

TAPE RECORDING FORTNIGHTLY

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the production of his
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By
JAMES MOIR

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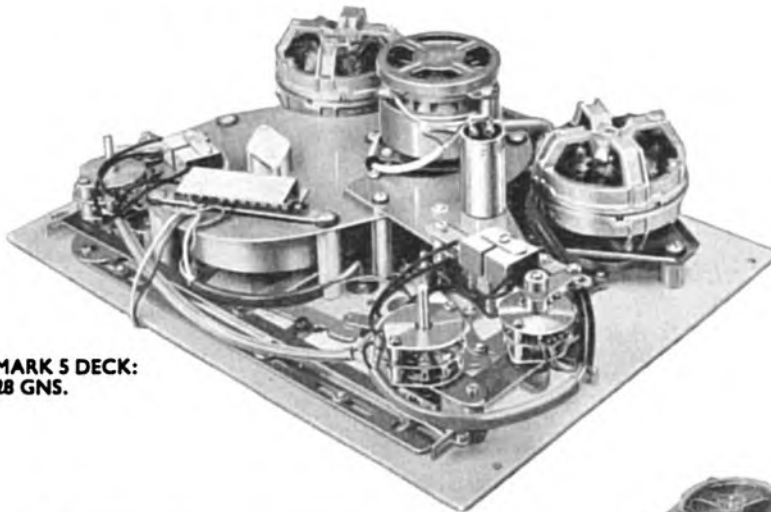
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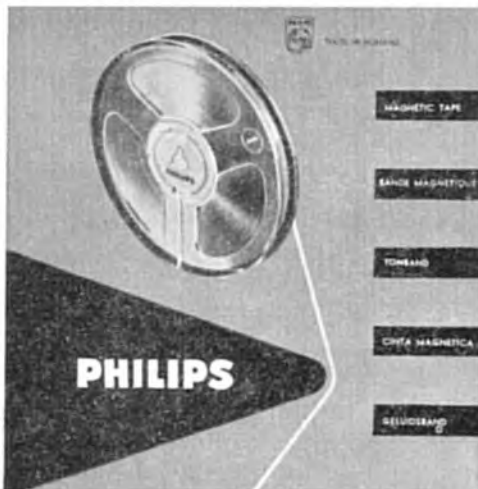


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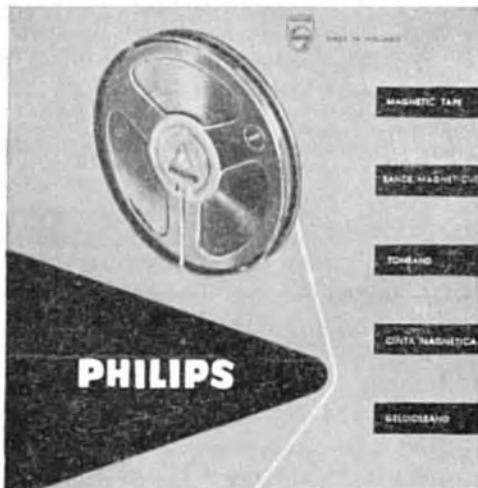
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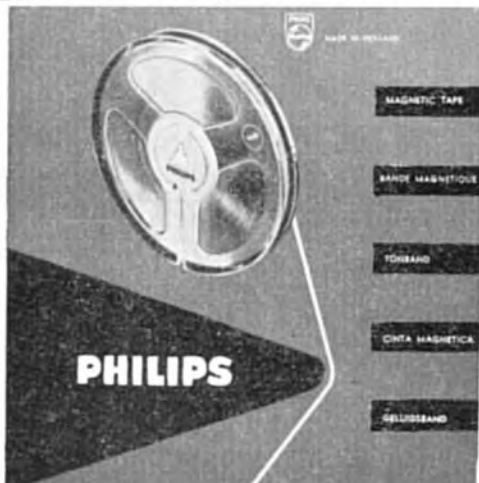
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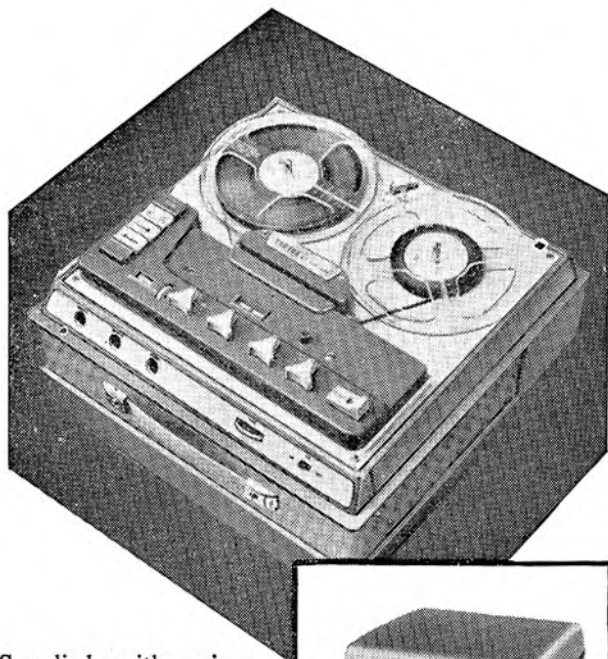


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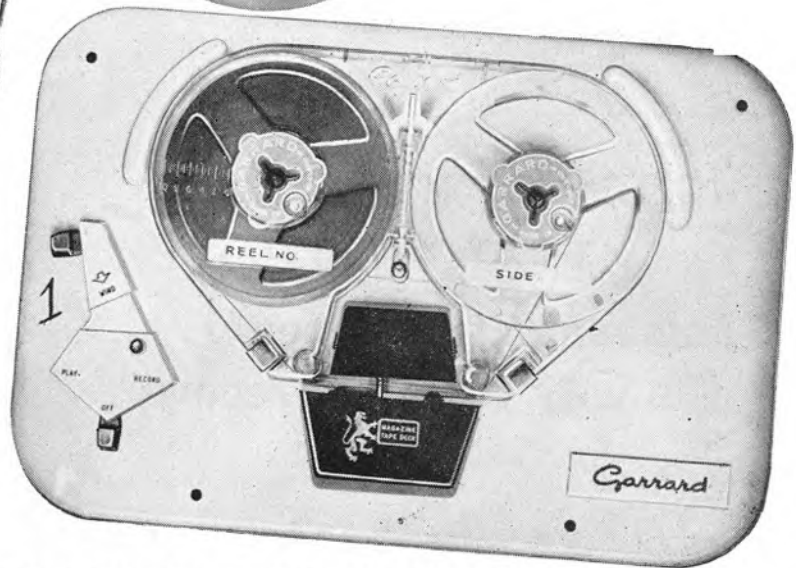
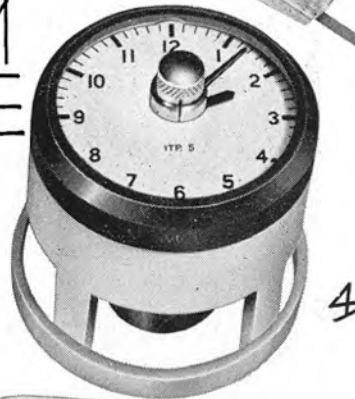
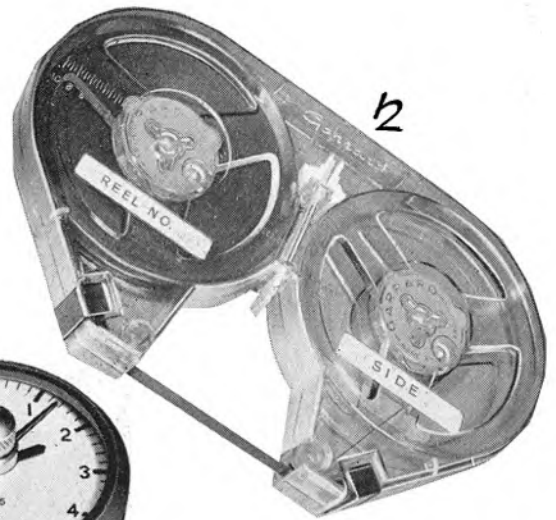
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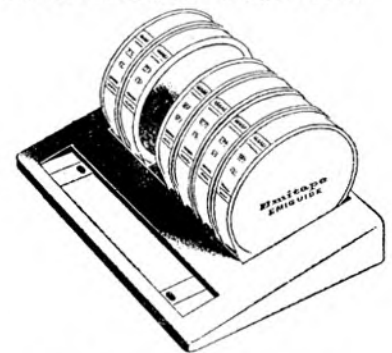
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TAPE

RECORDING
FORTNIGHTLY

Vol. 5 No. 20 4th October, 1961

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"Tape Recording Fortnightly" is published on alternate Wednesdays, by Print and Press Services Ltd., room 7, Tudor Street, London, E.C.4.

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

"Tape Recording Fortnightly" is available by a postal subscription of 45s. per annum, including postage, or it can be obtained at newsagents, bookstalls and radio and music dealers. In the event of difficulty, write to the Publishers at 7 Tudor Street, London, E.C.4.

Back numbers, if still in print, are available at 2s. 6d. per copy for issues up to November 1959, and 2s. per copy for later numbers.

EDITORIAL

Editor, R. Douglas Brown

Address all communications

7 TUDOR STREET, LONDON, E.C.4 FLE 1455-6

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We take the view . . .

A DIGEST OF NEWS, COMMENT AND EDITORIAL OPINION

THE Consumers' Association, which raised such a furore earlier in the year with its test-reviews of tape recorders, has had another go. The current issue of its publication "Which" contains the results. (It is available only to members, who pay £1 a year and get 12 issues. The address: 14 Buckingham Street, London, W.C.2.)

Personally, I find the most surprising thing in this new article to be the revelation that half of those who use tape recorders to record music from a radio or record player do it using a microphone rather than a direct line. This is stated to have been established by a specially commissioned field survey.

I am sorry that the survey did not also reveal how many of those questioned were aware of copyright problems when they make such recordings! I am sure the Mechanical Copyright Protection Society would have been fascinated.

The new survey does not appreciably alter the conclusions the Consumers' Association reached after the earlier investigation, although some of the machines that came off badly then do better this time. The Association sticks firmly to its conclusion that the Cossor CR1602 is the "best buy".

It does, however, take account of criticisms made here and elsewhere of

its first report. This "best buy" recommendation, for example, is now qualified as being "for non-specialist listening" and account is taken of the fact that speech and music are two very different things when it comes to recording.

Experienced listeners

We are told that the new tests are based entirely on subjective listening by that odd (as it seems to me) panel of "people experienced in listening to tape recorders". We are assured that each machine was checked to see that it had not been used before and was in good working order. And it is explained that the Cossor which is now recommended as the best buy is fundamentally the same machine as is sold under two other brand names.

The new article will be of great interest to enthusiasts, though there are still some findings which I would myself accept only with considerable reservation.

For example, the two machines which I would buy above all others reviewed come in for criticism, although one of them is placed on its own as being "excellent" in reproduction and presumably loses its pre-

eminence only when price is brought into consideration.

This time the tests have been made at $1\frac{1}{2}$, $3\frac{1}{4}$ and $7\frac{1}{2}$ ips—when these speeds were available—and one of the findings is that $3\frac{1}{4}$ ips gave results which were not significantly inferior to those achieved with $7\frac{1}{2}$ ips. (All the tests were made, it should be added, using the internal speakers of the recorders.)

Another innovation this time was the use of an expensive microphone (usually this meant one costing about £10), as well as the microphone supplied with the machine. This comparison produced a surprising conclusion: that the expensive microphones did not give "substantially better" results than the cheaper ones.

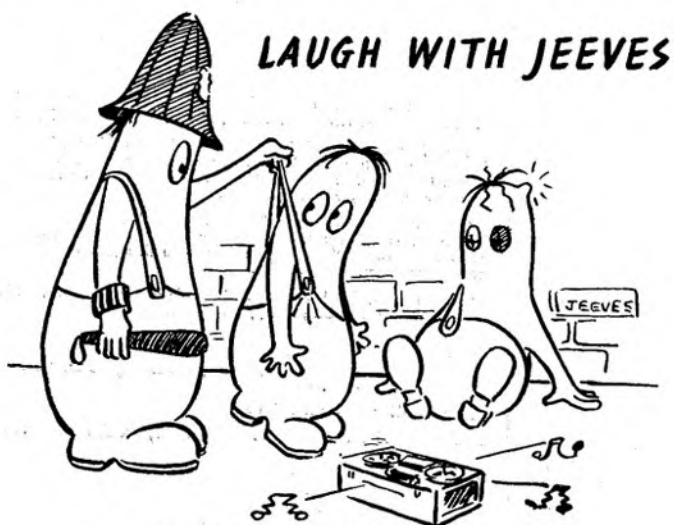
Ageing tests

One encouraging feature was that the recorders aged well. Each was put through 77 record/rewind/replay/rewind cycles, which is stated to be equivalent of 100 hours use. This had no serious effect on them. One of them actually improved; two deteriorated slightly in quality of reproduction—this was out of 13 tested.

One of the most unsatisfactory things about this test-survey, I feel, is the evidence offered about troubles arising in use. In the first test last January, six out of 18 were trouble-free. Four of those six developed faults in this second test. Three models which gave trouble in the first test were trouble-free this time. Four machines developed troubles on both occasions.

For my part, I should be much more chary of drawing sweeping conclusions from such conflicting evidence than are the Consumers' Association. With such small numbers of machines being handled, the element of chance can play a large part.

People take tape so much for granted that they cease to wonder at the complexity of the recorder, with its combination of electronics and mechanical engineering. It may be a long time before recorders can be counted upon to be as free from all initial troubles as a radio receiver or a washing machine.



"But officer, he started it by saying I ought to get my head examined."

Im Wheatter's

NOTEBOOK



Underwater Recording

WHEN I was recently asked what had been my most exciting recording session, I had no hesitation in describing a recording made under the sea on the Mediterranean coast of France, near La Dramont. I was testing a new microphone fitted to a full diving mask at the time, and can still remember my first words after going in off the rocks there: "Here I am in the deep blue sea at last."

All the preliminaries had been done at home in covered baths and test tanks, but now I was going to inspect a sunken ship lying in 40-50 feet of water. My description of this forlorn wreck was a most satisfying experience, the culmination of many hours of trial and error with a means of recording never previously successfully used.

Since this could be a very interesting and useful extension of the hobby for tape enthusiasts, especially those with battery portables, I would like to devote this issue to diving and the use of microphones under water, outlining some of the problems.

HISTORICAL

Divers from the earliest times have been very much cut off from the surface once they have placed their copper-helmeted heads under the water. Once submerged they had to rely on crude signals affected by tugging on their safety lines to communicate with the surface vessel, and divers working together below had to bring their helmets close together and talk to each other in muffled jargon.

This tedious procedure was carried out for years until the introduction of microphone and amplifier gear changed the whole pattern of communications between divers and surface craft.

Because of the large amount of space in a diving helmet, it became possible to instal a robust microphone which also served as a loudspeaker. Connections to the amplifier and control gear above were incorporated in the safety rope and air line leading to the diving platform, enabling the diver to exchange essential orders with his crew on a rather slow "over to you" process. The system

still serves today for all full-suited heavy diving operations.

FREE DIVING

With the introduction of free diving by "frogmen" in light rubber suits, or "skin" divers, where the conditions are warm enough, mobility was greatly improved, but communication was completely eliminated. For naval purposes, the breathing mixture was mainly oxygen, the carbon gas expelled by the diver being purified and re-circulated. This method prevented tell-tale bubbles rising to the surface and broadcasting the position of the diver—an essential safeguard during offensive operations. Obviously no communications, apart from hand signals, were possible either.

At that time free diving equipment was restricted to Naval and Military personnel. After the war, when it was possible to equip civilians with "frogman" suits, a compressed air breathing apparatus which allowed the foul air to escape in the form of bubbles became available.

There are points for and against each system. From communication aspects, both had equally restrictive features. Each required a nose clip, and air inhalation was achieved through the mouth, the air taken from a flexible tube and flanged mouthpiece which was gripped

DRY CELLS— and their uses

THE recent tragic news of the Central Brazil Expedition brought to mind a similar expedition organised for the BBC some while back. The expedition had been equipped with BBC portable recording equipment, including silver zinc accumulators which we used instead of dry cells for the E.M.I. L2 recorder.

On their return the members tendered a list of certain items, including a number of accumulators, which they had lost on their journey along the upper reaches of the Amazon. Explaining the loss of the cells, their leader wrote: "... they were lost due to being thrown at hostile Indians from whom we were escaping."

by the teeth. This was a mouthful indeed. Speech was quite impracticable because articulation was not possible without loosening the grip on the mouthpiece. When this was done water was let into the mouth.

It is here that I feel some readers will find a new interest in their hobby, both in the techniques of using their equipment or in the designing of suitable gear and its subsequent testing in the water.

SUB-AQUA CLUBS

To those who are contemplating extending their hobby in this direction, I would like to make one important statement. Although many thousands enjoy the hobby, even in cold waters, diving is a serious business. You *must* be properly instructed and trained to use reliable equipment. The best introduction is through a Sub-Aqua club. If you want to dive yourself, club instructors will make sure you are confident and able. If you are interested in the design of recording equipment for this purpose, you will require the help and co-operation of the club members in testing the gear under water.

It is important to remember that for adequate speech quality you will not be able to use the normal mouthpiece, and therefore a full face-mask is needed. This means that precautions have to be taken to prevent foul air accumulating in the mask. It is this feature that makes recording or speech communication by the diver more risky than otherwise. *Safety First* is the maxim of all good clubs in the underwater world.

EXPERIMENTS

All early experiments in underwater recording for the BBC around 1956 were made by myself, because it was my job to utilise portable recorders whenever they were the most suitable means of getting material for broadcasting. The E.M.I. L2 was the only instrument available at that time, and by present standards it was a bit heavy and on the bulky side. Anyone starting now has the advantage of using transistorised gear and the attendant benefits of small size and weight. From the broadcasting angle, immediate topicality is best served by a direct line from diver to surface, with either a radio link to the shore, or by direct line to the studio.

We have successfully accomplished quite a number of broadcasts including one for television concerning the Loch Ness monster, and one from the sea bottom at Worthing where Alan Dixon sat talking direct to the BBC Studio at Leeds. Of course, there is always a risk of failure on such occasions by reason of the weather, tides or cold fatigue. I think it would be fair to say that even professional engineers would not wish to do these shows regularly, however exciting the material available.

In my opinion recordings of underwater exploits are best attempted by trained divers who have a flair for descriptive reporting, and it is also a matter for discussion as to whether the

(Continued on page 36)

TAPE is a wonderful medium for bringing together drama, speech training, imaginative work and written expression, and that is what my class and I tried to do for Pennington Junior School's entry to the 1961 British Amateur Tape Recording Contest.

I should explain that I teach the "eleven-plus" class in a village school. Please don't get the picture of downtrodden waifs slaving at IQ tests in a hovel; we have a light and airy new room, and the children are as happy, healthy and energetic as one could wish.

My 1960-61 boys and girls were exceptionally pleasant children. I tore my hair at first over their three R's, but they soon showed remarkable talent in art and drama. So when

LIFE IN 1801

By R. B. CRUSE

basic work improved we were able to develop their dramatic powers.

Mrs. Shelley, our headmistress, has evolved some wonderful techniques in "music and movement", which she takes with my class once a week. When I saw a lesson I was struck by the way the groups of children worked out imaginative situations. They were really making up their own little plays without words, and miming them in perfect harmony

with the mood and time of the music. Obviously this ability could be used in other ways.

In previous years my classes had started projects in February or March; projects which entailed collecting things and writing booklets. This work was useful and interesting, but I felt a change was needed. I had started taking *Tape Recording Fortnightly*, and one of my first issues gave the results of the 1960 contest. The children were told that we might enter for the 1961 contest.

The school recorder, then less than a year old, is a Reps R-40; a large

SCHOOL TAPE CLUBS

In a previous article members of the Lancastrian Broadcasting Club were portrayed producing a tape recording for broadcasting to their school-fellows. In this, the first of three articles, PAUL GROVES, the Master-in-charge, describes his club's experiences with different broadcasting material

JUST as a club cannot run successfully if its recording equipment is faulty, so too it cannot flourish if its material lacks inspiration or is too stereotyped: a club which records the same type of programme at each meeting is doomed to failure.

The maxim at the Lancastrian School is: "*any sound is worth recording—it may come in useful.*" Thus visiting lecturers who come to the school are surprised, at the end of their demonstration, to find a microphone thrust under their noses and a small boy requesting that they repeat some particular effect; a most valuable tape of the instruments of percussion in the orchestra was obtained in this way. When the school Morris Dance Team celebrates May Morning in the playground, the tape recorder, on a long lead borrowed from the caretaker, follows them out to record the festivities for a "School News" programme; as the masters' football team, leaves the dressing room, on the occasion of an epic match with the school First Eleven, a club member will be there to interview some of the personalities; the sound of football boots on gravel and the cheers of spectators may also be recorded.

In this way a record in sound of events in the school year is kept, and valuable

practice in the skills of interviewing and recording out-of-doors is obtained.

However, the club began in a modest way by recording biographies of Faraday and Galileo for the science master; other clubs would be advised to begin very simply so that the members gradually assimilate the techniques of broadcasting. It is a mistake to overlook simple material in the search for something exciting and dramatic.

One of the most successful tapes at the school was a short story written by the school captain, Chris Kettel. It began as a composition and was passed to the club by the Head of the English department, Mr. D. Harmsworth, as suitable script for broadcasting. Mr. Harmsworth sometimes sets his senior boys the task of writing stories suitable to the medium. This particular one was based on the author's holiday experiences of life on the farm. Chris Kettel read it himself, and with a rustic dance tune at the beginning and end it made an excellent ten minute programme.

While every boy or girl may not be able to write a short story, everybody in a school can write a letter. Broadcasting is at its best when personal views are expressed in a lively manner. Letter programmes, modelled on the BBC's "Dear Sir" and "Any Answers" are most popular at the Lancastrian School. Various forms are asked to write letters on specific topics. About twenty letters representing typical and unusual points of view are then edited into a programme linked with my comments. Clubs wishing to try this will find "Smoking," "Home-work" and the "H-bomb" lively topics to begin with.

One of the aims of the club is to teach

its members the differences between good and bad broadcasting. All members are trained to look for suitable material and are encouraged where possible to write it up themselves. They know that there is much more satisfaction in broadcasting their own work than other people's; and then too, there is always the thrill of hearing their own names in the credits which feature at the end of every programme.

All ideas for programmes are discussed before they are scripted. The vital question is always: "Which is the best way to present this material?" The straightforward story has been mentioned, but it may be better to divide it up into parts or even voices. This latter method is a particularly suitable way of presenting documentary, biographical, religious and poetry programmes. The club has made successful tapes in this way on Louis Pasteur, parts of the Bible, prose and poetry anthologies on Spring and Christmas, and "The Pardoner's Tale."

This method (using up to eight voices) makes facts and figures and literature more palatable—always remembering that a good ten-minute tape is to be preferred to a mediocre twenty-minute one. Many schools will also find that a magazine or miscellany programme including a short story, some letters or poems, and the School News, linked by light-hearted music, is preferable to one long one on a single topic.

Interviewing has already been mentioned in connection with outside broadcasts. Since the Lancastrian Club began there have always been at least two members who have shown a particular flair for this, but even so, questions are always scripted for the interviewer and where possible the person interviewed is given notice of them.

Plays form fifty per cent of the content of programmes broadcast by the club. From experience the writing of these is left to members who show skill at this kind of writing. In the past year the burden has fallen upon David Longlands, Simon Frost and George Eld. The best script, called "A Trip to the Moon" was written by David Longlands.

(TO BE CONTINUED)

With his first entry in the British Amateur Tape Recording Contest the author gained first prize. In this article he describes the production of his award winning tape

and powerful instrument with the Collaro Mk. IV deck and an Acos crystal microphone. This was our total equipment—and we weren't at all sure how to use it in the best way, as no one in the school had produced any sort of creative work on tape. So when I broke off my narrative during a lesson in March to suggest a historical tape project we started more or less from scratch.

Of course, the class were as keen as could be; their immediate reaction was "Good idea, let's start straight away." They already had a fair background knowledge of Georgian history, and we had plenty of time and opportunity to develop our ideas.

First we decided on a number of brief episodes—a duel, a concert, gambling, a prize-fight and so on—each needing several lines of dialogue. Next the children split into groups to write the words, choosing their own sections. As far as we could manage it, everything had to be correct for a day in 1801. This meant some research, though we had to use imagination too; we couldn't get authentic street cries, for example, so we made up our own.

Occasionally there was a plaintive cry of "Please, sir, we don't know what to write," but most of the groups worked steadily to produce a reasonable script. We discussed each piece together, deleting inessentials and adding details.

I bought 1,200 feet of acetate tape (Triton, the most inexpensive I could find), and after a little practice the first group to finish recorded their section.

I still think this is the best bit of the tape. It describes the press-ganging of a sailor; the callous midshipman, the drunken seaman, his distraught wife, and the ironic singing of the press-gang combine to make a most effective episode.



The "happy, healthy and energetic" children of Pennington Junior School

Next to be finished was a brief section portraying child labour in factories. This required the noise of machinery, and after some experiment we decided to record a few children rattling rulers against chairs and desks at $3\frac{1}{2}$ ips. Replayed at twice the speed this gave a realistic effect, and superimposing the voices was easy.

So for some weeks we spent perhaps half an hour a day on the recording, often when an art lesson or other work was in progress. We brought in a few more sound effects including the school fire bell; coconut shell from bird tables; and a toy trumpet for the coach horn—I found Alan Beeby's articles on sound effects most stimulating—and gradually we built up the tape.

We also recorded a number of crowd effects, and I now know that thirty-two children can make enough noise for a crowd of several hundred.

Meryl Adler made an excellent announcer. Nearly all the class had lines to say, and everyone tried so hard that it would be unfair to pick out any for special mention—except Andrew Lewis; he developed his vocal powers remarkably, and became a star performer. One boy—perhaps reared on too much television—assumed a mock American accent when rehearsing. Two teachers' voices had to be used; Mrs. Selby took the part of an actress, and the depraved voice of a gin-shop proprietor was my own.

Although I had never spliced tape before, I assumed the responsibility of the editing. Before I could buy a splicing block a friend made me a grooved piece of wood which served perfectly for hundreds of splices. The editing sequence took three or four weeks to complete. We improved poor quality episodes by re-recording short sequences, and gradually cut down the tape until at last it ran for less than fifteen minutes.

The class heard the tape through several times during this period; in fact, they never tired of hearing it—though I did! At last, with myself by now feeling sick of the whole thing, the project was completed. I copied it on a neighbouring school's recorder, and sent it off quite convinced that it was crude, dull, and with no chance at all in the contest.

Was the effort worth it? Yes, very much so. Apart from the delight of winning a national contest and the value of the prizes, much was gained educationally.

The historical research and writing of the episodes meant a lot of valuable work and many facts were learnt which will be remembered. The children had the great satisfaction of carrying out a useful project; their interest did not flag throughout. Their acting ability could be seen to develop in a few weeks. I believe that nothing but tape could have done all this in such a short time.

PIANO & FORTE PLAY BACK PERFECTLY ON

TRADE MARK

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Made in Great Britain by Minnesota Mining & Manufacturing Co. Ltd., 3M House, Wigmore Street, London, W.1.



ALAN EDWARD BEEBY'S TAPE TALK

ANYONE for fish and chips? If so, you may be interested to learn that a brand-new fish-and-chip shop has just opened smack opposite the Beeby Residence. Know what it's called? Eh? "The Chippery"! Yes! "THE CHIPPERY"!!! Stone me, it's raised the tone of this neighbourhood a couple of notches. I can tell you! I mean, it does something for one's social status, don't you think?

Imagine a telephone-conversation with, say, the Duke of Dillwater: "We'll be round for cocktails about eight on Thursday then, Mr. Beeby. Number 88, did you say?" "Yes, that's correct, Your Grace; dead opposite 'The Chippery,' you know." What a farce! One squeak of this to the Lord Chamberlain, and I've had it for the Buckingham Palace Garden Party this year! And another thing . . . Beg pardon? What's all this got to do with tape recording? I'll tell you what all this has to do with tape recording, my impatient friends!

This fish-and-chip shop opens five days a week at 4.30 p.m. Between then and 11.30 p.m. it is downright impossible to even think of doing any tape recording! People shouting and yelling, cars grinding to a halt just outside the front-door, engines running, car-doors slamming, brakes squealing, kids screaming and hollering, and now, if you please, a gang of leather-jacketed, skid-lidded herberts have made it their nightly rendezvous, complete with at least a dozen high-powered motor-bikes all going at full-throttle!

Try what? Going into another room? Which room, pray! I've tried the sitting-room and the kitchen; I've tried the bedroom and the study, I've . . . Where? YES, I HAVE, MATE! It was too . . . well, it was too cramped, for one thing. And anyway, you feel such a daft nit, squatting on the floor in the pantry!

Anybody with a lonely, isolated cottage on the Cornish coast care to do a swop? Sounds of howling-wind, waves breaking on rocks and sea-gulls' cries not objected to: at least, they'll come in useful for sound-effects!

Offering recommendations for suitable "background" music items some time ago I pointed out that these recordings (on disc) could be purchased only by members of the Institute of Amateur Cinematographers. I also promised further details of the conditions currently governing the use of the recordings by amateur enthusiasts.

I have now received a comprehensive, three-page leaflet on the subject from the Institute's Secretary which, I regret to say, is far too lengthy and involved to even attempt to boil down without leaving half the contents out. Nevertheless, from reading the leaflet in full, it seems clear that membership of the

Institute does offer many useful benefits to the serious-minded tape enthusiast, and I strongly advise those of my readers wishing to employ recordings of specially-composed "mood" music to contact the Secretary at 8 West Street, Epsom, Surrey.

THIS MONTH'S RECOMMENDATION: For sea-scenes—waves, seagulls, ships, coastline-panoramas, etc., "The Tall Ships" by Trevor Duncan. Obtainable from Inter-Art Music Publishers, 33 Crawford Street, London, W.1.

"CRY FROM THE HEART" DEPARTMENT. "Please, please give us quieter 'stop' buttons on our tape recorders!" The plea comes from a colleague of mine who recently sabotaged the efforts of a BBC mobile recording-unit with his!

He was taking the opportunity of taping a theatre-organ recital at the same time as the BBC-boys when, halfway through the performance, his tape ran out unexpectedly. He pressed the "stop" button . . . "BOINK!!!"

Yes, they had to do the whole lot again! According to my (red-faced) colleague, the sound came up on playback just like somebody slamming an iron door! Manufacturers, please note.

FROM time to time, queries reach me concerning the purchase of blank-cartridge revolvers for use in amateur tape and cine productions: hence, the following few words of advice on the subject.

First, remember that, except in the case of specially-built items in the .22-calibre range, you will require a Firearms Certificate to enable you to purchase a weapon. Application should be made to your local police station.

Another tip: choose a gun which has the barrel blocked. Certificates are more readily granted here than for weapons capable of discharging bullets. In any case, an open-ended appearance of the barrel can usually be carried out for a small extra charge.

