure for frayed nerves. ("Cockaigne" Overture?) Shirley, my wife, who used to be a dental-nurse herself, doesn't have much faith in the idea . . . from personal experience.

Bringing a patient round from the anaesthetic on one occasion, she was interrupted by someone opening the surgery door, and the sound of a military band playing on the radio in another part of the house wafted through.

The patient (a hefty, 15-stone labourer), still slightly "under the influence," suddenly stood bolt upright, then marched determinedly forward . . . smack into and clean through a plate-glass French window! "Music Hath . . ." (?)

■■■■■
WILL Mr. S. Lowry, of London, S.W.1, who recently sent me an ingenious working-plan for devising "echo" effects please send his full address as I have someone interested who wishes to contact him.

TAPE IN THE SCHOOL

EDITED BY GEOFFREY HODSON



"And remember that the School Play is still in need of a tape loop of a certain sound effect."

THE WORLD OF TAPE

SAILORS WILL GET TAPED MESSAGES

PERSONAL greetings on tape will go to 2,500 sailors stationed in the Far East on Christmas Day as a result of a scheme organised by *HMS Collingwood*, the Navy's Electrical School at Fareham, Hampshire. It will enable wives, mothers and sweethearts to make short recordings for eventual transmission to ships based just off Christmas Island, Britain's nuclear testing base.

Arrangements have been made with over 350 shops throughout Britain who have recording facilities. Relatives and friends have only to contact *HMS Collingwood* and they will tell them where they can record.

Until two years ago, the land base broadcast only to the Portsmouth area. Last year, they tried broadcasting to the Far East and on one aircraft carrier 500 men heard personal messages from Britain.

This year, six WRNS are standing by to edit, record and produce the Christmas Goodwill programme, so that it can be sent to the waiting ships for playback on their broadcast systems.

Twenty-three-year-old Third Officer April Whitby, of Buckinghamshire, will introduce each item when the big day finally arrives.

When writing to manufacturers for information about new products, please mention that you saw it in "TAPE Recording Magazine."

MORE TEACHERS ARE USING TAPE

I HAVE recently visited British University Institute of Education and Dudley Audio-Visual Aids Society to give short tape recording courses. There is no doubt that more and more teachers are becoming alive to the many uses of tape in school, but I am glad to say that they are not accepting ideas unethically.

Many teachers genuinely feel that some of the work suggested for the tape recorder could be accomplished just as well without it. And this is partly true.

For example, the wall newspaper and the school magazine are two literary efforts well established in schools. They involve research, writing, revision, selection and co-operation. On the face of it a tape magazine has the same basic routine, and the only difference is that the finished product is spoken instead of printed.

But the difference is more subtle than that. Selection, arrangement and text need re-thinking for tape. You will

understand this more clearly if you make a transcript of a radio news item and compare it with the treatment of the same item received in the newspapers.

For when you work in tape you have to remember constantly that facts have to be presented more simply. When printed each reader can choose his own pace of reading. And if necessary go back over a point.

The pace of a tape production is predetermined—and this in itself requires judgment based on experience and intelligence.

The experience in listening to a tape magazine is available in itself. As most of the speakers will be known, and some of the contents familiar, usually one finds that critical attention is high.

By alternating taped and written magazines and wall newspapers, the children's minds are made more flexible. Their critical faculties are sharpened. And all the time they are exercising basic English skills.

New Zealand Newsletter

HUGE white caps of snow on the mountain tops, but the gardens a blaze of colour with spring flowers. Then spring turns to summer and New Zealand children start their long summer holidays in mid-December.

Choral Festivals in the primary schools are a highlight of the autumn term. Massed, semi-massed and individual school items of choral speaking and musical groups from widely scattered areas are staged, and the tape recorder has proved a great success. Items have been recorded by a choir trained by the Festival conductor to be used as models by participating schools, and Descants have also been recorded.

After tape rehearsals no interpretation difficulties are encountered at the Festival itself. With a few itinerant music specialists, and many schools being very small and not having staff with musical ability, the tape recorder has no equal as a teaching aid once a good model is available.

One New Zealand country school has started to operate an internal radio station. A group of children prepare and record a short programme during the last hour of school each day, and this is played back shortly after school ends. In this way all children, including the participants, hear the results of their efforts.

Books for the classroom

Did you receive some book tokens at Christmas?

This popular method of gift presentation can be put to use for a number of books devoted to the subject of tape in the classroom. The following is my selection.

* * * * *
Broadcasting with Children, by Kenneth Methold (U.L.P.). 9s. 6d.

The only full book on tape work with children published so far. Written by a Secondary Modern teacher, but should be read by Junior school teachers too.

* * * * *
The Tape Recorder in the Classroom, by John Weston (National

Committee for Audio-Visual Aids in Education), 33, Queen Anne Street, London, W.I. 2s. 6d.

An interesting booklet by a junior school teacher but of relevance to all teachers because the emphasis is on the manipulation of tape equipment.

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

Eleven plays written in the classroom. Good introduction.

* * * * *
Cameo Plays, 14, 20 and 26, published by E. J. Arnold, 3s. each.
Radio and tape scripts.

SPECIAL ASSIGNMENT

By Denys G. Killick

OF all the symbols of the past and present greatness of our country, none is held in deeper nostalgic affection than the sound of Big Ben. Britons in every corner of the globe look upon the sounding of the hour from Westminster as the voice of home.

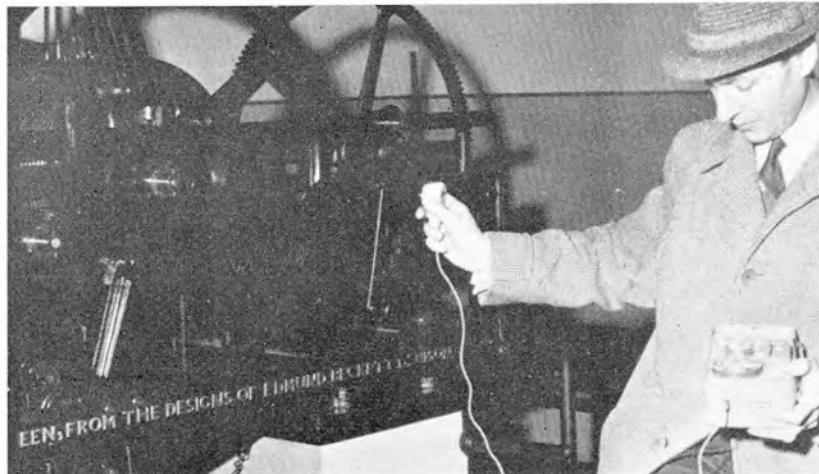
I have recorded many bells, many clocks, but the reader who asked that I should record the chimes of Big Ben was suggesting that I should record an institution. Mr. Robert Coote, of Blackheath, who wrote the letter, specified that the recording should be taken on a Clarion battery-operated portable.

The manufacturers, Messrs. G. B. C. Electronic Industries Ltd., co-operated fully, as did the Ministry of Works.

I made plans to record Big Ben itself from the belfry platform, and it did not require much imagination to conclude that I should be working under conditions of very great noise. I hoped to interview the gentlemen who would be escorting me, so I should have to practice voice recording, too.

One is always working at a great disadvantage when using strange equipment, and my first shock was the realisation that the Clarion does not offer any indication of the recording level, apart from the monitoring of the signal by its own internal speaker. For live recording through the microphone this, of course, is for all practical purposes useless. However, the machine does have a governed speed of $3\frac{1}{2}$ ips and I found by a little experiment that the lack of the conventional meter or magic eye was not as great a disadvantage as I had believed.

Operating in conditions of extremely high ambient noise, there is, with any machine, a very critical point at which the recording can be made; a fraction less gain on the level control will result in a tape so undermodulated as to be scarcely audible, while a fraction too much will distort the recording painfully. It is better to establish this point by practical experiment than by relying on any kind of level indicator. With the Clarion this was done quite easily by holding the microphone in front of my



Recording Big Ben

Readers suggest the recording assignment and, if they wish, the equipment to be used. Killick does the job and reports on the problems encountered and the way they were solved. Let him have your suggestion for his next assignment.

Goodmans speaker unit, turning my standard amplifier up to full blast and playing back a recording of a brass band.

To record in this way is simply to ask for distortion, but if it's done carefully you can also determine the point at which you get minimum distortion on a reasonably well modulated tape.

To achieve a satisfactory level for a spoken commentary and interview was very much more difficult. All one can do is to use a setting of the level control which you think will be correct in the light of your general experience and particular knowledge of the machine. In other words, make a cheerful guess and hope for the best! From what I learned by using the Clarion I did conclude that any owner who has the patience to take enough trouble with the machine could soon get the hang of recording "blind."

In Old Palace Yard, at the foot of Big Ben, I was joined by a parliamentary guide, a voluble, elderly gentleman, and a Ministry official. Together we walked through a massive wooden doorway and started ascending the stone steps of the clock tower.

It was here that I actually started recording. I wanted to get on tape not only the main features I had come to record but all the other incidental sounds as well. It's well worth remembering that the value of any finished tape may be determined by the support given to the major items by the creation of a background of reality in the form of subsidiary sounds.

Record just as much as you can. If two-thirds of the material turns out to be useless, it doesn't matter; the tape can always be used again. The sections found to be exactly what is wanted will be priceless.

On the way up I realised I should have to abandon my carefully thought out

commentary and series of searching questions. The guide proved truly to be a guide, and a stream of information flowed from him at such a rate that I was relieved of the necessity of thinking of anything other than recording what he said.

Through a door leading off the main stairway, we walked along a narrow passageway running right round the tower behind the clock faces, and as we went the facts and figures tumbled fast from his lips. The diameter of the faces, the number of pieces of glass, the length and weight of the hands, the system of lighting; all this information was given without a single question being asked. I was as awed by this gentleman's store of knowledge as I was by the close proximity of this clock of clocks.

A few more short flights of steps brought us into the chamber housing the clockwork mechanism. Here at the ticking heart of the clock I watched fascinated at the swing of the pendulum as the whole history of its design and installation was retailed. Did I refer to ticking? If you can imagine a tick with the power of a blacksmith behind its slow and regular beat, then it was ticking.

My first set-back occurred there in the machine room. At a quarter to eleven when the clock chimed the three quarters I was out of tape and in the middle of changing spools. The sounds from the mechanism, the thuds and clatters that are heard when the clock chimes are indescribable. I bit my lip with chagrin, put on a new tape and suggested we should go on up to the belfry immediately to be sure to catch the eleven o'clock chimes.

When I stood on the platform, not six feet from the great bell itself, I felt a moment of sheer panic. Far beneath was spread a gigantic panoramic view of London; the muted roar of the traffic reached even that height. I spotted, up on a wooden panel, the pair of microphones used by the BBC for their direct broadcasts from the tower. I looked from them to my little Clarion and from the

(Continued on page 33)

WHAT IS SOUND?

SOunds are the brain's interpretation of small changes in the normal pressure of the air that surrounds us. Nothing moves in the air without producing these pressure changes, though many of the "sounds" that result are inaudible, either because they are produced at frequencies below 15 cps or above 15,000 cps (approximately speaking) or because they are concealed (masked is the technical term) by other noises. Inside the frequency range of 15 cps to 15,000 cps very little escapes us solely because of its low level, for nature has developed the hearing system almost to the theoretical limit of sensitivity.

Broadly speaking, all sounds fall into two classes, those we desire—speech and music are typical examples, and that much larger group we call noise—all those sounds we do not desire but have forced upon us by modern civilisation.

How do they differ? Why, for instance,

should you be transported to the seventh heaven by Schuman's "Great" concerto (substitute your own particular favourite here) but be driven to distraction by a continuous stream of heavy lorries accelerating past your home? Quite frankly, the complete answer to this question is not known.

We do know that single frequency tones such as those produced by a tuning fork make little appeal to our aesthetic sense, unless one is particularly interested in the science of sound. Simple combinations of these single frequency tones do give pleasure, particularly when the individual frequencies are related in such simple ratios as 5 : 4, the major third; 4 : 3, the perfect fourth; 3 : 2, the perfect fifth, or 2 : 1, the octave. When there is no such simple relation between the frequencies in a complex tone, our ears tend to be insulted by the resultant sound and we refer to it as "noise."

There are many other reasons, some technical, some psychological, for a sound causing annoyance. It may be too loud, too prolonged, or it may merely be a new noise, but this is such a large subject that we will need to return to it at a later date. One of the most common characteristics of an annoying

noise is the presence of components of many frequencies, all related in a random manner. Products are rarely designed to produce noise, it just happens as a result of the operation of some mechanical device in which no steps have been taken to ensure that the sounds have any particular frequency.

Musical instruments are so designed that, while the sounds they produce are very complex, each note containing ten to twenty or more component tones (known as the harmonics), these components have frequencies related by very simple ratios. When an orchestra tunes up before a concert, the players are ensuring that the simple ratio rule holds, not only for the individual instruments but for all the instruments playing as an ensemble. The players of all the "tunable" instruments, such as the violins, do this by tuning their instruments so that their "A" string (nominally 440 cps) vibrates at the same frequency as the "A" of one of the "fixed tuned" wood-wind instruments. More recently it has become the practice to install an electronic oscillator as a standard of pitch for the whole orchestra.

All these sounds, music, speech or noise, have to be transmitted and reproduced by a communication system, whether it be of hi-fi or telephone standard, and for this reason the equipment designer needs to know something about the characteristics of the sounds.

What information does he need to have in order to ensure a *perfect reproduction* of the original sound? By "perfect reproduction" an exact reproduction of the original is inferred, though this may not be the most pleasing reproduction. Similarly, the requirements for ensuring maximum speech intelligibility are generally not those for obtaining the best speech quality, the transmission of intelligible speech requiring a relatively simple system. Reproducing all the little nuances of tone and timbre that characterise the quality of the original speaker's voice is much more difficult to achieve.

In the quest for an exact reproduction the most obvious need is some information about the frequency range encompassed by the component tones in speech and music. In other words, what are the lowest and highest frequencies occurring in speech and music? The designer also needs to know what loudness range is required—that is the ratio of the loudest to the quietest sound—and what acoustic power he must provide in the listener's living room.

Though he cannot obtain the information from any measurements on the speech and music signals, he must also know what distortions can be accepted by the listener. This may sound like

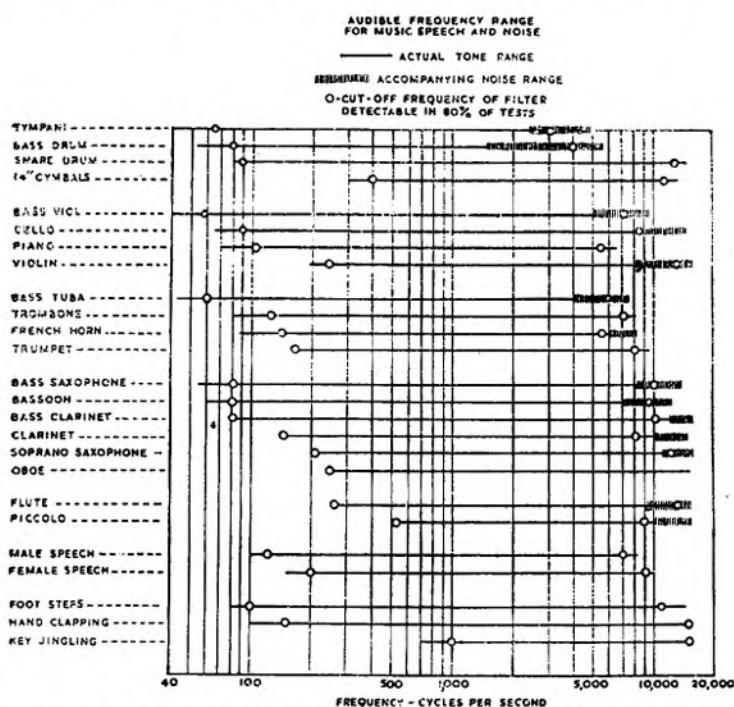


Fig. 2.—Bar chart showing audible frequency range for music, speech and noise

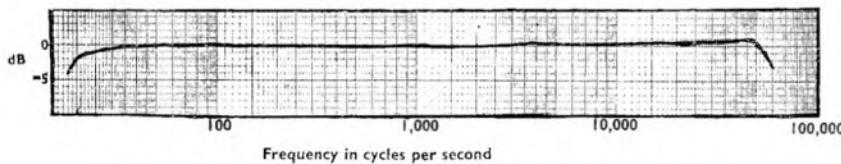


Fig. 1. Frequency response of Laboratory B & K microphone

rank heresy to the purist who may well suggest that all the original sound should be reproduced and that we should let the listener's ear be the final arbiter. This is a policy of over-emphasised perfection, that might be accepted if it did not have economic repercussions.