Second-hand guns are, of course, the more economical buy, and thoroughly reliable in performance, provided you go to a reputable dealer. DON'T buy ancient, used revolvers from back-street, second-hand shops: such items have usually lain rusty and neglected for years, and are potentially dangerous. When buying privately, insist on an expert check-up before completing the sale.

Messrs. Webley & Scott Ltd., Park Lane, Handsworth, Birmingham, 21, have quite a reasonable selection of used, converted revolvers to offer from £6 upwards. A postcard to the secretary, Mr. B. J. Onions, will bring a copy of the firm's current list.

TO the Editor: "Dear Sir, With regard to your recent suggestion that I should interview comedian Harry Secombe on the subject of tape recording, I beg you to consider the fact—before taking any drastic steps—that I have a wife and a home to support! Well, sir, you're not going to believe this, but . . ."

Me: Are you interested in recorders, Mr. Secombe?

Harry: Definitely not, Jim! Bought one some time ago—dirty great thing with iron wheels, plastic knobs an' that. Couldn't get a squeak out of it!

Me: That's queer! What sort of tape did you use?

Harry: Tape . . . ?

Me: (Discreet cough) Have you any comment to make on wow and flutter . . . ?

Harry: Best double-act in the business today, Jim!

Me: . . . And artificial reverberation?

Harry: I'm trying to give it up!

Me: How about recording-heads?

Harry: Couldn't say. Never had my head recorded!

Me: (Mopping brow) Mr. Secombe, what are your views on the concentration of weak sound-impulses by means of parabolic-focusing and . . .

Harry: Watch your language, Jim, lad! I've a good mind to report this to your Editor! What's his name?

Me: (Desperately trying to think straight) Er . . . Mr. Brown.

Harry: A likely story! Tell that to the marines! Look, there's one, sitting in the second row of the stalls at the London Palladium, where I am currently appearing in the all-electrically-lit, foot-and-mouth-type entertainment entitled "Let Yourself Go," purely for the lolly!

Me: Mr. Secombe, that was rather an obvious "plug."

Harry: Ah, now—speaking of plugs—I'd be interested to know whether you are in favour of a more rigid programme of standardisation, having regard to the continually-increasing influx of foreign recording equipment into this country . . . Mr. Beeby, what are you doing? Please don't walk up my dressing-room wall like that . . . ! Wipe the foam from your lips, and stop that sound-type screaming . . . !

THERE appears to be some confusion concerning the Numix mixer manufactured by the Nusound Recording Co. I've been asked several times if this item can be used with any make of tape recorder. The answer is no. The Numix was designed and built specifically for use with the Ferrograph recorder only.

FROM RECORDING TO CINE

Part four of a new series by Richard A. Margoschis

RECORDING THE SOUND TRACK

WE come now to the problems which face us when recording the sound track to accompany our film. In using tape we are fortunate, in that if we do make an error we can, at certain stages anyway, make corrections by editing, without having to make the whole recording again. This is not so with stripe on film, for it is impossible to cut out sound, physically, without removing some of the picture; this suggests that when using stripe it might be advisable to make the sound track on tape first and then, after checking with the film, to dub it on.

Referring to the four types of sound track mentioned in the last article (*September 20 issue*) we can consider first the preparation of a musical background. From your timed cue sheet, you will know the times at which certain music must begin and end; using this, you can cue in your various pieces against a stop-watch or seconds clock—again the dark room clock is

admirable for the job and big enough to be easily seen.

Where certain bars of music are to accompany certain pictures the timing is more critical, and it will be necessary to time from the beginning of the piece to the bars required; from this subtract the time from the beginning of the film sequence to the particular frames and your music must start that number of seconds after the start of the piece.

The second type we must consider is a plain commentary. This having been prepared in the form of a script, it must next be presented to the microphone in the best possible manner. Assuming that you are going to do this yourself, read it through until you know it well. I find it is a great help to read it aloud, in order to be sure that I am getting the correct intonation to each sentence.

When actually recording, it is necessary to have a visual aid to be able

to cue in the various parts of the commentary at the correct time. This can be provided by a suitable time-piece or by the film itself. I think that, in several respects, the former is preferable.

If you select this method, place the clock sufficiently far away from the microphone but in a position where it can easily be seen at a glance. Have your script, which should be typed or clearly written in double spacing, lying before you in single sheets; fan the sheets out on the table so that you can easily and silently remove one when you have finished it.

Start the clock and the tape running, volume control set at a previously checked level, and commence reading as the seconds finger comes on to zero. After finishing the first paragraph, wait for the seconds finger to arrive at the number of *seconds* indicated for the next paragraph to start and then continue your reading.

Stereo recording is easier than you think

STEREO recording is subject to the usual laws of growth, including the one about the egg and the chicken. If more people tried it there would be more ideas about what to do; and if there were more ideas about what to do more people would have stereo recorders.

I would appeal, above all, to tape enthusiasts with a taste for the fanciful to try their hands at the game. The fact that stereo is so much more realistic than mono is, surprisingly enough, a great asset when it comes to this sort of thing.

I am not quite sure why. Partly, it must be because some element of the remarkable is already present in the disembodied sound—as distinct from a sound in a box.

Norman Paul who is well on the track of something with his sounds from a second (mono) recorder and an extension speaker that can wander about (for creating special effects during the recording session).

People with technical leanings and

Stereo Notes

By D. W. GARDNER

equipment can contribute a good deal to this exploration of stereo possibilities. It is true, for example, that instruments will wander from side to side occasionally, even when they are not supposed to—and the effect can be contrived by varying the balance controls during playback.

It should not be difficult to evolve a recording technique that will achieve as much movement of this kind as may be desired. Remember that sounds in the higher frequency range are easier to push around than the lower ones. You will also find that people vary in their capacity to localise accurately—although not many will fail to achieve reasonable separation.

Apart from the realm of pure fantasy, it does seem that one of the best introductions to stereo recording is through recording plays and excerpts from plays. Getting actors and actresses may be an

obstacle at first but this should not remain a difficulty for very long if you go the right way about it. For amateur acting is extremely popular and any dramatic group will tell you that they have great difficulty in finding parts for everyone.

Why not drop in on one of the groups in your area and see what can be organised? You could start by suggesting that they might like to hear a recording of a part of their current production; and once they have agreed you could ask for their co-operation over the special techniques involved in stereo recording. Before long, I am sure, a few of them would get really interested in the business and be pleased to take part in a whole series of experimental productions. Many of these types are also looking for opportunities to do some script writing and producing, which is just what you would probably need.

I wonder, by the way, if the Federation of British Tape Recording Clubs has a line of contact with the British Drama League. If not, I feel sure that they could help each other quite a lot, beginning with exchanging addresses of groups interested in the idea of combining forces occasionally.

Generally it is not necessary to watch the minutes on the time-piece, unless a break in reading extends for more than one minute; in such a case note on your script the time of the beginning and end of the break and be sure the seconds finger goes round the required number of times.

SYNCHRONISATION MARKS

When your recording is complete you will, no doubt, be eager to try it against the film. This is the next step in the procedure and it brings along the next problem—how to start the film and tape in perfect sync. Try the following procedure.

Splice on to the tape a coloured leader, the splice being exactly five seconds before the start of the sound track. Splice on to the film a good length of black leader and, about ten seconds from the film end of it, scratch away a small area of emulsion in the top right hand corner of a frame. The exact timing of this is not critical, as it is used only as a warning.

Now make a similar mark *exactly* five seconds (eighty frames) before the first frame of your picture. Run up the projector and recorder to normal working temperature—this is important—and, while doing so, adjust the reflector to throw the necessary light on to the strob, and adjust the projector speed to hold the strob steady. Stop both machines.

Load up the recorder and position the splice between leader and tape—which is really your tape sync. mark—against the play-back head. Load up the projector with at least twenty seconds to run before your warning mark appears. Switch on the recorder but *hold the tape still by means of the pause control*; without altering the speed control, start the projector.

Watch for the warning flash on the screen and then when you see the second flash, the film sync. mark, let go the pause control to start the tape. The two machines will then be synchronised. Because the projector now has a spool of film to move, however, it might run slightly slower, so adjust it against the strob immediately.

It is, of course, possible to reverse the order of starting the machines, but I think this undesirable because of the fact that the projector takes slightly longer to get up to running speed than the recorder, and you would not have a visible sync. mark on the screen.

As the film proceeds, watch the strobe. If it tends to turn clockwise, the film is running a little too fast,

and vice versa. I think you will find it easier to correct a case of film-behind-sound than sound-behind-film.

You will now know whether or not your sound track is perfectly timed. If you think it is not, check it again before making alterations. If it is necessary you should be able to adjust the timing by cutting out, or splicing in, the necessary lengths of tape between sections of the commentary.

voice! It can be argued that when the film is shown you will hear the projector in any case, but I see no reason why its sound should be spread around the room by coming from your loud-speaker as well. Actually, 8 mm projectors have an advantage here, for they are quieter-running than the larger sizes.

Nevertheless, the difficulty can be overcome, and some modern house

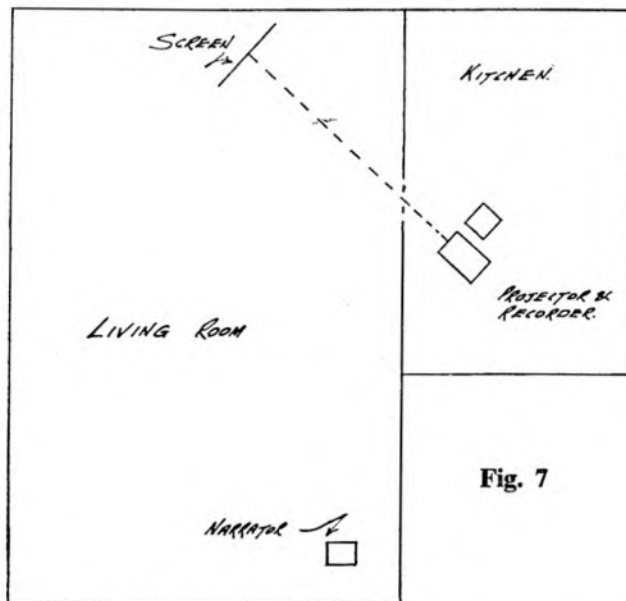


Fig. 7

Earlier, I mentioned that the sound track *could* be recorded against the film, in other words, as the film is being projected. My main objection to this method is that, unless you take special precautions, you will record the sound of the projector as well as your

designs actually provide a clue to the answer. To be successful, especially with the usual type of microphone, you really require the use of two rooms, and a serving hatch between a kitchen and dining-room can provide the required conditions.

Projector and recorder can be set up in the kitchen and the picture projected through the hatch into the dining room, a piece of plate glass being placed across the hatch to further reduce noise (see Fig. 7). So long as you can see the film, even if it is reversed through an opaque screen, such as a sheet, it will give you your cues.

Other problems arise because, in order to control the speed of the projector, the recorder will also have to be in the kitchen. So you require an assistant (wife or husband) to operate the machines or speak the commentary. In addition, a low impedance microphone will almost certainly be required, due to the length of lead necessary.

In the next issue, in the final article in this series, I shall discuss the more ambitious kinds of sound-tracks.



Now
is
the
time . . .



My Diary

LAST month when I was writing
Lup my diary for you. I was so full
of holiday plans I could hardly stop
talking about them. Now it's all over
—we've been back home for three
weeks and it's difficult to believe we
were ever away.

But what a country Scotland is!
Rain? It rained every day; oilskins,
sou'wester and gumboots became our
uniform dress. I don't mind the rain,
but it did make recording very diffi-
cult. There was water everywhere; the
sea in front of us, waterfalls cascading
down the mountains behind us, rain
sometimes as fine as mist and at other
times pouring in torrents on top of us
and finally oozing up through the
waterlogged ground under us. Is it so
surprising that many of our recordings
are of the sounds of water?

I had no idea how many quite differ-
ent kinds of sounds can all be made
by water. From the bubbling of the
burn to the throaty roar and rumble
of the massive fall, from the tinkle of
the wavelets over the sand at low tide
to the full force of a night gale with
lashing winds and the ominous trail in
the sky of a distress rocket from some
ship in danger out at sea. All so very
different, yet all equally expressive.

We didn't record any seals, but we
did see some basking on the rocks off
the coast of Skye. I should dearly have
loved to go ashore but the little thirty-
foot boat that was taking us up the
Sound of Sleat was being tossed
around like a matchbox and wouldn't
have stood a chance amongst the
breakers pounding against the shore.

I'm still kicking myself for missing
another recording. One afternoon we

heard the most unearthly sounds echo-
ing among the crags immediately
above our camp. Stupidly I ran out
to see what was happening without
stopping to pick up the recorder.
Searching the rocks through my glasses
I spotted them; a magnificent pair of
ravens.

Their cry is a weird croak, but with
all the power of a klaxon behind it,
and it was this that had brought me
running from the tent. In a few sec-
onds they were gone, and although I
kept watch we didn't see them again.

That's part of the fun of recording.
One never wholly succeeds—there's al-
ways something left to accomplish. A
good, genuine recording of wild ravens
is now a must on my list for the future.

Now it's a case of back to the
common task, to dull routine. Dull?
Only by comparison for life need never
really be dull for anyone concerned
with such a vital, exciting activity as
recording living sound.

No one can deny but that we live in
troubled times. The threat of war
becomes daily more terrible. A great
gentleman has gone proudly to prison,
rightly or wrongly, for publicly demon-
strating his belief. Countless others
would be glad to follow. This is no
place to argue either for or against
the action that our fellow citizens are
taking, but it definitely is the place to
remind you that what happens today
will be history tomorrow. Those of
us concerned with the recording of life
in our times are finding it anything
but dull!

AUTUMN. Clocks soon to be
changed, muffins for tea—and
evening classes. All over London
schools have been opening their doors
to the adult population at the begin-
ning of the first term of the new school
year.

The range of subjects you can study
is unbelievably varied, from basketry
to boat-building, from languages to
flower arranging. But will you find
tape recording there?

If you had asked that question this
time a year ago the answer would have
been a regretful, "No." This year the
answer for Londoners is thankfully,
"Yes."

NOMINAL FEE

Instruction is now available at a num-
ber of schools for a purely nominal fee—
seven shillings a term. If you're suffi-
ciently keen it's up to you to find out
where and inquire just what the activities
of this particular class happen to be.
Check in the L.C.C. booklet *Floodlight*,
and see if there's a class anywhere near
you. If there is, go along and see the
principal and explain what you want.
He'll most certainly introduce you to the
tape recording instructor who can tell you
exactly what his class does.

It may well be that you don't even
need to have your own equipment. There
might be scope for you if you're interest-
ed in recorded drama or production or
even writing for sound features. Even
if you think that your own particular
interest is of little value and only indirect-
ly connected with recording, go along and
have a chat. You might be welcomed
with open arms and find yourself intro-
duced to an unexpected field of activity
that just meets your needs.

CHILDREN'S CORNER

WHAT a wonderful thing it would
be to be able to go into the jungle
and see all the wild animals and to
record the sounds of their voices.
Some people do. Have you seen on
television the films that they have
taken? I think you must have to be
rather brave to go and photograph a
live lion and record the sound of his
roar. I'm not sure if I should be
brave enough, but I'd like to try if I
had the chance.

If anyone ever does ask me to go
into the jungle they're sure to say,
"Have you ever recorded any animals
before?" and if I have to say, "No!"

they'll probably look for someone else
instead. So I've recorded lots of ani-
mals just in case. Have you?

My old cat was the first one I
recorded. "Pushca" is his name and
he's not very exciting. He doesn't
make much noise either, and it took
me a long time before I had recorded
all his different meows and funny
little purring noises. But he is a real
animal and he can be quite dangerous
if he doesn't get his food just exactly
when he thinks he ought to have it.
Have you got a cat, and if you have,
have you tried recording him? Be-
tween you and me it isn't really as
easy as it seems, but we musn't tell
people that, otherwise they'll think we
can't record the real wild animals.

Of course, a dog would do, too.

Mind he doesn't jump up and knock
the microphone out of your hand,
though! Some friends of mine have
got some birds in a cage and I think
I'll ask them to let me record their
singing. Even some very little ani-
mals can be recorded.

Once I recorded a tiny white mouse.
He squeaked and made all kinds of
odd noises but I think he was a little
bit wild too because in the end he
bit my finger and made it bleed!

When you've recorded all your own
pets I'm sure you'll find that some of
your friends have other creatures you
could record.

Then perhaps one day you might
get the chance to go off on an expedi-
tion to all the thrilling places that
I've not been able to go to—yet!

Make way for the

LADIES

Personality of
the month—8

Mrs. Dorothy Brown

A new regular
monthly feature

Edited by
Vivienne Gooding

I WONDER how many of my readers really believe that women can be as interested in tape recording as men? I'm quite sure that at least some of the gentlemen who loyally invest their 18 pence every other week hastily turn to the next page when they come across the heading "Make Way for the Ladies." That's a pity, because I doubt if any of them would object to having a cosy chat with a Director of a company manufacturing some of the finest recording equipment made in Great Britain.

"I shan't keep you more than half an hour," I had told Mrs. Dorothy Brown, Director of Vortexion Limited, as I made my appointment for eight o'clock one evening. In fact it was nearly 11 o'clock that night when she waved good-bye after an interview that was more like a reunion between old friends.

Time and time again I have referred in these columns to the welcoming friendliness I have met wherever I have gone to talk about tape recording. To be honest, I did wonder if something a little more formal might be expected from the top executive level of a concern whose reputation is almost legendary. A smile from Mrs. Brown and a rather large Martini appeared simultaneously to dispel my fears.

"Why," asked Mrs. Brown, "aren't more women interested in tape recording?"

Now strictly speaking I was there to ask the questions and she was supposed to supply the answers, so I couldn't help giving a sly little grin to myself when I found the tables being turned. Astride my favourite hobby horse I explained how *Tape Recording Fortnightly*, the first magazine of its kind, is also the very first to cater specifically to the needs and interests of our sex.

"I believe the trouble is," said Mrs. Brown answering her own question, "women tend to be a little scared. A television set may be an even more complex piece of equipment electronically, yet these days there must be few women who would hesitate to switch one on, so isn't it rather silly to be frightened of a tape recorder?"

I agreed, of course, as she went on. "The machines that my company produce are intended for use by either professionals or really serious amateurs, yet at the age of 11 my daughter was in sole charge of one at her school. She used to do all the recording work for the entire establishment without any help whatsoever!"

Even making allowances for an inherited family aptitude 11 years is pretty young to be playing around with top

quality equipment. And to get consistently good recordings over a period of time as I've no doubt she did speaks volumes for the simplicity of its operation. Mrs. Brown was very quick to add that although naturally biased in favour of her own products she believed that almost any other intelligent child of the same age could operate almost any other make of machine equally as well.



When I asked her what private use she made of tape recorders she at once became the proud mother again.

"My daughter's 19 now and she's very keen on ice skating, in fact we have hopes that in a year or two she might be taking part in some of the international contests."

Congratulating her I asked what the connection was between recording and ice skating.

"The recorder plays a most important part in Ann's training. All her movements on the ice have to be timed exactly to music, and so between us we work out a suitable programme which I record on tape, editing out any movements not required. As the sound reproducing equipment at the rink is limited to a 78 rpm turntable I have a disc cut from the tape and Ann takes it with her when she goes to practice. It's as easy as that!"

Mrs. Brown showed me the machine she uses, a perfectly ordinary (three-year-old) Vortexion model W.V.A. without any special modifications.

"Ann's using it to learn Italian, too. I got hold of one of the 'language on tape' courses for her and I've been surprised how quickly she's managed to pick it up."

When speaking about her business activities Mrs. Brown was very modest, but

I couldn't help feeling that her personal approach to commercial life must have contributed in no small way to her firm's success.

"I like to feel," she said, "that our customers are people who are as interested in sound recording as we are. We don't just deal in goods and money like a grocer selling packets of tea. We're very conscious of our position in the recording world and we're jealous of our reputation too. I wish you could see our service department—equipment comes in to us from all over the world for maintenance. It's not at all unusual for us to have to remove the remains of a family of bugs that have lived quite happily inside a machine during its five or six years' use in the tropics!"

So much has been said recently about servicing difficulties with some kinds of machines that I couldn't resist the temptation to ask Mrs. Brown what the position was for private owners of her recorders.

"Servicing isn't really a problem for us," she replied. "Other manufacturers who perhaps cater for a rather different market probably have their own method of handling repairs. In our case we don't expect a machine to go wrong but if any attention is required we much prefer to check it over ourselves at our own works rather than have anyone else interfere with it. The occasional faults that do happen now and again can usually be put right by our specialised staff very quickly, but if some well-meaning enthusiast has had a go first . . .!"

How refreshing to hear a manufacturer speak like that, but then Mrs. Brown is a most refreshing and invigorating person. She hastened to add again that although this policy of personal service for the owner worked very well indeed for the hand-made equipment produced by her company it could lead to chaos for a firm mass-producing goods for the popular market. I suppose so, but there's something very NICE, very BRITISH about this policy of personal service which appeals to me immensely.

"Before you go I should like to mention one thing I've discovered. When you came in I asked why more women weren't interested in recording? I can tell you now, when you do get a woman interested, and by that I mean really interested, she's liable to become so thoroughly taken up with it that she'll leave the men standing!"

Why had a woman not won any of the tape recording contests? Neither of us knew at that time that Miss Goodwin was about to be declared a winner with her "Blackbird and Chaffinch in a Storm." Congratulations from me, Miss Goodwin, and I'm quite sure that Mrs. Brown would like to pass on her congratulations too.

IMPEDANCE MATCHING

THERE is no better-known or more respected name in the world of audio than that of JAMES MOIR, M.I.E.E. He has had vast practical experience in the industry and is the author of the standard work "High Quality Sound Reproduction" Mr. Moir now joins our team of regular contributors and will contribute a special series of articles on fundamental problems of sound recording and reproduction.

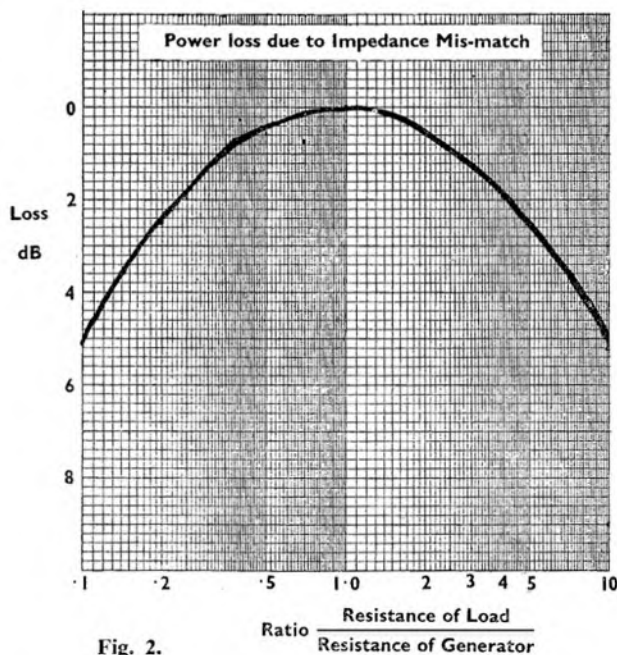


Fig. 2.

HIGH fidelity amplifiers and even radio receivers without any pretensions to high fidelity, commonly have an indication in the instruction book that an extension speaker, if used, should have some specified impedance, very often 3 ohms. This is the commonest example of an "impedance matching" requirement, but there are many others. A 30 ohm microphone is specified for a particular tape recorder, or a piezo pick-up must be connected to an amplifier having an input resistance of not less than perhaps 2 megohms.

There is no one all-embracing reason for requiring an impedance match so it is worth examining the conditions under which a match is necessary. In practice a match may not always be possible, so that it is also useful to know just what happens when the equipment must be used, though an impedance match cannot be achieved.

Two circuits are matched when the impedance measured at the output terminals of the first circuit is equal to that measured at the input terminals of the second circuit as in Fig. 1. The basic reason for requiring a match is that it ensures that the maximum possible amount of audio power is transferred from one circuit to the other.

As a typical example, if the instructions supplied with your amplifier indicate that it

Only the simple example has been discussed. A perfect impedance match requires that the resistive components of the two impedances should be equal and the impedances should have conjugate phase angles. Of academic importance in this instance for the amateur cannot manipulate the phase angle of the load.

A power generator whether it be a bell battery, a dynamo, an alternator or a valve will deliver its maximum possible power to a load resistance equal to the internal resistance of the generator. For a load resistance either higher or lower than the generator's own resistance the available power output will be less than the maximum possible. Fig. 2 indicates the power loss in dB due to a simple resistive mis-match between any form of power generator and the load.

The importance of impedance matching was first appreciated by the early telephone engineers. Being without amplifiers to compensate for their line losses they found it necessary to take every possible step to ensure that the maximum power from the microphone reached the headphone at the far end of the line. Maximum efficiency requires that the microphone, line and headphone all have the same impedance, but for reasons that are too complicated to pursue at this point, this equality cannot be achieved. However, the impedance differences can be corrected at the junctions between microphone and line and between line and headphone by inserting impedance matching transformers at these junctions.

It may be shown that the insertion of a transformer having a turns ratio

$$\frac{\text{Primary turns}}{\text{Secondary turns}} = \sqrt{\frac{\text{load impedance}}{\text{generator impedance}}} = \sqrt{\frac{R_L}{R_g}}$$

will make a load of R_L ohms connected to the secondary side, appear as an apparent load of R_g ohms at the primary terminals. The same technique is used in an amplifier, an output transformer of turns ratio

$$\sqrt{\frac{\text{optimum load for valve}}{\text{loudspeaker impedance}}} = \sqrt{\frac{R_L}{R_g}}$$

being used to match the low impedance speaker to a valve that requires a relatively high impedance load for efficient operation.

Fig. 2 shows that the power loss due to

an impedance mis-match is not very high provided the mis-match is not too serious. Thus a load impedance twice (or half) that of the generator will only result in a power loss of .5 dB. Unfortunately this simple arithmetic neglects an additional complication that is only important when valves, transistors or other non-linear devices are involved. Such non-linear devices generate harmonic distortion unless presented with their preferred value of load resistance, the distortion setting a practical limit to the amount of power that can be drawn in the mis-matched condition, well before the power loss becomes important. A typical example is shown in Fig. 3.

In the matched condition, a 4 k ohm load, the power output is roughly 37 watts and the third harmonic distortion about 1 per cent. A change to a 6 k ohm load reduces the power output by only 1 watt, but it increases the distortion by ten times to 10

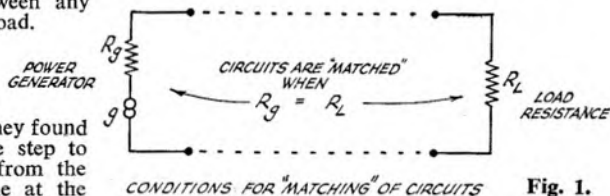


Fig. 1.

per cent. The rate of rise of distortion with mis-match is a function of the type of valve being used, pentodes and tetrodes used "straight" being much worse than triodes or tetrodes used in the ultra-linear or distributed load circuits.

Thus we now have two important reasons for requiring an impedance match. It ensures that we obtain maximum power, and, where valves or transistors are the power generators, it ensures minimum harmonic distortion.

A matching requirement invariably appears at the input end of every tape recorder for the microphone input terminals will be marked "high impedance" or "low impedance," or, if you are fortunate, both high and low impedance terminals will be provided. All the professional quality microphones are of low impedance, 25/30 ohms, 250 or 500 ohms and, to do them justice, the specified input impedance must be provided by the tape recorder. Where low impedance input terminals are provided on the machine it is a straightforward example of impedance matching to ensure the transfer of the maximum amount of audio power from the microphone to the tape recorder.

The power is generated by a linear device and a mis-match will not result in any increase in harmonic distortion but it will

IMPEDANCE MATCHING

result in some modification in the frequency response of the system.

It is impossible to be precise in detailing the effects of a mis-match on the frequency response because this depends to a great extent on the actual design of the input transformer in the tape recorder, but guidance can be given. A microphone having an impedance higher than that specified for the recorder will result in some loss of bass and top response, but at both ends of the range the loss will take the form of a slow "roll-off" rather than a sharp cut-off. Conversely, a microphone having an impedance lower than ideal will produce an extension of the bass end, but will tend to introduce a peak in the top end response without any significant extension of the top end range. In most instances a mis-match of two to one would be required to make any significant change.

Most tape recorders of the non-professional variety are only provided with a high impedance input circuit, the impedance being that of the grid resistor to the first valve, usually 1-2 megohms. These are intended for the direct connection of a piezo microphone using a few feet of screened lead. Matching is not involved, though there will be loss of bass if the input resistor in the tape recorder is below that specified by the designer of the microphone. Few of the cheaper piezo microphones have a satisfactory bass response and in most instances the use of an input resistor of half the required value will not introduce any significant additional loss.

If you are a real enthusiast you will eventually want to use one of the better quality low impedance microphones of the moving coil or ribbon variety, and the problem of impedance matching becomes important. Many tape recorders have sufficient gain to allow a moving coil microphone to be used directly connected to the high impedance input terminals, but in every instance the performance will be greatly improved by the addition of an input transformer between the microphone and the tape recorder.

The improvement is not one of frequency response; in fact, the response will be slightly worse with the transformer than without it, but the sensitivity and signal-to-noise ratio will be vastly improved. The gain in sensitivity is directly proportional to the transformer ratio and, as a ratio of 50:1 can easily be achieved (from a 30 ohm microphone) the improvement in sensitivity can be very substantial. The improvement in signal-to-noise ratio is generally equally obvious. Noise due to the first valve and its circuit is roughly constant and, as the addition of a high ratio input transformer allows the amplifier gain to be reduced, the valve noise is reduced in about the same ratio. Alternatively the speaker can be allowed to stand further from the microphone, almost always a bad thing, but sometimes unavoidable in public address work.

Selection of the transformer turns ratio presents some difficulties. At first sight it would seem to be the problem of matching a microphone having an impedance of, say, 30 ohms, to the input resistor of the tape recorder, perhaps 1 megohm. Application of the simple formula given earlier will indicate that a ratio of

$$\sqrt{\frac{1,000,000}{30}} = 182:1$$

is required, but a rapid survey will show that such transformers are not available, for they cannot be designed or manufactured.

In fact, the problem is not one of impedance matching for the purpose of minimising power loss, for valves are voltage operated devices and the best performance is secured when the maximum signal voltage, rather than the maximum signal power, is supplied

to the grid circuit. Analysis shows that the maximum signal voltage is achieved by an input transformer of the highest possible ratio consistent with the achievement of the desired frequency range.

The design of input transformers will not be pursued, but it can be stated that the maximum ratio obtainable is, first of all, a function of the price that can be accepted. But there is another limit set by the impossibility of winding a transformer to have a secondary impedance greater than roughly 300,000 ohms. In practice, 100,000 ohms is a more usual limit.