Transmitting a greater volume range or a wider frequency range than is necessary, costs money and the public, quite rightly, are not prepared to pay for an academic improvement that they cannot detect with their ears. A claim to a frequency range perhaps 100,000 cps wide looks good in the advertisements, particularly in America, but in my own experience only results in sound quality inferior to that obtainable when the frequency range is restricted to, say 15,000 cps.

There are two aspects of the problem of determining the frequency range (and the other information) that should be transmitted, but the order in which they are discussed is not of particular importance. The equipment designer must know which characteristics are significant in determining the special quality of the original music and speech and he must then know something of the ears' performance in dealing with these characterising factors.

As a simple illustration, the acoustic noise produced by a pistol shot or by steel balls falling on a metal plate may contain frequency components up to 100 cps, but this extended spectrum is hardly likely to be significant if the hearing system eliminates all frequencies above, say, 15,000 cps. However, a start will be made by examining the frequency spectrum of some typical music, speech and noise.

The acoustic signal could be broken down into its separate components ("analysed" is the technical term), using acoustic instruments alone, but electronic instruments have reached such a high standard of perfection that analysis is more easily achieved by first converting the acoustic signal into an electrical signal. This requires a microphone of unimpeachable performance, but these are available. Fig. 1 illustrates the performance of a typical example, the Brüel & Kjaer Type 4133 condenser microphone, from which it will be seen that the frequency response is substantially "flat" up to around 40,000 cps while the harmonic distortions are well

below .1 per cent at the maximum sound intensities reached by a large orchestra.

All the factors determining the quality of sound from an instrument are not yet understood, or perhaps it might be more accurate to say that we do not understand the relative importance of each of the factors, but there is little doubt that the frequency range occupied by the fundamentals and harmonics is one of the significant factors. This information has been obtained on practically all the common and many uncommon orchestral instruments.

The measuring technique is (apparently) straightforward and obvious. The instrumentalist is seated in front of a microphone, at a distance of about four feet, and asked to play chords or some typical piece of music while the electrical signal from the microphone is analysed. If necessary this is repeated with other chords or musical composition. A similar process has been followed using various orchestral combinations, cinema organs and other musical instruments, so that there is a vast mass of data available.

The usual method of presenting the information is shown in Fig. 2 where the frequency band occupied by the music is shown as a solid line, while that part of the frequency band occupied only by the accompanying bowing, blowing or scraping noises is shown by the dotted extensions. This data would appear to demonstrate that a frequency range extending from below 40 cps to well above 15,000 cps is necessary to reproduce everything from the lowest notes of the piano and bass viol to the highest components of the snare drum, oboe, hand clapping or key jingling.

Before placing this interpretation on the results—and this is the usual interpretation—there are several points worth noting. When making the analysis, the microphone was placed within a few feet of the instrument and the instrumentalist was instructed to play loudly, though both procedures increase the relative amplitude of the higher frequency components. It should also be noted that the method of presenting the data gives no indication of the relative amounts of acoustic power in the different regions of the frequency range, the bar chart giving the same prominence to a region in the frequency band where a signal peak

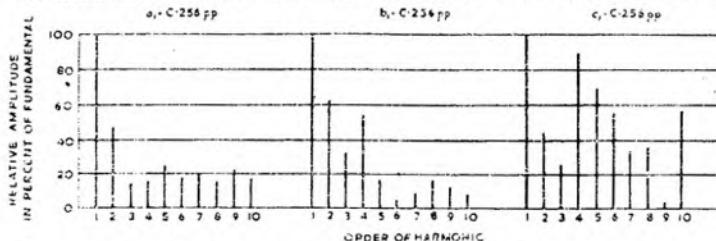


Fig. 3. Harmonic structure of 256 cps note played on a piano at three different loudness levels

With this first monthly number we welcome a large number of new readers to *TAPE Recording Magazine*.

To introduce them to audio, we are inaugurating an authoritative but very readable explanation of the whole background of audio—theory and practice.

This is the first article in the series.

The author is one of the best-known authorities in the field. His "High Quality Sound Reproduction" is recognised as a standard work.



occurs once a minute as it does to another region where there are several hundred peaks per minute.

The effect of playing an instrument softly or of speaking softly is the same, it reduces the amplitude of the higher harmonics, giving a soft smooth tone to music and an appealing intimate character to the voice. This is turned to good (and lucrative) account by crooners, who must sing softly to give the required appeal and must, therefore, use a microphone to get the effect over to an audience. Fig. 3 illustrates the effect of striking the same note on a piano at three different loudness levels and it will be seen how much more prominent are the harmonics in the "loud" playing shown by the right-hand diagram.

It is reasonable to assume that the frequency range required to reproduce an orchestra could be defined by using the data on the individual instruments to specify the lowest and highest frequency required, but measurement shows that this assumption is not true. Because an instrumentalist modifies his technique when playing with an orchestra, it is found that the frequency range required by an assembly of instruments is less than is required for the individual instruments. This will not be pursued, as there are other and more significant considerations that modify the required frequency range.

Room noise has a most important effect on the effective frequency range of a speaker or musical instruments. Noise is always present in the replay room and it is this rather than any lack of sensitivity in the hearing system that fixes the frequency range required in a sound reproducing system. For an understanding of this we need to see how the acoustic power produced by an orchestra is distributed over the frequency band. When we do this it is found that most of the acoustic energy is concentrated in a rather narrow portion of the frequency band. But more about this in my next article.


sound and picture

THE TAPE-SLIDE SHOW

THE increased use of colour film and the consequent production of transparencies which have their greatest significance when shared with others have prompted many of us to arrange our slides in some systematic order. When we come to the point where, in our slide shows, we are no longer satisfied with "off the cuff" remarks, we may wish to attempt the use of a prepared script, recorded on magnetic tape, complete with appropriate sound effects and background music.

It is in two phases of this preparation of the tape commentary that I am particularly interested: the achieving of naturalism in the commentary itself and the use of background music.

It is a very real art to produce a script and to record it so that it is thoroughly alive. It is well worth the effort involved to try several methods.

Make this experiment: gather a group of friends before whom you can speak easily, without any sense of strain. Show the slides you have determined upon in their logical order. Keep your recorder in operation while you speak, so that you may have an accurate record of what you have said. Preserve this tape, at least temporarily. If you have opportunity, attend someone else's showing of slides, and record his comments, just for your own private study.

Now prepare a written script, planning your sound effects. Record that script, with the sound effects if convenient. Now show the slides to a friendly critic, using your prepared recording as commentary. Invite remarks and make notes for future reference. Re-run your slides with the first tape as commentary and then record the two of you discussing the relative merits of sets of comments.

In all probability, your final script will turn out to be a combination of the two. Something of the spontaneity of your freely spoken explanation will be transferred to the script; and there will be an improvement in the order of your thoughts and in diction because of the discipline of the script.

You will now have come to the time when you can think of your finished production. You may need help in order to blend in the sound effects satisfactorily. A trial attempt with the more delicate parts will probably be desirable. With all in readiness, now, prepare your finished taped commentary.

If you want to be really meticulous, prepare a second tape. You will then be able to make a choice. Preserve the rejected recording for a time, however, for you may decide after a showing or two of the slides to return to it.

This preparation may seem unnecessarily complicated. But nothing can cancel out the effects of a good set of slides as thoroughly as a poor commentary. By the same token, a superior narrative can give life to an otherwise mediocre set of slides.

Suppose, now, we turn to the matter of background music. To me, this seems something of a nuisance. The use of such music seems to be a carry-over from the days of the silent cinema, where it played a particularly valuable rôle. While the use of such music has persisted even into this modern age of television, it is genuinely out of place with slides which are accompanied by a spoken commentary.

When you witness a television programme or a modern film without a musical background, you experience no particular distress. It is not essential that you hear every word spoken. Your imagination, together with the action you see on the screen, will supply what your ears do not actually catch.

If you want to test this some time, turn on your television to a dramatic programme to which there is a musical back-

ground. Watch the unfolding story until you think you have the proper setting for the plot, then darken the screen and listen to the sound track to the end. You will discover that your loss of comprehension is considerable. Apart from the absence of the picture, there will be as well a marked diminution in understanding resulting from a drowning of the human voice by the music.

The very same thing happens in the showing of your slides. Your slides are a series of still pictures which by themselves do not tell much of a story. Your commentary, therefore, becomes all-important.

If it be blurred or obscured, and this condition is always possible if there are those with hearing difficulties present, your show will lack the sharpness and detail which it ought to have.

Those of us who are addicted to photography and tape recording can use the one hobby to serve the other. We shall succeed best, however, when we employ in each the best skill of which we are capable. Magnetic tape can bring life to the arrested moments of time which our cameras record for us.

TAPE PEOPLE

Robert M. Creek

SOON after the last war a small business opened its doors in North London. It was called "R.M.C. Radio" and its name derived from the initials of its proprietor, Mr. Robert Creek. Electronics was not only Mr. Creek's business, it was his hobby; so when, in 1948, he came across an unfamiliar piece of mechanism called a tape deck he bought it and began to experiment. Quickly appreciating its possibilities, he bought half a dozen more.

At that time there were probably one or two models of tape deck available, but no one had thought of making them up into complete recorders for domestic use. Mr. Creek will admit he had no such idea himself at first, and he only used a complete machine, built by himself, to demonstrate the decks. Radio dealers were thrilled with the demonstration models, but they weren't in the least interested in the deck by itself without the pre-amp and audio output stages. If the public were anxious to buy complete tape recorders, that was surely the thing to offer them?

In 1950 the Magnetic Recording Company was formed and its first machine, the "R.M.C." was marketed. It had a polished wooden cabinet containing an eight-inch speaker; its deck ran at a single speed of $7\frac{1}{2}$ ips, half track, and was simple to operate. The amplifier was designed to give a standard of quality



higher than might be expected in a comparable radio or radiogram. The price? About 45 guineas.

That was less than twelve years ago, and those early machines were made in the original shop premises. The firm are very proud of a photograph of its first delivery van, bought second-hand for £40!

From such humble beginnings grew the Wyndson Recording Co. Ltd., the name which the Magnetic Recording Co. adopted when it took over its present modern factory premises in Friern Barnet. To build up a business in the space of a few years from nothing more than the germ of an idea requires not only the inspired genius of men like Mr. Creek, but also the willing co-operation of a skilled staff of specialists who work together in answer to a common vocation rather than employees simply doing a job.

Today the Wyndson Recording Co. Ltd. turn out fine pieces of both domestic and professional equipment, quite a large proportion of which are destined for the export market. Yet they still cling jealously to the policy first formed in that little room over R.M.C. Radio—to make friends rather than customers.

DENYS G. KILLICK.

IDEAS FOR YOUR BOOK TOKENS

GILBERT BRIGGS, in his fascinating new book of **Audio Biographies** (Wharfedale Wireless Works, Ltd., 19s. 6d.) quotes two views on the project. Ralph West encouraged him to write the book with the words "People are always more interesting than things." But then Paul Klipsch declared that "An engineer is apt to be a person who likes things better than people and therefore has difficulty expressing emotions, even if he is pretty good at describing motions."

Well, Gilbert Briggs is the living proof that one can be a first-class audio engineer and a rich human personality at the same time. And his new book is the result of this blend of virtues.

He has chosen 64 leading figures in the world of audio, set out basic biographical facts in "Who's Who" style, followed up with his own impressions of the person, and then allowed them to tell their own stories in their own words, encouraging them to describe their special contributions to audio and the more amusing incidents in their lives.

The result is one of the most readable and informative books on audio we have seen for a long time. Names that every audio enthusiast knows well—if only from the advertisements—are suddenly transformed into rounded, lively personalities and the drama of the development of audio in Britain is captured.

There are photographs of all those included and the book is lavishly produced on imitation art paper, so that it is a bargain at the price.

Five women—including the author's wife, are featured. Nineteen of the 64 live abroad. The subjects include recording engineers, technicians, manufacturers, professional writers and amateur enthusiasts.

Mr. Briggs' irrepressible humour bursts through on almost every page and he has communicated his own zest and gaiety to many of his contributors.

This is the ideal book to start you off on an exciting, questing new year of audio activity.

RUDOLPH DYNER

* * *

IT is an astonishing thing that until now no adequate book on microphones and microphone techniques has been written for the amateur tape recording enthusiast. Now that it has appeared, it is good that the author should be John Borwick.

His experience fits him admirably to bring the knowledge of the professional into fine focus for the assistance of the amateur. His **Microphone Guide** (Focal Press, 7s. 6d.) is a first-class introduction to the subject.

He declares the problem at the outset:

"there are no hard and fast rules for the best place to put the microphone for speech and music reproduction. In fact, the experts still resort to trial and error when they are faced with a new group of performers, or a strange hall or room. But trial and error is not the same as 'hit or miss.'"

Then he sets out to perform his task thoroughly and skilfully, explaining first the theory of the microphone, the various types available and their directional properties. Then comes a chapter titled "good connexions" which offers sound advice on cables, plugs and sockets, on microphone impedances, long and short leads and matching transformers. Many of the most familiar questions from beginners are here answered.

There is a chapter on mixing and monitoring, another on echoes and room acoustics (including advice on creating a studio in the home) and two detailed chapters discussing the problems of recording speech and music. These latter are full of severely practical advice.

The book costs 7s. 6d., which seems a lot for 82 pages of text (92 pages in all) but it is by quality rather than quantity that *The Microphone Guide* should be judged. An excellent narrative is helped by 54 line illustrations.

The other "Focal Soundbook" just out—**The Tape Editing Guide**, by Ronald Hack, is not such good money's-worth at 7s. 6d. It is substantially smaller (64 pages, 51 of text) there are fewer illustrations and yet one still feels that Mr. Hack has had some difficulty in padding out his writing to fill the space. The book does not cover more ground than any of the series of articles which have appeared in the tape magazines from time to time.

Nonetheless, many enthusiasts may find it convenient to have the information in this convenient form. Mr. Hack's first three chapters are elementary, but competent, explaining the reasons for editing and the basic techniques. His fourth chapter, on editing of music, surprisingly glosses over the possibilities of electronic music and musique concrete. The final three chapters, on editing for cine and for other hobbies and editing at work, are really concerned with putting across ideas for creative recording, rather than with editing technique, as such.

R.D.B.

Hans Koebner's EUROPEAN NEWSLETTER

BERLIN

The Copyright problem is hotting up here. The German Company of Copyrights for Artistic Works, GEMA, has prepared a proposal for a new copyright law, demanding a special fee for each tape recorder sold. This payment would enable the owner to copy music from works recorded by the Company. GEMA is understood to have mobilised support in legal quarters, but the tape recording industry is insisting on freedom to copy all works, so long as they are not used for commercial purposes.

The industry points to France, where this problem has been easily solved.

The legislators at Bonn are still discussing a new copyright law, which will take account of the new techniques of communication of the 20th Century and of the two opposing arguments.

Meanwhile, GEMA is involved in a test case, which will last at least two years. Every tape recorder owner hopes that 1962 will bring a solution to an unhappy situation.

PARIS

The Third International Biennale Photo, Optique et Cinema introduced nothing new to the world of tape. Tape recorders suitable for use with slide and cine projectors were shown by Grundig and Revox. The main feature to excite tape enthusiasts was the news of a "triple-play-tape" produced and released by Kodak, Rochester. But (as so often) it will not be available in the immediate future.

MUNICH

Some interesting new tape recorders were shown at the Berlin Exposition in

August 1961, but they are still not on the market. Of special interest were the new Opta 409 and the Uher 4000, both portable recorders with a great future. I hope later to be able to offer a technical report on these machines.

VIENNA

The Eumig Company are reported not to be entirely satisfied with their tiny tape recorder for their cine camera "C 5." The interest of cine amateurs has been roused, however, and, if my information is correct, 1962 will bring two cine-cameras for "sound-filming" with tape.

HANOVER

Professor Sennheiser, owner of one of the earlier companies established here, manufacturing excellent amplifiers, tuners, and microphones, produced some years ago a short-wave pocket transmitter and receiver, which can be used to operate a tape recorder remotely at distances up to 325 feet. Telefunken was granted a patent covering this system, called "Mikroport," Grundig has a similar device and now the Post Office authorities have given permission for the use of certain short waves for this purpose.

COPENHAGEN

Denmark is stepping out in the tape recorder market. The "Movie-Stereo-A-Two" recorder may be classified as portable studio equipment. It has ten (!) amplifiers, with printed circuits, and can be used either mono or stereo.



**YOU'LL KNOW GOOD SOUND
WHEN YOU SEE IT!**



If you've seen "Ben Hur" or "The Guns of Navarone" you'll know what we mean. Both these outstanding films were recorded on Zonastripe—a fact worth remembering when you are buying tape and want to buy the best. Zonatapes are supplied in handsome case bound library containers and are obtainable from most high class radio, music and photographic shops.