Accepting this latter figure, the maximum turns ratio that is practicable is

$$\sqrt{\frac{100,000}{30}} = 58:1$$

With high ratio transformers it is essential that the transformer be mounted as near to the tape recorder as possible, and, in fact, it should be mounted inside the machine with secondary leads as short as possible.

Thus, in this particular example, a matching transformer is used for yet another reason; to achieve maximum sensitivity or the maximum signal-to-noise ratio. Obtaining maximum signal power or minimising harmonic distortion does not enter the picture.

(Continued on page 36)

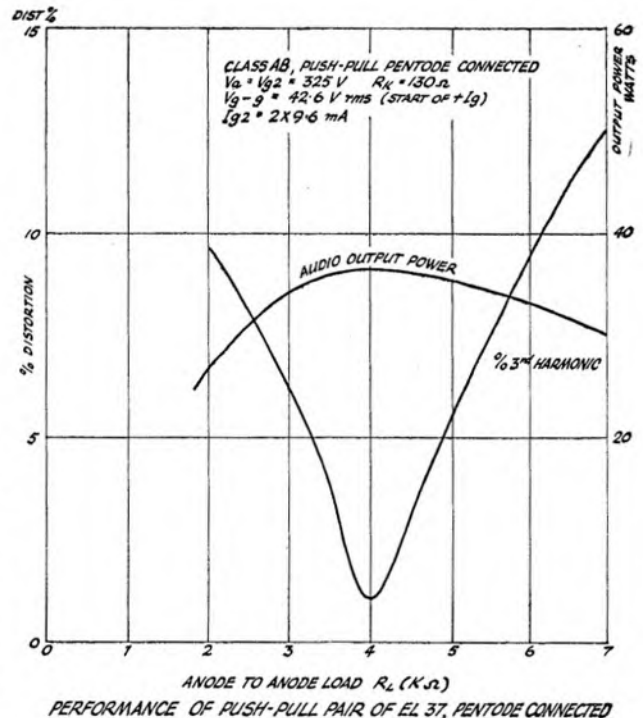


Fig. 3.

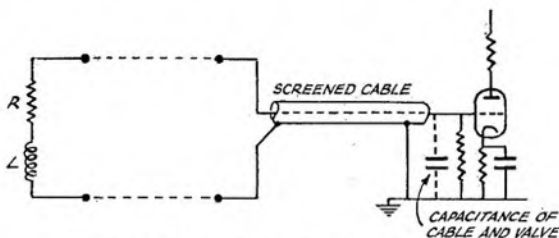
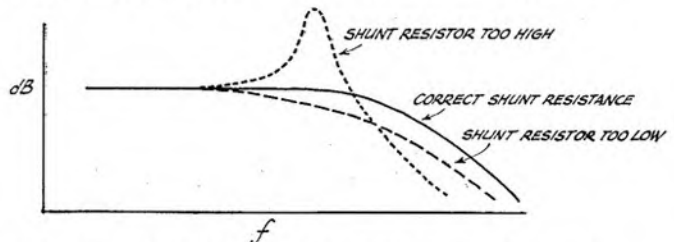


Fig. 4a (left) and 4b. Circuits of High Impedance Magnetic Pick-up effect of shunt resistance on frequency response



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Sound technicians of the De La Rue Film Unit use an E.M.I. RE321 during the making of a documentary film, on the Thames at Chiswick

AUDIO CONVENTION

THE British Sound Recording Association has arranged a special whole-day Audio Convention to mark its Silver Jubilee Year. To be held at the Institute of Electrical Engineers, commencing at 10 a.m. on Saturday, October 14.

The programme will include the following talks: *Non-linear Distortion Measurement*, by J. Somerset Murray, B.A., A.M.I.E.E.; *Some Highlights in the History of Sound Recording*, by H. A. M. Clark, B.Sc.(Eng.), M.I.E.E.; *The Cocktail Party Problem*, by Prof. Colin Cherry, D.Sc.(Eng.), A.M.I.E.E.; *Studio Acoustics*, by C. L. S. Gilford; and *Recording and the Artist*, by Peter Andry.

Registration for the Convention costs 30s. for non-members, or £1 for members of the Association. Tickets may be obtained from the Hon. Secretary, S. W. Stevens-Stratten, F.R.S.A., "Greenways," 40, Fairfield Way, Ewell, Surrey.

SIX 45 watt power amplifiers, two pre-stage microphone amplifiers and switching equipment is the basis for the *Son and Lumiere* production currently at Stirling Castle. Standard Telephones and Cables have installed the equipment which uses two-track recording applied through automatic switching circuits to four amplification channels.

Radiated through 5 ft. column loudspeakers at strategic positions throughout the castle, the narration, written by Eric Linklater, is spoken by James MacKechnie for the production by Finley Macdonald.

MANCHESTER Art Gallery recently began a "listen as you look" service. Visitors are able to hear commen-

EVERY word and every sound at the three big party political conferences this autumn are being recorded by the BBC. Extensive installations—and the use of miles of tape—are involved, but experiments made last year proved convincingly that this "record everything" technique is an advance on the system used hitherto. Previously only speeches and debates selected in advance have normally been recorded on disc.

The new system means that the BBC News will be able to give more thorough coverage of these important conferences than ever before, although it does not mean that automation is taking over. Reporting staff attend every session to report the news and set the scene. Each "take" of actuality that they want inserted in their broadcasts is edited from what may total, by the end of the day, at least eight hours of almost continuous tape. In this way nothing of news significance should be missed.

At Edinburgh, where the Liberals met, the BBC was already equipped to make such extensive recordings. But at Blackpool and at Brighton, for the Labour and Conservative Party conferences, special offices and recording rooms have had to be constructed, and a mobile studio brought in for Overseas News broadcasts.

WHEN an unmanned electricity sub-station broke down recently, science sprang into action with a device which dialled "O" and went on to tell the telephone operator, by means of a recorded message, that mechanics should be sent to repair the fault.

The answer the recording got was another recording which said: "You no longer dial 'O' for the operator. Please replace your receiver and dial 100."

For all we know they went on like that for hours, each trying to din its message into the other.

NEWS IN BRIEF

tries on a selection of paintings in the permanent collection, relayed through pocket-sized radio receivers and lightweight earpieces from a bank of tape recorders and amplifiers.

Mr. S. D. Cleveland, director of the gallery, said he hoped the 50 outfits, given by the Granada Group, would be particularly useful in special exhibitions.

ARE you the "burring type," the "howling type," the "machine-gun type" or the "motor-cycle type" of snorer?

Seeing the tragedy of a Japanese husband divorcing his young bride after one



BERT EBRALL, Manager of the 7Qt Broadcasting Company of Queenstown, Tasmania, interviews an engineer at one of the world's toughest mining projects situated 3,000 feet up on Mt. Lyell. Four million tons of rock have to be moved in an area where rainfall exceeds 100 inches a year. Manager Ebrall reports that the Fi-Cord works perfectly, even in these conditions.

Vicar puts "I Will" on tape

COUPLES marrying at the Cranbrook Road Baptist Church, Ilford, Essex, can have a tape recording of the ceremony for a £1 fee.

A tape recorder installed by the vicar, the Rev. Collin Weller, is also used to send messages of encouragement and church services to missionaries in all parts of the world. Said Mr. Weller: "The tape recorder, paid for by contributions from parishioners, is serving a splendid purpose. Our missionaries also tape messages and send them to us and it really does make us feel we are in touch with everyone. Couples marrying in the church love to have a recording of the service and it is wonderful to think that in 20 to 30 years' time the tape can be played back and sound just like the original service."

day because she snored. Dr. Ikematsu, a Japanese ear, nose and throat specialist has been studying snoring for over nine years, and has used a tape-recorder to help him with his research.

It is interesting to note that Dr. Ikematsu operated on the young divorced bride's snore later and cured it!

FOR about two hours recently a Highland Pipe Band sat listening to a tape-recording of pipe music—played by 80-year-old American citizen, Mr. Donald Sutherland, who emigrated to America many years ago, taking his love of pipe music with him.

The old piper recorded on tape all the pipe tunes he could remember and posted the recording to Brora's pipe-major, Mr. W. Cairn Sutherland.

Directional properties of a complete loudspeaker

BY PETER MILTON

IN the last issue we considered the strength of the sound field radiated by first a single small sound source and then the effect which the proximity of an identical source has upon the pattern of the combined sound field. This pattern, which is known as the *Polar Response* is the acoustical equivalent to the lines of equal pressure on a weather chart. It is drawn so that the sound pressure at any angle off the main axis is proportional to the length of a line drawn from a fixed

ing force necessary for equilibrium, which is to place all the vectors head to tail and to complete the polygon. **Figure 1b** is the same as Fig. 1a re-drawn in this manner.

The next step is to place a number of these sources in a straight line and, assuming that they are equally spaced and vibrating in phase, to calculate the net result.

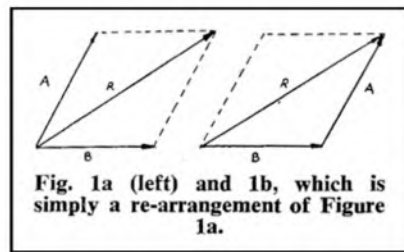
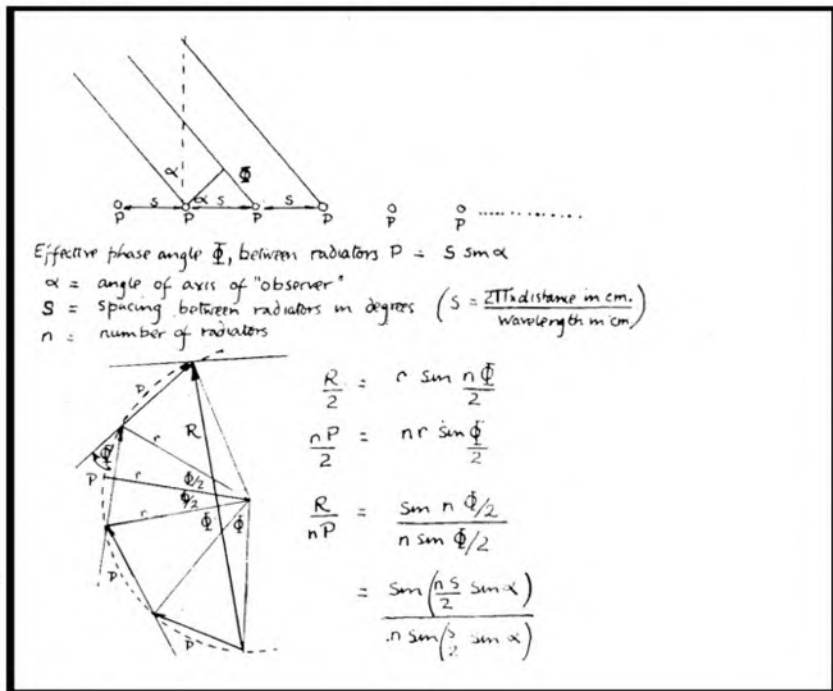


Fig. 1a (left) and 1b, which is simply a re-arrangement of Figure 1a.



The method is not as complicated as it would appear at first sight. First of all, the radiators are treated as pairs and the effective phase delay between them determined. This varies with the angle of "viewing", as shown last time. If these vectors are placed end to end it can be seen that they form chords of a circle, as shown in **Figure 2**.

The resultant is obtained by completing the polygon. The linking factor is the circle, so, by expressing the individual pressures and the resultant pressure in terms of the radius and the angle between radii, the polar diagram can be calculated.

This is no academic case, applying trigonometry for its own sake, because the practical application is to be found in many churches, cinemas and other public buildings.

Reference to **Figure 3a** will show that the beam width is narrowed considerably and the side lobes are suppressed by the use of spaced loudspeakers. If the line were vertical, the energy would be beamed in a horizontal dir-

point at the angle concerned. The length of the line indicates the strength of the sound field relative to the axis and it can be expressed as a percentage, or in decibels.

We also justified the idea of representing a sine wave as a vector, i.e., a line of length proportional to the maximum value of the wave, the angle relative to a fixed line or another vector being equal to the phase angle between them.

The addition of these vectors is achieved graphically by completing the rhombus in **Figure 1a**. The same result can be obtained by adopting the technique for finding the balance-

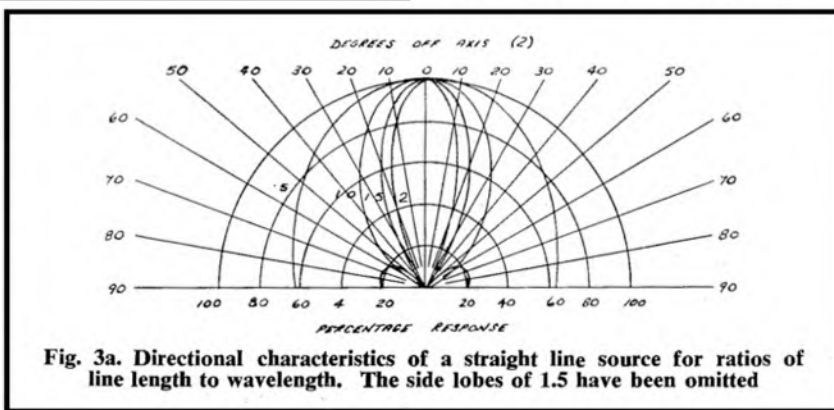


Fig. 3a. Directional characteristics of a straight line source for ratios of line length to wavelength. The side lobes of 1.5 have been omitted

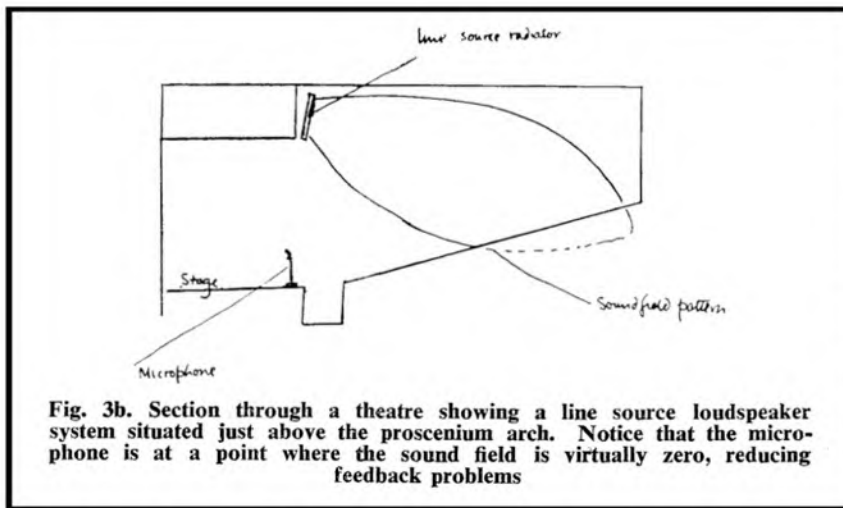


Fig. 3b. Section through a theatre showing a line source loudspeaker system situated just above the proscenium arch. Notice that the microphone is at a point where the sound field is virtually zero, reducing feedback problems

action, although, looking from above, the field pattern would be circular. The horizontal beam could then be used to concentrate the energy where it is needed. Out of doors this means that a crowd can be addressed without wasting the effort involved in deafening any birds there might be over-

next development is to take a small strip of cone and rotate it, forming a thin disc. The complication here is that all the individual lines which could be said to compose this disc interact, causing the mathematics in-

diagram indicates the relative sound pressure at various frequencies, instead of various piston diameters. For the sake of comparison, we could use the angle off axis at which the sound pressure is halved as a criterion of distribution.

At a frequency of 2kc/s, the wavelength of sound is 6½ in., which is slightly greater than the diameter of the piston. **Figure 5** shows the directional characteristics of a disc and, from this, we can deduce that, at an angle of 45 degrees, the pressure falls to half that on the axis. This is also the case in the loudspeaker of **Figure 4**. At a frequency of 4 kc/s, the diameter of the cone corresponds to 2½ wavelengths, and we would expect to find that the pressure at an angle of 20 degrees is -6dB. In fact, this is only the case at 40 degrees, the angle to be expected from a 3½ in. disc at this frequency.

Similarly, at 10 kc/s, we would expect an angle of about 10 degrees, and obtain 22 degrees—the same as for a 2½ in. disc.

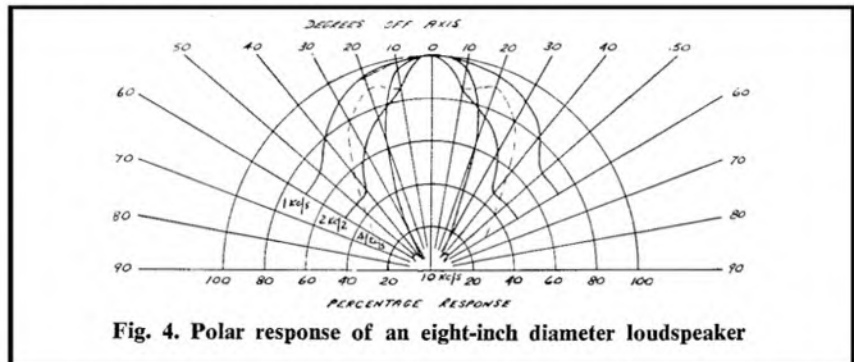


Fig. 4. Polar response of an eight-inch diameter loudspeaker

involved to take off into extremely high altitudes.

The **Table** summaries these formulae and it can be seen that there is a distinct family likeness between them.

Let us now relate the theoretical polar diagram obtainable from a thin disc to that of an actual loudspeaker. **Figure 4** shows the polar diagram of a high fidelity 8 in. diameter unit having a piston diameter of 6 in. The

This indicates that, at higher frequencies, the outer portion of the cone is being decoupled progressively, until only the central portion is vibrating at the extreme end of the treble register. This effect is modified by the fact that the cone is not continuous at the centre and that the velocity of sound in paper is greater than in air.

In the next issue we will continue this topic under the heading "Practical Polars."

Configuration	Relative intensity at angle α
	$P [1]$
	$2 \left[\cos \left(\frac{S}{2} \sin \alpha \right) \right]$
n radiators (general case)	$\frac{\sin \left(n \frac{S}{2} \sin \alpha \right)}{\sin \left(\frac{S}{2} \sin \alpha \right)}$
Disc, radius R	$\frac{2 J_1 \left(\frac{2\pi R}{\lambda} \sin \alpha \right)}{\frac{2\pi R}{\lambda} \sin \alpha}$ $\lambda = \text{wavelength, } J_1 = 1^{\text{st}} \text{ order Bessel function}$

Table showing the directivity formulae of types of acoustic radiators

head, and indoors, undesirable echoes (usually from the roof) can be avoided. Moreover, using this method of sound distribution, the rear section of an audience can receive the sound at substantially the same level as those seated at the front (see **Figure 3b**).

By a relatively simple mathematical manipulation, we can increase the number of radiators in the line and at the same time decrease the spacing between them until we have a sound source consisting of a straight line instead of a single point. The polar diagram can then be calculated. This formula could be used as a short cut, provided that there are more than four or five loudspeakers in the "line source."

Loudspeakers are not usually in the form of long straight lines and so the

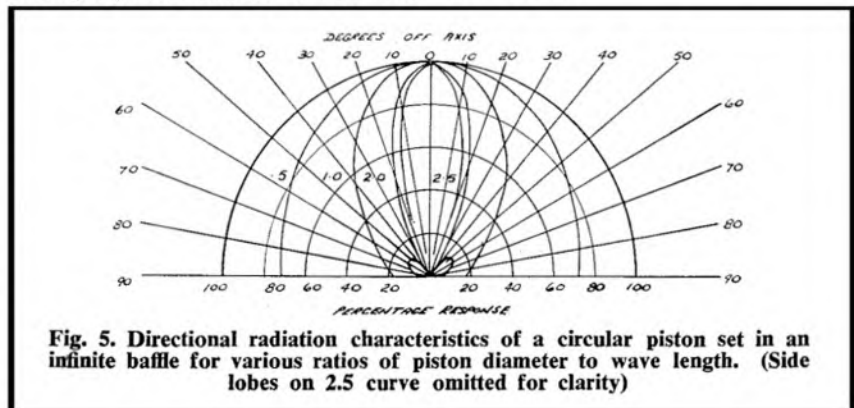


Fig. 5. Directional radiation characteristics of a circular piston set in an infinite baffle for various ratios of piston diameter to wave length. (Side lobes on 2.5 curve omitted for clarity)

MICROPHONE POSITIONING

THE recordist who favours concentrating on the more serious musical works usually performed by large orchestras and military bands—omitting for the moment chamber music, piano recitals or small works—has an advantage over the jazz and “popular” followers of requiring a considerably smaller number of microphones to record first-class tapes, providing that the technique is applied even more judiciously than that using several microphones. Why is this?

The aim of serious musical performances, be it military, orchestral, or grand choral, is that each musician plays a part and each part contributes to an overall effect. In other words, the efforts of the ensemble will transcend the efforts of the individual member of the orchestra, band, or group. Now, to itemise in this short article the requirements of different musical combinations would be much too lengthy, so I have prepared a table which by interpretation will give in general terms—but let it be understood *general*, the expected microphone requirements in order to make authentic recordings.

And for the sake of clarity, a purely representative military band is shown in the picture. The microphones can be seen to be over the band—one a little lower for the weaker reed section and the other a few feet higher to embrace all the sound so that the balance is given warmth from echo pick-up and creates “natural” distance.

This is the general requirement for recording such bands, and orchestras and some choral works; the exact height and placement depending on the strength of any section and the acoustic reinforcement. Some conditions will permit the use of forward facing microphones set high in front of the musicians or mounted on fully extended floor stands, but in this case the two microphones must pick up the entire field without too much emphasis on the adjacent instruments.

NAOMI ARCHER uses models to represent problems of microphone placing for the eleventh article of an entirely novel series designed to create, describe and offer advice on microphone technique.

All this may come as a surprise to those who believe that the more performers there are present, the greater the microphone requirement, but the fact is that with, say, a symphony orchestra, the intention is that the sound should consist of a blend of the component instruments, and in a piano concerto the same blend of instruments merely compliments the piano which, in turn, is heard only slightly to the forefront.

A few words of explanation may be of help here. The effects mentioned in the table are the contributions made by, say, a wind machine, simulated cannon fire, distant bugle, chorus, etc., and, of course, many more effects are provided by the pit orchestra and these will require special microphones according to the circumstance. Whatever else is happening on stage there is often a good display of individuality in operas and musical shows and the likelihood of many microphones being required.

Comparing the requirements for recording a military band and those of a light or dance orchestra, a whole section might have a part to play where the mood is more personal and perhaps romantic, and being in the line of showmen it is common for the particular section to step forward to play their piece into microphones which are specially placed for this kind of sectional individualism.

Although a similar principle applies with a brass or silver band, the mood

is not personal but perhaps more serious and the players do not rise and move forward, therefore, a microphone will be required over each major section. The tone of a brass band is sweet but limited in colour and it is a good thing to back up the sections' microphones with one or two placed at a distance to induce a “rounding” effect.

In the case of certain military pieces, there can be either one or several soloists—a cornet trio, for example—and what is more they need not necessarily fall out of line to contribute their part, so some forewarning in this event is necessary and the precaution taken of having an overhead microphone. It is helpful, too, to have some understanding of the similarities and differences between bands and orchestras.

A string section is rarely found within the complement of a military band nowadays, and more commonly its combination consists entirely of wind instruments and percussion, including both brass and reed—the clarinets corresponding to the main strings of the orchestra. The basic difference between the military band and the brass band is the absence of reed instruments in the latter.

An opportunity to record a military band can often be sought through an official body such as the local council, who may have made such arrangements for civic functions, carnivals,

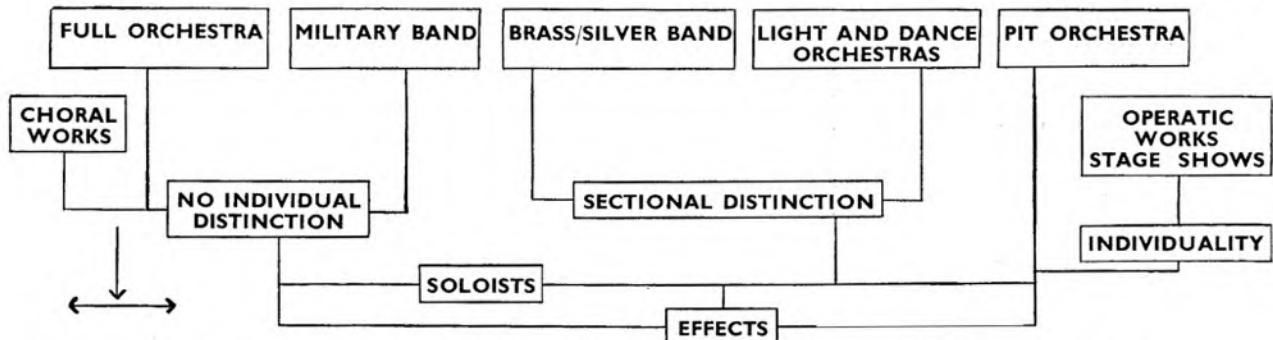


Chart suggesting expected microphone technique by interpretation for accepted auditory perspectives



etc. The brass band, however, is very popular with amateur players and there seems plenty of scope for the recording enthusiast, especially in holiday towns.

The foregoing has been but a brush

through the main body of our musical culture today. Naturally, there are many generalisations and the table and comments about usual effects is not meant as a rigid guide to all musical performances, but it is intended to

show a line of attack in microphone placement. There will always be deviations on any general rule, but it is a good thing when called upon to record any work to have a line of action along which to experiment.



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Equipment Under Test

THE Winston Thoroughbred tape recorder is a three-speed twin-track recorder incorporating the well-known Collaro Mk IV Tape Transcrip-tor, three loudspeakers and a ver-satile mixing panel. All these features make this recorder a somewhat bulky but none the less attractive instrument.

The cabinet is very soundly con-structed of wood and covered with a tan pigskin-type covering with gilt finish to the speaker grills and fittings. At the rear there is a compartment which houses a three-core mains lead and crystal microphone, and next to this is a removable panel giving access to a fused mains tapping plug. To the left of this is another panel with ex-tension speaker sockets and internal speaker muting switch. The instru-ment control panel is attractively finished in gilt with maroon knobs which match the push button controls on the Tape Transcrip-tor. The instru-ment is supplied complete with a 1,800-foot spool of long playing tape and a good quality Acos crystal microphone.

The mixing panel incorporates var-ious facilities, enabling home record-ing enthusiasts to put a professional touch to recordings. The use and operation of the mixing panel is sim-ply explained in the comprehensive and well-written instruction manual, which is supplied with the instrument. One very useful section of the manual explains in simple language the rea-sons why the manufacturers choose a three-speed tape deck.

* * *

TAPE DECK

The Collaro Tape Transcrip-tor Mark IV deck is so well known that except for a few of the more impor-tant features a full description will not be attempted here.

Seven clearly identified push buttons provide control of all tape movements and amplifier switching. To avoid accidental erasure a safety lever must be actuated, before the record button can be depressed. Speed selection is obtained by turning the knob situated at the top rear of the machine.

On rewinding in both directions the tape is lifted clear of the heads to minimise wear on the head faces. The rewinding time of 2 minutes 40 seconds is rather slow compared with

THE WINSTON THOROUGHbred

most other decks, but this is only a minor detail when one considers the advantages of being able to change from one track to another without having to remove and turn over the tape spools—a feature only found in two current tape recorder decks.

The braking system is efficient and operates at any point throughout a reel without any sign of tape spill. Other useful features are a three-digit tape position indicator and a pause control. Pulling the "Pause" lever towards the front of the machine halts the passage of the tape through the heads, whilst leaving the machine in the "switched on" position. The two heavy induction type motors fitted are smooth running and quiet in opera-tion. One minor criticism of the machine reviewed was that tape spool-ing was rather uneven especially on the faster speed of 15 ips and during fast rewind in both directions.

* * *

AMPLIFIER

The amplifier has been built around the tape deck, as an integral part of it,

with the exception of the power supply which is on a separate chassis screwed to the rear of the cabinet. Full marks can be given for servicing accessibility.

The top cover of the tape deck is easily removed, giving access to three retaining wood screws. After remov-ing these the tape deck, complete with amplifier, can be lifted clear of the cabinet. The multi-way connecting lead to the power supply is sufficiently long enough to allow this.

The amplifier is of the conventional record/replay type. Valves used are: 6BR7 first amplifier, 12AX7 second and third amplifiers, EM83 recording level indicator, EL84 audio output and bias oscillator, plus a 6 x 4 rectifier in a full wave circuit. There are two feed-back loops one over the second and third amplifiers and the other over the audio output stage.

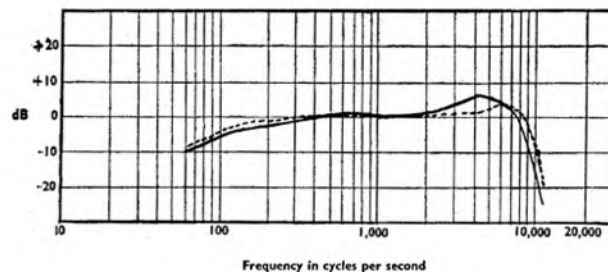
Three speakers are used—an unusual luxury in a recorder of this size—one 7 x 4 inch permanent mag-net type mounted in the front, and two electrostatic treble units mounted one on either side of the cabinet.

Record/replay

at 7½ ips.

— Upper track

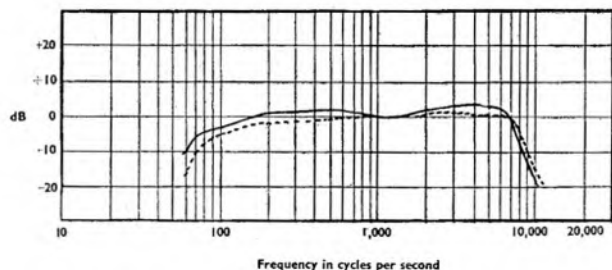
. . . . Lower track



By

D. ALLEN

A mixing panel provides two inputs via standard jack sockets. The first input is for a microphone or radio jack and the second for gramophone or radio tuner input, each input having its own separate volume control. Both of these inputs can be used simultaneously and mixing can be carried out by careful use of the separate volume controls. The tone control, incorporated with the mains on/off switch, is connected in the second feedback loop to provide variable top cut. This only operates on playback or when the recorder is



being used as a straight-through amplifier. To the right of the tone control is the record/playback amplifier switch, all other amplifier switching is carried out by the tape deck push buttons. Immediately next to this is the monitor socket which is connected across the output of the third amplifier stage.

The monitor or output socket serves two purposes: to enable the user of the equipment to monitor a programme using either the microphone supplied or a suitable hearing aid ear-piece and secondly as a high impedance output source to feed into the input of an external power amplifier, for public address work.

Frequency response checks were made on both lower and upper tracks using the tape supplied with the instrument. The response curves shown in the diagram were those obtained at a speed of $7\frac{1}{2}$ ips. Further measurements were taken using the E.M.I. standard frequency test tape and the playback results plotted as shown for both upper and lower tracks.



Signal-to-noise measurements were made using the tape supplied and with the eye just closing on the record level indicator a figure of -35dB was obtained. With the tape fully modulated at saturation point, the signal-to-noise ratio was better than 40dB .

worse when using an external 10-inch speaker mounted in a cabinet of moderate dimensions.

Recordings were made at all three speeds of BBC programmes from an FM tuner as well as speech recordings via the microphone supplied with the recorder. The music recordings, especially at 15 ips were extremely good and, due to the excellent response from the electrostatic speakers, the high frequencies were reproduced with amazing clarity.

CONCLUSION

The Winston Thoroughbred tape recorder is certainly a solid and well-constructed instrument, the standard of workmanship, and this includes soldering, is good, and the general layout of the amplifier is neat and tidy. However, the reviewer feels that in a machine costing £61 19s. some form of equalisation should have been provided for the different tape speeds. Also, in the recorder submitted for review the hum level was rather higher than one would have expected in a machine of this class.

Replay response curves using E.M.I. test tape corrected to CCIR
— Upper track
... Lower track

Erasure was complete after the tape had been fully modulated at a frequency of 1,000 cps.

Slight wow was noticeable on a continuous tone at $7\frac{1}{2}$ ips. But at a frequency of 1,000 cps this was a severe test.

Residual hum was noticeable from the internal speaker and was slightly

MANUFACTURER'S SPECIFICATION

Speeds: 15, $7\frac{1}{2}$, $3\frac{1}{2}$ ips.

Frequency response: 50-16,000 cps at 15 ips; 50-12,000 cps at $7\frac{1}{2}$ ips; and 50-7,000 cps at $3\frac{1}{2}$ ips.

Wow and flutter: Better than 0.1 per cent.

Maximum spool size: Seven inches, providing over two hours per track using double-play tape.

Loudspeakers: One 7 x 4 inch elliptical, and two 3-inch electrostatic treble units.

Power output: Approx. 4 watts.

External speaker sockets: 3 ohms impedance, switch to cut out internal speaker.

Inputs: Microphone—2mV (Impe-

dance $\frac{1}{2}$ megohm); Gramophone—200 mV (Impedance $\frac{1}{2}$ megohm). Monitor socket—1 v at 20 Kohms.

Valve line-up: 6BR7, 12AX7, EL84 and 6X4.

Tone control: Variable top cut and boost on playback. Pre-set equalisation on record.

Recording level indicator: Magic eye. Size: $17\frac{1}{8}$ x $15\frac{1}{2}$ x $9\frac{1}{2}$ inches.

Weight: 48 lb.

Other features: Mixing, push button controls, drop-in tape loading, pause control, servo breaking and spool locking, digital rev. counter.

Makers: Winston Electronics Limited, Govett Avenue, Shepperton, Middlesex.

The copyright problem— and competition tapes

THE recent correspondence on the copyright question certainly seems to prove a case for the alteration or amendment of the Copyright Act. The Mechanical Copyright Protection Society Ltd., are rather like a record that's got stuck in a groove! They go on and on and on quoting the act as it stands.

Whilst I realise that this is their function in life, surely they must realise that a bad situation is gradually getting worse. The law is being openly flouted by tens of thousands of recorder owners. And instead of helping the composers and copyright owners, the MCPS is actually harming them by their unwillingness to compromise.

Where this whole copyright question turns sour is over the problem of domestic recordings. I know that as the law stands it is wrong for me to hum, whistle, sing or play any copyright work into a microphone. But thousands of us do it and will continue to do it despite the MCPS, the Copyright Act, or anything else. It is this insistence on the "letter of the law" that turns most of us away from any consideration of the MCPS case. If they were willing to agree that domestic recording such as I have described does no harm to the composer financially, then perhaps more of us would pay more attention to their request for serious consideration of other breaches of the law.

Surely the MCPS is not trying to make us believe that the many hundreds of artists who own recorders, and use them to improve their techniques, and in doing so use copyright works, actually apply for licences and pay fees to the MCPS.

If only the MCPS would allow a differential between domestic recordings for private use and outside recordings for outside use, then we should really be getting somewhere at last.

In this way they would be helping the composer; serious attention would be paid to their case; the law would become simpler and more easily understood; and a rather useless battle of words would turn into something constructive and useful. It is because the Copyright Act was passed long before the advent of widespread use of tape recorders that makes it so difficult to understand for the average recorder owner.

If any law or part of any law be thought stupid by the vast majority, then only fools will obey it and even greater fools try to enforce it. Witness what happened to the betting and licensing laws prior to their amendment.

All of us who do a great deal of recording wish to stay within the law. It is up to the MCPS and other similar bodies to help formulate laws that we can understand and with which we will comply.

Having aired that view, may I now pass to another point, raised by John Hone (*August 9 issue*). He proposed that we be allowed to use commercial sound effects in the British Amateur Tape Recording Contest, pointing out that not everyone has a battery portable.

Whilst I agree with the second statement, I strongly disagree with his first proposition. One of the most entertaining things about making up a contest entry is either recording outside effects or else creating them artificially at home. In a previously published letter I also said that any "acting" should also be done by club members.

Surely if we are to engage first-class amateur actors and use commercial sound effects we will in effect become mere recording engineers. The creative aspect will be destroyed and more and more "dubbing" will be employed.

I would suggest that if Mr. Hone has not got a battery portable then he should join a club and borrow one. If there is no club in his neighbourhood, then he should form one. And if he cannot create his own effects at home then he should practice until he can! I am still hoarse from creating the flock of sheep for our contest entry, and I am quite sure the neighbours think I am stark staring nuts!

CHARLES AITKEN.

Secretary,
Dundee Tape Recording Club.

AFTER reading the letter from Mr. John Hone in the August 9 issue of our magazine, I should like to observe that surely Mr. Hone has missed the whole point of the British Amateur Tape Recording Contest! As he stated, quite rightly, one of the rules of the competition is that no "commercial recordings" may be included.

To my way of thinking, if an amateur uses any part of a recorded disc, which is made by professionals, that part of his entry is clearly not the work of the amateur. Incorporation of a pre-recorded item is far simpler than having to make that item first and then incorporate it into a tape.

Any amateur worth his salt would, I am sure, meet the challenge of making his own effects with gusto. Indeed, I feel that is the whole fascination in the creation of a tape. After all, a tape recorder is a creative instrument in its own right.

True, the finished tape may not sound truly "professional," but why should it? "Professionalism," if I may coin the word, often results in the very boredom of which Mr. Hone complains! The amateur often finds an original approach to his subject, which stems from the simplicity of his ideas. I am rather of the opinion that the professional, as against the amateur, often scorns simplicity and introduces complications which are often unnecessary. In fact, they sometimes tend to "blind us with science"!

I shall await with keen interest our next issue to learn what our brother amateurs have to say and I sincerely hope, Sir, that the "Letters to the Editor" section of our magazine continues to expand and flourish. I always find it full of interest.

RICHARD PHILBRICK,

Uxbridge, Middlesex.

Letters to the Editor

Casual treatment

I WAS rather shocked by the rather casual treatment Mr. H. Burrell-Hadden gave to the faulty alignment of heads in his review of the Reflectograph. No doubt the expert can find these things out and set them correctly, but the wretched purchaser will make many recordings over the years and will only discover it when he has to buy a new recorder.

I speak with feeling as this happened to me, though the fault was in the frequency correction networks. Five years of recording have to be faked by fiddling with the amplifier controls.

Surely this is the sort of thing which makes the amateur feel tape recording is only for the expert.

G. W. ALLEN.

Wallingford, Berks.

BURRELL-HADDEN COMMENTS: Mr. Allen has raised quite a valid point, but the "casual treatment" in this review was due entirely to the fact that such misalignments are rare indeed. As I pointed out in the review, this lapse was most likely due to a defective line-up tape and, in this particular model, hardly likely to recur. However, head alignment is a problem that should be checked on purchase. The way to achieve this is to play a tape, recorded on the machine being bought, on another machine in the shop.

Insure your equipment

BEING a keen reader of your excellent magazine and in particular material dealing with outside recording activities, I do feel that I should pass on a lesson that I unfortunately learnt last week.

While visiting my friends one evening to demonstrate my newly-purchased Philips Stereo 3536 my car was broken into and all my treasured tapes, microphones and recorder were stolen. The total financial loss was roughly £130.

I have since found out that this sum could have been easily insured for about 10s. per year. I would earnestly advise any person who has reason to take his equipment outside to consider such a wise investment and to obtain a policy that would enable him to replace his equipment if stolen under circumstances experienced by myself.

J. C. EVANS,

Hitchin, Herts.

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

Letters to the Editor

THE EXPERTS WERE WRONG

I MUST hasten to thank Mr. Alan Beautement for his letter (*August 9 issue*). Many of your readers should be helped by his advice, indeed none of us have been in the business so long we can't learn a great deal more.

However, without complicating a generally simple problem, we must remember that any conductor can be excited by stray inductances and, should the conductor be connected to a high gain amplifier the tiny voltages induced may be delivered, quite indiscriminately, to the outgoing end as audible signals. The provision of screening may not cure the trouble and an efficient earth can aggravate it, and here I quote Herbert and Proctor on the subject. The earliest authority I seem to remember reading (some years later) which dealt with this problem was a paper delivered to the IEE by G. S. Hills in 1906.

We must take it that the interference is not caused by lax maintenance or poor workmanship and adopt the simplest, most reliable cure . . . move the machine through a 90-degree turn or to another room and avoid straight lengths of cable. If you indulge in the refinement of balance lines, as I have to, so much the better, but a little care is all that is usually needed.

A story apropos to conclude. Shortly after the Droitwich transmitter came into service a farmer who lived near Ledbury in Herefordshire complained that when he picked up his telephone earpiece during the evening all he could hear was some chap called Henry Hall playing dance music from an hotel in Scotland. The farmer was connected by a twin wire air-line of such length, straightness and direction that it formed a tuned aerial. Now that very short wavelength signals fill the air, a very short piece of wire with a capacitor in series can become quite accidentally, an efficient aerial, pointed in the right direction.

Next time you travel alongside a GPO multi-circuit overhead transmission line, notice how the pairs of wires seem to weave about from pole to pole. This optical effect is caused by the rotational transposition method of avoiding the pick-up of stray audio signals, and not just to make it difficult for the linesman to identify a particular pair.

But let us all take heart, even the experts can be wrong. Not so very long ago all the feeders to a new television studio extension had to be dug up again because they had been laid in neat parallel ducts, screened and balanced, and at high level, and the level of cross-talk was phenomenal. Re-laid with a few kinks here and there, the trouble disappeared.

D. C. COMPER,

Putney, London.

Two-or four-track— and head cleaning

I HAVE taken your very good magazine since the first issue, and have taken a great interest in the two-track v. four-track argument which went on for some time and then ceased with neither side winning.

At that time I had a Vortexion WVA model which was my second recorder. Before then I had owned a very large portable(?) machine with three speeds, $3\frac{1}{2}$, $7\frac{1}{2}$, 15 ips, ten watts push-pull, permanent magnet erase, and full track recording. The Vortexion was about $4\frac{1}{2}$ years old when four-track and stereo came upon the scene. I wanted to go over to stereo, but the cost for converting the Vortexion was too much for my pocket. For this reason I sought a demonstration of all the stereo recorders available, finally deciding on the Philips EL3536 which, complete with microphone and two speakers, was wonderful value. I use this machine with two enclosures with eight inch Goodman Axiette speakers.

After reading Mr. Phillips letter (*September 6 issue*) I feel tempted to tell him to have a demonstration of this machine, and he will never say anything against four-track again.

RUSSIAN TACTICS

I WAS interested to read your reference to the Russian tape recorders ("*We Take the View*," *July 26 issue*), and whether the Russians are, in fact, mere copyists of Grundig, etc.

This is surely directly in line with the case of other "consumer durables"—e.g., the small Opel car, the domestic Frigidaire. The Russian authorities, having apparently decided that their own engineers should be occupied with more "important" matters, import representative western products, and adapt the design forthwith, thereby eliminating all research expenses—the Russian interpretation of patent right being absolutely in accord with this policy!

M. R. RATCLIFFE.

Bradford 7.

I have quite a few tape correspondents in America, one owning an Ampex stereo recorder, and they all agree that the quality of this recorder is excellent even at the lower speeds, when using Andio-tape, Irish or Philips tapes.

One more suggestion for Mr. Phillips, try using Klenzatape. This is one product that every tape recorder owner should have, together with a defluxer, for keeping the heads clean.

Once again many thanks for a wonderful magazine, and please let us have some more articles on stereo—four-track for preference (let's keep looking forward).

HARRY LANGSTON.

East Ham, London.

WE always make a point of studying your Readers' Letters as it certainly keeps us in touch with the consumer point of view and many worthwhile suggestions have been noted.

However, we must take odds with Mr. G. C. Phillips on the subject of cleaning tape heads (*September 6 issue*). No matter how fine the bristle, it is more than likely that any brush would soon cause damage to the very delicate and sensitive playing heads. As a matter of fact, we even discourage the use of our own Metro-Brush for this purpose, stating this on the pack, even though it has feather-soft nylon bristles.

We would suggest that Mr. Phillips use the product we especially manufacture for the purpose of cleaning the tape heads the renowned Klenzatape, the only tape head cleaner approved and recommended by many of the largest tape recorder manufacturers in the world. The method of application ensures that the task is safely and efficiently completed in a matter of seconds without removing the head cover. We regularly supply many of the British manufacturers with Klenzatape fluid for use in their own service departments.

S. COHEN,

Manager, Metro-Sound Manufacturing Co. Ltd.

We aim at a fair balance

I HAVE read *Tape Recording Fortnightly* since its first issue, and would like to see more hints for beginners on subjects such as "How to use a recorder" and "Tips on tape correspondence," and less space taken up by articles like "The Nature of Sound" and "Stereo Notes." After all, there are other hi-fi journals for those whose tastes and pockets go so deep.

In spite of these, I still enjoy many of the items and will continue to keep my order running with my newsagent.

J. K. FREEMAN,

Wickersley, Nr. Rotherham.

1959, we published three articles on "Making friends by tape exchanges," and we are publishing at intervals the series by Denys Killick on using a tape recorder in the field.

Using the results obtained from our reader quiz early last year, we have aimed at presenting a fair balance on all aspects of tape recording. Our occasional technical features have been welcomed by many regular readers. We must, of course, continue to serve their requirements, although not at the expense of those readers looking for creative tape recording articles.

We are always pleased to receive articles from any reader that may cover the points such as those raised in Mr. Freeman's letter.

EDITOR'S NOTE: In the issues of October, November and November 4,



"Could you direct me to the tape deck?"

MODIFICATIONS TO DOMINUS

DOMINUS (ENGLAND) LIMITED, manufacturers of the combined tape recorder and cine projector, have asked us to announce certain modifications relating to their model reviewed in our September 6 issue.

The current Dominus no longer uses "continental tracking" (left to right, bottom track), following the re-positioning of the recording, playback and erase heads. It is now possible to interchange with tapes made on another machine. Another modification makes possible the superimposition of speech on to a musical background. This can be achieved by simply inserting a jack plug into the extension loudspeaker socket when recording speech. This action only partly erases the previously recorded musical programme instead of complete erasure as would otherwise be the case.

Pointing out that their machine is issued with a Collaro microphone, not an Acos as published, the manufacturers also ask users to note their recommendation that the three-core mains lead supplied should be connected to a three-pin "earthed" plug. Careful attention has been paid to ring earthing the amplifier circuit to reduce hum level to the minimum and this feature is enhanced with an efficient earth through the three-pin power plug.

Some confusion may have resulted from the statement in our review concerning synchronisation, and the fact that it was noticed the tape speed drops when the projector is running with a full reel of film. This would only affect users who record on a second machine and transfer the tape to the Dominus. Tapes recorded on the Dominus will, of course, play back at the recording speed. The recorder and projector are both operated by the same motor, and the makers intend programmes should be dubbed on to the Dominus from any second recorder. In this way any speed variation will be identical on recording and playback, and therefore not noticeable.

NEWS FROM THE TRADE

A SERIES of exhibitions are currently being held throughout the country by Truvox Limited. Displaying their new two- and four-track tape recorders, tape decks, and tape decks with tape pre-amplifiers, the show has already visited a number of towns in the south of England, and on October 4/5 will move to Lincoln.

From there it will move to the following towns: Manchester (Oct. 9/10), Liverpool (Oct. 11/12), Leeds (Oct. 16/17), Hull (Oct. 18/19), Bournemouth (Oct. 26/27), Northampton (Nov. 2/3), Glasgow (No. 9/10), Newcastle (Nov. 13/14), Middlesbrough (Nov. 15/16), and Norwich (Nov. 23).

Further details are available from Truvox Ltd., at Neasden Lane, London, N.W.10.

MONO and stereo recordings of the same performance can be made simultaneously on a special type 17-channel audio mixing control console now being manufactured by E.M.I. Electronics Ltd. for Levy's Sound Studios of New Bond Street, London.

This latest development in mixing equipment, including console, rack-mounted units and special features designed by E.M.I. to meet Levy's particular requirements, will be used for making the highest quality master recordings on magnetic tape, for the production

of gramophone records, commercials and feature programmes. Cost of supplying and installation—around £9,000.

DESCRIBED as "an enthusiasts dream come true," the hi-fi department of the new showrooms at Fenham Radio, Newcastle, is said to have the largest selection of equipment on view in the North. The Northumberland dealers recently opened large showrooms in New Bridge Street, Newcastle, and to celebrate the opening are holding a "Meet the Makers" exhibition during the week commencing October 9. Many of the larger manufacturers will exhibit and provide demonstrators who will be available to discuss technical details with the general public. Among the highlights of the new showrooms will be continuous demonstrations of stereo sound, and some of the latest models exhibited at the recent Radio Show.

LATER developments at E.M.I. update the announcement in our last issue concerning the marketing of their sound equipment. The position now is that the British Radio Corporation will be marketing tape recorders and record reproducers under the H.M.V. and Marconiphone labels while the Gramophone Company will market their domestic sound equipment under the E.M.I. trademark. Within this latter group is the "Voicemaster," the two-speed tape recorder introduced at this year's Audio Festival.

We would like to apologise for an incorrect statement in the same issue regarding the domestic appliance activities of the E.M.I. group. The Domestic Appliance Division of the Gramophone Company was transferred on July 1 to a new company—H.M.V. Domestic Appliances Ltd., of 363, Oxford Street, London, W.1.—under a General Manager, Mr. A. F. Burton. Existing and new products bearing the H.M.V. mark will be sold mainly through retail channels. Mr. W. Roxburgh, Managing Director of Morphy-Richards (now a part of the E.M.I. group) carries the overall responsibility for domestic appliance activities within the group.

SHURE Electronics Limited has been formed to handle the sale of Shure products in the United Kingdom.

The London Sales Office and Service Centre has been established at 84, Blackfriars Road, London, S.E.1. (Telephone: WATERloo 6361.) Mr. J. W. Maunders who has represented Shure in this country since 1960 has been appointed Managing Director.

ENGLISH NUMBERING MACHINES LIMITED announce the introduction of a new tape position indicator, for use with the BSR TD2 tape deck. A complete pack comprising the counter with fixing screws, driving pulleys and belt, as well as a clip-in window may be obtained, price 36s.

English Numbering Machines Limited, 25, Queensway, Enfield, Middlesex.



Their introduction to the tape recorder market is announced by Bush Radio Ltd., with the TP50 tape recorder, illustrated above. This is a four-track single (3½ ips) speed machine priced at 40 guineas. Quoted frequency response is 80-10,000 cps, with wow and flutter given as less than 0.2 per cent. A B.S.R. Monardeck is incorporated accommodating 5½-inch reels, and providing a playing time of 91 minutes per track using double-play tape.

Bush Radio Limited, Power Road, London, W.4.

New Products

STELLA ANNOUNCE BATTERY PORTABLE

STELLA RADIO AND TELEVISION LTD. announce the introduction of a compact portable battery tape recorder, model ST470, which operates from six 1½-volt torch batteries.

The recorder, complete with a sensitive moving-coil microphone, three-inch reel of double-play tape, empty take-up spool, and screened connecting lead for recording direct from radio or replaying through an external amplifier, sells for 25 guineas and weighs 8 lb. The dimensions are 11½ x 7¼ x 4¼ inches.

The operating controls and the tape deck are on top of the machine, thus making it easy to operate while carrying. The handle is detachable and an imitation pig-skin carrying case and shoulder strap (optional extras) facilitate easy transportation. The controls are limited to push-buttons for start, fast wind and fast rewind, and a safety lock switch to prevent accidental erasure. Also incorporated is a combined recording level and battery voltage indicator, and a volume control for recording and playback.

Styled similar to a portable radio the casing is in light beige polystyrene with an ivory coloured plastic speaker grille. The microphone can be stored away in a special compartment at the side of the machine. A plastic cover is fitted to protect the reels and recording mechanism when the recorder is out of doors.

With this plastic cover in position, the recorder will accommodate three-inch reels providing a playing time of 32



The new Stella ST470

minutes per track. With the cover removed, four-inch reels can be fitted and the playing time is doubled. Rewind time is approximately 100 seconds for 300 ft. of tape.

The quoted frequency response is 120-5,500 ± 3dB at the single speed of 1½ ips. Signal-to-noise ratio is given as better than -40 dB, and wow and flutter as less than 0.5 per cent.

Battery life is rated at about 20 hours, and the total output through the built-in four-inch loudspeaker is 250 mW.

Stella Radio & Television Company Limited, Astra House, 121-123, Shaftesbury Avenue, London, W.C.2.

'Sound' introduce four models

AS first announced in our August 26 issue, Tape Recorders (Electronics) Limited introduced four new recorders at the Radio Show.

Basically two recorders, each has a two-and four-track version. The first of these is the Sound Slimline Three-Two, a two-track recorder selling at 40 guineas, and incorporating speeds of 7½, 3¼ and 1½ ips. The quoted frequency response is 80-13,000 cps ± 3dB at the top speed, and the signal-to-noise ratio is given as 40dB minimum. Wow and flutter is rated as less than 0.2 per cent total.

It has piano key operation with features including facilities for superimposition mixing, monitoring through loudspeaker, straight-through amplification magic eye recording level indicator, pause control and rev. digital counter.

The built-in loudspeaker provides an output of 3½ watts.

Built around the Collaro Studio deck, the Slimline Three-Two accommodates seven-inch spools, providing 4½ hours playing time per track on double-play tape.



The Sound Slimline One-Two

Inputs are provided for microphone (1.5mV peak into 2 M ohms), and radio/pick-up (200mV into 1 M ohm). A standard 3 ohm extension speaker socket is also provided, with a 100mV peak output. The valve line-up is EM87, EF86, two ECL86, EM87, and a metal rectifier.

Mains supply is 200-250v, AC 50 cycles, with consumption rated at 100 watts. A 60 cycles model is available to order.

The dimensions are 13½ x 13½ x 5¼ inches, and the recorder is housed in a two-tone beige cabinet. The four-track version, Slimline Three-Four costs 45 guineas.

The second new model, the Slimline One-Two incorporates the BSR Monardeck. This has a single speed of 3¼ ips and accommodates 5½-inch spools. Maximum playing available is 91 minutes per track using double play tape. The price is 32 guineas, and again there is a four-track version, Slimline One-Four, providing twice the total playing time, and costing an additional 5 guineas.

The size is 13½ x 11½ x 5¼ inches. Features include superimposition facilities, mixing and straight-through amplification. Output is rated at over 3½ watts from the built-in loudspeaker. Other features are as for the Three-Two model.

All the Sound Slimline models are supplied complete with microphone, spool of tape and all accessories.

Tape Recorders (Electronics) Limited, 784-788, High Road, Tottenham, London, N.17.

NEW BUILD-IT-YOURSELF KITS

ASERIES of kits designed to enable the home constructor build his own tape recorder are announced by Martin Electronics Limited.

Three basic types of constructional kits are offered, each based upon the "brick-by-brick" system, and developed to incorporate printed circuit amplifiers. They are assembled with valves, and individually tested, and supplied with wires cut to length and attached by one end to the relevant component part. Detailed instructions are included with each kit, and as an added facility there are case and loudspeaker assemblies offered, with or without the appropriate deck.

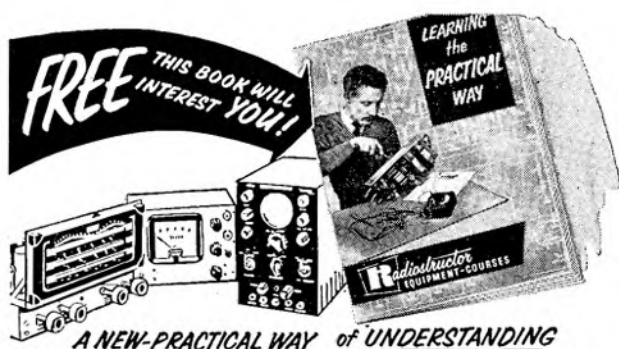
The Martin Recordakits can build a three-speed two-track recorder using a Collaro Studio deck, or a four- or two-track recorder using a BSR Monardeck.

Prices range from eight guineas for Type 8312-M (for BSR half-track deck), to eleven guineas for Type 8311-V (for the Collaro deck).

Martin Electronics Limited, 155, High Street, Brentford, Middlesex.



Above, the Magnavox TM840 four-track, three-speed recorder described in our last issue. Selling at 57 guineas, the TM840 incorporates an 8 x 5-inch elliptical loudspeaker providing 3½ watts output. Quoted frequency response is 40-14,000 cps at 7½ ips, with signal-to-noise rated at 40dB. Magnavox Electronics Limited, Magnavox House, Alfred's Way, Barking, Essex.



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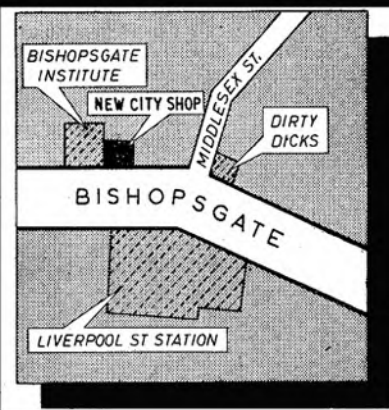
TAPE RECORDING HANDBOOKS

**ADVICE ON BUYING
A TAPE RECORDER**

By J. F. Ling 2/- (2/6 inc. postage)

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

Available from: 7, TUDOR ST., LONDON, E.C.4.



OUR NEW CITY SHOWROOMS!!!

NOW OPEN. We proudly announce the opening of our new City Tape Recorder Centre. This superbly equipped and stocked tape recorder paradise is easily reached by bus, train, tube and road. (See drawing.) Our Unique H.P. Terms, Free after-sales servicing, Free Technical Information, Pamphlets, etc., are readily available both here and at our other well-known branches.

★ We are open ★
★ SUNDAYS ★
★ 9-30a.m. - 2p.m. ★
★ Closed Sats. ★
(City Showroom only)

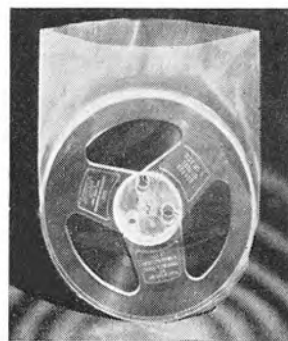
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205 HIGH ST. NORTH, EAST HAM
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Made from top-quality polythene, and having a generous “turn-over” closure, they protect your tapes from dust and atmospheric changes. Equally necessary for both pre-recorded and virgin tapes, they are the answer to “sticking.”

In packets of 12: 3"—1/6d.; 4"—1/8d.; 5"—1/9d.
5½"—2/-; 7"—2/4d.; 8½"—2/8d.

FROM YOUR DEALER; OR WRITE TO US, ADDING 1/6d. POSTAGE

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Dept. 6,
Buckhurst Hill,
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**LOW-PRICE TAPE
with a REAL GUARANTEE**

7" 1200 ft. Acetate 17/6 POST FREE
7" 1800 ft. Polyester 29/-

Brand new, perfect, splice-free, attractively boxed.

GUARANTEE: If you are not completely satisfied, I undertake to refund the full price plus the cost of your return postage.

A. VILLIERS, 12A Horseferry Rd. Est., London, S.W.1.
(Mail orders only, please)

News from the Clubs

AS a result of the ever-increasing number of complaints about poor service given to tape recorder owners, the **FEDERATION OF BRITISH TAPE RECORDING CLUBS** has decided that some action must be taken to protect its members. Accordingly, they are to set up an Approved Dealer Scheme.

A list is being compiled of dealers who are known to give prompt and efficient service, compiled from information received from local tape clubs. The list will be circulated to all Federated clubs with the advice that their members deal only with Approved Dealers. The scheme is in the hands of A. J. Rogers of the Anchorage, Lyon Road, Crowthorne, Berkshire, who welcomes applications from dealers to be placed on their list.

The above notice, issued in the latest Federation newsletter indicates yet again the concern the organisation, an entirely voluntary movement of amateurs composed of members drawn from the local clubs in the UK, has for tape recording enthusiasts. It is encouraging to see the efforts made along these lines by amateurs for their own good.

Further details of the Federation and applications for membership should be addressed to the Secretary Mr. E. Roger Aslin, of 211, Melfort Road, Thornton Heath, Surrey.

An old friendship was strengthened at the July 5 meeting of the **COVENTRY** club when Alan Stableford, Chairman of the Federation, visited the members to talk about the work of this national body. The meeting was of particular interest to the Coventry members, because exactly three years to the day the Federation had been formed in the city's Hotel Leofric.

Equipped with his Vortexion WVB, Alan presented a variety of tapes during the evening, including extracts from the British and International Tape Contests, entries. The members heard entries from Sweden, Germany, Holland, China and Great Britain. Among the tapes heard was the 1959 Tape of the Year, Norman Paul's *The Rest is Silence*. Afterwards, Alan answered questions about the contest, including the arrangements for the judging, what the judges looked for, and the rules to be observed when submitting an entry. Mr. Stableford was well qualified to answer, having been a judge for the past two years.

Earlier the members had heard that their offer to the International Friendship Committee of the Corporation had received an encouraging reception by one

of the committee members, and was to be discussed at a meeting later that month.

The members then made final arrangements for the proposed Treasure Hunt scheduled for July 13. For this event the members were instructed to proceed from their headquarters with sealed instructions and follow the clues contained therein after reaching a predetermined spot. Unfortunately two of the members, Dan Woodcock and his wife, went astray along the route, and missed the final meeting place, and with it the drinks that were waiting for the exhausted members.

After discussing the evening's activities the members present were entertained to a tape produced by Roy Penfold on a Stuzzi Mquette during an excursion to the wilds of Warwickshire.

The Treasure Hunt was discussed at the July 19 meeting, and arrangements for a similar outing during September were made. The next item on the agenda was a demonstration of the Simon SP4 by Stan Day and Henry Hopfinger. Stan had made a tape detailing the features of this recorder, and later demonstrated the three-way mixing facilities, using a Chapman FM Tuner, a transcription unit and a microphone. His presentation was followed by Ron Longmore's who had taken along his Saba TK35.

During the course of the demonstration the lighter mood was not forgotten and the members heard a rare recording on the activities of bird watching which included a skit on the hunt for a haggis.