ZONAL FILM (MAGNETIC COATINGS) LTD., THE TOWER, HAMMERSMITH BROADWAY, LONDON, W.6 • TEL: RIVERSIDE 8741

WHAT HAS HELD BACK STEREO?

By

COLIN EBDON

STEREOPHONY is a proved fact. There is no longer any doubt that, given a reasonable microphone technique, a good recording, and good reproducing equipment, a most convincing effect of the spatial distribution of the reproduced sound can be created. Furthermore, the system is capable of artistic use; in addition to the possibility of re-creating the spatial distribution of the original sound field, technical development has made possible the creation of many effects which it would be quite impossible to hear in real life, although these sounds are, of course, derived from the sounds present in the studio.

Stereophonic reproduction has become a new medium of artistic expression. In addition to the more obvious uses for the reproduction of music, enterprising recording companies have issued discs of dramatic productions, and broadcasting organisations all over the world have carried out ex-



A provocative article pointing the finger at manufacturers who do not provide adequate demonstration facilities.

periments in the many ways of using stereophonic techniques in the production of feature documentary and imaginative dramatic works.

The BBC, as is well known, have been working on the development of studio techniques for all types of programme material, and a number of examples of what can be done have been broadcast during their Saturday morning experiments. They have also transmitted recordings produced by other radio stations, and everyone who heard the magnificent production of "Ondine" by the Japanese radio NHK will have been impressed, not only by the fine result (which, incidentally, won an Italia prize) but also by the vast amount of work that must have been done to establish the expertise necessary to achieve the final result.

In spite of all this vast worldwide effort, costing a great deal of money, and involving hundreds of dedicated people in many different countries, the advance of stereophony as a means of entertainment in the home has not been as rapid as might have been hoped, and perhaps I can be so bold as to suggest some possible reasons for this.

Domestic stereophonic sound reproduction started with a small issue of two-track pre-recorded tapes, and the relatively few people who were able to either buy new machines, or modify existing ones, for the new system, marvelled at the great advance in sound reproduction that they achieved. The number of tapes avail-

able, however, and the number of enthusiasts equipped to play them—two directly related quantities—was comparatively small, and it was not until the arrival of the stereophonic disc that any numbers of people heard stereophonic sound at all. Since that time, sales of stereophonic discs have steadily increased, as also have sales of reproducing equipment for them, but the increase has not been as rapid as everyone hoped.

What could be the reason for this? It seems to me that one of the most important reasons is a fundamental one, namely, that very few people, and that includes many of those that have bought "stereophonic" equipment, have ever heard stereophonic sound properly at all.

The standard of demonstration in the average dealer's showroom leaves much to be desired, even supposing that the equipment demonstrated is capable of achieving the desired result. I am not now thinking of the specialist "high fidelity" dealers, who often go to considerable trouble to give excellent demonstrations, and whose equipment, within the various price ranges, is first class.

How can the other, not so good demonstrations, be improved? Firstly, it must be realised that the system is one of *domestic* stereophony, that is, it is intended to be heard under *domestic* conditions, more particularly domestic acoustic conditions, and not in the rather "live" acoustic of the average small shop.

(Continued on page 21)

GOODMANS

Secret of Supremacy

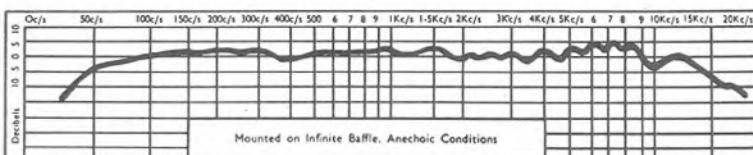
The High Fidelity Loudspeakers featured on this page are the finest and hence the most sought after 8" and 10" units produced. Both models owe their outstanding success to their smooth high definition treatment of all types of programme material.

They employ the now famous Goodmans plastic terminated hyperbolic diaphragm driven by a long throw aluminium coil moving in a very high magnetic field. Perfection of these basic features in precision assembled loudspeakers is the secret of the supremacy of the AXIETTE and AXIOM 112.

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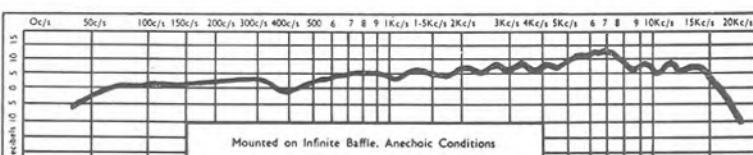
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What has held back Stereo?

● continued from page 19

For good reproduction of the stereophonic sound picture, it is absolutely essential that the direct sound from the loudspeakers is not confused by a large amount of reverberant sound, and the stock of highly polished television and radio cabinets found in the average showroom, not to mention the inevitable, and very necessary, glass display cabinets, produce so many confusing reflections that any proper stereophonic reproduction is impossible.

Now the cost of a separate demonstration room, acoustically treated, is more than most small dealers can afford, and so the only solution for them is to offer demonstrations in the home. Many people fight shy of this, since the obligation to buy is very strong. A much better solution would be some form of subsidy from the manufacturers, together with specialist advice, to enable the small dealer to provide suitable listening conditions in his shop. This would be greatly in the manufacturer's interest, and more sales would undoubtedly result.

This acoustic problem, however, is not all. Much of the equipment sold under the name of "stereophonic" can only give, even in the best possible conditions, a poor reproduction of the intended sound picture. I am referring, not to the equipment sold by the specialist "high fidelity" dealer, but to the so-called stereophonic radiogram.

This instrument, with its loudspeakers in the same cabinet, separated by only three or four feet, will only produce a stereophonic sound picture for someone sitting within about three feet of it. Other people in the room will notice very little difference from an ordinary monophonic machine. Far too many such instruments are being produced at the present time and it is small wonder that the average member of the public cannot hear any appreciable difference between stereophonic

and monophonic recordings on such instruments.

The practice of aiming the speakers away from the listener and using nearby reflecting surfaces to widen the effective difference between them, while undoubtedly giving a greater spread of sound, only tends to confuse the sound picture by preventing the essential direct sound from reaching the listener.

So it may be said that the manufacturers themselves are effectively obstructing the development of stereophonic reproduction by neglecting to provide equipment which is capable of being their best advertising medium.

It may be that there is sales resistance to equipment which needs more than one cabinet, but one or two manufacturers have solved this very satisfactorily by making one or both of the loudspeakers detachable, so that they can be spaced apart when stereophonic reproduction is desired and assembled together with the turntable unit as one cabinet for normal radio or monophonic record listening. It should surely be possible for other manufacturers to follow this lead and to make similar provision for good stereophonic reproduction. This single factor would, I am quite sure, go a long way towards popularising this new form of entertainment.

While disc reproduction can produce very fine stereophonic sound, this is not enough. All over the world enthusiasts are looking forward to the day when regular radio transmissions of stereophony will be possible, and it has been the complaint of dealers and manufacturers that the poor sales response to stereophonic equipment has been due to the fact that this is not yet possible.

Many difficulties stand in the way of such broadcasting, and while many ingenious systems have been proposed, only one country so far, the USA, has embarked on large-scale stereo transmission.

Unfortunately, the system chosen for use in that country is not very suitable for use in many European countries, including the United Kingdom, since the effective service area of the transmitters is greatly reduced. In a system of many local stations, with the majority of the listeners within the primary service area, this may not be important, but European broadcasting is largely geared to a small number of high-powered transmitters, with many listeners living at great distances from them.

If the American system were adopted in Europe there would be the danger that many of these distant listeners would be unable to achieve satisfactory reception.

More ideas are necessary. This is undoubtedly a radio frequency transmission problem and while many transmitter manufacturers have done considerable development work on the various systems so far proposed, it is to the experts in these organisations as well as the research departments of the broadcasting organisations, that we must look for a major "break through" in stereophonic transmission.

ENTER THE DERAM New Decca pick-up

IN the minds of many people stereo has become associated primarily with the radiogram—the very machine that is normally least calculated to do complete justice to the medium. There are two things to be done about this. One is to educate the public as far as possible to understand that first-class stereo is something that cannot be got on second-class terms, either of price or convenience. The other is to improve the general run of stereo-radiogram continuously so that they become more and more worth while.

The Decca Deram ceramic pick-up cartridge, at the modest price of four guineas, with diamond stylus, looks like making a major contribution towards the improvement of stereo (and mono) reproduction among machines where price is a vital factor. It has a most impressive specification, and I commend readers to the leaflet Decca have issued on the subject—which includes some record groove micrographs showing not only the slight amount of damage that occurred after 256 playings with the Deram, but also the horrible holes made by "a good commercial pick-up with a tip mass of 3 milligrams" after only one playing.

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stereo broadcasting

In the BBC Engineering Division Monograph No. 38, D. E. L. SHORTER, B.Sc.(Eng.), A.M.I.E.E., reports on BBC operational research on microphone and studio techniques in stereophony. The extract printed here discusses the problems of making stereo and mono recordings simultaneously.

A STEREOPHONIC system is said to be compatible when it can yield a signal capable of giving satisfactory results on equipment designed for monophonic reception.

The programme reproduced on a monophonic receiver should so closely resemble a normal monophonic transmission that the degree of compatibility is, in practice, limited only by the nature of the programme material.

Throughout the experiments, particular attention was paid to the requirements of compatibility. Wherever possible, an independent monophonic microphone system was set up and a normal monophonic version of the programme recorded simultaneously as a standard for comparison. With dramatic productions, it was impossible, on account of the movement of the actors, to make a simultaneous monophonic recording of the stereophonic production; in one case, however, a critical scene was re-enacted for comparison, using normal monophonic technique. For the purpose of the international study of microphone techniques by the E.B.U., a series of programme excerpts was produced in the form of stereophonic and monophonic recordings capable of being run synchronously, thus permitting direct comparisons to be made.

* * *

Compatibility of Left- or Right-hand Signal Alone

At the time that the investigation was commenced, interest was being expressed in the possibility of utilising the left- or right-hand stereophonic signal alone to

provide a monophonic programme, i.e., of achieving "left-right compatibility."

In the earlier stereophonic systems, employing a pair of omni-directional microphones spaced between 30 cm and 60 cm apart, left-right compatibility would at first sight appear to be automatically obtained, though even this only follows if the optimum microphone positions for stereophonic and monophonic reproductions are the same.

However, the stereophonic effects obtainable with spaced omni-directional microphones are poor by present-day standards, and current practice is to employ pairs of microphones which, by reason of their position or orientation, give prominence to sounds originating respectively on the left or right.

In these circumstances, the reproduction from either channel taken by itself must necessarily be unbalanced; when listening, for example, to the left-hand channel alone, performers on the left-hand side of the stereophonic stage are heard in the foreground, while those on the right-hand side appear distant, a condition well exemplified in experiments with programme sources as diverse as the BBC Variety Orchestra and the choir of King's College Chapel, Cambridge.

It was necessary in the early stages of the work to investigate and demonstrate to the various interested parties the problem of achieving left-right compatibility; to this end a number of commercial stereophonic recordings as well as various items of recorded material produced in the course of the studio experiments were studied. It was concluded that while there is a certain amount of material—particularly symphonic music picked up with distant microphones—which would give a tolerably balanced reproduction on the left- or right-hand channel alone, there is nevertheless so much material which is not amenable to this treatment that it would be impossible to base a complete programme service on the assumption of left-right compatibility.

This statement is, of course, based on the assumption of left-right compatibility, and monophonic balances are to be judged by current broadcasting standards. If it were decided as a matter of policy to lower the standard of criticism, a considerably higher proportion of pro-

gramme material could be said to exhibit left-right compatibility.

* * *

Compatibility of Left- and Right-hand Signals Taken Together

Most of the proposals for stereophonic transmission on a single radio-frequency channel do not demand left-right compatibility but assume that a satisfactory monophonic programme can be produced by adding the left- and right-hand signals, *A* and *B*. Stereophonic programme material which meets this requirement may be said to exhibit "*A + B* compatibility."

A monophonic programme formed by the addition of the left- and right-hand stereophonic signals is clearly free from the one-sided effects referred to in the previous section and it is often assumed that in such a programme all the requirements of compatibility are automatically satisfied. While this assumption was found to be true in many cases, the studio experiments also revealed a number of potential sources of incompatibility which require to be taken into account, and these will now be discussed.

* * *

Microphone Position

The *A + B*, or *M* signal carries in general a lower proportion of reverberation than that contained in the stereophonic transmission as a whole. Reproduction of the *M* signal on a monophonic receiver is therefore characterised by the relatively "dry" quality commonly associated with sound picked up at short range. The effect of this result on compatibility is well illustrated by the case of two recordings of a string quartet made at the Camden Theatre. One recording, taken with a relatively close microphone position, was of the "intimate" type, while the other, obtained with a more distant microphone, could be described as a concert-hall type of presentation.

While both recordings were agreed by all concerned to be good examples of their kind, that taken with the close microphone, having already a low proportion of reverberant sound, gave excessively "dry" quality on the *M* signal; for a compatible transmission only the

Stereo broadcasting

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more distant balance would therefore have been acceptable.

It should not, however, be concluded from the above that the optimum microphone positions for stereophony as such are necessarily more distant than for the corresponding monophonic transmission; indeed, the reverse is sometimes the case. It would appear that the listener's impression of the relative prominence of two reproduced sounds depends on whether these emanate from the same point, as in monophonic reproduction, or are separated laterally, as is possible with stereophony.

A similar situation arises when the direct and reverberant sounds from a single source are reproduced stereophonically, since the former is localised while the latter is distributed over a wide front. Some change in balance must therefore be expected when the various sounds on the stereophonic stage are superimposed in the monophonic version (though the direction in which the change takes place is not always the same).

One instance of this effect was noted in the dramatic production, *A Scent of Sarsaparilla*, where the level of background effects considered appropriate for stereophony was rather too high for the existing monophonic transmission.

A more striking example was provided in an item for solo singer, chorus, and orchestra recorded with a multi-microphone arrangement during a broadcast of *Show Time* at the Camden Theatre. The programme was balanced by listening to the stereophonic presentation. On reproducing the *M* signal, however, the soloist was found to be too prominent relative to the orchestra, while the chorus appeared to have receded into the background. In a case such as this an acceptable compromise can be effected and was in fact achieved in later experiments, but this process requires more facility for experiment and for changes in studio layout than is possible when sharing an existing monophonic transmission.

Use of Difference Signal for Special Effects

In nearly all transmission systems in which the monophonic programme is provided by the *A + B* or *M* signal, the additional information required to build

up the stereophonic sound picture is provided in the form of a difference signal *A - B* or *S*. In the stereophonic receiver, the original *A* and *B* signals are reconstructed by taking $(M + S)/2$ and $(M - S)/2$, from which it will be seen that any signal transmitted on the *S* channel will be applied to the two loudspeakers in reverse polarity.

Special "pseudo-stereophonic" effects may be introduced by signals transmitted in the *S* channel only, while some workers have even introduced artificial reverberation into this channel. It is therefore important to note that the *S* signal is not recognised or reproduced by a monophonic receiver and effects which are essential to the monophonic version of the programme must not be introduced by additions to this signal.

Timing

Although not strictly an engineering matter, it may be of interest to note a form of incompatibility connected with timing, which became evident during experimental dramatic productions. In a stereophonic presentation, sounds such as the ringing of a church bell, or footsteps unaccompanied by a dialogue, can be allowed to continue for a period which in the monophonic version would be regarded as monotonous.

After the final recording of the catacomb scene from *The Cask of Amontillado*, the actors were asked, for comparison, to play the excerpt again in the manner to which they had been accustomed in the past. It was at once noted that the "normal" performance was being taken at an appreciably brisker pace than the stereophonic presentation. For the monophonic version of the scene, the time taken was found to be 11 per cent shorter.

The compatibility or otherwise of the desired monophonic signal depends very much on the nature of the programme. Assuming the normal standard of judgment at present applied to the monitoring of programmes, the left- or right-hand signal alone cannot safely be assumed to yield an acceptable programme, on the other hand, the sum of these two signals can nearly always be made to do so by taking various precautions and making some compromises in balance.

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.

Unless otherwise mentioned tape contacts will be made using a speed of $3\frac{1}{2}$ ips, on half-track tape. If space permits, additional speeds, or track usage will be published. Maximum spool size only is given.

Bailey, F. C. (Male 53). 18a, Booths Farm Road, Birmingham 22a. Colour photography, stamps, Esperanto. $3\frac{1}{2}$ ips. 5-inch spools. Male contacts anywhere, letters first please.

Dewitt, David, A. (15). 42, Addison Road, London, W.14. Philosophy, psychology, gymnastics, microscopy. $1\frac{1}{2}$, $3\frac{1}{2}$, $7\frac{1}{2}$ ips. 7-inch spools. Contacts anywhere welcome.

Germann, Gerhard (28). 8, Hartmann Strasse, Stuttgart-Feuerbach, Germany. Model railways, short-wave radio, jazz, opera and folk music. $3\frac{1}{2}$, $7\frac{1}{2}$ ips. 7-inch spools. Can speak a little English.

Kerr, G. (Male 23). Block A, 4, Waterloo Square, Camberwell, London, S.E.5. Pop music and films. Any speed. 7-inch spools. Anyone, anywhere.

Keszei-Koch, Janos (25). 48, Allen Park, Stillorgan, Dublin, Ireland. 35 mm. photography, 8 mm. colour cine, any music except rock'n'roll. $3\frac{1}{2}$, $7\frac{1}{2}$ ips. $8\frac{1}{2}$ -inch spools. Anyone, anywhere, English or Hungarian language.

Knight, Michael (220, Ringland Circle, Newport, Monmouthshire. Classical music, instrumental rock. $3\frac{1}{2}$, $7\frac{1}{2}$ ips. 5-inch spools. Female contacts preferred.

Lawson-Smith, P. (23). 4, Fisherman's Way, Bourne End, Buckinghamshire. Brass bands, catering and stereo. $1\frac{1}{2}$, $3\frac{1}{2}$, $7\frac{1}{2}$, 15 ips ($7\frac{1}{2}$ ips for music). $8\frac{1}{2}$ -inch spools.

Maguire, William (13, Arthur Avenue, Whitewell Road, Newton Abbey, N. Ireland. Country and western music. $3\frac{1}{2}$ ips. $5\frac{1}{2}$ -inch spools. Contacts anywhere welcome.

McLean, R. T. (32). 20, Beaconsfield Road, Fareham, Hampshire. Fishing, boating, travel. $3\frac{1}{2}$ ips. $5\frac{1}{2}$ -inch spools. 2- or 4-track. Overseas contacts preferred.

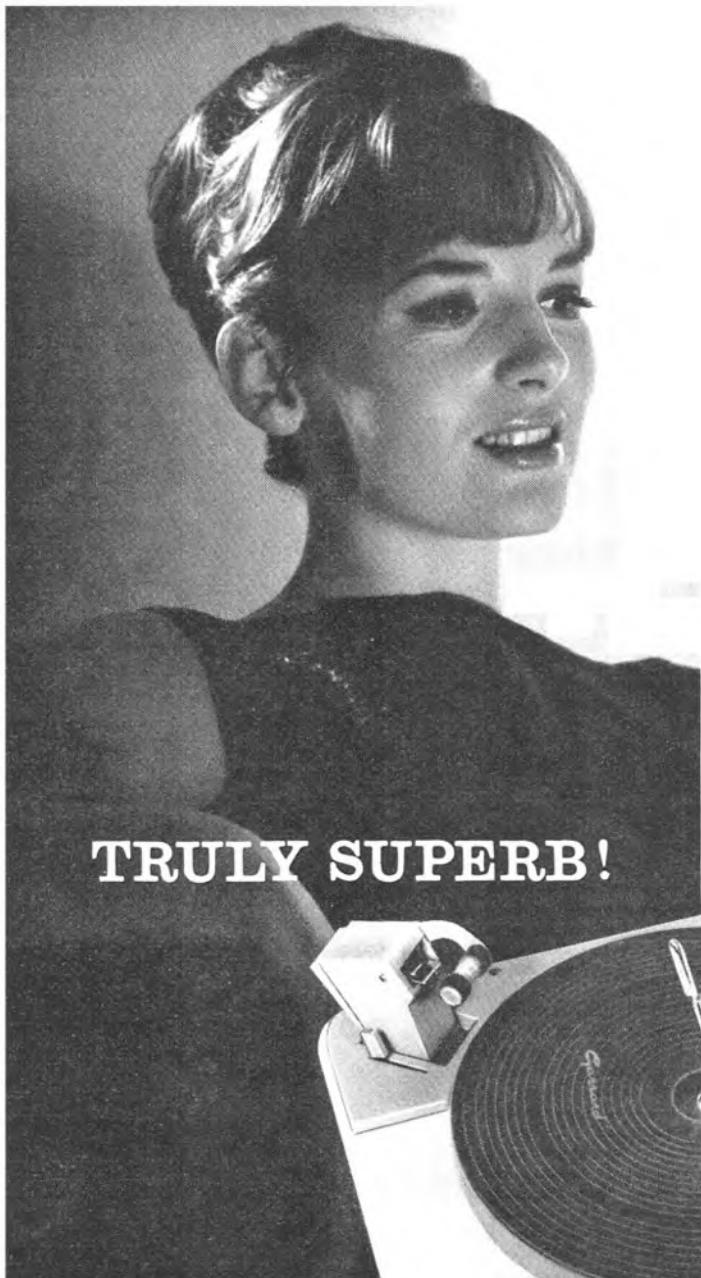
Messenger, Margaret (Mrs.) (5). Beaulieu Park, Wellington Road, St. Helier, Jersey, Channel Islands. $1\frac{1}{2}$, $3\frac{1}{2}$ ips. $5\frac{1}{2}$ -inch spools. Family exchanges wanted.

Moorhouse, T. (49). Grange Villa, 39, Warren Road, Rhyl, North Wales. Motoring, fishing, stereo and mono. $3\frac{1}{2}$, $7\frac{1}{2}$ ips. Contacts required in Commonwealth countries and USA.

Spring, H. A. M. (Male). 16, Newquay Avenue, South Reddish, Cheshire. General interests, all tastes in music. $1\frac{1}{2}$, $3\frac{1}{2}$, $7\frac{1}{2}$, 15 ips. $8\frac{1}{2}$ -inch spools. Anyone, anywhere.

Thomas, Klaus (29). Wurzburg, Am Dicken Turm 4, Germany. Books, photography, travel. $1\frac{1}{2}$, $3\frac{1}{2}$, $7\frac{1}{2}$ ips. 7-inch spools. Wish to exchange language conversations.

Thompson, H. (Male). 4, Priory View, Priory Road, Hastings, Sussex. Light classical music. $3\frac{1}{2}$, $7\frac{1}{2}$, 15 ips. 7-inch spools.



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MOST people realise that if you have stereo equipment you can play mono tapes and discs through it. Far too few realise, however, that there are considerable advantages in playing monophonic material through two speakers even when you have not got the complete chain of stereo equipment.

I suggest that you try this technique out, almost regardless of whether you intend to have full stereo equipment eventually. I say "almost," because your choice of a second speaker should be related to your ultimate plans in this respect. It would not be wise, for instance, to think only of the desirability of the speaker you are acquiring matching the one in the tape recorder. Think of the new speaker as one of a matching high-fidelity pair, and buy the two together now if you can manage it—the pleasure you will get out of them will be enormous.

The value of the second speaker is one of the general lessons that the stereo age is teaching us—namely, that all sound is better for being allowed to escape from its box. With the two speakers arranged a few feet apart just as they would be for stereo reproduction, and with an identical signal passed to each, the sound appears to come from a point mid-way between them. Usually the apparent sound source is wider than it would be in the case of a single speaker, but the degree of "spread" achieved, if any at all, is not the point.

If you allow yourself to think only technically it may be difficult to con-

stereo
COLUMN • BY D.W. GARDNER

THE ELEMENT OF ILLUSION

Vince yourself that this change of apparent sound source can have any material effect on the quality of reproduction. To think only technically, however, in this case, is to ignore one of the most important elements in art and entertainment—the element of illusion.

When there is only one speaker at work this element is actually working negatively. The pull of illusion is consistently towards persuading us that everybody and everything we hear is actually inside the box—speakers, singers, interviewers, interviewees, bull-fights, bells and full orchestras.

Ridiculous? No more than the pull of illusion that enables us to believe in the reality of characters appearing on a flat cinema screen. Naturally we are willing victims of the illusion in the case of the flat people, and prefer not to co-operate in the case of the people in the box, but

the illusion is playing its part just the same and making it very difficult for us in the latter case, to use our imagination favourably.

When you have two speakers, however, and the sound appears to come simply from a point in space, the imagination is freed from the mechanical pressure to assume that the speaker, or other sound, is in the box and can set to work instead on the wholesome task of visualising him, her or it, or all of them, in their natural shape, size, form and setting. Previously the imagination had the well-nigh impossible task of un-thinking the presented illusion before re-creating the true picture.

It follows from this that the double speaker arrangement can add to the effectiveness of almost all of your mono recordings, from recitations, interviews, bird songs and parlour talk to plays, documentaries and symphonies. Whenever, in fact, you want your listeners to "picture" the people or scenes you have recorded then you can be sure that the two-speaker technique will assist you to do just that.

This is not stereo, but it is a step towards it; and whatever advantage you detect from the system should be marked down as a piece of evidence in support of those who are always trying to point out that it is the incalculable and unmeasurable factors of this kind that make stereo superior to other forms of sound. Nobody has yet invented an instrument that will record whether a listener's imagination is working for or against you—but it matters just as much as frequency response and other measurable factors.

STAR STEREO DISCS

EDWARD GREENFIELD chooses THE CLASSICS

Verdi: Otello. Tebaldi/Del Monaco/Protti/Vienna Philharmonic conducted by Karajan. Decca SER 209-11.

This is outstanding even among Decca's opera sets—the recording of breathtaking realism and clarity, the conducting supremely vital and refreshing, the singing often inspired.

Brahms: Violin Concerto. David Oistrakh/Philharmonia conducted by Klemperer. Columbia SAX 2411.

With Klemperer's mature and satisfying help David Oistrakh's third attempt at recording the Brahms concerto proves by far the finest, a version which will stand any comparison for years to come.

Britten: Noye's Flode. Owen Brannigan/Sheila Rex/English Opera Group conducted by Norman Del Mar. Argo NF 1.

Recorded at this year's Aldeburgh Festival with singers and players including many local children, this captures perfectly the miraculously simple and deeply moving flavour of this medieval story of Noah, helped by some of the most vivid stereo yet heard on disc.

ROBERT GOWER chooses JAZZ

Piano in the Background. Philips SBBL 611.

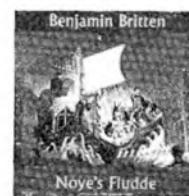
Blithely ignoring the title, Duke Ellington plays more piano on this LP than he usually does. His magnificent orchestra blows along with him in its customary exemplary fashion and the result is an indispensable addition to the select group of top-quality jazz recordings.

Gillespiana. HMV CSD 1392.

Big-band jazz imbued with Latin-American influences. This suite is a tribute by Argentinian pianist Lalo Schifrin to his employer Dizzy Gillespie, the trumpeter with the most dazzling technique and creative musicianship in modern jazz. Thoroughly at home with Latin rhythms, Gillespie plays with controlled assurance throughout.

Big Joe rides again. London SAHK 6123.

Hard-voiced and rawly emotional in approach, Joe Turner rides through a pungent blues set backed by a suitably swinging band of top jazzmen.



IVAN MARCH chooses LIGHT MUSIC

Philharmonic Promenade Concert. Conducted by Herbert Karajan. Columbia SAX 2404.

For sheer sumptuous sound (and performance to match) cannot be beaten. The rich recording shows that E.M.I. like Decca have a wonderful new stereo sound.

Tchaikovsky Concert. Conducted by Sir Malcolm Sargent. Decca SXL 20023.

Includes the "Sleeping Beauty Waltz," "1812 Overture," an extremely brilliant "Marche Slav," and a somewhat reserved "Romeo and Juliet" which does not wear its heart on its sleeve but offers fine recording, particularly of the brass and bass drum, and is thus sonically very affecting. This is one of the new inexpensive "Concert Classics" costing only 28s. 3d. in stereo.

Make way for the **LADIES**

By VIVIENNE GOODING

THE turn of the year. My family and I approach the New Year with a curious respect and lively anticipation as we wonder just what it will hold for us. Soon I shall be turning to a new diary, its pages as yet unmarked as it lies waiting on my desk.

Meanwhile, this is the season of parties, and, as we record the family festivities, I wonder if my grandchildren will ever hear these tapes.

Just imagine, if tape recorders had existed fifty years ago, I should be able to listen to my parents' parties when they were children. This is the heritage, denied to us, which we can pass on to future generations.

It is these thoughts which make another new year an exciting prospect, a new adventure in living.

I HAVE had a very interesting chat with Mrs. Francis, wife of the well-known Streatham retailer. She takes a very active part in the business and is keenly aware of the need to cater for the woman's point of view.

More and more women, she told me, are buying recorders for their own use. Quite a large proportion are buying for a particular purpose: church work, elocution practice, hospital work, teaching and welfare work. Charitable work features very largely in their activities.

Ladies, I find, are greatly concerned about the weight of the machines they buy. They're scared of being landed with a contraption so heavy they can't take it out and about with them. This is fine, because it proves that the women DO want to take their recorders out and really to use them—unlike a few men I know who are far too exhausted by their hard day's work ever to attempt to use their machines outside their own homes.

There is no doubt that the past year has seen a real awakening of interest by women in tape recording, and, as we might expect, they are bringing to recording their own feminine influence and outlook. The idea that recording is too difficult and too technical to be properly understood by a woman is, thankfully, as dead as the dodo.

Keep right on, ladies, and let's look forward to another year of even greater achievement when we, in our own way, can use recording for the benefit of our families, our friends, and society as a whole.

DO-IT-YOURSELF

By L. REID

WHEN using several recorders, and possibly a gram and tuner as well, the temptation exists to go on adding adaptors to the mains socket . . . or worse still, to make temporary connections with bare wires. This looks very inefficient and can be dangerous; never do it.

A neater and safer method is to make up a switchboard with the required number of outlets, and connect this to the mains—preferably to a 13 amp or 15 amp point—by means of heavy duty rubber cable. Recorders use comparatively little current so you need not worry about overloading the circuit unless you connect them up by the dozen!

For club use, where recorders are likely to have a variety of different plugs, the switchboard should have at least one of each type of socket . . . 2-pin, 3-pin, and the latest flat-pin contacts . . . but never fit a bayonet light-socket as the contacts are exposed. If anybody uses a bayonet type plug on his recorder persuade him to fit a two-pin instead; he can still make use of light-sockets if he wants to by means of a "2-pin to bayonet" adaptor, although the practice of using light sockets for recorders should not be encouraged.

Your club switchboard can be a fixture and attached either to the wall or built into the bench where the recorders usually stand, but it is a good idea to make up a portable form for use on outside recording jobs; you will then only have one plug to match up to whatever socket is available.

The portable form of switchboard—or rather *switchbox*—is best made from stout gauge galvanised iron sheet, which is easily cut with a large pair

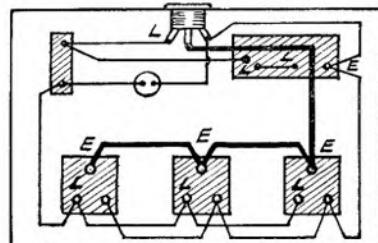


Fig. 2. Switchbox wiring

of metal cutting shears and hammered into shape over the edge of a wooden block.

Fig. 1 shows the design of a small portable switchbox which I made up for my own use, and the construction should be clear from the drawing, but there is no reason why you should not use a wooden box if you wish. Note that all the fittings are of the flush-mounting type for neatness and ease of connecting up; all the wiring is done from the back after the components are mounted. Fig. 2 shows the wiring, which must be carried out with insulated wire of 5-amp carrying capacity for safety.

Normally each outlet socket would have its own switch so that the current could be cut off while a connection was being made. In my box only one outlet has a separate switch; the remaining three take their current from one 15 amp switch, so that all come on together. The reason for this is that I often want radio programmes taped when I am at work, and this arrangement makes certain that everything will be switched on when required; it is easy for unskilled helpers to overlook something if the operation entails much switching.

As an extra precaution to show that the current is on, there is a neon mains indicator connected to the *output side* of the 15 amp switch. Incidentally, it isn't a bad idea to fit one of these neon indicators to all your equipment (or radio dial bulbs if 6.3v current is available) as it is all too easy to leave apparatus switched on if there is no indication. A suitable type of mains fuse could also be inserted in the circuit if desired, and this might on occasion save a trip to the meter cupboard!

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**a remote
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Tidy up that mains socket

It is worth getting the modern silent action switches for use on A.C. as they are not only quiet but sturdy; make sure that all switches are fitted in the *live* mains lead, which in this *country* is the RED wire. GREEN goes to earth, while the remaining wire goes to the other, neutral, main; but be careful with continental equipment as this does not always follow the British colour code. If in doubt seek advice.

For ease in transport the mains cable to my switchbox is made detachable, and connection is made by means of a flush-fitting Bulgin type three-pin mains socket of the sort usually found on amplifiers, with matching plug on the cable.