Henry Hopfinger returned to the dais after the usual raffle, this time to give a talk on cine cameras. He was to continue his talk at their August 16 meeting, when members were also promised a demonstration of the new Philips battery portable, and a tape from their American contact Kenneth Miller of *Contact Microphone* fame.

Also promised for the future are visits from B.A.S.F., Grundig and Fi-Cord.

Another recent sound hunt was organised by those past masters, the members of the **WALTHAMSTOW** club.

The "sealed orders" routine was once more in force, and the hapless chosen found they had been ordered to "take

a short train journey," "record sounds of a typical pub," or "ride on a bus." All of these assignments were successfully accomplished, including perhaps the most difficult—a visit to St. Mary's, the parish church. There, after making an excellent recording of a choir practice and interviewing a chorister, the group heard a voice which introduced itself as belonging to Elijah Cluckbucket (circa 1700 A.D.), and which proceeded to supply details of its owner's life in old Walthamstow. His earlier welcoming mood changed, he began voicing his protest at being "knocked up" and asked the members to replace his stone. To the accompaniment of creaks and groans, and the rattling of chains, the group obliged and the "ghost" vanished.

A unique tape exchange is currently being encouraged by the club. At the Soviet Exhibition in London some of the members heard that the Radio Club of Russia had a tape recording section keen to exchange tapes. A letter was sent off, and the club are now waiting for further developments. In his recent newsletter Ken Perks expressed the hope that the Iron Curtain was non-magnetic.

Another tape exchange has been effected, with a serviceman in Germany. Sergeant Tony Clarke, a local who applied for membership some while ago, was given honorary membership, and asked if the club could perform any services for him. Back came a prompt request for sounds of his town's High Street market Saturday afternoon.

Always willing to oblige, a society member armed with a battery portable collected recordings of stallholders crying their wares, a butchers' auction, and many amusing selections of sales patter. An edited version of the tape was sent to the Sergeant with a promise of another, made during a bus ride along the route the ex-bus driver once operated.

The society was invited to visit the **Bethnal Green** club on September 1. For that meeting the members were promised a stereo demonstration, and the chance to meet **Cafford** club members who were also to be in attendance.

Quizzes and guessing games also at one of the latest meetings of the **SOUTH BIRMINGHAM** club. Chairman Dennis Osborne and Brian Elliott had devised a tape of unusual sounds which included a bark of an Alsatian dog played back at quarter speed, and a coin being spun in a box. The tapes were heard on the Countess tape recorder which was later demonstrated by Brian Elliott.

(Continued on page 37)

Members of the Eastbourne club at their AGM. Second from left is the chairman, Miss Dee Harris



Photographs of club groups are always welcome—in addition to any illustration of unusual activities



Classified advertisements

Rate—Sixpence per word (minimum 5s.); Trade, ninepence per word (minimum 10s.); box numbers, one shilling extra. Payment with copy. Copy should be sent to Advertisement Department, "Tape Recording Fortnightly," 1, Crane Court, Fleet Street, London, E.C.4.

TAPE-TO-DISC

J & B RECORDINGS: Prompt Tape to Disc and Sound Effects Service. 14, Willows Avenue, Morden, Surrey.

TAPE TO DISC RECORDING

Reduced prices. Finest professional quality. 10-in. L.P.—30s. (32 mins.), 12-in. LP—35s. (45 mins.). 7-in. EP 17s. 6d.

48-HOUR POSTAL SERVICE

S.a.e. for leaflet to Dero Sound Service, 52, Hest Bank Lane, Hest Bank, Lancaster. Tel.: H.B. 2444.

JOHN HASSELL RECORDINGS. Tape/Discs. All speeds. CCIR Studio, 21, Nassau Road, London, S.W.13. Riverside 7150.

MISCELLANEOUS

WONDERFUL SELECTION OF BARGAIN SECONDHAND RECORDERS completely overhauled and fully guaranteed for £12 always on display at all showrooms of Britain's Leading Tape Recorder Specialists, City & Essex Tape Recorder Centres. See page 34.

PRE-RECORDED TAPES

Unique complete catalogue listing all makes. Mono, Stereo, 7½ and 3½ ips, including World Record Club tapes. Call for FREE copy or send 1s. mailing fee. Dept. T.R.1, Teletape Ltd., 33, Edgware Road, W.2. PAD 1942.

RECORDING TAPE. See my advertisement on page 34. Nobody has yet asked for his money back. Villiers.

MISCELLANEOUS

FRIENDLY FOLK ASSOCIATION, 87, Terrace, Torquay. Leading International Correspondence Hobby Club since 1943. Now included, facilities for Tapesponding. Details free.

Recording Tape. Save up to 30 per cent. Send for list. Also 50 secondhand Recorders in stock. E. C. Kingsley & Co., 132, Tottenham Court Road, London, W.1. EUS 6500.

Ask your dealer for American Ferro-dynamics "Brand Five" recording tapes: the best tape value!

SERVICES

L. Bishop Ltd., Tape Recorder Services, 1708, Bristol Road South, Rednal, Birmingham. Telephone: Rubery 709. Grundig Specialists.

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

FOR SALE

Brenell Mark 5 Tape Deck, amplifier with monitor meter, power unit, £40. E.M.I. Ribbon Microphone, low imp., suitable for boom suspension or stand, £10. Lustraphone LFV/59, low imp., moving-coil dynamic microphone, £5. Tolley, 14, Hathaway Hamlet, Shottery, Stratford-upon-Avon.

Potential Tape Student desires to be relieved of brand new, unused, "Connoisseur" turntable (Type B) with stereo arm (less head), £20 cash (carriage paid). D. Roylance, 27, Helsby Street, Warrington, Lancs.

Sabafon Tape Recorder, two years old, two-track, two-speed, automatic stop and reverse microphone, £40. Original cost, £93. Box 430, Tape Recording Fortnightly, 1, Crane Court, Fleet Street, London, E.C.4.

Impedance Matching

(Continued from page 21)

The final example is the connection of a pick-up to your pre-amp. The simplest example, that of a piezo pick-up, can be dealt with in a few lines.

If the resistance appearing across a piezo pick-up is below the designer's specified value, the bass end of the frequency response will be attenuated. If the shunt resistance is above the specified value, the bass end will be improved, but generally the improvement is not very significant.

The high quality magnetic pick-ups present a problem that is a little more troublesome. Their designers usually specify that they should be terminated in some particular value of resistance, 50 k ohms being a typical value. The effect of using a resistance of some other value depends on the internal impedance of the pick-up. In general, they are predominantly inductive but include some series resistance as in Fig. 4a.

When a generator having these characteristics is connected across a circuit having some shunt capacitance—the input circuit of your tape recorder or amplifier, for example—a resonance will appear at a frequency determined by the circuit capacitance and the pick-up inductance.

This resonance will be damped by the addition of a shunt resistor across the input circuit so here we have yet another reason for matching; the damping of a resonance. It will be obvious that the circuit capacitance should be minimised, for this will raise the frequency at which the resonance appears, and this minimises its effect on sound quality.

The effect of using values of shunt resistor other than the specified value can now be studied, if we assume that the designer chose a value that gave a flat response. Values lower than specified will result in the top end response rolling off at a lower frequency, but the roll-off will be gentle, approaching 6 dB per octave. The bass end response will not be affected.

A shunt resistor higher than the specified value will result in a peak appearing in the top response, without any significant extension of the frequency range. The bass end response will be unaffected. The general effect is shown in Fig. 4b.

This completes a rather elementary survey of the matching problem, from which it will be appreciated that there are many reasons for requiring an impedance match at the junction of two circuits.

The standard text-book explanation, minimising the power loss, is seen to apply in only one example, the connection of a low impedance microphone to a low impedance input circuit.

In every other instance some other reason is found to predominate. But there is one piece of advice common to all of the examples: "Follow the manufacturer's instructions."

S. M. Wheatley's Notebook

(Continued from page 11)

diver should be tied to his boat by the microphone line or have the recorder with him enabling freedom of movement. Some of the pro's and con's of this fascinating and very useful aspect of tape recording will have to be deferred until another time. Meanwhile you could contact your local sub-aqua club, or write to the editor of the Royal Naval Diving Magazine, H.M.S. Vernon, Portsmouth, Hampshire. This is a bright and breezy magazine which discusses all the latest developments in this field.

Subscription Order Form

TAPE RECORDING FORTNIGHTLY,
7, TUDOR STREET, LONDON, E.C.4

I enclose my subscription of 45 shillings for one year, post free (Subscription to USA and Canada \$7) beginning with the issue dated.....

(BLOCK CAPITALS)

Mr., Mrs., Miss.....

Address

.....

"Tape Recording Fortnightly" is published on alternate Wednesdays, and is obtainable at newsagents, bookstalls, and music and radio dealers.

News from the Clubs

(Continued from page 35)

Secretary Bill Judd then took the floor for the recently inaugurated tape clinic session. This is the interlude when recorders are thoroughly inspected and overhauled when necessary. Heads can be demagnetised, aligned and cleaned for the sum of one shilling which is placed in the kitty.

The Clarion battery portable recorder was demonstrated at another recent meeting, when the chairman of the **Warwick and Leamington** club paid a surprise visit.

Activities for the winter months are now being discussed, and negotiations are progressing for the formation of a team for the proposed hospital service. Arrangements are already in hand to visit the Birmingham Hospitals Broadcasting Association during an actual broadcast, and the committee are also investigating possible visits to the B.B.C. and I.T.V. sound studios.

Another visit scheduled for late September is to hear a programme organised by Gevaert entitled "Fidelity in sound and colour".

The main topic at the opening meeting of the **DUNDEE** club's winter session was the British Amateur Tape Recording Contest. After "patting ourselves on the back by playing over our entry again," the members' thoughts turned to whether they are top of the Contest League. They certainly have many points in favour of this claim.

Secretary Charles Aitken was an individual runner-up in 1958; the club gained a first in 1959, in which year member Harry Ayres took first place in the Music Section; and this year they are again near the top of the list. "We are now the proud owners of four certificates from *Tape Recording Fortnightly*" they say, and defy (nay, forbid) other clubs to match this. For my part I am standing well back.

They next turned to discussing next year's entry, and one was mentioned the Power of Positive Thinking, and suggested they start a fund to pay for travelling expenses to London next year to collect their first prize in the club section of the Contest. The question of prizes was discussed and, being Scotsmen, they thought a twelve-guinea trip to collect the *TRF* ten-guinea cheque didn't quite balance out. Finance aside, they have

now begun serious thinking on their next entry, taking for granted that the Club Section will once again be an open entry for 15-minute tapes.

On this point we have reached the same position as in our September 7, 1960 issue, when I called for suggestions for a subject for the club section; the results of my plea were published in the November 2 issue. Regulars may recall the apathy last year, so now I will call for a really special effort from club secretaries regarding the subject to be used. Or should it remain open? Once again we will set a date and ask that ideas should be received by November 1 in this office.

The attitude of the Dundee club to the contest is served well by a letter, published on page 30, by their secretary. Last year Peter Holloway of **West Herts** wrote of the considerable effort put into their entry by his club, and their realisation of the planning and production needed for success. This year **London** members have won the *Tape of the Year* award, and their secretary has been invited to Berlin for the International Contest judging. Why not make next year **YOUR** success? Now is the time to prepare.

CLUB MEETING DIARY

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

ABERDEEN: 1st Tuesday in every month at 8, Deer Road, Woodside.
ACTON: Alternate Fridays at the King's Head, Acton High Street. (Oct. 13.)
BARNSELEY: Every Tuesday at YMCA, Eldon Street.
BATH: Alternate Wednesdays at St. Mary's Church Hall, Grove Street. (Oct. 4.)
BATH (2): Alternate Wednesdays at 41, Herbert Road, Oldfield Park. (Oct. 4.)
BEDFORD: Final Tuesday in month at 131, London Road.
BELFAST: Every Thursday at 44, Dublin Road, Belfast 2.
BETHNAL GREEN: Every Friday at Shoreditch Tabernaacle, Hackney Road, E.2.
BIRMINGHAM: Every Monday at the White Horse Cellars, Constitution Hill.
BIRMINGHAM (SOUTH): Alternate Mondays at Stinchley Institute, Hazlewell Street, Stinchley. (Oct. 9.)
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 (Next Nov. 14.)
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, Guinea Street, Redcliffe. (Oct. 4.)
BRIXTON: 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. (Oct. 16.)
COTSWOLD: Fortnightly, alternating Monday and Thursday at Bayshill Hall, Royal Well Lane, Cheltenham. (Oct. 5.)
COVENTRY: Alternate Wednesdays at Holyhead Hotel, Coventry. (Oct. 11.)
CRAWLEY: 1st and 3rd Mondays at Southgate Community Hut.
DARTFORD: Every Thursday at 41, Winsor Drive.
DERBY: Alternate Wednesdays at Osmaston Park Hotel. (Oct. 11.)
DONCASTER: Alternate Thursdays at Lancaster House, Westlath Gate. (Oct. 12.)

DUBLIN: 1st Monday at "Hardy House," 6, Capel Street.
DUNDEE: Alternate Mondays at The Salvation Army Hostel, 31, Ward Road. (Oct. 9.)
EASTBOURNE: Alternate Saturdays at Hartington Hall, Bolton Road. (Oct. 14.)
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.
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, Nunsthorpe, Grimsby.
GLASGOW: Fortnightly, alternating Tuesday and Thursday at the Christian Institute. (Oct. 5.)
HARROGATE: Every Wednesday at 4, Belford Road.
HARROW: 1st and 3rd Thursdays at St. George's Hall, Pinner View, North Harrow.
HINCKLEY: Alternate Wednesdays at The Wharf Inn, Coventry Road. (Oct. 11.)
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. (Oct. 10.)
ILFORD: Every Tuesday at the RAFA Rooms, Cranbrook Road.
IPSWICH: Alternate Thursdays at the Art Gallery, High Street. (Oct. 12.)
JARROW: Alternate Mondays at Jarrow Central School. (Oct. 16.)
JERSEY: 1st and 3rd Mondays at "Santa Barbara" Maufant, St. Saviour.
KEIGHLEY: Alternate Wednesdays at the Spencer Street School Rooms. (Oct. 4.)
KETTERING: 2nd and 4th Wednesdays at the Rising Sun, Silver Street.
KIDDERMINSTER: Alternate Wednesdays at the Town Hall. (Oct. 11.)
LEEDS: Alternate Fridays at 21, Wade Lane, Leeds 1. (Oct. 13.)
LEICESTER: Alternate Fridays at the Newark Girls' School, Imperial Avenue. (Oct. 6.)
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 Thursday at the Ex-Services Club, King Street.
MANCHESTER: Every Saturday, 6 p.m., at 20, Navior Street, Hulme, Manchester 15.
MIDDLESBROUGH: Every Wednesday and Friday at 130, Newport Road.

NORTHAMPTON: Tuesdays and Thursdays at 36 Spring Gardens.
NORTH LONDON: Alternate Wednesdays from 1st Wednesday in month, at Bush Hill Park School, Main Avenue, Enfield.
NOTTINGHAM: Alternate Thursdays at the Co-operative Educational Centre, Heathcote Street. (Oct. 5.)
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. (Oct. 4.)
READING: Every Monday at Abbey Gateway.
REDDITCH: 4th Thursday at The White Hart Hotel, Headless Cross.
RUGBY: Alternate Thursdays at the Red Lion, Sheep Street. (Oct. 5.)
SHERNESS: Alternate Fridays at 136, High Street. (Oct. 13.)
SOUTHALL: Every Monday at Southall Community Centre.
SOUTHAMPTON: Alternate Thursdays at Southampton University. (Oct. 5.)
SOUTH DEVON: Alternate Wednesdays at the Y.M.C.A., Castle Circus, Torquay. (Oct. 11.)
SOUTH-WEST LONDON: Every Wednesday at Mayfield School, West Hill, S.W.15.
STAFFORD: Alternate Tuesdays at The Grapes, Bridge Street. (Oct. 17.)
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. (Oct. 12.)
WAKEFIELD: Alternate Mondays at York Street Hotel. (Oct. 9.)
WALSALL: Every Wednesday at Bluecoats School, Springhill Road.
WALTHAMSTOW: Alternate Fridays at 22, Orford Road, E.17. (Oct. 13.)
WARE: 2nd Tuesday at the Old Brewery Tap, High Street.
WARWICK: 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 (Oct. 25) and Heath Park Hotel, Hemel Hempstead. (Oct. 11.)
WEST MIDDLESEX: 2nd Thursday at the Railway Hotel, Station Road, Hampton, and 4th Thursday at Southall Community Centre, Bridge Road, Southall.
WEST WALES: 1st and 3rd Fridays at The Meeting House, New Street, Aberystwyth.
WEYMOUTH: Alternate Wednesdays at The Waverley Hotel, Abbotsbury Road. (Oct. 4.)
WINDSOR: Every Thursday at The Royal Adelaide Hotel.
WINCHESTER: Every Friday at 45a, St. Swithen's Street.
WOOLWICH: Alternate Mondays at the North Kent Tavern, Spray Street, Woolwich. (Oct. 9.)
YORK: Every Thursday at 62, Micklegate.
Unless otherwise stated, meetings start between 7 and 8 p.m.

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

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.

It will be assumed that all tape contacts will be made using a speed of 3½ ips, on half-track tape. Maximum spool size only is given.

Allison, Clifford. 3, Robertson Avenue, Edinburgh, 11. Music. Seven-inch spools 3½ ips. Contacts anywhere welcome.

Barrington, Ron (46). 9 Pickford Hill, Harpenden, Hertfordshire. Motoring, Hi-fi, Latin-American and Jazz instrumentals. 7-inch spools. 7½ ips. All tape types anywhere.

Bone, Alan (23). 33 West Road, Avondale, Salisbury, Southern Rhodesia. Motoring. 7-inch spools. 1½, 3¼, 7½ ips, two- or four-track. Wishes to contact enthusiasts anywhere except British Isles.

Brown, Charles A. (33). 23, Edwards Close, Wigmore, Rainham, Kent. Motoring. Seven-inch spools, 7½, 3¼, 1½. Contacts anywhere welcome.

Devitt, David A. (15). 42 Addison Road, London, W.14. Philosophy, psychology, gymnastics, microscopy. 7-inch spools, but prefers message spools at first. 1½, 3¼, 7½ ips. Contacts anywhere welcome.

Edge, Brian (28). Station House, Whalley, Blackburn, Lancashire. Speedway and serious tape recording. 5¼-inch spools. 3¼ ips only.

Howe, John W. (58). P.O. Box 684 Detroit 31, Michigan, USA. Travel. Prefers message spools first. Two-track only. Anyone, anywhere, no need to write first.

Kerridge, Mike (31). 73, Ampleforth Grove, Willerby Road, Hull, Yorkshire. Country, Western and Folk music. Seven-inch spools, 1½ to 15 ips, two- or four-track. Contacts anywhere, particularly battery portable owners.

Madden, William F. (33). 170 Daiglen Drive, South Ockenden, Romford, Essex. Perry Como records. 8¼-inch spools. All speeds, two-track only. Contacts wanted in all countries, particularly New York.

Milling, Peter J. (30). 74, Amhurst Park, London, N.16. Politics, philosophy and psychology. Wishes to contact enthusiasts in England, France and Israel.

Morris, Alan (17). 2 Falkirk Gardens, South Oxhey, Watford, Hertfordshire. Church work (Methodist), and Jazz. 7-inch spools, but message spools preferred. 1½, 3¼, 7½ ips, two- or four-track. English-speaking contacts anywhere.

Pender, Jes. (17). Flat 1, 12, Carlton Terrace, Portslade, Sussex. Rhythm 'n' blues, sport, occultism. 5¼-inch spools, 3¼ ips. Contacts anywhere.

Wade, J. 12 Dewsbury Close, Harold Hill, Romford, Essex. Grammar school boy learning French (not fluent). Football, aircraft, stamps and "pop" music. Wishes to contact French boy learning English.

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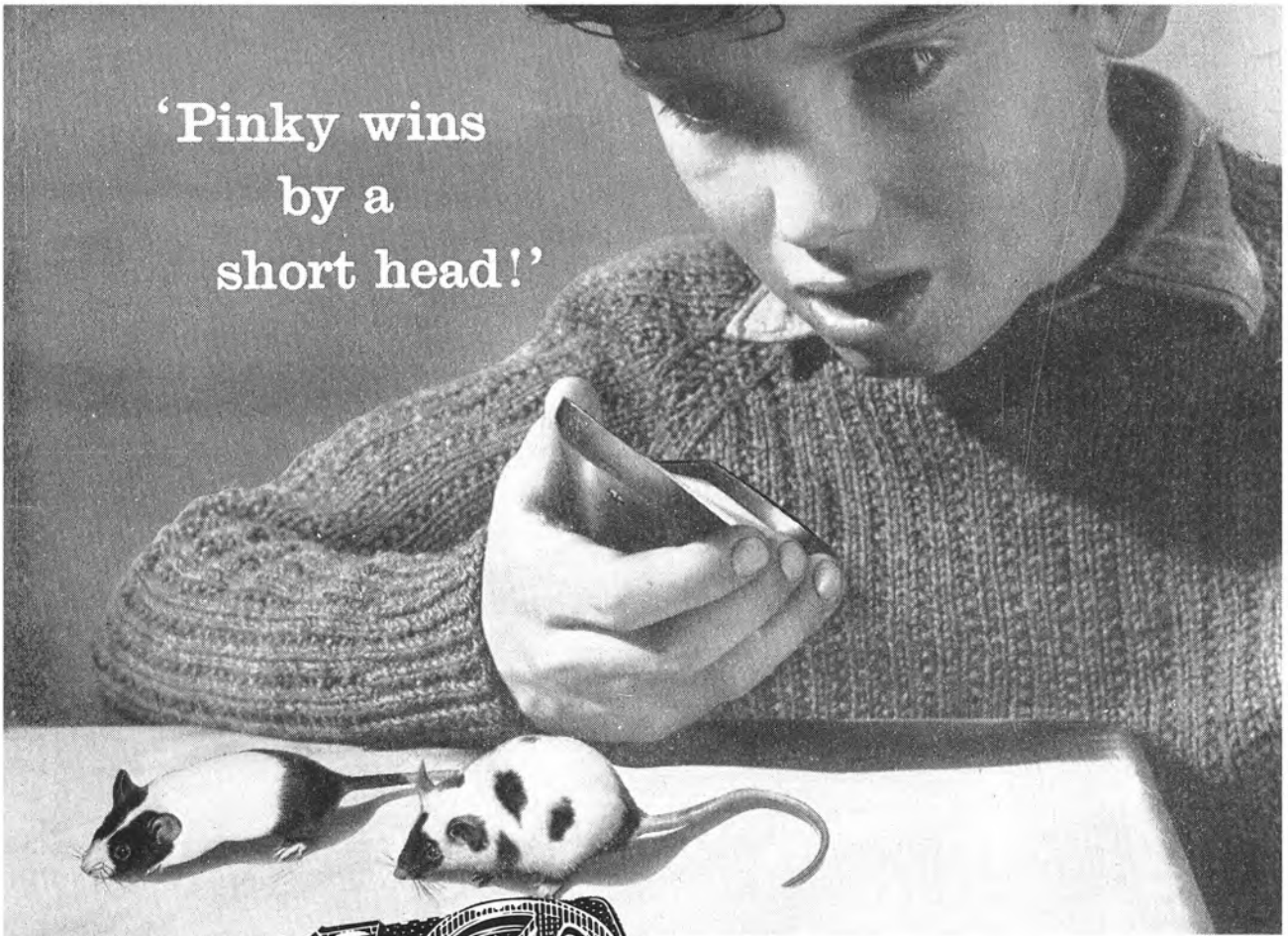
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excluding microphone

MAJOR SPECIFICATION

NO. OF TRACKS	Two or Four
NO. OF MOTORS	Three 4-pole induction motors
OPERATING SPEEDS	7½, 3½, 1½ inches per second
WOW AND FLUTTER	Not greater than .15% at 7½ ips
LONG TERM SPEED STABILITY	Better than .5%
TAPE POSITION INDICATOR	Digit Counter
HEADS	One Record/Play (3 micron gap) One erase
FREQUENCY RESPONSE	7½ ips — 50–20 kc/s±3dB 3½ ips — 50–14 kc/s±3dB 1½ ips — 50–7 kc/s±3dB
AMPLIFIER OUTPUT	6 watts push-pull
SIG/NOISE RATIO	43dB unweighted
VALVES	1×8D8, 3×ECL82, 2 metal rectifiers
BIAS FREQUENCY	64 kc/s
REPLAY CHARACTERISTIC	CCIR
RECORD LEVEL	M/C Meter
INPUTS	1: Mic. 2 millivolts at 1 Megohm 2: Gram. 200 millivolts at 100-300K

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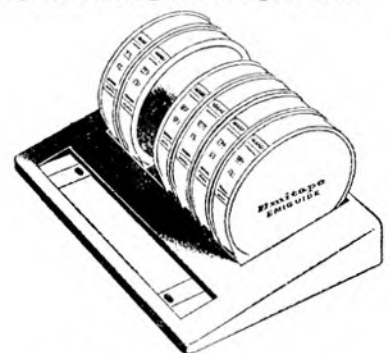
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TAPE

RECORDING
FORTNIGHTLY

Vol. 5 No. 21 18th October, 1961

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"Tape Recording Fortnightly" is published on alternate Wednesdays, by Print and Press Services Ltd., room 7, Tudor Street, London, E.C.4.

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

"Tape Recording Fortnightly" is available by a postal subscription of 45s. per annum, including postage, or it can be obtained at newsagents, bookstalls and radio and music dealers. In the event of difficulty, write to the Publishers at 7 Tudor Street, London, E.C.4.

Back numbers, if still in print, are available at 2s. 6d. per copy for issues up to November 1959, and 2s. per copy for later numbers.

EDITORIAL Editor, R. Douglas Brown

Address all communications
7 TUDOR STREET, LONDON, E.C.4 FLE 1455-6

ADVERTISING

All advertising communications to
1 CRANE COURT,
FLEET STREET, LONDON, E.C.4 FLE 0197

We take the view . . .

A DIGEST OF NEWS, COMMENT AND EDITORIAL OPINION

PRELIMINARY reports suggest that the public reception of tape records now that they are being offered on a substantial scale with an assurance of regular new issues is very good. Much as we wish it were otherwise, and do our best to see that it becomes so, the fact remains that tens of thousands of recorders in homes up and down the country are insufficiently used. It has always seemed to us common sense that the firm that made a really big bold bid to provide the wherewithal to turn these under-used recorders into music-players in regular use would do themselves and the tape recording industry a power of good.

It looks as though the moment has arrived, and we rejoice. We shall shortly be re-introducing into our columns a regular feature reviewing all new issues of tape records. It is some years since we pioneered these reviews of tapes and they were a regular feature of this magazine for a long period, until the supply of records coming forward proved insufficient to sustain a regular column.

Long-play (?) tape

IF tape records are, at last, to "get off the ground," there

is one plea I should like to enter without delay. It is that items should not be "coupled" on a single tape, except in cases where they have a natural link.

With discs, it is inevitable that—unless a large part of a disc is to be wasted—two quite unconnected pieces of music have often to be issued together.

It is a system that offers the recording company some obvious advantages. For example, if one side of a disc carries a recording by a top pops singer, it makes good commercial sense to put on the other side some relatively unknown but promising artist whom the company wishes to promote.

This is fair enough. What I like less is the coupling of two major works of classical music by different composers.

The arguments in favour of doing this with discs are easily understood; with tape they do not apply.

Let us not be tied rigidly to 5-inch reels. There are many works which, recorded at $3\frac{1}{4}$ ips, could be accommodated on the two tracks of 175 feet of standard tape, on a 3-inch reel, with a satisfactory natural break for

changing tracks. Where this is possible, it should be done.

* * *

There have been several attempts by tape recording clubs, individual enthusiasts and some of the smaller firms to market instructional tapes designed to improve the understanding and technique of recording amateurs.

Now the first full-scale effort to provide a set of instructional tapes has been made, with the appearance of six "Emiguides".

John Borwick, one of the best-known writers and lecturers in the audio field, is the man mainly responsible, and that ensures that a good job will have been done—though, at the time of writing, I have not had a chance to hear the tapes.

The six titles are explanatory of the field covered: Getting the quality right, microphone technique, tape editing, outdoor recordings, trick recording and sound effects, and producing feature tapes.

Apart from verbal explanations, the tapes contain practical demonstrations—they let you hear the sounds you should get, and those you shouldn't.

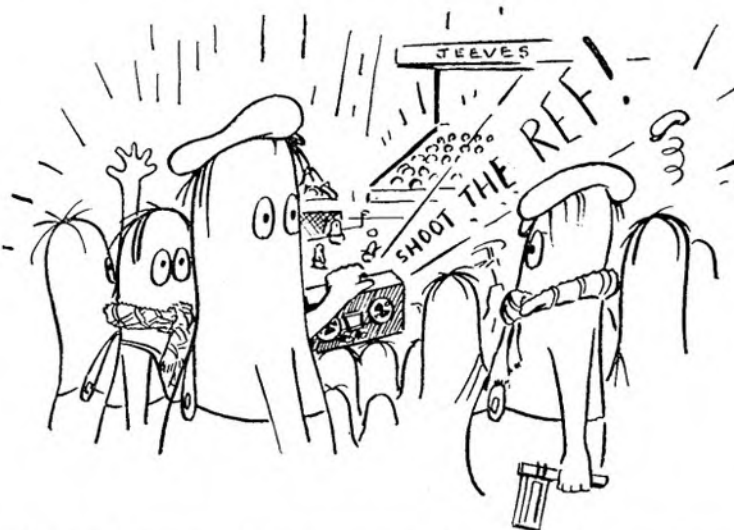
I expect these tapes to sell well and they should stimulate interest and improve the standards of entries in the annual Amateur Recording Contest. They cost 8s. 6d. each.

Berlin tapes

TALKING of Contests, by the time you read these words I shall be back from the International Recording Contest and the Congress of the International Federation of Sound Hunters in Berlin. Terry Devereux, who produced this year's "Tape of the Year", will be flying there with his wife to observe the proceedings—a guest of E.M.I. Sales and Service. Alan Stableford will be with me there to represent Britain on the judging panel.

Those who may have heard Mr. Devereux's "Just by accident" when I included it in a recent BBC "Sound" programme will wait impatiently to see how it compares with the best that Continental enthusiasts can offer. I hope to report on the International event and to broadcast some of the winning tapes in the "Sound" programme on October 29.

LAUGH WITH JEEVES



"I can make as much row as anyone else, and go home without a sore throat."

BY day a ladies' hairdresser; by night a stage personality. That's the story of Bruce Allan—thanks to his tape recorder.

It started with a school party when Bruce was fifteen. He teamed up with a pal and together they mimed to a record. Unfortunately, the day before the party, they dropped and broke the record. They managed to piece it together and play it on the turntable. They did their party piece—but ruined the pick-up. This episode taught Bruce Allan a lesson—next time he'd use his tape recorder.