When wiring up plugs imagine that the plug is in position in a wall socket; then the *right hand* pin will be the live one, and the red wire should be connected to this, assuming of course that the house wiring has been properly carried out. There is always the possibility that a power point has been incorrectly installed by an amateur, so make it a routine to check the polarity before connecting anything to a strange socket. This is easily done by means of a neon tester which will also show if the mains are A.C.; with alternating current the glow in the tube appears to vibrate when the tester is moved.

Fig. 3 shows the correct way to wire a plug. After preparing the cable end

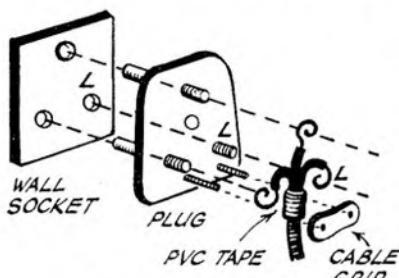


Fig. 3. Wiring a plug

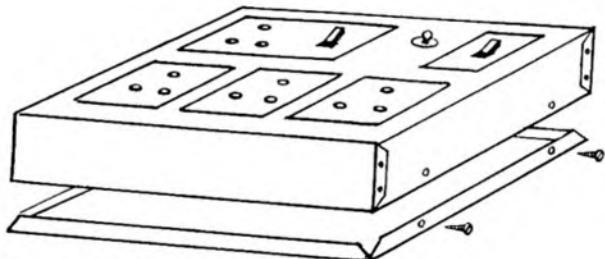


Fig. 1. Small portable switchbox

to suit the plug to be fitted, the braid is bound with P.V.C. insulating tape, or fitted with a rubber sleeve (obtainable from the popular stores) to prevent fraying; the increased thickness also provides that the cable will be more firmly gripped by the plug. Never fit a cable so that the strain comes on the actual connections or these will be liable to pull asunder and expose live wires.

It is a great advantage to standardise the plugs and sockets on all your equipment so that everything is interchangeable. The Bulgin mains type is neat and efficient and room can usually be found for one of these in the space where the original flex lead was stored. With a detachable mains lead you can make up several units of varying length to suit your different needs.

With the Bulgin plug as standard on one end of all mains cables you should decide what type is most suitable for the other end in order to avoid hasty alterations "on location" if you do much outside work; it does a cable no good to be continually twisted and untwisted. Although the "ring system" of house wiring is extending the use of the flat-pin type of plug, the older pattern of two- and three-pin sockets are still widely used.

There is much to be said for choosing the 5-amp 3-pin plug for the mains end of your cables. Not only do these fit their own size of socket, but by means of an adaptor they can be used off larger outlets if more convenient; and they are neat. In addition, the third pin gives earthing facilities if this is available on the socket being used. The unbreakable rubber type of plug is the cheapest in the long run.

For use with non-standard or obsolete power outlets I made up an assortment of "adaptors," consisting of short lengths of cable with various plugs on one end and 5-amp sockets on the other; the type of socket used

is described below when referring to extension cables.

All cables should be checked over periodically as constant bending causes the ends to break and this usually happens at the most awkward moment! (Another reason for having spares.) Always use strong 3-core cable, either of the hard-wearing type sold for electric irons or of cab-tyred rubber; flimsy cable is troublesome and can be dangerous.

If you do much outside work you will soon find the need for an extension cable. This is made up in a similar way to the "adaptors" mentioned above. The 5-amp socket into which the normal recorder lead is to plug can be a specially moulded flat rubber type made for the purpose (these are sometimes available in the popular stores) or, failing this, a socket can be made up from a Bulgin type fitted into the *bottom* of a small round tin, with the extension lead taken out through the lid by means of the special rubber grommet and cable support used on irons. See **Fig. 4.**

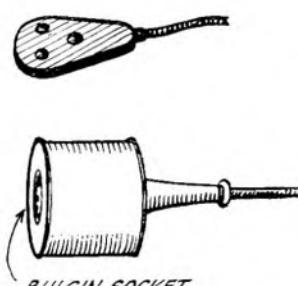


Fig. 4. Extension cable adaptor

Finally, when coiling cables after use notice how the cable tries to revolve as you wind, and allow it freedom to do this or it will kink, but if any great length is involved it is better to make up a small drum on which the cable can be rolled up. Always be on the watch for frayed insulation or loose connections, and see that exposed metal work is earthed by the green wire.

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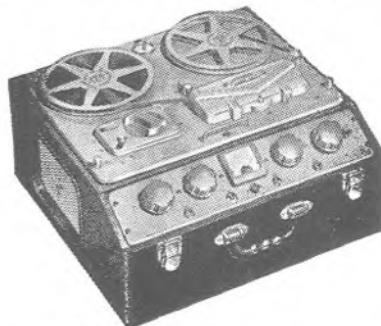
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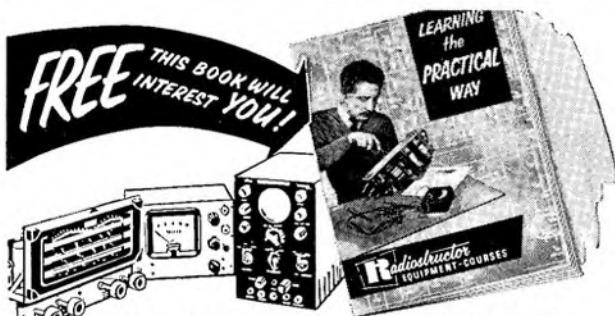
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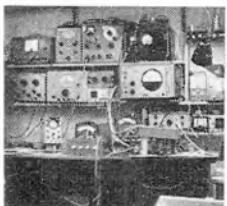
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TEST BENCH



ELPICO GELOSO G258

THE Geloso G258, a three-speed two-track tape recorder, is priced at 42 guineas and supplied complete with a three-inch spool of long-play tape, spare spool (the maximum spool size is five inches), and a high fidelity microphone. A microphone base suitable for standing on a table, is also supplied.

The recorder is attractively styled in a two-tone plastic case which has an overall size of approximately 13 x 8 x 6 inches. Push-buttons mounted along the right-hand side of the tape deck select *Record*, *Play*, *Stop* or *Wind* and a toggle switch mounted in front of these, switches the recorder on/off.

To the left of the mains switch are two controls concentrically mounted. The inner one operates for record level or replay volume, and the outer is a tone control on replay only. Mounted in front of the tape deck and in the centre of the recorder is a magic eye recording level indicator, and on the extreme left is a tape position indicator. Just below this on the front of the case is a lever which releases the pressure pads when loading or unloading a tape, by applying slight pressure to this, it works as a "pause control."

Near the back of the recorder, placed between the two spools is the speed selector which provides for $3\frac{3}{4}$, $1\frac{7}{8}$ and $15/16$ ips. This is only the third recorder to be made available in this country with the ultra slow $15/16$ ips.

Looking at the recorder from the rear, there are three jack socket connections, one on the left, for a micro-

phone, or radio tuner, etc., and two on the right near the mains inlet socket. The third (marked headphones), is for external speaker or headphones, during replay, and another above, marked "monitor," is a high impedance output for headphones which may be used to listen to a recording as it is being made. This is disconnected during replay.

The machine records from left to right using the upper track. By changing over the spools the other track is brought into use. With the tape supplied, the playing time is 1 hour 36 minutes at $3\frac{3}{4}$ ips, 3 hours, 12 minutes at $1\frac{7}{8}$ ips and 6 hours 24 minutes at $15/16$ ips. A transparent dust cover protects the tape spools when in use.

With the recorder switched to replay, the circuit is as follows: the output from the head is passed to one half of a 12AX7 double triode after which it is passed through the volume control to the second half of the 12AX7. Following this is half of a second 12AX7 and the signal from this stage is passed on to the output stage, a 6AQ5. Negative feedback is used between the second and third stages to provide frequency compensation. The signal from stage three is also fed to the second half of the second 12AX7 where it is rectified and passed on to the EM84 record level indicator.

The frequency response is compensated at each speed to ensure optimum performance.

When switched to record, the microphone is connected to the input of the

first half of the first 12AX7, which remains coupled as before to stage 2 (second half) which now feeds a signal to the record head via a filter network. Bias and erase voltages are obtained from the 6AQ5 which is now working in conjunction with an oscillator coil.

On test a signal of three milli-volts at 1,000 cps was required to fully modulate the tape. The frequency response obtained at each speed is shown in the accompanying graph. Although the slowest speed is intended for speech, some music was recorded from a VHF tuner and on replay the quality was quite suitable for background music, etc. The quality of recordings made at the higher speeds was well up to the standard I would expect from a machine in this class and in fact it is better than some costing more.

No audible wow or flutter was noticed except when sine waves were being recorded to check frequency responses, etc.

Using the microphone supplied, recordings were of good quality, but there was not quite enough gain in hand for any low level work. Most of the time the gain had to be at maximum. However, the microphone, although of low output, is very sensitive and sounds quite a distance away were recorded with excellent quality.

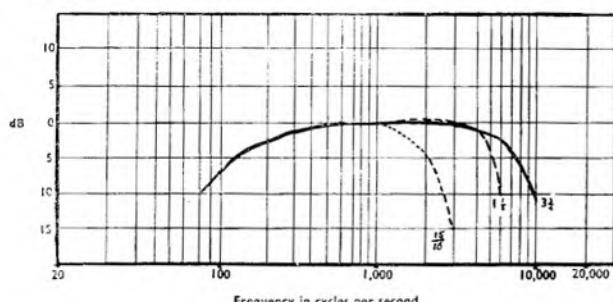
Erasure was complete even on heavy recordings. After erasure the tape noise was just slightly higher than a virgin tape, possibly due to some slight distortion of the bias wave form.

The tape wound evenly at each speed, but braking was not quite as good as I should like. Some slight spilling occurred at times on fast wind.

The G258 is simple to use and a neat compact recorder. General standard of workmanship is good and it should prove a reliable unit, the name Geloso may be new to many readers, but they are known for many good quality products, used by radio amateurs the world over.

The G258 is fair value for money and can be recommended.

E. A. RULE



Frequency curves of
Elpico Geloso
G258 tape recorder

by

Harald Harkansee*Telefunken Development
Engineer*

AFTER 1945 the development of magnetic recording techniques made rapid strides all over the world. Magnetic recording techniques used initially only for commercial purposes were improved and it was only after the creation of the first small domestic tape recorder intended for the amateur that magnetic recording quickly captured a large market.

During the past few years further fields of application were added and the magnetic recording principle was increasingly used in television, digital computers or storage equipment, also for controlling machine tools and last, but not least, as dictating equipment.

This great progress was made possible only by the substantial improvement of magnetic recording media and the electro-magnetic systems which are rightly given the collective description "head."

Starting with the invention of RF bias magnetising, by Braunmühl-Weber (1940) there existed until 1945 as many as twenty different varieties of circular-head types. These annular heads (erase, record, playback) all had the same annular cross-section of core, similar to those used today in studio equipment (Magnetophon M 5, T 9).

The design of these heads is shown in Fig. 1. The cemented, semi-circular stacks of core lamination made of mu-metal held in position by a top and bottom pressure plate and screws.

To prevent the laminations from separating when the edges of the poles are ground, the sheets were riveted with brass studs near the working gap. The correct gap width was obtained by a copper foil.

The principle of a rear air gap, used to reduce fluctuations in the magnetising density caused by varying tape contact at the recording head, was known at that time but, as was later realised, its dimensioning was not as good as it should have been. The playback heads used at that time also had a rear air gap which was used to equalise the inductance by inserting a sheet of mu-metal.

Also known was the use of magnetic recording for the purpose of stereophonic recording and playback. This was developed from the so-called push-pull method (patent applied for in 1938) which produced an improved characteristic in d.c. biasing.

The basic design of such a stereophonic playback head is shown in Fig. 2. To reduce feedback the separation between tracks and recording circuits was obtained by means of a copper strip. It was accepted at that time that with this design each system would have only one winding which made it asymmetrical and sensitive

The development of magnetic heads since 1945

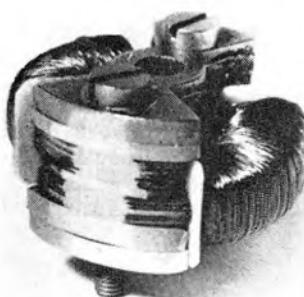
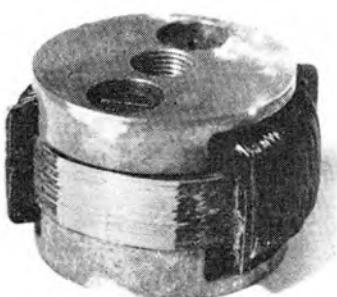


Fig. 1 (left). Annular or Ring Head with press mounting. Fig. 2 (right). Stereo playback head (annular ring type with press mounting). Fig. 3 (below). Ring type head (core mounting).

to hum interference. Although the total level was only between 12 and 15 dB it was sufficient to achieve the stereophonic reproduction effect. However, the designs described above, in particular the one employing pressure plates, showed numerous shortcomings.

Holding the sheets together only by pressure applied at right angles to their normal plane brought with it the disadvantage that the two halves of the core were held together only by friction, which meant that temperature changes during operation were liable to increase the gap width, thereby making the head useless.

This drawback was largely eliminated by a change of design in 1951 which consisted of inserting dovetailed springs engaging with the brass pins (later replaced by ivory pins) to produce a force component at right angles to the gap faces.

It was not until 1954 that the annular head was given its present shape by means of a coil former assembly. The flanges of the coil former were shaped in such a way that the two halves were firmly pressed against each other at right angles to the gap plane (Fig. 3). In that way any increase in the gap width during operation and excessive tension were avoided. In addition, small spigots at the end of the flanges of the thermoplastic coil formers were used to fasten the upper and lower cover plate.

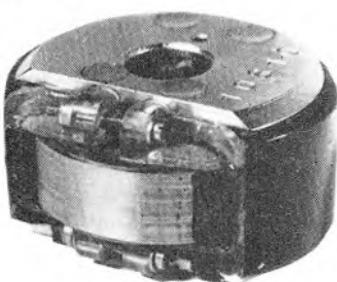
At the same time as annular heads for studio use were improved the first heads for the "Magnetophon KL 15" tape recorder were developed (Fig. 4). The three different heads (erase, record, playback) were designed differently and in accordance with their purpose. In addition to reducing the cost compared with studio heads, designers concentrated their efforts on reducing the size. Reduction in price was made possible by using twin-track techniques for the small tape recorders, later called domestic tape recorders. The so-called half-track technique had at that time been applied to the smaller "Magnetophon AW 2" studio tape recorders.

An interesting solution was found for the small erase head (Fig. 5) whose core cross-section looks like a figure eight. This made it possible to mount this head without difficulty. A low-loss silicon iron which had for some time been used for studio erase heads was also used for this erase head.

The windings were applied to the cemented laminated stack through the air gap which was approx. 0.4 mm wide. By fitting the erase head with a suitable copper spacer to provide the 1-inch contact width of the tape and by means of riveted flange rings the erase head also serves as guide and reversing element for the tape.

The two halves of the cores of the record and playback heads were for the first time made with parallel, straight flanks instead of with the semi-circular flanks used in the studio heads, which made it much easier to apply the windings.

To achieve the highest possible playback voltage (EMF) even without an input transformer, the larger playback head was given a sufficient number of windings to produce an inductance of approx., 10 H. At that time such a high inductance was made possible only because the reproduction frequency band at a tape speed of 7½ ips was no higher than 12,000 cps, which meant that the low characteristic resonance of the head could not cause any interference.



New manufacturing techniques were also employed for the production of playback and recording heads. After fitting the gap foil, the ground halves, complete with coils, were merely served several times with thread to facilitate assembly and potted into a drawn mu-metal case of about 2 mm wall thickness with synthetic casting resin. The tape running surface was surrounded by a suitable brass frame. The undersides of the housings were provided with spot-welded webs or plates for the three-point rocker mounting.

Improved methods for machining the pole-piece surfaces, and therefore the gaps, led to a general improvement of the quality of the heads in the course of time. The remainder was achieved by the introduction of special tapes for low speeds, such as the Types FS and LGH.

All these developments made it possible in 1953 to market the "Magnetophon KL 25" tape recorder with a tape speed of approx., $3\frac{1}{4}$ ips and an upper limiting frequency of 10,000 cps. Externally there was very little difference between these heads and those used on the "Magnetophon KL 15" but the mechanical gap of the playback head had been changed from about 10 microns (electrically 12 microns) to a maximum of 6 microns (electrically 7 microns) and the tolerances had been generally reduced.

Further development of the tapes mentioned above in turn brought about considerable improvements through the Type FSP and LGS tapes. The frequency band increase to 12,000 cps at a tape speed of $3\frac{1}{4}$ ips, which was achieved in the Type KL 35 (the successor to this unit) necessitated a reduction of the playback head inductance to approx., 2.5 H to ensure a simultaneous utilisation of the self-resonance of the head for distortion correction.

These units were always fitted with separate heads for recording and playback and each of these heads was provided with a balanced winding, uniformly distributed over both legs of the core. However, the development of a moderately priced tape recorder—the later Type KL65—once again made it necessary to find new ways.

This period of development again saw a new design of a combined head for recording and playback, the playback/recording head (**Fig. 6**). The so-called two-leg winding, whose advantage is the almost complete compensation of external stray fields, was replaced by a "single leg" winding. After receiving the wound coil formers over the rear cross arms and after fitting the gap foil, the two baked halves of the core were fitted with a bracket-shaped clamping spring of bronze, so that the spring force exerted a uniformly distributed pressure at right angles to the front and rear gap surfaces ($\text{air gap}=0$). The specific effect of the spring force, that is the position of the spring, is ensured by suitable shaping of the core laminations.

The head system assembled in this manner is centralised by the suitably shaped coil former in a mu-metal cap of 0.5 mm thickness, potted with synthetic resin, and the rear opening of the housing is closed with a cover, also of mu-metal. The head system projecting into the front opening of the housing is then ground

and lapped together with the housing to form a reliable running surface with uniform wear properties.

In these combination heads, whose dimensions are 12 x 12 x 15 mm, further screening within the equipment is indispensable for technical reasons. According to local requirements, these heads are made either with pin connections or wire connections. As a result of further improvement in manufacture, particularly in the machining of the pole piece surface, it was possible to reduce the mechanical gap width of ordinary batch-produce units to between 3 and 3.5 microns, without otherwise altering the design of the unit. This was the playback/recording head known under the name of "Ultratonkopf" which provided an upper limiting frequency of 16,000 cps at $3\frac{1}{4}$ ips, corresponding to 8,000 to 9,000 cps at a tape speed of $1\frac{1}{2}$ ips. This head was used for the first time in the "Magnetophon M75."

The drive for continued improvement of domestic tape recorders, even at the tape speed of $1\frac{1}{2}$ ips, was greatly assisted by the manufacturers of recording tape who introduced the long-play and double-play tapes whose flexibility ensured good contact between tape and head, quite apart from the increased playing time.

In the studio type of circular head too, and generally in commercial heads, considerable changes resulted from the continuing development. The circular erase heads, which had been made for a long time with gap inserts of mica instead of copper to ensure a lower power consumption, could be greatly improved with regard to their erasing properties by the so-called double gap ferrite erase heads (**Fig. 7**). Two erase gaps of different width in one magnetic circuit). The gain in erase attenuation was increased by 10 dB and thus amounted to 75 dB in the medium frequency spectrum.

In recent years, this type of erase head was replaced by the double system erase head (two systems, each of which contains a gap of different width, and one winding on the common centre limb) which, in another design, reaches the hitherto highest erase attenuation of nearly 90 dB.

The requirements of commercial recording techniques on multi-track heads (**Fig. 8**) demanded the adoption of a completely new construction because it is naturally essential in such cases that the pole piece surfaces of the individual systems are located in the same plane within a tolerance of a few microns. This could only be achieved with the aid of milled clamping pieces of brass or, for large production runs, by clamping pieces made of zinc die castings.

Because of the narrow spacing between the tracks and the necessary intermediate screening laminations which are required in the vast majority of the cases, only straight (parallel) core pieces can be used which are capable of receiving an accurate layer winding. The lamination stack halves, wound without coil formers, were therefore fixed with adhesive in the well defined slots of the clamping piece halves and additionally cast in resin. The subsequent common surface grinding operation of all pole piece surfaces ensures that the main requirement for multi-track heads outlined above is satisfied, provided great care is taken in processing.

(Continued on page 33)



Fig. 4. Recording head and playback head for the domestic Magnetophon KL15, KL25 and KL35 recorders



Fig. 5. Small erase head

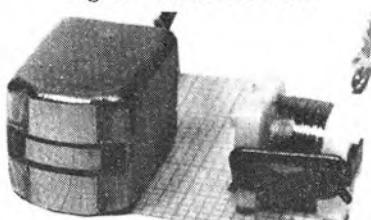


Fig. 6. Record/playback head with a mounting system consisting of a single wound side and the cores clamped with a bow formed clamp



Fig. 7. Double slit ferrite erase head (left), and double system ferrite erase head (right), for studio machines

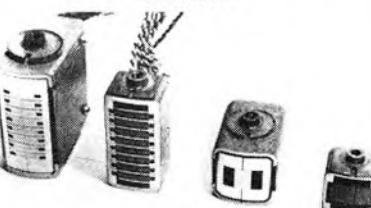


Fig. 8. From left to right. Multi-track playback head unit with eight tracks to one inch; studio playback double system erase head with eight tracks to one inch; Studio playback head with clamp fitting; and double system erase head

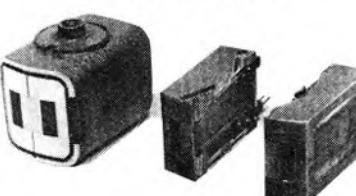


Fig. 9. Studio playback head with two equal halves clamped together (the wound halves of the core are already moulded with the mounting)

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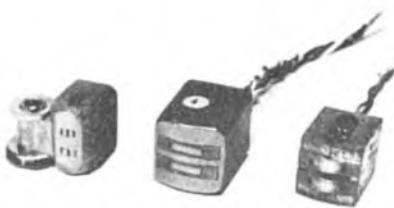


Fig. 10 (left). Left to right, four-track erase head for domestic recorder; four-track record/playback head; and two halves of four-track record/playback head clamped together. Fig. 11 (centre). The range of heads used in the domestic Magnetophon tape recorders (the four-track erase head on the right-hand side is described in the text). Fig. 12 (right). Dictating erase/recording/playback head with mounting system.

MAGNETIC HEADS

Continued from P. 31

With clamping pieces of this type heads with almost any desired number of tracks for all commercial tape widths of up to 2 inches can be made. Assembly of the pairs of clamping piece halves prior to surface grinding is then achieved either through clamping springs or screws. Screw assembly is used principally for narrow-gap heads. This also made it possible to improve the temperature stability by a further factor. In this respect, the synthetic resins used for this purpose will naturally require very critical selection.

This type of clamping piece assembly was also applied to the standard, single-track, studio heads of the "Magnetophon M10" tape recorder. Fig. 9, partly for technical reasons and partly for reasons of rationalisation. This new head system of only 15 mm width made it necessary to adopt a special shape for the running surface of the studio playback head to standardise the base boost at high tape speeds.

The experience gained in the manufacture of commercial multi-track heads was

also utilised in the development and manufacture of twin-track or stereo heads with small gap widths and little mutual coupling of the systems in the Type M76 and M77 home tape recorders, so that the clamping piece assembly technique was also used for this application, although in a somewhat reduced space.

This method of assembly made it possible for the first time to satisfy the stringent demands made on home tape recorders; it also became necessary to meet stringent demands in mass production. Today, the clamping pieces leave their zinc die-casting moulds with such a high degree of accuracy that machine-finishing is necessary only in individual cases.

The quarter-track playback/recording heads (Fig. 10) with two systems of only 1 mm track width, which are used in the four-track recorders ("Magnetophon 76") or for quarter-track stereo recording ("Magnetophon 77") thus have a mutual tolerance of only ± 50 microns in the track spacing with a nominal dimension of 3.5 mm.

The small external dimensions of

nitude of the sound and the slowly dying reverberation to be shattered by another hammer blow . . . and another . . . and another . . . The sound from the final stroke must have taken a full minute to fade into nothing.

Before leaving the tower I returned to the machine room and recorded the sounds from the mechanism as the next quarter hour was chimed.

When I listened to the playback I was surprised. The machine had functioned according to plan and the recording was as good as I had hoped it would be. The quality was not up to the standard I have come to expect from my own portable equipment, but the Clarion doesn't pretend to be a professional recorder. Does the last ounce of quality in an actuality recording of this kind really matter? If the tape is intended to be used purely for private pleasure and amusement, I would say definitely not.

The important point which I had set out to prove to myself was whether or not it was possible to use an every-day, popular-priced machine under the most difficult conditions. The conclusion I came to was that not only is it possible but the recording is of a high enough standard to give a great deal of interest and pleasure both to the individual who took it and those who listen to it.

Never make the mistake of under-rating the capabilities of equipment in this class. To the purist it may leave much to be desired—to the enthusiast it provides a means of taking a recording which is infinitely better than no recording at all.

Recording Big Ben

(Continued from page 13)

Clarion to the overpowering bulk of the great bell.

It was the wind that brought me back to the task in hand. The sides of the belfry are open to the weather and across the platform the wind whistled around the bells and strummed on the stretched and waiting cables. I had tried to imagine every possible occurrence, but I hadn't thought of wind and I had no idea of how susceptible the microphone was to wind interference. There was no shelter on the platform and the hour was rapidly approaching.

Luckily the doorway from the stairs opens directly on to the platform, so I took up my position there, shielding the microphone from the wind with my body. Carefully checking the level control on the machine, I glanced at my watch. It was just one and a half minutes to eleven, and the chimes begin one minute before the hour. Thankfully, I started the spools revolving and waited.

The silence was broken by a metallic thump and bang from the machine room below and at the same instant the bells began to ring out. These were the smaller bells, but their force was considerable. The full chime lasts for one minute and then comes the first stroke of the hour. The clatter of the bells faded into silence again.

With incredible force came the sound of the greatest of all bells; the percussive impact of the hammer, the crashing mag-

12 x 12 x 15 mm which include the mu-metal housing cap of 0.5 mm wall thickness are also noteworthy. This type of head with its inductance of 125 mH is specially designed for transistorised equipment. An increase of inductance to 1 H required for circuit reasons was, however, not possible because of the small winding space available so that this demand led to the development of a further somewhat enlarged type of quarter-track head (Fig. 11).

A corresponding erase head type was developed together with the quarter-track playback/recording heads. The miniature erase head already described was the basis of this development, determined by its application. A zinc die-cast housing which is provided with a side projection for mounting the head and the tape guide, contains the wound erase head cores which take the form of a modified ring of 7 mm diameter. Guide grooves in the housing ensure correct track spacing and centralising before the unit is potted in synthetic resin and surface-ground.

Further development in the application of tape recorders for dictating purposes led through the embossed grooved magnetic recording disk to the "Traveller" dictating unit and thus to a completely new type of head (Fig. 12). This development was greatly assisted by a very hard and abrasion-resistant core material, the 16 per cent aluminium iron, which is magnetically similar to mu-metal and has already partly been used in the production of commercial heads. The properties of this material were the essential prerequisites for the stability of the very small pole face of the head arranged to engage in the groove. The pole piece which projects freely by about 1.5 mm has a track width of less than 0.3 mm with a length of approximately 2.5 mm. Optimum matching to the different grooved radii is obtained by grinding both sides of the pole piece.

The head also fulfills the three functions of erasing, recording and playback, which led to a complication of its mechanical and electrical design. The combined double system is thus initially characterised by three pole piece arms which form the erase gap of 50 microns width and the record playback head of 5 microns width and are combined into one unit with the aid of brass webs held in place by adhesive. The gap spacing is formed by the centre arm of 1.5 mm width.

In the next assembly stage, the outer pole piece arms, which are offset towards the gap, are provided with one winding each.

After completing the rear magnetic circuit through two E-shaped yoke laminations, the entire system is fitted into a plastics housing with adhesive and potted with casting resin.

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THE Tape Transport System of some machines—like the course of true love—never seems to run smooth. Irate owners vilify the manufacturers, often without justification, for a minor adjustment may clear the trouble.

Modern decks are considerably simpler than those of a few years ago. This, despite the fact that they are designed to do more and run more accurately. It is on the older models that we are apt to find these small troubles such as jerky operation, frequently caused by the "refinements" of design when for some reason or other they are not doing their appropriate job.

Such complaints can be the result of faulty clutch operation. Depending on the function of the drive lever system, the adjustment of clutches can be delicate, sometimes difficult. Above all it is necessary to know exactly what each portion of the mechanism is designed to do.

The purpose of a clutch is to transmit torque from a constantly moving part to an intermittently moved part. It is often impractical, for example, to switch motors on and off as various directions of drive are required. Better to leave the motor running and only engage a clutched portion of the drive spindle when turning moment is needed, or when added tension against a turning moment is wanted, as in the case of a reservoir spool held back to prevent tape spillage.

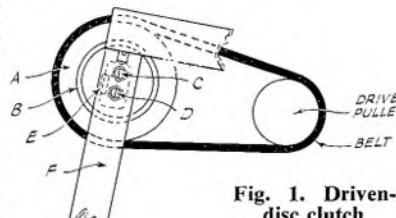


Fig. 1. Driven-disc clutch

The simplest form of clutch is the driven disc with a friction surface which is moved axially to engage a free-running disc at a fixed level.

Typical of this system is the Walter arrangement, as used on the 101, 303, 404, 505, and the "Playtime" tape recorders.

Several readers have queried the clutch adjustment, especially after unsuccessfully following the instructions pasted within the bottom cover of some models. These notes stress the importance of adjusting the clutch *opposite* to that which causes overspill and gives the correct procedure.

But the point often overlooked—and which seems to be bothering some readers, including D.L.J. of Wrexham, D.M., Newcastle, and P.C.O.N. of Ashton-under-Lyne—is the preliminary checking of the brakedrum level. If this is inaccurate, setting the clutch spring to suit will not solve the problem of erratic spooling or drive.

If we refer to Fig. 1, we see that there are three relevant screws. The two beneath the main lever arm have 4BA locknuts and are adjusted for upward pressure on the "Record/Playback" and

CLUTCH AND CARRY

"Fast Forward" function, to engage the brakedrum B and turntable with the driven drum, A. These two screws are shown at C and D in Fig. 1, and the third, E, can be seen to be concealed beneath the lever and clutchspring. (This is a view from beneath the machine.)

The correct setting of this screw, E, is for vertical freedom of the clutch brake drum when the machine is in the "Fast Reverse" position. That is, with the joystick pushed toward the top of the deck (12 o'clock high) and thus the lever F drawn toward the bottom. In this position, the clutch spring is clear of the spindle. Remember to adjust so that there is *only just* enough freedom vertically.

Incidentally, I might mention to "Wally" (surely a pun?) of Middlesbrough that with the mechanism in this position it is a simple matter to change the clutch belt, as there is then sufficient clearance to pass the belt between clutch spring and spindle and feed it over the lower section of the motor pulley. The general subject of drive belts, however, will occupy us in a future instalment.

To return to our clutch setting. Once screw E has been correctly set, move the joystick to "Play" or "Record." Slacken the locknut of the upper screw, C, and adjust the screw until the take-up turntable feels fairly tight to the hand. Do not over-tighten, and always check that the turntable is quite free on "Fast Reverse" after making this adjustment. Check that the locknut is secure.

Finally, adjust screw D with the mechanism switched to Fast Forward. This position gives maximum pressure to the clutch and it should be tight enough for a movement of the turntable to turn the flywheel via the pulley and both belts.

As a parting remark on this range of machines, the problem of "chatter" on "Fast Reverse" which is worrying J.V. of Battersea, is probably due to a worn clutch spider beneath the righthand turntable. But it may equally be the result of screw E not correctly set, and, as the makers are no longer producing and spares may be difficult to obtain, a run through of the above adjustments would be recommended.

A very different clutch arrangement is found on many Grundig machines, such as the TK9, 819, 12, 820 and 830. This is the magnetic clutch, an exploded view of which is illustrated in Fig. 2.

As can be seen, it is essentially simple. To answer W.H.T. of Bath, "No," there is little that can be done if the solenoid develops a fault, which will be apparent from a study of the clutch operation.

HARRY MACK continues his series
of articles offering technical
advice on problems of general
interest to recorder owners.

3: TAPE TRANSPORT

This clutch operates on a varying friction principle. The solenoid shaft is secured to the chassis by the two locknuts. On this shaft the clutch drive pulley is free to turn, transmitting its motion via the intermediate washers, the clutch disc and the felt insert of the upper turntable (and an inner, plastic, insert).

The amount of torque varies as the upper turntable is weighed down by the loaded spool, so that on take-up the amount of forward pull on the tape is just enough to maintain tension, and as a reservoir spool, the turntable slips on the polished top surface of the clutch pulley, providing braking action. In these circumstances the clutch disc is seated on the washers, within the clutch drive pulley.

When the machine is switched to fast wind the solenoid comes into action and the clutch disc is attracted up to the turntable and virtually locked to its plastic insert. Thus, the take-up spool, on "fast wind," becomes as a solid, rotating, body, while the reservoir spool, with the solenoid not energised, is free, except for the slight running tension to prevent overspill.