Before the next time a number of things had happened. He'd left school, done his piece for private parties, seen a number of miming acts on television—and decided he could do better himself. As events proved, he was right.

At his first attempt he won a talent contest at a Manchester social club—and so impressed the owner that he got him a couple of appearances in London night clubs. He was offered professional status in London but preferred to stay a part-timer and continue his hairdressing work during the day.

His act is divided into six minute sec-

Good for a laugh!

By
F. J. G. HODGE

tions and each section forms a complete sketch in itself. On average there are about 104 snippets of spliced tape in the final six-minute tape used for the performance and most of these are made up of special effects—odd words—short sentences—pistol shots—a few bars of music—and similar sound effects taken from records. He first decides in his mind just what the finished sketch will be about and what shape it will take, then he starts sorting through some of his collection of three hundred or more records to find the most suitable and fitting sound or effect to express his precise meaning.

Having found the material he then records the snatches of the various records on to a master tape. When all the pieces are recorded he puts them into some sort of order by cutting the tape up and then splicing the segments together again

in their correct sequence. This is his usual practice for each of his sketches. These spliced tapes are then dubbed on to a clean tape at a speed of $7\frac{1}{2}$ ips. This final tape is then put on a spare reel and coloured leader tape is used to separate the different sketches.

With the sound side to his liking Bruce then has to rehearse the actual miming. In the case of one particular sketch (where he parodies Westerns) rehearsal time took some six and a half hours in front of the mirror trying to fit the miming to the timing of the sound. Altogether it took more than four months of development to get that sketch ready for presentation—and even after all that time Bruce wasn't satisfied with it and feels it could be improved—yet his audiences love it!

The first tape recorder he had was a Philips, but later he bought a Ferrograph and then added a Reflectograph to his equipment. His microphone is a Reslo Ribbon and a Quad amplifier feeds a Goodmans Axiom 400 speaker, with double cone, which is mounted in a specially designed cabinet. Most of this equipment is taken with him when he goes to the various clubs to present his act.

How good is Bruce? Does he turn in a better performance than others who mime to tape? The manager of Manchester's Embassy Club certainly thinks so—and he's seen and heard most mime acts. But, be that as it may, there's no doubt at all that 18-year-old Bruce Allan can truly be called a "recording" artist.

Sound education for teachers

TWENTY students from places as far apart as Durham and the Channel Islands attended the third Summer School on the use of the tape recorder in school organised by the Educational Development Association at Trinity College, Carmarthen, in August.

The tutor in charge was John Weston who, assisted by Harry Walding, stressed the importance of sound in all branches of education and emphasised the essential need for an "ear" for languages and music. Practical demonstrations were given, including examples showing the creative response of children to such methods, and tapes of poetry, plays and music made up and recorded by children of various ages.

The syllabus included basic electronics and acoustics, recorder care and maintenance, auxiliary equipment, microphone technique, scriptwriting, programme construction, dubbing and editing, and the preparation of aural aids.

Feature tapes were planned and produced by groups of students following

their own particular interests. Among the programmes successfully presented were: The Great Fire of London, A Visit to the Globe Theatre in 1606, Elizabeth Fry at Newgate, Paul and Silas in Prison, the 1940 Invasion of Guernsey, and the Assassination of President Lincoln. Many students brought their own recorders, and repairs and adjustments were carried out during maintenance sessions. Additional equipment was loaned by Messrs. Grundig, and Clarke & Smith.

STOLEN

THIEVES who entered the factory of Simon Equipment Ltd., on the night of October 2, made off in a Simon van with, amongst sundry items, a vanload of 54 Minstrelle and six Cymbal tape recorders.

The Simon van was later found empty and abandoned after it had been reported for causing an obstruction.

Simon Equipment Ltd. have a record of the serial numbers of the missing recorders.



Brenell recorders for electronic music

LUCIANO BERIO (right) well-known Italian composer and founder of the famous Milan Studio of Electronic Music, instructing a team of composers in the art of creating electronic music. The photograph was taken at the Summer School of Music, Dartington, Britain's number one school of music.

FROM RECORDING TO CINE

ADDING A MUSICAL BACKGROUND

HAVING dealt in detail with single, straight-forward commentaries for linking with cine films, I want now to consider something more ambitious.

How do we go about adding a musical background? If you have mixing facilities, this should not be difficult, but at least two recorders are required. The original track is fed from recorder one to a mixer, to which is also fed the music from whatever source is available, the mixed signal being passed on to recorder two for re-recording.

MONITORING

The problem of monitoring now arises, because you must be able to hear the commentary, in order to cue in the music correctly. Most modern recorders have facilities for hearing, on their own loudspeaker, the signal which is going to the head for recording. This will give the necessary cues and an indication of the levels of commentary and music after mixing, but before recording.

If neither of the recorders available has this facility then it might be possible to hear it from the one which is reproducing the commentary (recorder one) but you would not then hear the mixed signal before it was recorded. Nevertheless, a satisfactory result can be achieved in this way, providing you first carry out tests and note the correct levels for music and commentary at the various stages of the sound track. In fact, it is very necessary to make these tests, whatever method you are using.

It is, of course, a great help when making any recording of this nature to be able to hear immediately the signal which has *been recorded*. This requires the provision, on the recorder, of a third head, complete with its own replay amplifier, a facility now provided by several domestic recorders, and available as an extra on others.

Before passing on from this type of sound track I wish to discuss its preparation with the use of only one recorder. In doing so I want to

assume that we are starting from the beginning, rather than adding music to an already-recorded commentary.

SUPERIMPOSITION

The method is to *superimpose* one signal over the other, rather than *mixing* them. This requires that the tape be passed through the recorder twice, first to record one sound and then to record the other sound.

Now obviously, unless special arrangements are made, the second pas-

tary or the music?" and to find the answer we must consider several points.

The first recording is likely to suffer some loss in quality when the second is superimposed; which then is the most important, the commentary or the music? I would say, generally, the commentary, as the music is to be background only.

The process is simplified if the timing of the music is not critical and if it is kept at a constant and subdued level. Bringing its level up slightly

RICHARD A. MARGOSCHIS concludes his series of articles on using a tape recorder to add sound to cine with advice on mixing the commentary and musical background

sing of the tape will cause the first signal to be erased. Many recorders achieve the required condition by means of a special button or knob marked "superimpose" or, in some cases, I believe, "trick," the use of which cuts off current to the erase head and prevents erasure.

If you do not have the facility, you might be able to produce the same result by placing a small piece of thin card over the erase head—sufficient just to hold the tape away—but be careful that it does not affect the tracking of the tape over the recording head, or present any sharp edges to the tape.

Now the recording head itself has a slight erasing effect, due to the high frequency "bias" which has to be fed to it to make it record at all, and this will cause a slight lowering in the level of the first recording when the tape is passed again to accept the second recording.

After tests, you will know how much allowance to make for this when making the first recording.

We may now pose the question "Which to record first—the commen-

during breaks in the commentary can increase your timing and cueing problems. On the other hand, recording the commentary after the music robs you of the freedom to adjust the timing by editing the tape to fit the film; you will not be able to cut without upsetting the musical background. Commentary timing, therefore, is important.

MIXING

Many recorders are now able to accept and mix a signal from a turntable, or other similar source, and from a microphone; it is possible, then, to record commentary and background at one go. If you are presenting the commentary you will require an assistant to look after the recorder and music.

Provided with a copy of your script, marked up with the music required, your assistant can cue it in and look after the recording level. This is, in fact, similar to the previously-described idea of adding music to a pre-recorded commentary, except that you and the microphone take the place of the first recorder.

One point to remember here is that, with a live microphone, any monitoring must be done with headphones to prevent "howl round."

If you are working with one recorder, and have difficulty in cueing because you are unable to monitor, two other suggestions are worth consideration.

If your machine is provided with a reliable counter to indicate the amount of tape that has passed the head, this can be used for cueing and, with practice, will give some degree of accuracy.

If you have no such counter, use a visible mark on the tape; such a mark can be made by the use of china-graph pencils or stickers. Self-adhesive labels for titling 2 x 2 colour transparencies are useful, as they are just the right width, though I believe special ones are now made for use on tape. When finished with, always remove them from the tape and dust with a little French chalk to eliminate residual stickiness on the tape. Different colours, of both pencil and stickers, can be employed to indicate difference operations.

MUSICAL BACKGROUND AND/OR EFFECTS

Having achieved some measure of success with the simpler types of sound track you will, no doubt, consider that certain shots in your film could have more impact if sound effects took the place of the musical background. This is possible with the strobe method, provided the sound does not require critical synchronisation.

For example, a shot of a man using a hammer requires the same critical synchronisation as one of a person talking and my earlier remarks apply; but a shot of machinery working or a noisy street scene can very well be improved by the addition of a sound effect.

In some scenes, a particular action may require a certain sound at a precise moment—as in the street scene, for instance—but if you are dubbing in the "general" sound of the street you might well get by although that particular sound has to be omitted. In doing this, you are relying upon the natural leniency of the human eye and ear.

If sound effects are used, they will either replace the musical background



The author seen with his impressive range of equipment, all of which is carried on a trolley. In the foreground and on top is a Bradmatic deck and home-built recording and replay amplifiers (separate) with mixing facilities, contained within a single case. Beyond is a Brenell Mk V, with a Bradmatic replay head only, and pre-amplifier tone control, again in its own case. Below is a turntable and beyond that CJR record and replay pre-amplifiers. Power packs and the main output amplifier is carried in the lower space

for the entire length of the film or for certain portions of it. The methods suggested for recording the other types of sound track can be adapted or extended to cover this further addition, though the method selected will finally depend upon the recording equipment available.

Three separate items have to be dealt with: commentary, musical background and sound effects. If three recorders and mixing facilities are available, an edited tape carrying music can be placed on one and a tape carrying edited effects on another, both these machines and a microphone being fed through a mixer to the third machine for recording the mixed sound.

On the other hand, when only one machine is available my earlier suggestions can be adapted by splicing tape carrying the effects into the tape carrying the music before the commentary is superimposed. To make the best of such a procedure I think it would be advisable to bring the music to a conclusion before the effect and restart it again afterwards.

If possible, such effects should not start and finish abruptly at full level. I find them less jarring to the listener if quickly faded up and quickly faded off. In order to make the effect last the correct time, this might be difficult

without copying, but by carefully lifting the tape off the erase head at the marked spot—with a pencil or non-magnetic tool—and dropping it back at the next spot it is possible to produce the desired result. (Practice first with unwanted sounds!).

LEVELS

This brings me to my final point. If a commentary is your primary aim, be sure that your musical background and effects do not over-ride it; they are there to *support* it.

Alan Edward Beeby has written in *Tape Recording Fortnightly* about sound effects and I would particularly refer my readers to his articles in the issues of July 27 and August 10 last year.

At the beginning of this series I said I hoped to be able to encourage those who had not already done so to "have a go." I repeat my plea, especially to "lone workers" like myself.

There is nothing like variety. Think for a moment of the variety of this job and the credit titles you could give yourself on your film—cameraman, film editor, sound recording, sound editor, mixing, narrator and producer—but do not forget your assistant, for she, or he, is just as important.

Have a go.

Recording from books

SEVEN HUNDRED boys sit intent, listening to a recording made from a classic book—a book which would perhaps otherwise remain collecting dust in the school library. The wind howls, setting the desolate atmosphere in the Essex marshes. The boys, identifying themselves with young Pip in *Great Expectations* as he confronts the fearsome escaped convict, wince at the words “. . . keep still you little devil or I’ll cut your throat.”

Of all forms of playwriting for broadcasting, book adaptation is the simplest for schools. First of all find a book which is full of dialogue and which you think will make interesting listening, pick an excerpt, and introduce it in this way:

1. (Music—*Italian Symphony, Mendelssohn, Disc 8.*) Fade.

2. **1st Narr.** I say, you there! Yes you. Don’t turn round! Have you read any good books lately?

3. **2nd Narr.** The Lancastrian Broadcasting Club presents “Have you read any good books lately?” a programme in which we hope to whet the appetite of you, the listener. Today we present a dramatisation from *Great Expectations* by Charles Dickens. So, settle down comfortably and listen to the strange adventure that befell the hero of this book.

4. Fade in. (Music—*Planets Suite, Holst, Disc 21.*) Fade.

5. **Old Pip.** My father’s family name being Pirrip, and my Christian name Philip, my infant tongue could make of both names nothing longer or more explicit than Pip. So I called myself Pip, and came to be called Pip . . . (as book until) . . . Ours was the marsh country, down by the river, within a of the river wound, twenty miles of the sea.

6. Fade in. (Wind—*Disc 3.*)

7. My first vivid and broad impression of the identity of things seems to me to have been gained on a memorable raw afternoon towards evening. At such a time I found out for certain that this bleak place, overgrown with nettles, was the churchyard, and that the small bundle of shivers growing afraid of it all and beginning to cry, was Pip.

8. **Convict.** Hold your noise, keep still you little devil or I’ll cut your throat.

9. **Pip.** Oh! Don’t cut my throat, sir. Pray don’t do it sir. . . .

The great advantage of the tape recorder over other forms of dramatic presentation is that you can prepare a finished article in a very short time. The above is an excerpt from the Lancastrian script used in the recording, and is taken from Chapter One which consists mainly of dialogue. This 15-minute tape took a boy one evening to adapt, and it took the club one two-hour session to record.

It was broadcast to the school the following day, so, including the typing

In his second article on “Recording in School” PAUL GROVES discusses the classics, and how they can be used for programmes on tape

of the scripts, preparation and rehearsal, the whole thing was over in a week. Yet the recording was followed as intently as the school play which takes months of preparation.

One of the mistakes made by children in playwriting is that the narrator interrupts about every third line of dialogue. This mistake can also be made in book adaptation where the dialogue is broken by frequent passages of description. If the same pattern used by the novelist is used as a broadcasting script the dramatic continuity is ruined and it is far better to invent dialogue than to have continual interruption for narration. Here is an excerpt from *The Invisible Man* by H. G. Wells:

“The stranger came early in February, one wintry day, through a biting wind and a driving snow, the last snowfall of the year, over the down, walking from Bramblehurst Railway Station, and carrying a little black portmanteau in his thickly-gloved hand.

He was wrapped up from head to foot, and the brim of his soft felt hat hid every inch of his face save the shiny tip of his nose; the snow had piled itself against his shoulders and chest, and added a white crest to the burden he carried. He staggered into the “Coach and Horses” more dead than alive, and flung his portmanteau down. “A fire,” he cried, “in the name of human charity! A room and a fire!”

He stamped and shook the snow from off himself in the bar, and followed Mrs. Hall into her guest parlour to strike his bargain. And with that much introduction, that and a couple of sovereigns flung upon the table, he took up his quarters in the inn. ”

In the Lancastrian broadcast, which began with the same introduction as *Great Expectations*, this became:

4. (Music.)

5. **Narrator.** The stranger came early . . . (same as book until) . . . and flung down the bag he carried.

6. (Wind—*Disc 3. Door slam mic. 1.*)

7. **Invisible Man.** A fire! In the name of human charity a fire. (Stamping and shivering.)

8. **Mrs. Hall:** Good evening sir.

9. **I.M.** A fire, woman. A fire!

10. **Mrs. H.** You want to stay sir?

11. **I.M.** Of course I do. (Shivering.)

12. **Mrs. H.** Well, sir, what kind of room would you be wanting . . . ?

13. **I.M.** Here’s money woman. Now then, a fire.

14. **Mrs. H.** Oo! Two sovereigns! Oh yes, sir. This way, sir . . .

In this excerpt dialogue has been invented both for the Invisible Man and Mrs. Hall, yet the atmosphere of the original has been retained. Care must also be taken to keep the dialogue in character: here the curt manner of the Invisible Man which adds to the mystery at the opening of the story is kept throughout and speech suitable for a simple countrywoman is invented for the landlady.

As a point of interest, for this production recorded music was dispensed with in the time pauses in the play and instead the club made its own “concrete music” by recording some chords played on a zither which were played back at half speed; this gave the eerie effect that was needed.

Providing the right books are chosen, secondary school children will soon learn the skill of book adaptation. In the Lancastrian Club most of the boys now writing original material began in this way; it gives them both material and plot and an insight into dramatic dialogue. It can be thoroughly recommended to other clubs.

(TO BE CONTINUED)

Unity of Learning

“UNITY of Learning” was the title of a course for Junior school teachers held in Eastbourne last month. One of the three course sections was called “Sound” and it was led by Glyn Harris—well known to readers of this page.

The whole course was concerned with finding out how to establish the right atmosphere in a Junior school, so that the children could be led to find out things for themselves.

The “Sound” people were invited to use their ears exclusively for a while and to look and listen round the town for people and places, imagining they were taking a class of children round. Then they retraced their steps with tape recorders.

It was an exercise in gathering material and no importance was laid on the end product. Some technical instruction on operating equipment, drama technique, and editing was given. Nearly all eighteen were new and sceptical towards tape recording at first, but gradually became excited and convinced of the possibilities.

STAFF ROOM NEWS

P. J. Kingston, headmaster of Stan-ground V.C. School, Peterborough, has retired after 23 years with Hunts Education Committee. His school were the 1960 Schools Section winners of the British National Tape Recording Contest.

* * *

Glyn Harris has been appointed headmaster of Cooper’s Lane Primary School in London.



TAPE IN THE SCHOOLS

These were the best!

GEOFFREY HODSON comments on the school tapes in the 1961 B.A.T.R.C.

THE British Amateur Tape Recording Contest Schools' Section this year showed a leap ahead in quality, compared with previous years. Apart from the winners, there was real evidence that tape work in the schools is becoming more sure of itself. There was a spirit of adventure about the entries that the Editor passed over to me as a sample check which I found most stimulating. Faults there were, of course, but they were all forgivable because some real attempts had been made by the children to explore sound.

Strangely, once more Junior entrants swamped the Secondary schools. Are the Secondary schools really so busy they can't enter? What a pity, because there is some very good work going on which deserves a wider hearing.

As you will have read, the winning entry was submitted as a first-time effort by both the teacher and class concerned. *Life in 1801* sweeps through fifteen scenes with pace and life. One can sense the enjoyment the children have had in preparing their script and then recording it.

But the most remarkable thing about the production, for me, was their grasp of the medium. So often one hears presented as tape material written essays being read aloud, or plays which have not thrown off the stage. But Pennington Junior Mixed School, of Lymington, in Hampshire, entered the realms of sound with ease.

The scenes cunningly included historical facts and employed the whole class as actors. True, the class was an "A" stream, top class, but the results passed the 11-plus examiners at the Russell Hotel!

The two main technical blemishes were poor balance of announcer and piano at the beginning, and some very abrupt fades. In a letter, the teacher (R. B. Cruse) tells me that the dubbing

was not quite true to pitch either; this I did not detect.

There was some lively work from the runners-up, Thurmaston Junior School, Leicestershire. Their magazine programme had variety and it was well presented. I particularly liked the extract from their library discussion, "Children Talking." The topics included pocket money, "what irritates you most about adults," and helping in the home. H. J. Fox used the montage technique, and he could really have had a child doing his own narration spot.

Quotation of the month A LEADER IS BEST

Witter Bynner, *The Way of Life*
According to Lao tzu

The highly-commended entry, *Moses—the baby saved from the River*, was the sound text to accompany a film-strip made by the children. Here again the virtues were direct story-telling, economy of effects, and spontaneity. Again an "A" stream class, this time seven-year-olds. H. J. Walding, their teacher, joins with me in amazement at the nonchalance of the children's microphone technique. They achieved radio acting effects that some of my adult students have never done, even after sweat and blood.

Next year Mr. Walding has 4B, and he is wondering if their results will have less clarity and more inhibitions. "When they are encouraged, it seems to come naturally to seven-year-olds to talk freely and have feelings of security in the class room."

Stanground V.C. Primary, of Peterborough (last year's winners), used an imaginative approach to the theme *400 Years Ago*. The tape was not quite so flowing and spontaneous as their previous entry, but once again I

was delighted to hear a lot of children working and enjoying themselves.

Two Yorkshire entries chose their themes from nature. Cottingham Primary Boy's School, from the East Riding, tried an interesting experiment *Tom Lives at Beck Farm*. As the entry only lasted 3 mins. 15 secs., they gave the judges two versions! After a short descriptive narration, spoken by one boy, the rest of the class then imitated the dawn chorus of birds and animals, leading up to Tom being woken by his mother. The accuracy of some of the imitations was good.

Market Street Junior School, of Hoyland, Barnsley, after only one month's experience with the tape recorder, sent a piece of work which was good from the education side, but dull as a piece of listening, because there was no variety in presentation. *A Visit to Elsecar, King's Wood* was presented by a narrator introducing a topic, followed by group comments. Thus four birds were mentioned and four or five children read their sentence about them. Other topics included tree shapes, on the ground, in the air, the magic atmosphere, trees, sounds, the sky. One particularly good moment was when three children said what it felt like to jump over a stream.

Last year's runners-up, Lee Manor Primary School, of London, went to town with what I can only describe as a Braden show manqué. It was most amusing in places, although the gag book was a little musty. *The Headmaster Regrets* it was called. No further comment.

Now we must look ahead to next year. Of course, some Junior teachers are doubtful about the value of competition tapes anyway. The batch I heard this year satisfied me that they can have value, provided that the needs of the children are constantly kept in the forefront of the teacher's thinking.

One final technical point. The biggest difficulty is maintaining constant levels when recording in short bursts, possibly in different rooms. What can we do about this?

Oh yes, and one other point—look at this month's quotation.



Members of "The Mutleyphonic Workshop" gained first prizes in the 1960 and 1961 British Amateur Tape Recording Contest.

In this article they describe the design of the portable recorder with which they produced their winning tapes.

THE advantages of a portable tape-recorder, independent of a mains supply, are obvious. Unfortunately, many people will have been deterred from acquiring one because of the price, which is generally comparable with the mains recorder they already own. For such people, here is the design of a portable recorder which we have been using for the past year.

It utilises the Gramdeck tape table and pre-amplifier, worked by a clockwork gramophone, the case of which contains all the equipment, apart from the microphone. Recordings can be made in any position—even upside-down—simply by plugging the microphone into an external socket, and releasing the brake.

The proud owner of a miniature battery recorder is likely to scoff at such crude arrangements, but it is worthwhile to consider the relative merits. Our greatest disadvantage is the need to rewind the motor every three to four minutes, which limits the length of individual recording sequences. However, there are no batteries to be continually replaced, and the deck can take five-inch spools, even with the lid closed. At the normal recording speed of $7\frac{1}{2}$ ips (turntable speed of 78 rpm) using standard tape, this means 15 minutes recording time without a spool change. At this speed, the frequency response will be (according to the manufacturer's brochure) up to 10,000 cps \pm 3 dB. As regards "wow and flutter," the heavy ten-inch turntable keeps this to a very low level. Not having the necessary equipment, I am unable to quote figures, but we have made recordings of church bells that would satisfy the most critical listener.

Another disadvantage is the weight. Although it is far lighter than many so-called "portable" mains recorders,

it is still too heavy to carry for more than a few hours, and if your interests lie in recording "A Day at the Seaside" or "A Week's Holiday in South-end" you will just have to buy an expensive miniature portable.

The advantages that I would rate most highly are the low cost (around £12, excluding the clockwork gramophone, which can generally be found in Grandma's attic) and the complete absence of recorded hum on the tape.

The conversion of the gramophone is fairly straightforward, involving mainly woodwork. All the innards are removed; the arm and horn being discarded. For ease of operation, the lid is re-hinged on one of the long sides. The re-positioning of the motor board

(see Fig. 1) needs to be fairly accurate if the turntable is to miss the box of the pre-amplifier, and the lid to miss the spools.

All the dimensions shown are the minimum possible (at least, for five-inch spools) with a tolerance of about $\frac{1}{8}$ -inch. The depth of the box allows generous vertical clearances, but as will be seen later, it is as well to mount the motor as low as possible. A new hole will have to be made for the winding handle, with a brace and bit, and the brake must be re-positioned, so that it can project outside the case through a slit cut with a fretsaw.

At this stage a hole should be cut in the front of the case to take a socket for the microphone plug. A

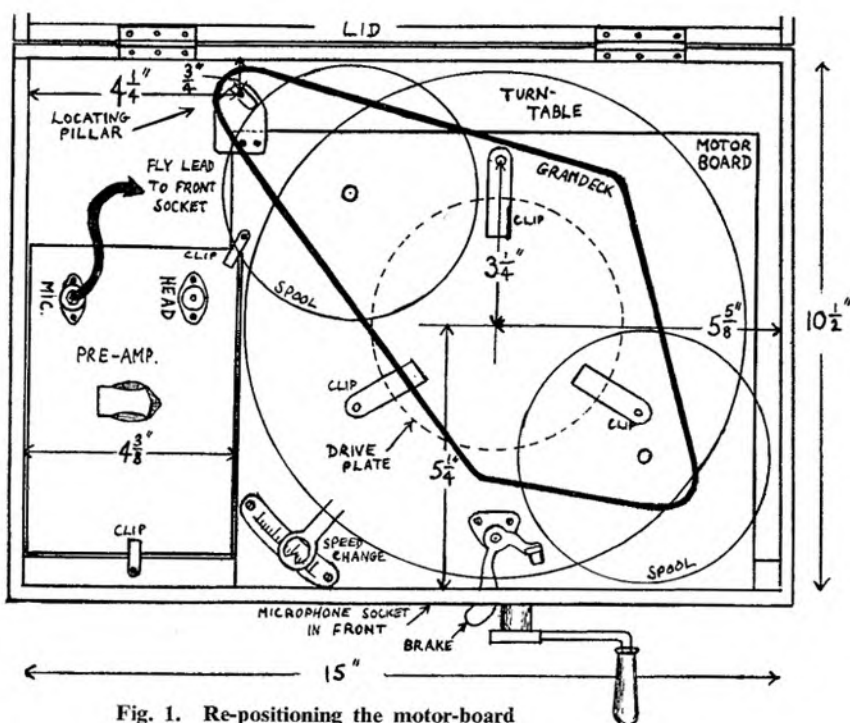


Fig. 1. Re-positioning the motor-board

CONSTRUCT YOUR OWN CLOCKWORK RECORDER

co-axial fly lead is taken from this socket to plug into the microphone socket on the pre-amplifier. This is held in place by means of small metal clips. For the locating pillar, which prevents the tape deck from rotating

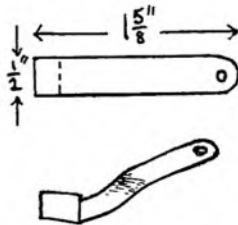


Fig. 2. Tape deck clips

with the turntable, we used an $\frac{1}{8}$ -inch diameter knitting needle, fixed into a hole in the bottom of the case, and held by a metal bracket from the motor board.

This completes the alterations to the case, but remember, it is worthwhile to check the clearances of the turntable and spools at each stage. It is also worth covering the case with rexine or plastic sheeting to improve the appearance.

The tape-recorder can be used in this state, provided it is not held on its side, when the tape deck will fall off the turntable, and yards of tape will festoon the interior. In order to prevent this (advisable) three clips are cut according to dimensions in Fig. 2, preferably from springy brass. These are fixed to the turntable by bolts, so that when the Gramdeck is placed on it, they can be swivelled round to grip the circular drive plate. (Shown dotted in Fig. 1).

However, the spools can still fall off, and it took us some time to evolve an efficient method of holding them, especially as the take-up spool is rotated via a felt washer, its weight providing the necessary friction. Fig. 3a shows the solution. The Gramdeck spindles are drilled out with a hole $\frac{3}{16}$ -inch diameter, and we found that a bolt could be fixed in these, carrying two washers and a spring to bear on the spool. If you enjoy tapping threads

in holes, go ahead; this is the surest way of fixing the bolts.

For others, like us, whose metal working facilities are small, there are two alternatives. The first is to find a small nut and bolt, and force the former into the hole. The second is more aesthetically attractive. The bolt is made a force fit, although removable.

Starting with a bolt approximately $\frac{1}{4}$ -inch diameter, we turned the thread off by clamping a hand drill in a vice, putting the bolt in the chuck, turning the handle with the left hand, and wielding a flat needle file in the right. This is tedious, but it saves buying a lathe. Finally, the bolt is tapered to

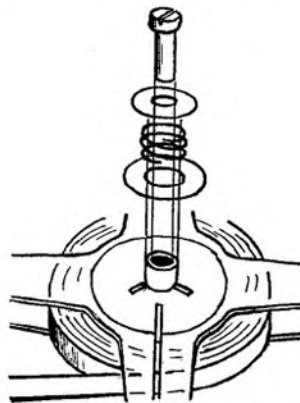


Fig. 3a. Spoolholding washers

the dimensions shown in Fig. 3b, the end sawn off, and cut along its length to provide the necessary resilience. The spring is wound from wire, and should be carefully adjusted to press no hard-

er on the spool than necessary. Failure to do this will shorten the running time, and in extreme cases, lead to "wow."

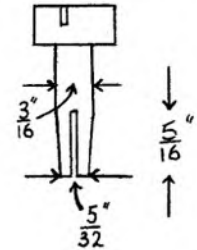


Fig. 3b. The bolt is tapered

Once the tape recorder has been set up, recording is simple. If the pre-amplifier is kept switched to "record" (as the battery lasts 600 hours, this is not very wasteful) there is no need to open the lid except to change the spools.

But in order to be sure of good recordings every time, it is worthwhile taking some extra precautions. As the Gramdeck erase consists of putting the tape over a permanent magnet, it is susceptible to jolts, and it is advisable to erase the tape beforehand, preferably with a bulk eraser.

Another annoying tendency is for the tape to get caught below the record head. In this position, it still winds on quite normally, but no recording is made. This generally occurs if the tape from the supply spool is slack when the motor is started. This can easily be remedied: always keep the pressure springs in place when moving the tape recorder.

Finally, don't wake Grandma when you rummage around her attic.

MODIFICATIONS

TWO modifications in the electrical side of this recorder have been made since the article was written. These now make it into a self-contained unit, and are as follows:—

A 10 K ohm potentiometer volume control has been fitted in the "fly-lead" from the external input socket to the pre-amplifier. They have also installed a one watt transistor playback amplifier in the Gramdeck pre-amplifier case, and running off the same battery. This is heard through an 8 x 3 inch elliptical loudspeaker, mounted at the back of the cabinet, partly beneath the turntable. This enables the monitoring of recordings on headphones as they are made and checking afterwards.

SHOULD one start an article on tape editing by an attempt to justify what must seem to the amateur to be an awful waste of tape? Certainly, as a professional, I don't have to pay a penny a foot cash down for every scrap that goes into the waste bin. But the fact remains that although intensively edited programmes are my bread and butter, very little tape is lost in their production—and I wouldn't be at all popular if it were.

But even so, I do waste a little more than the amateur needs to; for after all, there gets to be a stage where the professional's time is more valuable than the tiny scrap of tape that he is reclaiming. For me the criterion is a simple one: if it's the sort of edit where I mark both ends of a fluff or hesitation before cutting, then the length is not worth reclaiming; whereas if spooling or replay is needed to get from the "out" to the "in" I play the cut off on to a special reject spool.