A further refinement that will be met is the energising of the appropriate

tent fast rewind has been met with several times, as one reader (**T.P., Derby**) points out. This is likely to be the result of the bearing of the lower clutch pulley working loose, and, regrettably, there is no cure except replacement.

Further common faults are belt and felt insert hardening. The drive belts are of a thermo plastic material and may stiffen and stretch if the machine has been out of use for a while. To ease the belt, slight warmth must be applied, and the best way of doing this is to run it between the folds of a heated cloth, turning the spool or pulley with the machine disconnected from the mains and switched to "rewind." Alternatively, if you have enough patience, let the machine run in a rewind operation for an hour or more. The felt insert at the bottom of the turntable can be roughened with fine sandpaper and cleaned with methylated spirits, in the usual way.

Adjusting the clutches of these machines can be a finicky job—made much easier with the aid of a couple of .2 mm steel washers.

First, slacken the locknuts, then take up enough tension on the inner locknut to hold the shaft firmly. Remove the turntable and insert the two washers on top of the solenoid; replace the turntable and check that the felt insert is clear of the drive pulley upper surface. Remove the turntable again and take one washer away; replace the turntable and check that the felt is just rubbing the drive pulley surface. To alter the level of the assembly, hold the locknut firmly and insert a narrow-bladed screwdriver in the slot at the top of the shaft (see Fig. 2). When this is done, remove both washers and test running conditions.

A little time and care taken in this operation will pay dividends later in trouble-free functioning. A similar exercise of patience is needed when adjusting the clutch brackets on such models as the Philips AG8107 and 8.

From Liverpool comes a cri-de-coeur by **B.W.M.**, who says that "despite adjustment" his Philips 8108 persists in slowing down during fast forward winding. This complaint is a common one—but a closer inspection will reveal that the forward "pull" is weak when there is only a little tape on the take-up spool. When the spool is nearly full, the machine rewinds merrily.

This would seem to indicate that there is something akin to the operation of the Grundig spool, the friction depending



upon the weight of the tape. But this is only part of the operation. In the Philips system (modified in later models, happily) the turntable is on a spindle which rests at its lower end on a clutch pad attached to a lever. As the lever moves downward, the spindle drops, allowing the turntable to drop and felt pads on the underside to engage with a clutch plate, driven by the main pulley. **Fig. 3** shows the bare bones of the system.

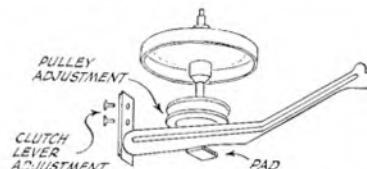


Fig. 3. Philips magnetic clutch

It can be seen that there are two fixing screws in slots on the end of the lever arm. With these set to the mid-position, check that the die-cast pulley is situated so that about 3 mm of the spindle projects beneath it. Then, again using trial and error and sufficient patience, make final adjustment with the two screws, ensuring that the spindle is allowed to drop to its fullest extent during the appropriate fast wind function.

Too much clearance here can prevent the turntable from receiving correct torque on "Record" and "Play," so always check all working positions after making these adjustments. Once more, ensure that felt pads are softened and that the composition pad at the base of the spindle is not missing. If it is, a small square of cork, $\frac{1}{8}$ -inch thick, lubricated with graphite grease, should do the trick.

If the pulley has been running at the wrong level for any time, the belt may be damaged. This is a coiled spring belt—and changing it is another story.

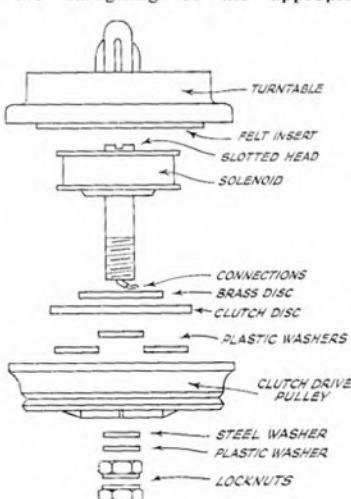


Fig. 2. Grundig magnetic clutch

solenoid when the "temporary stop" is actuated, to assist braking.

From this it can be seen that there is little to go wrong with the clutches, once they are properly set. No problems of leverage, simply an electrical switch that operates on "fast wind" or "temporary stop." But the fault of intermit-

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J.Wheatley's NOTEBOOK



Journey of a lifetime

WHAT recording equipment would you take if you intended to tear yourself away from civilisation and spend 18-24 months in the Antarctic. This was the problem Duncan Carse—sailor, explorer, adventurer, actor, and one-time Dick Barton of the BBC—faced when he planned his vigil in the spring of last year. I was called in to help him in his decision, as he wanted to make recordings of his experiences at the South Pole to assist him in a book he intended to write.

First problem was no electric generator, so accumulator batteries were out. Low temperatures meant that dry cell operation was too great a risk of the motor speed dropping so low as to be useless. The only recorder available was the German manufactured Maihak. Samples of these machines had already been used in the Antarctic, and had given good service. They were clockwork driven models with conventional amplifiers and moving coil microphones. Lubrication problems would not arise, as they had their fill of special low temperature greases.

Eventually the machine in its Ration Box, and after many practical recording sessions, was ready for shipment. I also saw that Mr. Carse had a supply of all the necessary associated equipment, jointing tape, razor blades (an important point as he is bearded), spare empty spools, rubber belts and, of course, a supply of clean tape. We agreed thirty five-inch reels providing fifteen hours of recording time should be enough.

All this, of course, happened some time ago, and just two months ago I read that after his vigil Mr. Carse had at last

made contact with the Weather Station in South Georgia.

I was looking forward to regaining contact with the adventurer to hear of his successes or otherwise with his recordings. However, I now learn that all his belongings, plus the tapes and recorder, lay buried in the snow and ice in the wreck of his hut.

They may one day be rescued, and what a story they will tell of one man's fight for survival, of loneliness, illness and perhaps despair. A record of courage, faith and hope may be there on magnetic tape. What an interesting speculation as to whether it will be found, and in what age or in what state the world will be when it is once more played back.

What a recording for the "Tape of the Year" Contest.

Protecting tapes in transit

THE point of packing tape recordings for despatch was raised in a letter from Mr. Shaw of London, E.18. He quite rightly took me to task for a point made in my September 6 notes, that a non-magnetic case would act as a magnetic insulator. What I meant to convey was that any magnetisable material used for packing would encourage deflection of a stray magnetic field towards itself thus bringing nearer to the tape the hazard of erasure. A container which sites the tape in the centre of the package with as much air and packing material to surround it as is practicable is the best safeguard.

FI-CORD MODIFICATIONS

IMPORTANT news for users of the Fi-Cord battery portable this month is the announcement that the manufacturers are fitting new improved plugs and sockets for microphone connection. In the latest consignment of these instruments to the BBC the modifications, incorporating the German manufactured PREH plug, are being made.

It involves a simple locking collar which secures the plug to the socket making it virtually impossible for the connection to break inadvertently.

I returned my own machine to the company effecting the change, the Erskine Laboratories in Scalby near Scarborough,

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New recorder from Japan

PIANO key control and a digital rev. counter are featured in the Japanese Diawa DE-30 transistorised tape recorder recently announced by Cromptons (Manchester) Ltd.

Three speeds, 1½, 3½ and 7½ ips, are incorporated, and the 6 x 4 inches elliptical loudspeaker produces a quoted output of two watts. It accommodates five-inch reels providing a maximum playing time of 4½ hours at the slowest speed using double-play tape. Other features include facilities for monitoring, tone control, pause control, safety erase lock, external speaker socket and separate microphone and radio inputs.

Measuring 14 x 13½ x 7 inches, the DE-30 weighs 23½ lb. and costs 44½ guineas. Included in the list of accessories available are moving coil microphone, five-inch reel of tape plus spare spool, earphones, radio and gram leads, adhesive tape and movie adaptor.

Cromptons (Manchester) Limited, 29, Minshull Street, Manchester 1.

NEW PRODUCTS

Wyndson introduce new design

JUST in time for this issue is news that Wyndson Recording are to enter the upper price bracket with a new model

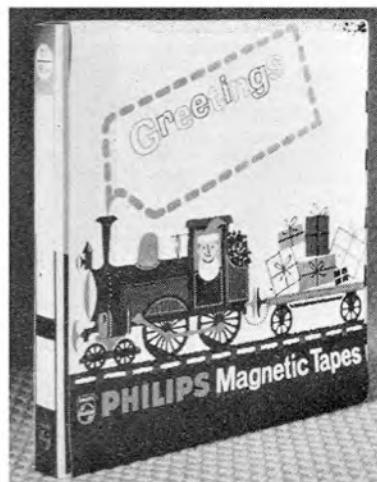
TRUVOX ADDITIONS

TRUVOX LIMITED announce additions to the recently-launched "Series 80" described in our September 20 issue. The two new models, designed as professional tape recording units for schools, for use with existing amplifying equipment, are models PD83 and PD85 which are two-track and four-track machines respectively.

Both models have an integral record amplifier, erase and bias supply, and the replay amplifier is correctly compensated for both tape speeds of 3½ and 7½ ips. Quoted frequency responses are 30-20,000 cps ± 3dB and 30-12,000 cps ± 3dB at 3½ ips. Signal-to-noise ratio is given as better than -45dB. In accordance with educational practices, GPO jack sockets are used for input and output connections, but Continental or American phono sockets can be fitted to special order.

Supplied mounted on wooden stands, the machines are £48 10s. for the PD83 and £52 10s. for the PD85.

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



A train representing progress over the past year is the central motif of the new Christmas wrappers produced by Philips Electrical for their magnetic tape.

The wrapper, litho printed in red, black, and green on white, will cover the boxes for their 5, 5½ and 7-inch reels.

scheduled for the New Year. Precise specifications are not to hand at present, although we understand the machine will be in the £70 range, will incorporate a Truvox deck with four-track heads, and will operate at 3½ and 7½ ips.

Other expected features are maximum spool size of 7 inches, meter recording level indicator, and an 8-inch aluminium coil loudspeaker. Facilities for conversion to stereo will be included, the recorder will incorporate low and high impedance inputs and outputs, will be suitable for operation on all voltages, and fully tropicalised.

One other feature, incorporated for the first time by this company, will have the speaker facing the rear. This facilitates operation using a wall or corner to spread the sound area, or use by a demonstrator who will be able to face his audience and still operate the machine normally.

Wyndson Recording Company Limited, 2, Bellevue Road, Friern Barnet, London, N.11.

Improved voltage level indicator

A NEW voltage level indicator for tape recorders has been produced by Mullard. In many recorders, the a.f. voltage appearing at the anode of the recording output stage is about 10v, insufficient to close the display of currently available level indicators.

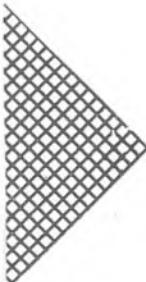
The new Mullard EM87 is claimed to have a grid base of only 10v and in addition, a high sensitivity in the initial region of the control characteristic (V_g OV).

Over modulation of the tape is immediately apparent, since a.f. signals greater than 10v in amplitude cause the luminous areas to overlap, giving a brighter centre portion to the display.

Maximum ratings area: anode voltage 300v, anode dissipation 600mW, cathode current 5mA, and deflection electrode voltage 300v. The heater draws a current of 300mA at 6.3v.

The EM87 has the same overall physical dimensions (72.8mm overall length x 22.2mm diameter) and the same pin connections as the EM84. The fluorescent strip is 32.6mm x 4mm.

Mullard Limited, Mullard House, Torrington Place, London, W.C.1.



News from the Clubs

EDITED BY FRED CHANDLER

BRIXTON

A general invitation to tape enthusiasts willing to help with the production of a play is made by the secretary of the Brixton club.

Following their success with the Lambeth Festival tape, now in the hands of the Town Hall, the members found further activities in a brand new venture by offering to assist with sound effects, etc., in a one-act play soon to be produced by a local dramatic group.

Secretary: R. G. Garrett, 56, Rattray Road, Brixton, S.W.2.

* * *

COTSWOLD

At the latest meeting of the Cotswold society, the members welcomed Mr. Frank Parrington of BASF Chemicals Limited. After providing the usual demonstration of his firm's products and the film *The Magic Tape*, the members were then shown some examples of tape/slide synchronisation using instruments manufactured by Zeiss Ikon. The illustrations included live mono and stereo recordings, and included a copy of the first orchestral recording to be made on tape; a performance of Mozart's Symphony in C major, conducted by Sir Thomas Beecham, and recorded 25 years ago.

At an earlier meeting Messrs. Allen and Cowley of Simon Equipment Ltd. visited the club to exhibit their products. Principal feature shown was the new Simon SP5, a monaural recorder with provision for conversion to stereo record and replay. The club members themselves aided in the demonstration, with recordings made on the Simon equipment. Outstanding of these was a recording of the organ of Cheltenham, made by Peter Turner with SP4 and ribbon microphone, and an operatic group and orchestra, recorded by Peter Duddridge.

During the evening, John Yeates announced that he had secured and recorded an interview with actor Finlay Currie who made a "personal appearance" in the town in connection with the film *Ben Hur*. The interview is to be featured in the club's Hospital Service, together with excerpts from the film's sound track by special permission of the company.

The hospitals' service operated by the members has been extended to include a further hospital; and a request has been received from the Red Cross for co-operation in a message service for patients in a hospital at a distance from relatives and friends.

Membership continues to increase, so does the fashion of battery recorders. Latest to arrive is the new Stella owned by John Yeates. Female membership is also on the increase, there were four at their latest meeting.

Secretary: Peter D. Turner, Cave Cottage, Oakridge Lynch, Stroud, Gloucestershire.

* * *

DARTFORD

An extension of the practical sessions has been noticed by the members of the Dartford club, where a number of accessory items are currently being constructed. First off the stocks was a parabolic reflector made by the vice-chairman, Les Coates. Measuring some twenty inches in diameter, this unit was hammered out on a hollow tree-trunk—a process taking almost two weeks. The inside has been painted a dull colour and the outside covered with sheet foam material. No report has yet been received of its performance.

Two other members, Brian Lintell and Bert Woods, meanwhile are constructing a mixer unit. The finished product will have four or five channels, pre-faders, PP meter, and two outputs. At present only two channels are operating, but the end is not so far away.

Microphone booms are also in the process of construction, the job to be completed in time for Christmas when members expect a rush for the services at various sessions. Already they are forging ahead with their social services activities.

The rock'n'roll singer and his accompanying group were recorded by members for eventual playback at the local hospitals by Mr. Copper, who has organised a disc-jockey service for some years. Further co-operation has been promised by the club members along these lines.

The members welcomed along some of the members of the nearby club at Bromley for a recent meeting. On the agenda were a number of practical demonstrations, including recordings made in the past few months; Mr. Coates' reflector; various microphones (shown by Mr. Woods), tape editing (Mr. Lintell) and a "public showing" of the equipment built by club members. Among the items displayed were an acoustic screen (Mr. Lintell), loudspeaker enclosure (Mr. Pulham), FM Tuner (Mr. Tietjen), and a ribbon microphone (Mr. Woods).

Secretary: Mr. E. H. Foreham, 117 Westgate Road, Dartford, Kent.

HUDDERSFIELD

In an endeavour to extend membership the Huddersfield club members have commenced a series of lectures and demonstrations on tape recording. The series is arranged to take place on the first Wednesday in the month, and the first of these was held on October 4, when the Chairman, K. G. Leach, presented a talk entitled *How a tape recorder works*. Over forty persons attended this and the second lecture, *Copying, mixing, fading, and recording from radio*, held on November 1. The large attendance owed a lot to the assistance given by eleven local retailers who displayed advertisements for the club. Further publicity was gained by two announcements in the local paper, plus a write-up after the first of the lectures.

The series will continue for five months, the subjects including *How to get the best from your microphone*, *Understanding Acoustics*, *Microphone balance*, and *Cleaning your recorder*.

The club now possesses a moving coil microphone complete with matching transformer and stand, an extension cable, and a four-channel mixer unit. Currently in hand is the purchase of a portable recorder. All the equipment the club possesses is insured, and the secretary invites anyone wishing to have further details of the insurance scheme used, to contact him direct.

Another recent acquisition for the club is an eight-inch high "Competition Cup," engraved with these words and the club's name. This is the new prize for the quarterly contest held for club members.

Secretary: J. D. Iredale, 9, Ingfield Avenue, Dalton, Huddersfield.

* * *

MAIDSTONE

Publicity on a grand scale came the way of the members of the Maidstone club recently when the local paper devoted about 150 square inches of photographs and details reporting a visit they paid to the Cheshire Home for Incurables.

Object of the visit was to interview patients and pass on the recordings made to friends and relations. The tape enthusiasts asked about hobbies and interests, and particular interest in musical tastes. These recordings have now been passed on, and attempts are now being made to collect the musical pieces requested.

Although most requests were for particular tunes, a number asked for recordings of special interest. These included

a peal of bells from a certain church, and the sound of a train running along the tracks. The club members spent over an hour talking to the patients.

Secretary: Reg Preston, 4, Queen's Road, Maidstone, Kent.

* * *

NORTH LONDON

Outside recordings have been the order of the day at the North London club. The Enfield Show was the first such exercise, and this provided an opportunity for members to show their skill at interviewing and using portable tape recorders. The members compiled a half-hour programme of the contents of the Show which included stands and exhibitions from local clubs and societies displaying and demonstrating their work. Interviews, recordings of live music by local bands and general effects were included in the programme which has since been issued as part of a recorder weekly newsletter issued to blind and handicapped persons in the district by the Enfield Toc H branch.

Further experience at location recording was provided when members taped hymns sung by a church choir for the benefit of patients at Enfield War Memorial Hospital.

A demonstration of headphone stereo was recently given at the club's headquarters by Mr. G. H. Tughan of Teletape. He was visiting the club as a representative of Denham & Morley Ltd to demonstrate the Butoba battery portable recorder. Accompanied by Mr. Thomas, manager of Teletape's servicing department, he also played a number of tape records and demonstrated an advance model of the new Sony range of recorders.

Competition number five, the production of an original two-minute advertisement, has been won by Ray Maslin, who has gained second place in the two previous contests. His prize-winning tape advertised a "wonderful, never-to-be-forgotten holiday of the future—on the moon, Mars or Venus."

Secretary: Richard Collison, 30, Ridler Road, Forty Hill, Enfield, Middlesex.

* * *

WINDSOR

At a recent meeting of the Windsor club it was decided to extend membership to overseas enthusiasts. First two to be enrolled in this new scheme are Mr. Ken Maddocks and Miss Jan Nachonacky of Spokane, Washington.

Both have been in contact with the club secretary for some months, and are already taking an active part in the affairs of the club with tapes plying back and forth across the Atlantic.

A change of meeting place is announced, their future meetings are to be held every Thursday at the Guildhall. They have not completely disposed of their former headquarters at the Royal Adelaide Hotel, for they are to continue to hold dances there in aid of club funds. Organised by Mr. Christopher Kelly, the next of these will be held on December 30 and February 10.

Secretary: William A. C. C. Smith, 73, Kings Road, Windsor.

CLUB MEETING DIARY

Is your club included in this list? If not, send details, on a postcard please, including date of the next meeting.

- ABERDARE:** Alternate Wednesdays at 81, Brynmair Road, Godreaman, (Dec. 20.)
ABERDEEN: 1st Tuesday in every month at 8 Deer Road, Woodside.
ACTON: Alternate Fridays at the King's Head, Acton High Street, (Dec. 22.)
BARNSLEY: Every Tuesday at YMCA, Eldon Street.
BATH: Alternate Wednesdays at St. Mary's Church Hall, Grove Street, (Dec. 27.)
BATH (2): Alternate Wednesdays at 41, Herbert Road, Oldfield Park, (Dec. 27.)
BEDFORD: Final Tuesday in month at 131, London Road.
BELFAST: Every Thursday at 44, Dublin Road, Belfast 2.
BETHNAL GREEN: Every Friday at Shoreditch Tabernacle, Hackney Road, E.2.
BIRMINGHAM: Every Monday at the Chapel Tavern, Ludgate Hill.
BIRMINGHAM (SOUTH): Alternate Mondays at Stirchley Institute, Hazlewell Street, Stirchley, (Jan. 1.)
BLACKBURN: 1st and 3rd Tuesdays at Blackburn YMCA.
BLACKPOOL: Every Wednesday at "Habonim," Lonsdale Road, off Lytham Road.
BOURNEMOUTH: Alternate Tuesdays at the Queen's Hotel, Queen's Road, Bournemouth West, (Dec. 26.)
BRIDGWATER: Every Tuesday at Evis' Radio Shop, West Street.
BRIGHTON: Every Wednesday at The Brunswick Arms, 38, Ditchling Road.
BRISTOL: Alternate Wednesdays at Redcliffe Church Hall, Guineas Street, Redcliffe, (Dec. 27.)
BRITON: Every Tuesday at The White Horse, 94, Brixton Hill, S.W.2.
BROMLEY: 2nd and 4th Thursdays at St. Mary's Church Hall, College Road.
CAMBRIDGE: Every Wednesday at the Mitre Hotel, Bridge Street.
CARDIFF: 1st and 3rd Tuesdays at 46, Caroline Street.
CATFORD: Every Thursday at the Black Horse, Rushey Green, Catford, S.E.6.
CHESTERFIELD: Every 3rd Monday at the Yellow Lion Inn, Saltergate, (Jan. 8.)
COTSWOLD: Fortnightly, alternating Monday and Thursday at Bayhill Hall, Royal Well Lane, Cheltenham, (Dec. 28.)
COVENTRY: Alternate Wednesdays at Holyhead Hotel, Coventry, (Dec. 20.)
CRAWLEY: 1st and 3rd Mondays at Southgate Community Hut.
DARTFORD: Every Thursday at 41, Winsor Drive.
DERBY: Alternate Wednesdays at Osmaston Park Hotel, (Dec. 20.)
DONCASTER: Alternate Thursdays at Lancaster House, Westgate, (Dec. 21.)
DOVER: Alternate Mondays at the Priory Hotel, Dover, (Dec. 25.)
DUBLIN: 1st Monday at "Hardy House," 6, Capel Street.
DUNDEE: Alternate Mondays at The Salvation Army Hostel, 31, Ward Road, (Jan. 1.)
EASTBOURNE: Alternate Saturdays at Hartington Hall, Bolton Road, (Dec. 23.)
EAST HERTS: Alternate Mondays at 3, Chadwell, Ware, (Jan. 1.)
EDINBURGH: 1st and 3rd Fridays at 22, Forth Street, Edinburgh 1.
FRIERN BARNET: 2nd Friday at 7, Harmsworth Way, N.20, and 4th Thursday at 146, Friern Barnet Lane, N.20.
GLASGOW: Fortnightly, alternating Tuesday and Thursday at the Christian Institute, (Jan. 2.)
GRANTHAM: Weekly, 1st week in month Wednesday; 2nd, Monday; 3rd, Thursday; 4th, Friday at Grantham Technical College, Avenue Road.
GRIMSBY: 1st Monday at 21, Langton Drive, Nunthorpe, Grimsby.
HARROGATE: Every Wednesday at 4, Belford Road.
HARROW: 1st and 3rd Thursdays at St. George's Hall, Pinner View, North Harrow.
HASTINGS: Every Tuesday at the Citizens' Advice Bureau, Cambridge Gardens.
HINCKLEY: Alternate Wednesdays at The Wharf Inn, Coventry Road, (Dec. 20.)
HOVE: Every Thursday at 44, Hogarth Road, Hove.
HUDDERSFIELD: 1st and 3rd Wednesday and last Monday at the Public Library, Ramsden Street.
HULL: Alternate Tuesdays at 281, Hessle Road, (Jan. 2.)
ILFORD: Every Tuesday at the RAFA Rooms, Cranbrook Road.
IPSWICH: Alternate Thursdays at the Art Gallery, High Street, (Dec. 21.)
JARROW: Alternate Mondays at Jarrow Central School, (Dec. 25.)
JERSEY: 1st and 3rd Mondays at "Santa Barbara" Maufant, St. Saviour.
KEIGHLEY: Alternate Wednesdays at the Spencer Street School Rooms, (Dec. 27.)
KETTERING: 2nd and 4th Wednesdays at the Rising Sun, Silver Street.
KIDDERMINSTER: Alternate Wednesdays at the Town Hall, (Dec. 20.)
LEEDS: Alternate Fridays at 21, Wade Lane, Leeds 1, (Dec. 22.)
LEICESTER: Alternate Fridays at the Newarke Girls' School, Imperial Avenue, (Dec. 29.)
LONDON: 2nd and 4th Thursdays at the Abbey Community Centre, Marsham Street, S.W.1.
LUTON: 2nd and 4th Tuesdays at Flowers Recreation Club, Park Street West, Luton.
MAIDSTONE: Every Wednesday at the Ex-Services Club, King Street.
MANCHESTER: Every Saturday, 6 p.m., at 20, Naylor Street, Hulme, Manchester 15.
MEDWAY: Every Monday at 23, Edward's Close, Rainham, Kent.
MIDDLESBROUGH: Every Wednesday and Friday at 130, Newport Road.
MILLOM: Every Wednesday at Millom Centre.
NORTH LONDON: Alternate Wednesdays at Bush Hill Park School, Main Avenue, Enfield, (Dec. 20.)
NORTHAMPTON: Every Tuesday at the Peacock Room, Grand Hotel.
NOTTINGHAM: Alternate Thursdays at the Co-operative Educational Centre, Heathcote Street, (Dec. 28.)
NORWICH: 4th Tuesday at "Lady Chamberlin Hall," 38a, St. Giles' Street.
PONTYPOOL: Every Monday at the Hospitality Inn, Crumlin Road.
PLYMOUTH: Alternate Wednesdays at Virginia House, Plymouth, (Dec. 27.)
READING: Every Monday at Abbey Gateway.
REDDITCH: 4th Thursday at The White Hart Hotel, Headless Cross.
RHYL: Alternate Tuesdays at Studio A, Bedford Street, (Jan. 2.)
RUGBY: Alternate Thursdays at the Red Lion, Sheep Street, (Dec. 28.)
SHEERNESS: Alternate Fridays at Arthur Gisby's, 136, High Street, (Dec. 22.)
SOUTHALL: Every Monday at Southall Community Centre.
SOUTHAMPTON: Alternate Thursdays at Southampton University, (Dec. 28.)
SOUTH DEVON: Alternate Wednesdays at the YMCA, Castle Circus, Torquay, (Dec. 20.)
SOUTH-WEST LONDON: Every Wednesday at Mayfield School, West Hill, S.W.15.
STAFFORD: Alternate Tuesdays at The Grapes, Bridge Street, (Dec. 26.)
STEVENAGE: 1st and 3rd Tuesdays at the Tenants' Meeting Room, Marymead.
STOCKPORT: 1st Friday at the Unity Hall, Greek Street.
STOKE NEWINGTON: Every Wednesday at 53, Londesborough Road, N.16.
SWANSEA: Every Thursday at the YMCA Buildings, St. Helen's Road.
URMSTON: Alternate Thursdays at Davyhulme Scout Hut, Barton Road, (Dec. 21.)
WAKEFIELD: Alternate Mondays at York Street Hotel, (Jan. 1.)
WALSALL: Every Wednesday at Bluecoats School, Springfield Road.
WALTHAMSTOW: Alternate Fridays at 22, Oxford Road, E.17, (Dec. 22.)
WARWICK & LEAMINGTON: 1st and 3rd Wednesdays in Room 18 of the Royal Leamington Spa, Town Hall.
WEST HERTS: Fortnightly alternating at the Cookery Nook, High Street, Watford (Dec. 20) and Heath Park Hotel, Hemel Hempstead, (Jan. 3.)
WEST MIDDLESEX: 2nd Thursday at the Railway Hotel, Station Road, Hampton, and 4th Thursday at Dormers Wells Primary School, Dormers Wells Lane, Southall.
WEST WALES: 1st and 3rd Fridays at The Meeting House, New Street, Aberystwyth.
WEYMOUTH: Alternate Wednesdays at The Waverley Hotel, Abbotsbury Road, (Dec. 27.)
WINCHESTER: Every Friday at 45a, St. Swithen's Street.
WINDSOR: Every Thursday at The Guildhall.
WOOLWICH: Alternate Mondays at the North Kent Tavern, Spray Street, Woolwich, (Jan. 1.)
YORK: Every Thursday at 62, Micklegate, Unless otherwise stated, meetings start between 7 and 8 p.m.

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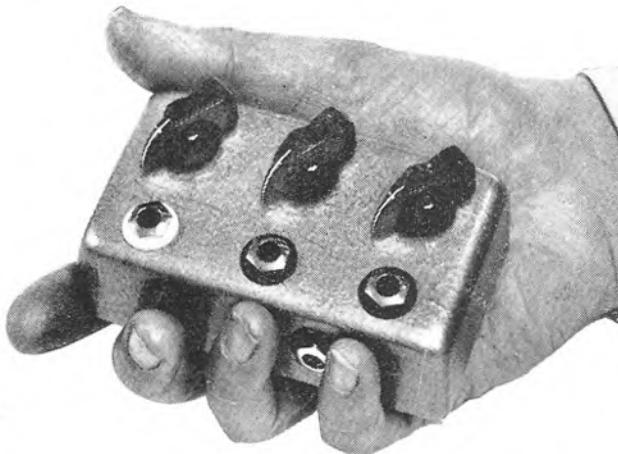
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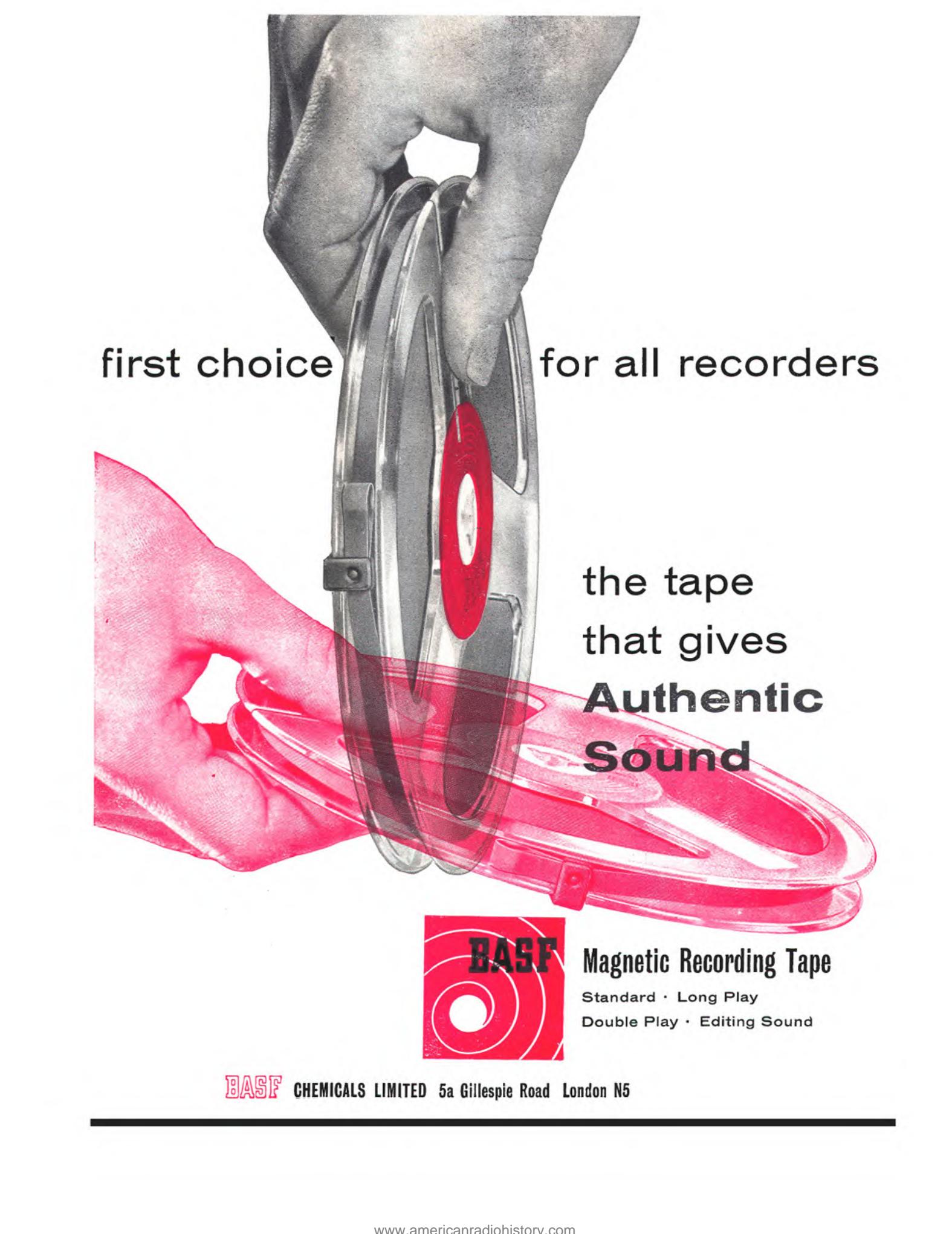
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