Spools of tape made up from the longer cuts are virtually as good as brand new tape, provided the joints are well made—though the amateur may like to copy what the BBC does when reclaiming tape, and go through such spools to replace all "temporary" joints by "permanent" ones. I wouldn't say that for the amateur

EDITING: I

ALEC NISBETT takes the view that editing is as important to the amateur as it is to the professional—and that little tape need be lost even in extensive editing. In this, the first of a new series, he concerns himself first of all with the problem of reclaiming edited tape, and then describes the best means of reducing the need for extensive editing.

this is strictly necessary, but it does give the reclaimed tape the additional aesthetic quality of looking new.

The value of reclaimed tape made up from short lengths naturally depends rather more on the quality of your editing. (I once had a recorder which automatically detected bad joints by tearing them apart—though this was not a facility intended by the machine's makers!) But it's not at all difficult to make adequate joints, and the truth is that you can go on using the tape pretty well until it's so full of edits that it's an odds on chance

that your next cut will go into a previous one. Or, if you feel that it is a bit of a risk using a much cut tape for your most important recordings, it is still of value for recording rehearsals or short programme inserts, for sound effects or for making copies of material that is to be sent through the post.

TAPE CHARACTERISTICS

One thing to remember here is that all material for a particular programme should if possible be recorded on the same sort of tape. To have to deal with tape of different physical characteristics is inconvenient (more particularly for reclaiming the tape afterwards) but editing together tape of different electrical characteristics is certainly to be avoided—and if the tape is used again without separating out the different parts will result in jumps in level, and possibly to a lesser extent, changes in quality. Where this has inadvertently happened it will be necessary to copy part of the material and adjust its level. But this is a pitfall which it is easy enough to avoid. And as far as the editing itself is concerned, I have found that in the course of say, half a day's concentrated editing, making perhaps a hundred or more joints, it need not be necessary to throw away more than a few feet of tape.

I know there are a lot of people that these reassurances won't reassure. But I think it's worth pressing the point that other writers in this magazine have made: that the most important single advance that the amateur recordist makes is when he takes a razor



At work. First mark the tape with China-graph pencil over the replay head (lift the pressure pad off for a moment). Place the tape in the editing block and draw the razor blade along the cutting groove. Play off unwanted material on to the reject spool, mark and cut again. Join up (as here) and that's it. When editing out tiny fluffs keep the short scraps of tape (piled one on another, so that you will know which was the last) until you are quite sure they will never be needed again.

EDITING: I

TO EDIT OR NOT?

blade and for the first time cuts a tape with the intention of improving its recorded content.

As I write, I have just returned from a short collecting trip to the midlands town of Kenilworth, with something like ninety minutes of interviews and actuality—and all for a programme which will last 13 minutes and 45 seconds, including studio narration, when complete. (This is for a programme called "Postmark, UK" which has been going out every Sunday for over ten years on CBC, in Canada).

PROGRAMME BUILDING

By selection and much careful editing I hope to distil from my recordings a strong flavour of the town's past, present and, if possible, future. In the course of a great deal of talk, both on and off the tape, I have built up in my mind the story that the programme will tell; and from my palette of voices this story will emerge with as much economy in the linking as possible. And, incidentally, I did tell all my interviewees how I intended to construct the programme; explaining (i) that I would be cutting out my own voice from the interview, and (ii) that I would then select from the clearest and most natural part of what they had recorded. Not a single word of what I recorded was read from a script, or prepared in any other way.

Obviously, this method, in which editing plays a major creative role, isn't the only way of building programmes—and it is not the only way of using a tape recorder, either. Some amateurs go in for tape recording because they enjoy playing about with bits of wire and electronic components, and it's more fun to do this if the end product actually does something; other people buy tape recorders simply as a means of storing sounds. I certainly wouldn't decry either of these activities—but neither of them, it seems to me, adds up to making an "amateur tape recordist."

RECORD WITH THE EDITING SESSION IN MIND

Nearly all recordings will benefit from, at the very least, just a little tidying up; and at all times when recording this should be borne in mind. But don't expect the razor blade to accomplish the impossible: it will make things a lot easier if right from the start of the first recording, you are constantly



All ready to go. A useful sort of layout, this, with the editing machine on a table that is rather below standard height, and all the tools ready to hand on one side. For me, the simplest sort of splicer is the best; and this one is fixed permanently to the desk. Note also that the front part of the protective head cover is removed—editing is easier without it. On the table; a spool for reject tape (no need to throw any but the shortest lengths away), a Chinagraph pencil, a spool of jointing tape (some is cut up ready for use), and the script. In the drawer; leaders, spacer, and trailer tape. Missing: one razor blade

checking in your mind what might be needed at the editing session.

There are lots of things to be watching for: just what these are, depends on the type of programme. For example, in a talk, will it be possible to edit that fluff, or would a retake be advisable? (And, of course, always retake from earlier than is necessary and carry on well beyond the fluff, in order to give a choice of points to cut at.)

ESTABLISH IDENTITIES

In a discussion between several people, ask yourself whether the various voices have identified each other and the things they are going to talk about sufficiently clearly. If not, record a round of names and subject pointers in each voice so that these can be cut in where necessary. Watch for continuity of mood: if the point you are likely to join up to ends with a laugh, try to start the new take with something to laugh about (which can be cut out). Discreetly discourage phrases such as "as I've just said," and retake if they are not cleanly editable. And so on.

If in doubt about "pauses" that you think you may want, get everybody to sit still and record ten seconds of atmosphere (though this is a request which is probably more impressive than it is necessary—as atmosphere for pauses can generally be picked up quite easily from hesitations between words at other points on the tape). If you are going to record atmosphere for this purpose it is best to do it while your speakers are still there: after they have gone the sound of this may be slightly different.

If much editing is going to be required, don't be too clever in your control of levels: this can make for difficulties with the background atmosphere. And if the background is heavy, record a spare track of perhaps twenty seconds: this may be needed later for

fades or for "looping" under continuity. At a music recording session it is once again useful to record a few seconds of atmosphere at the end of each item in order to have something to join up to the start of the next piece. This should be recorded at the time (and if necessary record an extra ten seconds or so of "silence" at the end for cutting in at points where there proves to be insufficient). There should be enough for a fade-out at the very end (or a fade-out should be recorded at the end of the session, ready to cut on to the end of the last item at the point where reverberation has died away).

Music retakes should be recorded as soon as possible after the original, so that the performers can remember the exact intonation at the link point, and also so that the physical conditions of the studio should be as close to the original as possible (an orchestra quite literally warms up; its tone changes appreciably in the earlier part of each session in a studio).

LEARN BY EXPERIENCE

These are lessons which are learned very quickly by experience: there is nothing more frustrating than to have a programme made untidy by failure to record something which would have taken ten seconds if it had been attended to at the right time. A little forethought can make all the difference between amateurish lack of finish and a smoothly professional programme.

In this article I have considered two extremes of editing. In either case the reader will notice that editing serves the programme: I am not much in favour of such jolly exercises as distorting the meaning of a speaker by cutting out a word here or there, or by cutting together phrases out of context—except, perhaps, to prove to oneself how dangerously easy this can be.

The importance of reflectors

BY PETER MILTON

IN the two preceding articles we dealt with the reasons why a loudspeaker or combinations of loudspeakers have a sound distribution pattern which varies according to the frequency of the sound being radiated. The shape of the ideal polar diagram depends upon the purpose for which the loudspeaker is intended, but apart from public address work, the main application where the polar response is important is in stereophonic sound reproduction.

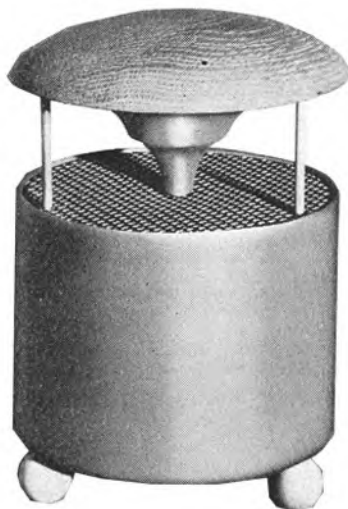
It has been shown that it only requires a difference of intensity of between one and two decibels to produce a perceptible movement of the image. **Figure 1** shows the polar diagram of the eight-inch loudspeaker cited in the last issue, redrawn in the conventional manner. It can be seen that even allowing for a 3dB change in pressure, the useful angle over which the response remains fairly uniform is only about 40 degrees.

This is not so important as it would appear at first sight, since under normal domestic conditions the loudspeakers are so angled and spaced that optimum results are obtained over the relatively small area required. In fact the author has demonstrated stereophonic sound to very large audiences using perfectly standard forward-facing loudspeakers.

A uniform response in the horizontal plane can be achieved by mounting the loudspeaker on its back, using the ceiling and walls to diffuse the sound.

The result is pleasantly spacious and airy, but when used in a stereophonic system, upward-facing loudspeakers usually tend to make the "sound stage" appear to curve behind them. This may be due to the delayed signals arriving from the images of the

omni-directional units and also by the effect of distance caused by a reduction in the strength of the middle register.



Burne-Jones "Top C" tweeter

With a forward-facing system the stage extends in a straight line between the loudspeakers. This is very noticeable in an anechoic chamber. There is of course no vertical information and if the position of the units themselves is below that of the ear, the "best seat in the house"

becomes a seat in the gallery. Beautiful stereo, played by the pint-sized musicians.

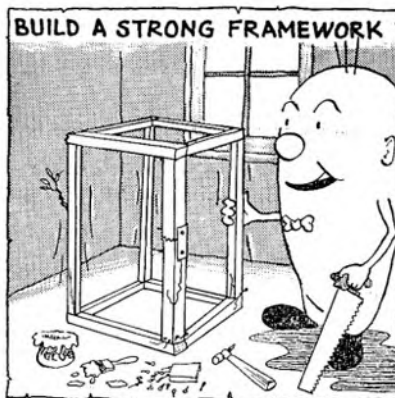
It is a widely held view that the pattern of sound distribution should lie somewhere between the extremes of omni-directional and the normal narrowing-with-frequency beam. This gives considerable scope for experiment and the following outline of some of the methods used may be of assistance to "Do-it-yourself" enthusiasts who wish to improve their loudspeaker systems.

The first step is to prevent reflections from the rear walls of the room by either absorbing the sound or directing it away from them. If the room is fairly heavily furnished, reflections from the opposite wall should present no problem, but if this wall could be fitted with a curtain of acoustic tiling, an advantage would be gained.

Reflecting the sound in a controlled manner is a useful way of broadening the sound pattern. The "blunderbuss" method of placing a cone over the speaker directs the "energy" away from the ceiling although a lot of it is wasted on the walls at the rear.

Perhaps the ideal configuration would be a unit mounted at an angle of about 15 degrees with a suitably shaped reflector mounted just above it.

Build
a
Corner
Reflex
Cabinet
with
Mike!



The main objection to this arrangement would be the amount of the space it would require, but a preliminary set of experiments (carried out with the aid of bent aluminium and sticky tape) indicated that the method has possibilities. Any reflector should be acoustically dead.

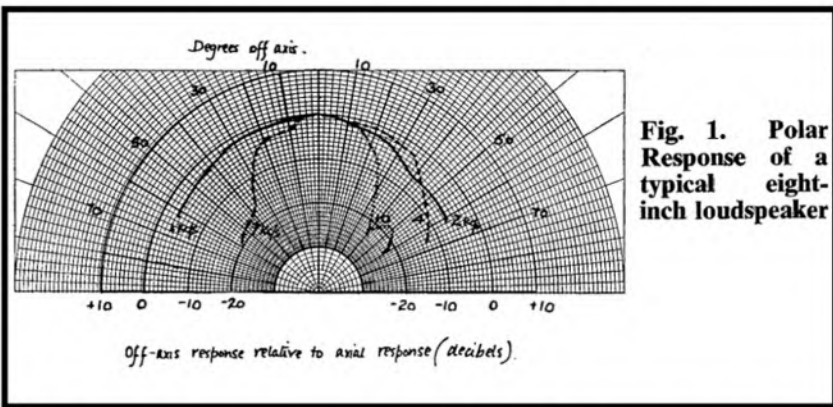
One way of ensuring this is to form it out of aluminium or lacquered card and to fill it with plaster of paris. The dimensions are ob-

in which the reflector also has the effect of horn loading the cone to some extent.

A less common way of modifying the polar response is the use of an acoustic lens. The principle involved is very simple. When a parallel series of waves strikes a flat obstacle, at right-angles to it, the instantaneous pressure at the surface is uniform, since parallel, i.e. non-divergent waves have a plane wavefront. It

the edge causes the waves to diverge. There are a few drawbacks to this idea unfortunately. Reflections between the cone, the rear surface of the baffle and the back of the box are set up, emphasising some notes and suppressing others, giving rise to unnatural reproduction. This may be partially overcome by suitable lagging. In addition to this, extra loading will be applied to the cone, having the effect of raising the bass resonance of the complete system. This will be tackled more fully in later articles.

The last way of obtaining divergent sound is to place an obstacle directly in front of the loudspeaker, such as a wooden sphere. This is not the same thing as using a "phasing plug" (cf. Messrs. Lowther). In the author's own opinion the forward-facing diffuser, unless carefully evolved under laboratory conditions, is more ornamental than useful, and could do more harm than good by setting up standing waves, causing peaks and troughs in the frequency response. This accusation could be levelled at any structure near and around the cone but it is even more true of an object placed at the centre of the loudspeaker.



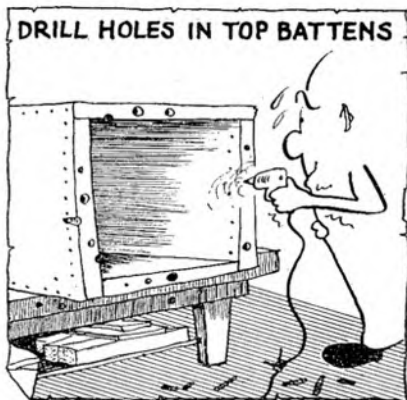
tained by deciding upon the frequency at which it is to become operative. At low frequencies the loudspeaker is omni-directional and the sound travels round the reflector. Reference to Figure 1 will show that the beam width starts to narrow between 2,000 and 4,000 cycles. This will occur at proportionally lower frequencies in larger loudspeakers.

The reflector should be comparable in size to the wavelength of the sound to be radiated, so in order to be effective at 2,000 cycles it should be between six and eight inches wide. In order to spread the treble evenly, the radius of the curvature of the reflector should decrease as it intercepts the higher frequencies. A neat example of an omni-directional tweeter is the Burne-Jones "Top C,"

follows that waves emanating from a point source have a spherical wavefront. A parallel beam can be made to diverge by delaying the outer parts progressively, so that the wave-front—the points of equal amplitude—lie on the surface of a sphere.

This can be achieved by placing a series of slats across the beam forcing the outer section to travel a greater distance than those at the centre. The most convenient application for this is in the mouth of a horn, although it has been used with considerable success, when reduced to its bare essentials, in the form of a few highly-polished slats mounted vertically edgewise on, in front of the loudspeaker.

If sound waves are caused to pass through a narrow slit, diffraction at



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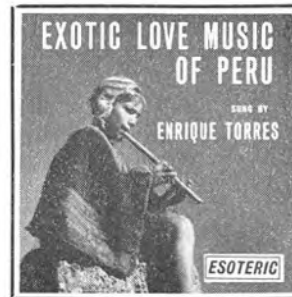
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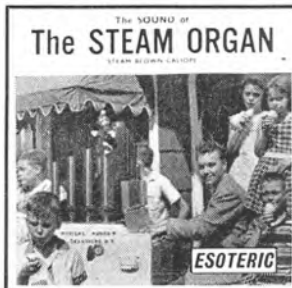
How We Hear; Sound Vibrations; Frequency Range of Human Ear; Pitch And The Mel Scale; Intensity; Standing Waves; The Decibel; Doppler Effect; Echo And Reverberation; Delay Distortion; Fundamentals And Overtones; Quality; Filtered Music and Speech. Playing time 45 minutes. BT101(M) Mono 3 3/4 i.p.s. 21/-, 7 1/2 i.p.s. 35/-.



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ORDER FORM

To TAPE OF THE MONTH CLUB

22 Coastal Chambers, Buckingham Palace Road, London, S.W.1.

Please enrol me as a Member of the Tape of the Month Club. I enclose 5s. covering 12 months' subscription. I agree to take a minimum of FOUR further tapes during the next 12 months, selected from the lists you will send to me.

I enclose Cheque/Postal Order/Money Order for..... in settlement for the tapes selected and 5s. annual subscription.

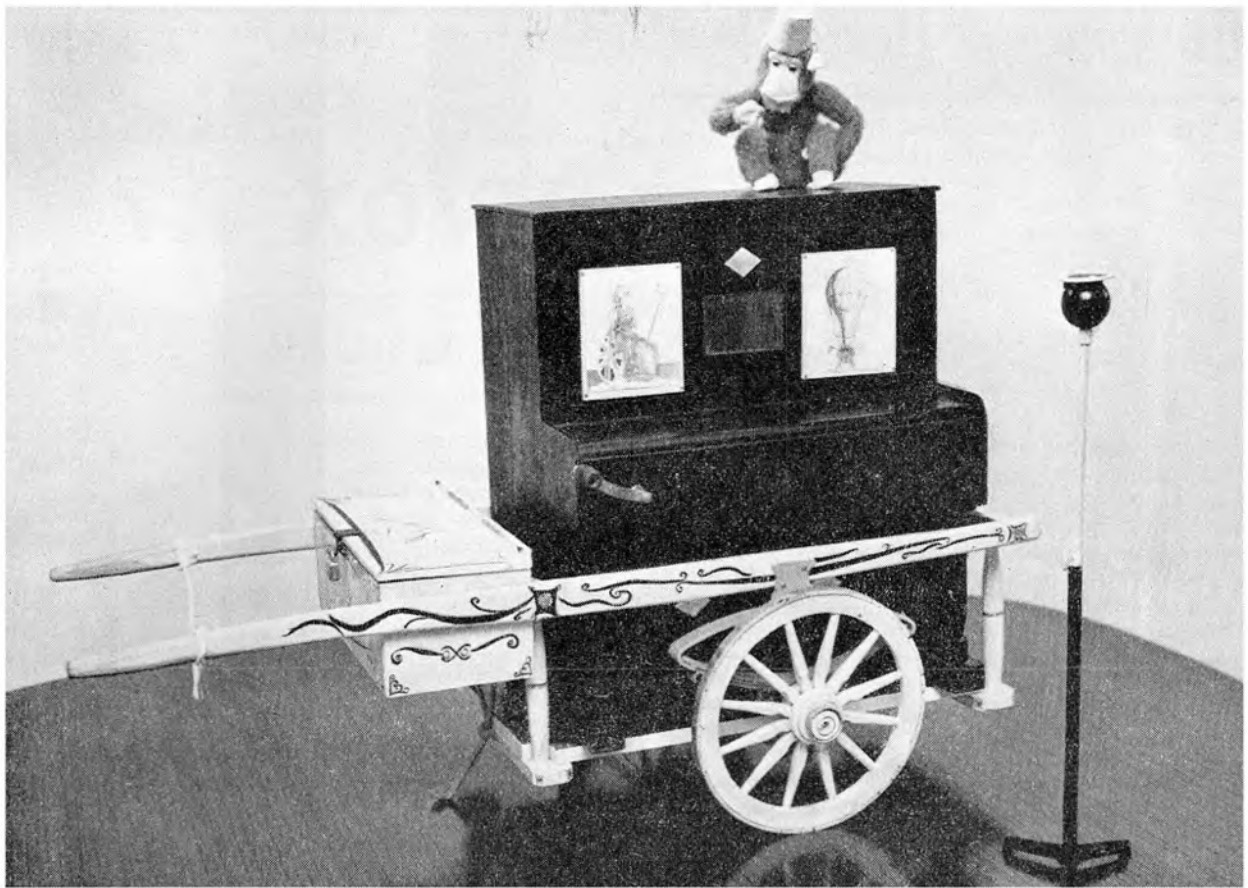
Mark M for Mono or S for Stereo in the square beside the titles of your choice. CROSS OUT the box indicating the speed you do NOT require. Send remittance for all tapes chosen and include 1/6 to cover postage and packing. Write your name and address in BLOCK CAPITALS.

- | | |
|---|--|
| <input type="checkbox"/> EVER LOVIN' MISS LEE | <input type="checkbox"/> DIXIELAND |
| <input type="checkbox"/> THE SOUND OF THE STEAM ORGAN | <input type="checkbox"/> TOP BRASS |
| <input type="checkbox"/> SOUND ADVENTURE | <input type="checkbox"/> MERRY-GO-ROUND |
| <input type="checkbox"/> DANCING TIME FOR SQUARES | <input type="checkbox"/> EXOTIC LOVE MUSIC OF PERU |

SPEED 3 3/4 7 1/2 Delete the speed NOT required

Name

Address.....



IT is often a delight to return to the simpler modes of early days, to the days when magnetic recording and radio were probably just one of the dreams of a futurist. All the same, the clockwork and spring and ratchet mechanism was a highly exacting craft, and it is comforting to think that it could have proved as much a headache to the repairer as our audio equipment does today!

Many of us have never heard or seen a street piano—now inappropriately called “barrel organ,” and there is not the gradation of tone which gave the pianoforte its name, but the title is probably befitting since there is more semblance of the piano than a mechanical organ.

The task of seeking out these musical entertainers of over one hundred years ago may be made easier for the portable recorder owner, but it depends on the kind of results required. There are indeed a number of working street pianos still to be found, certainly in the London area, and also in a number of outlying counties such as, Hertfordshire, Kent and Suffolk. The late Canon Wintle was a collector and an exponent of the craft and, in fact, he himself made several street pianos of a very high quality; today one of these famous instruments may cost around £100.

Once having found your piece of historical treasure, be it a street piano, hurdy-gurdy, or music box, it would pay dividends to record it inside a building

NAOMI ARCHER uses models to represent problems of microphone placing for the twelfth article of her series offering advice on microphone technique.

because, although they were originally played out of doors for collections, much of the character of the instrument is lost in free air. The hurdy-gurdy would be easier to manage inside a building as it used to be carried, rather than pushed on a cart, and the mechanism was more akin to the music box.

The model shown in the picture represents the important details of a street piano. The handle on the left is turned to operate a pin-studded wooden barrel and as it revolves it lifts certain hammers which strike the strings. The microphone should not be placed too close to the handle end of the instrument as it will pick up ratchet noise and the music will be spoiled. This is one of the main problems of recording mechanical and clockwork musical instruments of any kind. Therefore, position the microphone to the right facing the front. Sometimes it helps to have the lid lifted but do not go so far as to remove covers and casings because they serve as the sound box, and the music is mellower when they are left in place. Also, it would be difficult not to pick up *all* the mechanical noise as well as the tune change-over action.

There are usually ten tunes on one barrel and there is a resounding crash as the barrel slips along so that the ham-

mers are in line for different pins. We consider that these sounds contribute to the character of the street piano but as the microphone is directionally sensitive and not selective, it would be a pity to emphasise the mechanical noise which is not generally heard above the hub-bub in the street. Your choice of type of microphone will again depend on the building, but if you are forced to make the recording out of doors then a wise choice would be in the cardioid type.

If you are fortunate enough to contact a genuine owner who still uses his music in the street, complete with the pet to attract attention, then as likely as not there will be a store of tales that he can tell about his life, his acquisition of the instrument, who made it and how old it is: all this is an interesting prelude to a cheerful jangly sound mixed with deeper tones to mark a milestone of an era. It is no wonder that some of the older folk have a nostalgic interest when they hear the recordings which prove to be immensely popular and more worthwhile as time goes by.

There are other kinds of ancient musical novelties which have peculiar problems for recording, and outstanding among these is the old-time fair organ—but that is another tale.

Equipment Under Test

THE name of Truvox has been connected with sound reproduction for the past 38 years and they were one of the first British manufacturers to produce tape recorders. Today they can claim ten years experience in the manufacture of high quality tape recording equipment and consequently each new recorder incorporates the latest technical advance in a fast growing industry.

The Truvox R7, has classical styling in three tone blue/grey with contrasting knobs and silver trim. The dimensions are 16 by 16½ by 10½ inches high, including the lid, and it weighs 45 lb complete with all accessories. With the recorder there is a full seven-inch reel of tape, an empty seven-inch reel, a good quality crystal microphone and a spare lead fitted with a jack plug. The microphone and spare lead are housed in a small storage pocket in the rear of the cabinet together with a three core mains lead.

Fitted with a two-speed tape deck, (3½ and 7½ ips), which uses three motors, it will record and replay in both directions, thus there is no need to change the spools over when reaching the end of a tape. Track change is achieved by just turning a switch. This feature is made possible by the use of twin tape head assemblies. The

THE

TRUVOX R7

By

E. A. RULE

reversal in tape direction is almost instantaneous, less than two seconds being taken up by the change over.

The deck is fitted with an auto stop, digital counter, direction indicators and a pause control. Eight other controls are provided: **track selector**, to select the track required and also change the direction of the tape; **Tape control**, selecting fast wind, record or replay; **Stop**, to return the tape control to a neutral position at the same time stopping the tape; **Record**, a push button which has to be pressed before the Tape Control can be turned to the record position, thus preventing accidental erasure; and **Speed selector**, to select either type speed, and which also has a neutral position.

Separate bass and treble controls are provided, with the bass control arranged in the circuit to provide automatic bass compensation depend-

ing on the setting of the volume control. The volume control is a slider type and enables smooth "fades" to be obtained. Both tone controls are out of circuit on record, when the bass control is used as a monitor volume control.

Three input sockets are mounted along the right hand edge of the deck and these can be used for microphone or other signal sources. Another input jack socket is mounted at the rear of the recorder and is matched for a radio tuner or crystal pick-up. A socket is also provided for an external speaker, the internal speakers are automatically muted when this is in use.

In addition to the recording and reproduction of tapes, the amplifier can be used on its own as a high fidelity radio or gramophone system.

No painless switch for trained monophonists

STEREOPHONIC sound has been with us now for quite a time—long enough one would think to give most people who are interested in sound recording and reproduction time to weigh it up fairly and decide whether they, personally, want it or not.

The fact is, however, that hundreds of people are being totally unfair to stereo, forming a prejudice against it on a brief acquaintance and refusing to give it a fair trial. And the most astonishing thing about this, at first sight, is the fact that many of the worst offenders seem to be people with highly-developed musical senses, people who have been going to concerts all their lives and who are familiar with all the subtle differences that can make or mar a performance.

It is the people with fewer preconceived ideas who take to stereo like ducks to water. They usually prefer it right from the start, given a reasonable

Stereo Notes

By D. W. GARDNER

demonstration. They feel quite sure it is a better sound—often before anyone has told them that they are listening to stereo equipment.

Some salesmen even find that they can sell stereo equipment to the newcomer to sound reproduction much more easily if they keep quiet about the fact that it is stereo until the customer has practically made up his mind to buy it. Quite a number of people, apparently, are puzzled and put off by the idea of it, and possibly prevented thereby from listening to it in a normal, relaxed way.

This is one important clue to the resistance that can be put up to stereo. Instead of accepting the sound simply as a musical performance, there is a tendency on the part of a person hearing stereo for the first time to assume that there is an obligation to play at instrument spotting. After making this mistake they may well go off in a huff complain-

ing that all they want to do is listen to music and not bother about where the instruments are.

We are becoming aware, however, that there are more important and more excusable factors about anti-stereophony, factors which quite logically affect the experienced musical listener more than the comparative newcomer.

The basis of it is this. The experienced and highly-developed music-lover often has a remarkable capacity for remembering what instruments and combinations of instruments should sound like, and they use this ability to supplement deficient reproduction as far as possible. This process of interpretation and improvement by imagination can become a very fine art in relation to the individual's own equipment, or the type of equipment (usually mono) to which he has become adjusted.

It follows that any change at all is likely to upset the somewhat delicate process—and it can be quite a long time before a similar degree of adjustment has been restored.

(Continued on page 32)

It has a rated power output of ten watts and on test the measured distortion at this output was only 0.5 per cent, a very low figure indeed. In fact even when recording a signal at maximum modulation level as indicated on the magic eye and then replaying at ten watts output the distortion was still only 2 per cent. This is so far the lowest of any recorder with a complete amplifier system that I have yet measured.

Two Rola-Celestion Hi-flux loudspeakers, an 8 x 6 inch elliptical and 4 inch round with cross-over are fitted in an acoustically designed cabinet, and when replaying some recordings made from a VHF tuner gave a very good account of themselves.

The main amplifier consists of push-pull EL84s in ultra linear driven by an ECC83. Negative feedback is used. The rest of the tape amplifier consists of two EF86 pentodes used as pre-amplifiers on record and replay and an ECL82 triode-pentode used on

a modified Hartley circuit, and has a clean wave form. Auto stop is provided by insulated tape guides, and when the metal strip attached to the tape passes over these, a DC bias voltage which is fed to an EN91 is removed, thus increasing the current through the valve and closing a relay in its anode circuit which in turn stops the tape and returns the Tape Control to neutral.

There are many interesting points about the R7, but due to the need to conserve space only the main features have been mentioned.

The recorder was put through all the usual tests and checked to see if it met with the manufacturer's specification. Without exception the Truvox R7 met all claims made. Examination of the internal construction



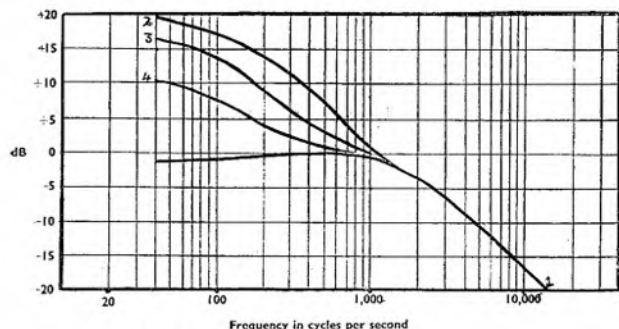
of low noise valves and components as well as careful wiring. All transformers are vacuum impregnated and of generous size.

The recorder was left on for several hours and although the ambient temperature was high there was no excessive heating anywhere in the recorder. The R7 is without doubt a well-designed unit and can be recommended as a reliable tape recorder. For a unit in this class it is excellent value.

MANUFACTURER'S SPECIFICATION

- Speeds: 7½ and 3½ ips.
- Frequency response: 30-17,000 cps ± 5dB, 40-15,000 cps ± 3dB at 7½ ips; 40-10,000 cps ± 5dB, 50-9,000 ± 3dB at 3½ ips.
- Wow and flutter: 0.1 per cent total at 7½ ips; 0.2 per cent at 3½ ips (RMS).
- Signal-to-noise ratio: — 45dB.
- Motors: Two separate B.T.H. for fast winding. Capstan motor; capacitor run, two speeds, reversible.
- Speed variation: Less than one per cent at either speed.
- Loudspeakers: 8 x 6 inch elliptical and four-inch round.
- Inputs: Two high impedance, two low impedance. Sockets 1 and 2 — 4mV at 2.2M ohms (7½ ips); 2½mV at 2.2M ohms (3½ ips); Socket 3 — 40mV (7½ ips), 25mV (3½ ips) at approx. ½M ohm; and Socket 4 — 250mV (7½ ips), 150mV (3½ ips) at approx. ½M ohm.
- Output: Low impedance 15/16 ohms.
- Output power: 10 watts push-pull.
- Valve line-up: Two EF86, ECL82, ECC83, Three EL84, EM84, EN91, EZ81.
- Power consumption: Not exceeding 170 watts.
- Dimensions: 16½ x 16 x 10½ inches.
- Weight: 45 lbs.
- Price: 82 guineas (including tape and crystal microphone).

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



Effect of tone controls on the replay response of the Truvox R7 using EMI Test Tape at 7½ ips

- 1: Maximum treble cut
 - 2: Bass at maximum, volume at minimum
 - 3: Bass at maximum, volume at + 3
 - 4: Bass at maximum, volume at + 6
- } With volume at maximum there was no bass boost

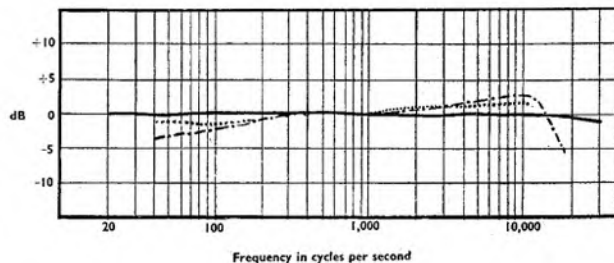
record. The pentode section provides a constant current feed to the record head. Modulation level is indicated by an EM84 magic eye and an OA81 diode rectifier. The circuit used has a "fast rise slow decay" and therefore the peak level is shown without the fluttering normal with this type of indicator.

Bias and erase voltage is obtained from a triode connected EL84 used in

showed a well engineered recorder built to last, with good quality parts throughout. A recorder of this type with ten watts output could prove very useful in schools, etc, or as part of a high fidelity system.

Recordings made from VHF and the microphone supplied were excellent, the measured signal-to-noise ratio when used as an amplifier was over 60 dB, due no doubt to the use

Frequency response of Truvox R7 (Tone controls "flat")
 — · — · — Record/replay at 7½ ips using Emitape supplied
 Replay using EMI Test Tape at 7½ ips.
 — Amplifier only, radio input socket.



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LETTERS TO THE EDITOR

STEREO—from a mono disc?

I WOULD be interested to know if any of your readers have heard stereo played from a mono record on a stereo deck with the balance control fully operating on one speaker in another room, the other speaker still being attached to the deck pressed up against a wall. I doubt it!

Yet this was the set-up I was proudly shown recently. My friend asked me what I thought of stereo. Naturally I was completely flabbergasted.

It took me some time to convince him that he was wasting his money buying mono records for his newly acquired stereo table. However, I broke the news to him as gently as possible and frantically re-positioned the furniture, set the balance etc., and almost had to force him into the sound area to hear what stereo really sounds like using a stereo record.

Previously he had really believed he had a stereo set-up. How many others may think like he did?

I must admit my own "conversion" was not sudden. Even though I have made many recordings of my own dance band on mono and have been studying

A.F. amplifier design, loudspeaker design, and instrument harmonics for some years, it was not until I casually flicked the switch to "S" on my newly acquired TK60 that I realised I had been using only one ear.

Norman Paul's "Footsteps in the Dark" article (*September 20 issue*) was an almost identical account of my own experiences.

Now I too am up half the night busily converting my mono tapes.

CORPORAL TOMS

Doncaster, Yorkshire.

Hi-Fi HARRY by Rich



"Placing my foot in the right stirrup I eased myself into the saddle and . . ."

Brickbats and bouquets!

I RECENTLY realised my ambition to have the hi-fi outfit that I have always dreamed of—nearly £300 worth. I got for my money:—

A battery portable tape recorder costing over £70 that failed on the first evening. Three machines, and four weeks later, I am *still* having trouble with it.

A stereo amplifier that cannot stand up to the maker's claims by a long shot.

A very well advertised stereo-arm that is *still* not delivered, although I was assured of immediate delivery.

Another arm, reputed to be the finest of its type in the world, that failed after only six hours' use, and for which the supplier now wants £5 10s. to repair in spite of the fact that the failure was not due to mis-use.

And you ask us to stop sniping at the manufacturers. You've got some hopes.

On the other side of the balance sheet, let me tell you something of the people that made the less expensive items in my new outfit—Jason and WAL.

I ordered a Jason JTV/2 locally and was quoted six weeks delivery. I then had a word with Jason's direct, and in no uncertain manner. In the face of their reply I could do nothing but apologise. They accepted the fact that it was poor service, apologised, guaranteed delivery in three days' time, and actually supplied within two! That is the first time I have known a British maker to say he could be at fault.

For sheer service, though, how about this from Wellington Acoustic Laboratories Ltd.

I had a WAL Stereo-Gain, and believing there to be a fault in one channel

sent it to WAL, quoting facts, symptoms, etc. It arrived at their factory on a Monday, was checked, tested, fault found, repaired, tested and arrived back here again the following day. On the Thursday I received a personal letter of apology for causing me inconvenience from no less than the Directors. Brother, those people can inconvenience me any time they feel like it, and I will not make a peep.

Now, if these two companies can put up that kind of show, why can't the others?

DAVE WISEMAN

Acton, London, W.3.

CONGRATULATIONS

IN the August 23 issue of *Tape Recording Fortnightly* I read the list of prize-winners in the British Amateur Tape Recording Contest of 1961.

As a fellow competitor (though not a winner) I offer my congratulations to the winners. I have taken the closest interest in the progress of this competition, and have been impressed by the obvious care and thorough coverage by its sponsors, in the magazine. My warmest thanks for their encouragement.

Praise, too, for the judges, who must have had quite a task in their selection, and from your brief accounts of the various winning tapes it is obvious that every care was taken in the final choice.

I shall look forward indeed to purchasing a copy of the winning tapes when your suggested magazine tape becomes available. May I say that I think this is a brilliant idea, and thoroughly bears out my conviction that *Tape Recording Fortnightly* is sincerely interested in promoting the Art of tape recording in its best sense.

"More power to your elbow," and with very best wishes.

RICHARD PHILBRICK.

Uxbridge, Middlesex.

WELL, HOW ABOUT THAT!

I BUY and sell second-hand electrical goods—tape recorders, radios and such. The other day a young lad came into the shop with a small battery tape recorder which he wished to sell. I asked him if he had his parents' permission to dispose of it.

At that the lad switched on the machine and a woman's voice said: "This is my son's tape recorder and he wishes to sell it." The voice went on to state the price required.

Rather taken aback I recorded a reply saying how much the machine would be worth to me, and told the boy to take it home.

He soon returned and once again the "mystery voice" came from the machine, this time accepting my offer.

Thus the deal was settled. I am afraid this scientific age is getting too much for me.

J. A. SIRRELL,

Reading, Berkshire.



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AUTOMATIC RECORDER ANNOUNCED BY SYMPHONY

New Products

M.S.S. TAPE RACK

A UNIQUE fully-automatic tape recorder capable of switching itself on and off at pre-determined times has been announced by Northern Radio Services.

The instrument comprises basically the Telefunken Model 75T tape unit allied



The Symphony Auto Recorder

with a special electric clock/time switch and an 0-30 minutes process timer. It is mounted with a high-flux 9 x 5-inch elliptical loudspeaker in an attractive rexine-covered portable cabinet.

The function of the machine, as modified, is to make it possible for radio

programmes, for example, to be recorded in the absence of an operator. The controls can be set so that the instrument will switch itself on at a pre-determined time, sufficiently in advance of that time to allow for "warming up"; and will also switch on the radio set, or tuner. At the pre-set time the machine will record the broadcast and at the end of the time will switch itself, and the radio set, off. A tape mechanism disengages the tape transport from the capstan and tape heads immediately the mains is switched off, whether the tape is fully played or not. This prevents any "flats" being worn on the capstan or the heads being magnetised by the tape.

No loss of recording quality is incurred at the beginning of automatic recordings by the warming up process achieved by the built-in process timer which can be pre-set to any warming up period from 5 to 30 minutes.

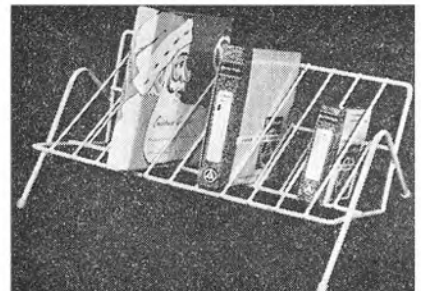
The price of the Auto Recorder, incorporating the two-track, 3½ and 1½ ips, Telefunken 75T, is 69 guineas. Also available are versions incorporating the four-track Telefunken 76T for 79 guineas, and the four-track stereo model 77T at 99 guineas.

It can be supplied in a variety of polished wood table and console cabinets or the parts can be supplied without any cabinet for fitting into customers' own cabinets.

Northern Radio Services Limited,
11, King's College Road, London, N.W.3.

A PRACTICAL, attractive, and inexpensive means of storing tapes of various sizes has been announced by MSS, the Mastertape tape manufacturers. Illustrated below, this rack is made from strong, welded-steel finished in abrasive-proof plastic, with rubber feet to protect the furniture, and weighs only a few ounces.

It will accommodate up to twelve tapes of any of the usual sizes between 3½ and 8 inches, each box resting securely in its own compartment with the title panel clearly visible.



The price is 18s. 6d., and it will be available from any radio shop or store, or direct from the manufacturers.

Our photograph also shows the new Mastertape "Book" packs, and the special gift wrapper in which 5 and 5½-inch tapes will be available at Christmas.

M.S.S. Recording Company Limited,
Poyle Trading Estate, Colnbrook,
Buckinghamshire.

Philips introduce mains supply unit

PHILIPS ELECTRICAL LTD. have now introduced a mains supply unit designed for their new battery tape recorder, the EL3585 described in our July 12 issue.

The two-unit device consists of a plastic tube which fits into the battery compartment of the recorder and a metal encased transformer and rectifier. The metal encased unit measures 6 x 3½ x 3 inches and the full unit weighs just under only 3 lb.

The recorder can be powered from the mains by this device which operates on 110, 127, 200-250V AC, 50 cycles. The price is £5.

Philips also announce the addition of a new supplementary piece of equipment. This is a pre-amplifier, type EL3774/00, designed for the monophonic EL3541 and EL3542 tape recorders, enabling among other facilities, playback of pre-recorded two and four track stereophonic tapes.

For stereo playback, or simultaneous playback of two separate mono tracks the pre-amplifier is plugged into the stereo outlet already provided on the recorder and connected to the pick-up sockets on a radio, or an amplifier with a loudspeaker

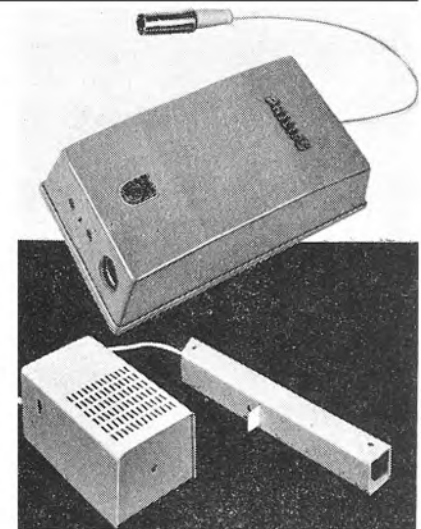
system. This will form the right hand reproducing channel whilst the tape recorder forms the left.

For the enthusiast, probably the most popular use of this will be its facility for listening to the playback of one track on headphones and being able to make a synchronised recording on the other track. This facility is particularly suitable for synchronising musical items, play rehearsals, speech and background music for film commentary and trick effects.

On some of the earlier versions of these two tape recorders slight modifications may be needed in order that the low DC operating voltage for the pre-amplifier can be applied. The pre-amplifier costs £6 10s. and if modification is needed it can be carried out at small cost by the local dealer.

The pre-amplifier is enclosed in a 6½ x 3½ x 1½ inch cabinet in grey plastic with foam plastic base. Output voltages are: 5-pin DIN socket, approx. 1 volt across 150K ohms; and 2-pole socket, approx. 200mV across 1K ohms.

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News from the Clubs

"TAPE clubs and their purpose" was one of the subjects of a meeting attended by members of the clubs in and around London at a recent meeting in the heart of the metropolis. The question had arisen during the first of a series of quarterly meetings organised and attended by representatives from the clubs in Friern Barnet, Ilford, London, Reading, Walthamstow, West Middlesex and Woolwich.

Alan Stableford of the Federation presided, and when I visited, those present were deep in this vexed question.

I was surprised to hear that a number of those represented placed the social service type of activity far above that of the creation of feature tape. It was even asked "what is the use of a programme on tape once it had been produced?", although only from a secretary who had been asked this question himself.

As far as this column goes, I am on the touchline in such a debate. However, I cannot help feeling, as did Mr. Stableford, that the prime function of a tape club is the extension of the chosen hobby including the manipulation of sounds and of ideas and the use of the equipment through which both of these may be expressed in a concrete form. To such an end, the production of feature tapes is ideal.

Of course, the social service provides a humane touch to any tape or similar club, and it certainly provides publicity towards the search for a greater membership. But let us not lose our sense of proportion. As the chairman said, any of these services can be achieved by other more experienced organisations.

When the cine, cycle, car and similar type of clubs meet, they concern themselves with their own particular interest. Then let the tape clubs do likewise. Let the members get down to serious, or even semi-serious recording if they are so inclined, but get them producing feature tapes. Stop me if you have heard this

before, but ask any of the older clubs. They place the emphasis in the right direction, that is why they are "old clubs."

The question is an important one for club members, and no doubt many would like to hear other views on it. We will gladly publish any letters on the subject.

Apart from all this, the general trend of club activities seems not to be in too dogged a line. And it is encouraging to see the increase of inter-club meetings such as that mentioned above.

Other inter-club contacts have been achieved by the members of the **RUGBY** society. At their July 13 meeting they heard a tape by and about the **Bourne-mouth** club, and played the *Transistors*



Don Fisher of the Harrow club seen with the golden microphone awarded to him as first prize in a competition organised by The Voicespondence Club of America

tape produced by the members in **West Middlesex**. To supplement this tape, president John Bannister had taken along a wide selection of transistor radios which members examined and discussed for the rest of the evening. A fortnight later blind member Jack Willis spoke on

his hobby of tape exchanges, and his methods of using a tape recorder. Edited illustrations to his talk were played on his Ferrograph. The editing perfection achieved by Mr. Willis on his machine seemed incredible to those present, so he explained his success was achieved with judicial use of the pause control.

Nelson Woerner, who uses the same technique, also spoke on his tape exchange experiences, and called upon the support of his Grundig stereo machine. He also gave advice on postal rates for tape mailing. The third machine demonstrated during the evening was a Wyndors Viscount, shown by Charles Wilkinson.

Secretary Mike Brown visited the **York** society during his holidays, extended even further their club contact list. A similar intended visit, to the **Wakefield** club, to see his old friend Mike Storey, was not realised. Says Mr. Brown: "Many of the ambitions of my holiday were not realised, even my Stuzzi remained in its case the whole time." Fancy admitting that!

Latest activities of the club included a visit to the Coventry Herbert Art Gallery on September 14 to a lecture by Fred (Mr. Electronic Music) Judd entitled *Experiment in Sound*, and a talk/demonstration on the *Development of tape recording*, presented by Mr. Bannister at their September 21 meeting.

Earlier in the month Nelson Woerner, Ken Morris and Charles Wilkinson recorded a wedding service and part of the reception, and afterwards watched the local apprentices annual "Rag" procession, where they recorded interviews with some of those taking part. Altogether, a not unsuccessful day.

Having just attained their first birthday, the members of the **Brixton** club have been looking back on their achievements during the year. With meetings held first of all in the organiser's small flat, they soon grew up into a membership of 21 and held meetings in the saloon bar of the White Horse pub in Brixton Hill. Like many of the tape clubs, they have been inundated with requests for assistance by local associations and clubs.

At present membership has decreased to just ten active members, but these have chalked up quite a number of recording successes during the past twelve months, including programmes for a *Tape for the Blind* magazine, with items being produced individually or in groups. They have also produced feature tapes on the Audio Festival, and the Lambeth Festival, interviewed local and national personalities, and recorded concerts by local musical groups and church choirs. In addition to these, and the regular demonstrations and practical sessions at their fortnightly meetings, the members also produce a bi-monthly competition with a silver cup for the eventual winner.

(Continued on page 33)

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STEREO NOTES

(Continued from page 24)

Our music lover, in fact, has developed the subconscious habit of interpreting the monophonic message into an approximation of stereophonic terms and he is seriously disconcerted for some time when he finds that this job is being done for him. The fact that this is being done better by stereo—with all due respects to the musician's memory and imagination—and that it is really more pleasurable and less fatiguing not to have this extra work, cannot compensate at first for the fact that the hearing apparatus is now trying to do the same job twice, in two different ways.

Quite a long period of re-education may be necessary—a matter of several weeks before the adjustment is finally made to the improved conditions.

A penetrating reader may ask if mono plus the imagination of the highly-developed musical mind may not be a superior alternative to stereo. This suggestion is acceptable, I feel, only if we take it to the logical conclusion and decide that the trained imagination is altogether superior, that concert-going is eventually superfluous and that all the apparatus of music reproduction should be passed on to less fortunate souls.

The truth is that music lovers of experience, pretty well to a man, are very grateful for all that properly used high-fidelity equipment can bestow; and those who have taken the time and trouble to adjust themselves to stereo are, in the end, those who appreciate it more than anyone else.

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News from the Clubs

(Continued from page 31)

Recent activities of the **CATS**, the Cambridge club members have also varied. Besides journeying nine miles to an Old Folk's Home, to present some of the club's recordings, they have also recorded two weddings, organised their own autumn exhibition, arranged a film show and begun work on their proposed tape on Cambridge.

Residents of the Willingham Old Folk's Home were delighted to see Chris Lindsay and secretary Mike Renshaw when they went along to present a number of the tapes recorded by members during the past year.

September 29 was the date fixed for their three-day autumn exhibition, and a number of local dealers, as well as manufacturers were represented and organised displays. The members themselves displayed a number of home-constructed items of equipment, and arranged an exhibit which publicised the advantages

of membership of a recording club. Admission was free, and prizes were given for various competitions.

The film show was presented by Wilmex Limited who visited the club on July 12. Mr. P. G. Stenning took along *Objective Perfection*, the Irish Tape film which shows the complicated and exacting process in the manufacture of magnetic tape.

At another meeting, Mr. D. Sleight gave a report on the Radio Show, and compared the quality of a number of recorders, with practical demonstrations. Useful tips on recording techniques were also given, and a number of these were put to effective use on July 5 when the members visited the main line railway station to collect material for their documentary tape on Cambridge. A variety of portable recorders were available to the members, including the only recently announced Philips transistorised machine, and most of the day was spent collecting sound effects.

Another recently formed club has quickly got into the swim of tape club

activities, and have recently accomplished their first "public showing."

The occasion was the **FRIERN BARNET** Summer Show, and the members of the local club were present for two days to demonstrate their equipment and techniques. A *Record-your-voice* stand was also organised.

Practical demonstrations are a regular feature of their meetings, being presented by Mr. F. Inman (recording and recorders), and Mr. J. Neal (splicing).

A competition has been arranged for the best five-minute feature tape. As an added incentive Mr. J. Fulton has presented a Cup, and Mr. Neal, a Plaque. The members are currently preparing their tapes, which will be judged at Christmas.

We publish below the latest list of club secretaries available. It has been compiled from information received from clubs and, where details were not supplied, from our files. Check that your club is correctly mentioned, and advise us accordingly. This list is also being used in our 1961-62 Yearbook.

TAPE CLUB DIRECTORY

ABERDARE: Michael Rogers, 13, Stuart Street, Aberdare, Glamorganshire.
ABERDEEN: Ronald C. Miller, 136, Crown Street, Aberdeen.
ACTION: Dave Wiseman, 8, Woodhurst Road, Acton, London, W.3.
BARNSELY: Eric Clegg, 12, St. Bart's Terrace, Park Road, Barnsley, Yorks.
BATH: K. W. J. Gingell, 9, Norfolk Crescent, Bath, Somerset.
BATH (2): M. Blake, 41, Herbert Road, Oldfield Park, Bath.
BEDFORD: W. Summerfield-Turner, 131, London Road, Bedford.
BELFAST: Mrs. Hazel Jordan, 36, Sandymount Street, Stramillias Road, Belfast 9, Northern Ireland.
BETHNAL GREEN: H. Challer, 82a, Mortimer Road, Dalston, London, N.1.
BIRMINGHAM: D. Brown, 133, Pool Lane, Oldbury, Birmingham.
BIRMINGHAM (2): Mrs. Dawn Knee, 3, Knifersley Road, Sutton Coldfield, Warwickshire.
BLACKBURN: David Birwistle, 7, Manor Road, Blackburn, Lancs.
BLACKPOOL: Miss B. P. Wainwright, "Heathwood," 36, St. Chads Road, Blackpool.
BOLTON: J. H. Graham, 186, Greenmount Lane, Bolton.
BOURNEMOUTH: Mrs. J. L. Lawson, 8, Dolphin Avenue, Northbourne, Bournemouth, Hants.
BRIDGWATER: Miss J. Sharnan, 34, Lakeside, Taunton Road, Bridgwater, Somerset.
BRIGHTON: Ralph Vivian, 37, Ditchling Road, Brighton, Sussex.
BRISTOL: M. E. Hollier, 27, Dean Lane, Southville, Bristol 3.
BRIXTON: R. G. Garrett, 56, Rattray Road, Brixton, London, S.W.2.
BROMLEY: David A. Cornett, 110, Prince's Plain, Bromley, Kent.
CAMBRIDGE: Michael E. Renshaw, 6, St. Vincent's Close, Girton, Cambridge.
CARDIFF: Mrs. R. E. Hill, "Gedrys," Gwaeloy-y-Garth, Nr. Cardiff.
CATFORD: Derek C. Harter, 62, Barmeston Road, Catford, London, S.E.6.
CHESTERFIELD: R. J. Darby, 191 Highfield Lane, Newbold, Chesterfield, Derby.
CLACTON: A. C. Ings, 18, Coopers Lane, Clacton-on-Sea, Essex.
COTSWOLD: Peter D. Turner, Cave Cottage, Oakridge Lynch, Stroud, Gloucestershire.
COVENTRY: L. S. Day, 41, Moseley Avenue, Coventry, Warwickshire.
CRAWLEY: R. C. Watson, 32, Southgate Drive, Southgate, Crawley, Sussex.
DARTFORD: E. H. Foreman, 117, Westgate Road, Dartford, Kent.
DERBY: R. J. Cartledge, 40, Balaclava Road, Derby.
DEWSBURY: Alec Mercer, 31, North Park Street, Dewsbury, Yorkshire.
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DUBLIN: Barry J. Hardy, "Hardy House," 6, Capel Street, Dublin, Ireland.
DUNDEE: Charles W. Aitken, 59, Strathmartine Road, Dundee.

EASTBOURNE: Brian Whittingham, 2, Millstream Gardens, Wannock, Nr. Polegate, Sussex.
EDINBURGH: Mrs. Margaret Evatt, 25, Gayfield Square, Edinburgh 1.
ETESSA: A. C. A. Howard, c/o, Local Room Details — G.P.O. Cable and Wireless — Electra House, Victoria Embankment, W.C.2.
FRIERN BARNET: A. S. Andrews, 13, Hartland Road, Friern Barnet, London, N.11.
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HARROW: Leslie Bouldstridge, 10, Towers Road, Hatchend, Middlesex.
HASTINGS: John Aitchison, 62, Vicarage Road, Hastings, Sussex.
HEREFORD: J. Pegg, 58, Homestead, Putson, Hereford.
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HUDDERSFIELD: George Parks, 175, Newsome Road, South Newsome, Huddersfield, Yorkshire.
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ILFORD: David Bolton, 13, Gloucester Road, Manor Park, London, E.12.
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MIDDLESBROUGH: G. W. Brian Harrison, 27, Tennyson Street, Middlesbrough, Yorks.
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MITCHAM: S. S. Bailey, 41, Manship Road, Mitcham, Surrey.

NORTHALLERTON: C. F. Clegg, 5, Friarage Mount, Northallerton, Yorkshire.
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NORTH LONDON: Richard Collinson, 30, Ridler Road, Forty Hill, Enfield.
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NOTTINGHAM: Brian L. Harris, 40, Chetwynd Road, Bilborough Estate, Nottingham.
PENRITH: Malcolm Leggett, 38, Milner Mount, Scars Estate, Penrith, Cumberland.
PLYMOUTH: John Baker, 8, Brandreth Terrace, Keyham Road, Devonport, Plymouth.
PONTYPOOL: G. A. Owen, 10, Coedcar Terrace, Pontypool, Monmouthshire.
READING: D. M. Noyes, 4, Froxfield Avenue, Reading, Berks.
REDDITCH: Miss Barbara J. Wiggett, 3, Yvonne Road, Crabbs Cross, Redditch, Worcestershire.
RICKMANSWORTH: Len Hart, 2, The Greenery, Rickmansworth, Hertfordshire.
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WALSALL: Mrs. Joan Walford, 41, Mill Road, Pelsall, Walsall, Staffs.
WALTHAMSTOW: Ken Perks, 9, Third Avenue, Walthamstow, London, E.17.
WARWICK AND LEAMINGTON: Miss Eileen Jones, 26, Hampton Street, Leamington Spa.
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TAPE recorder owners who would like to make contact with others of similar interests to exchange news and views by tape are invited to send their name, address, sex, age and special hobby.

It will be assumed that all tape contacts will be made using a speed of 3½ ips, on half-track tape. Maximum spool size only is given.

Allison, Clifford. 3, Robertson Avenue, Edinburgh, 11. Music. Seven-inch spools 3½ ips. Contacts anywhere welcome.

Barrington, Ron (46). 9 Pickford Hill, Harpenden, Hertfordshire. Motoring, Hi-fi, Latin-American and Jazz instrumentals. 7-inch spools. 7½ ips. All tape types anywhere.

Bone, Alan (23). 33 West Road, Avondale, Salisbury, Southern Rhodesia. Motoring. 7-inch spools. 1½, 3¼, 7½ ips, two- or four-track. Wishes to contact enthusiasts anywhere except British Isles.

Brown, Charles A. (33). 23, Edwards Close, Wigmore, Rainham, Kent. Motoring. Seven-inch spools, 7½, 3¼, 1½. Contacts anywhere welcome.

Devitt, David A. (15). 42 Addison Road, London, W.14. Philosophy, psychology, gymnastics, microscopy. 7-inch spools, but prefers message spools at first. 1½, 3¼, 7½ ips. Contacts anywhere welcome.

Edge, Brian (28). Station House, Whalley, Blackburn, Lancashire. Speedway and serious tape recording. 5¼-inch spools. 3¼ ips only.

Howe, John W. (58). P.O. Box 684 Detroit 31, Michigan, USA. Travel. Prefers message spools first. Two-track only. Anyone, anywhere, no need to write first.

Kerridge, Mike (31). 73, Ampleforth Grove, Willerby Road, Hull, Yorkshire. Country, Western and Folk music. Seven-inch spools. 1½ to 15 ips, two- or four-track. Contacts anywhere, particularly battery portable owners.

Madden, William F. (33). 170 Daiglen Drive, South Ockenden, Romford, Essex. Perry Como records. 8¼-inch spools. All speeds, two-track only. Contacts wanted in all countries, particularly New York.

Milling, Peter J. (30). 74, Amhurst Park, London, N.16. Politics, philosophy and psychology. Wishes to contact enthusiasts in England, France and Israel.

Morris, Alan (17). 2 Falkirk Gardens, South Oxhey, Watford, Hertfordshire. Church work (Methodist), and Jazz. 7-inch spools, but message spools preferred. 1½, 3¼, 7½ ips, two- or four-track. English-speaking contacts anywhere.

Pender, Jes. (17). Flat 1, 12, Carlton Terrace, Portslade, Sussex. Rhythm 'n' blues, sport, occultism. 5¼-inch spools, 3¼ ips. Contacts anywhere.

Wade, J. 12 Dewsbury Close, Harold Hill, Romford, Essex. Grammar school boy learning French (not fluent). Football, aircraft, stamps and "pop" music. Wishes to contact French boy learning English.

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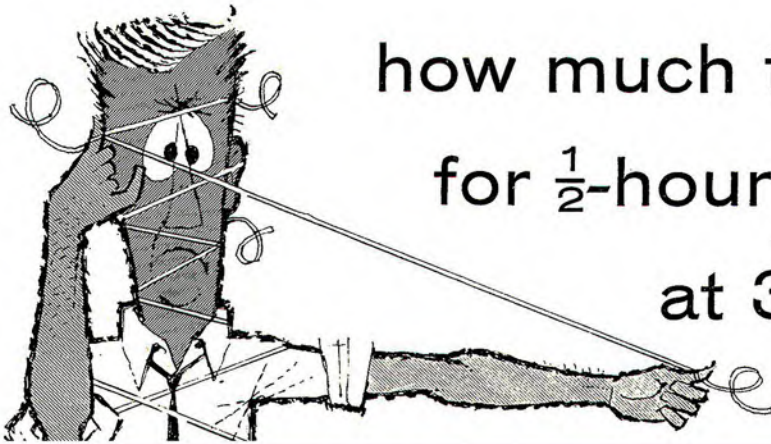
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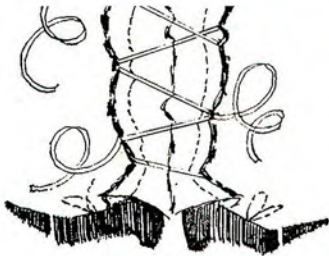
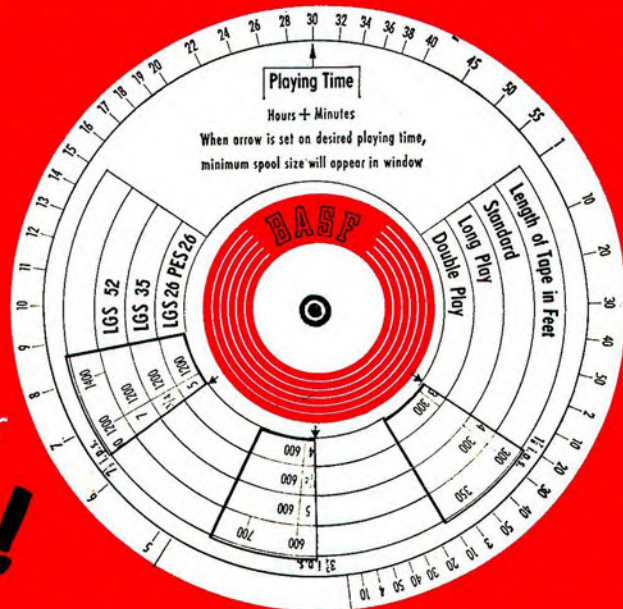
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