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TAPE RECORDING AND REPRODUCTION MAGAZINE

Here's the tape recorder for YOU! says **JACK JACKSON**

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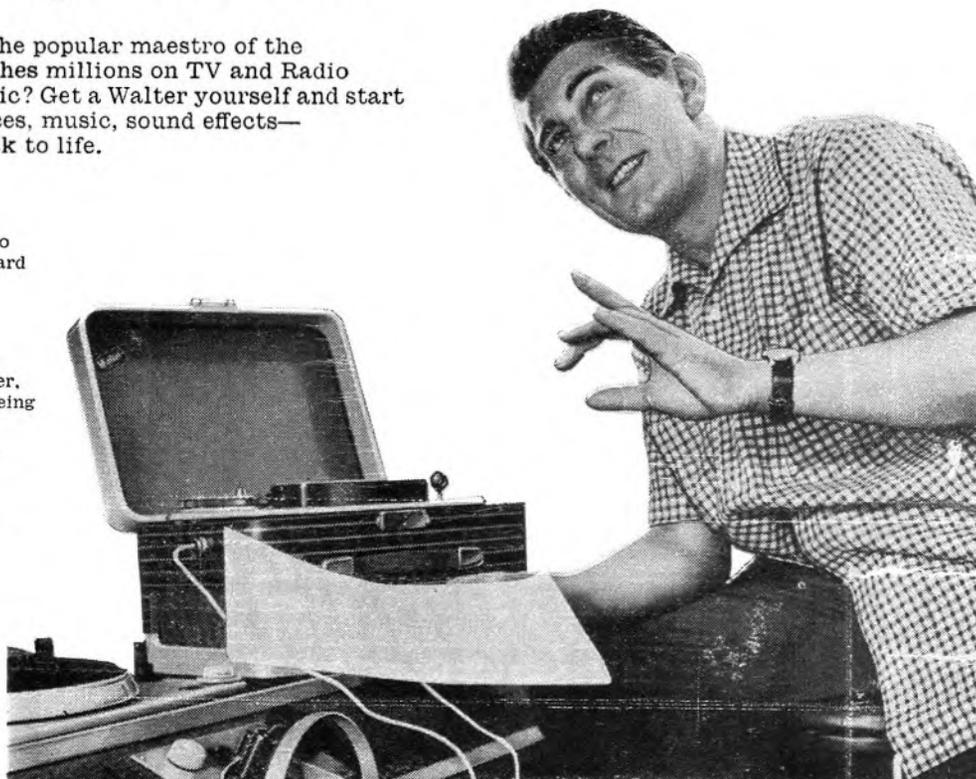
SIMPLE CONTROLS Only two! The 'joystick' (exclusive to Walter) for Record, Play, Fast Forward and Fast Reverse, and the Volume control.

SUPERB QUALITY Full orchestral frequency response (40 to 10,000 cycles). Delivers 3 watts through large (9-in.) elliptical speaker, the maximum volume on playback being enough to fill a medium-sized hall.

MARVELLOUS VALUE The Walter 303 gives you everything you want in a tape recorder, yet it costs only 39 gns. including microphone and 60 min. reel of tape.

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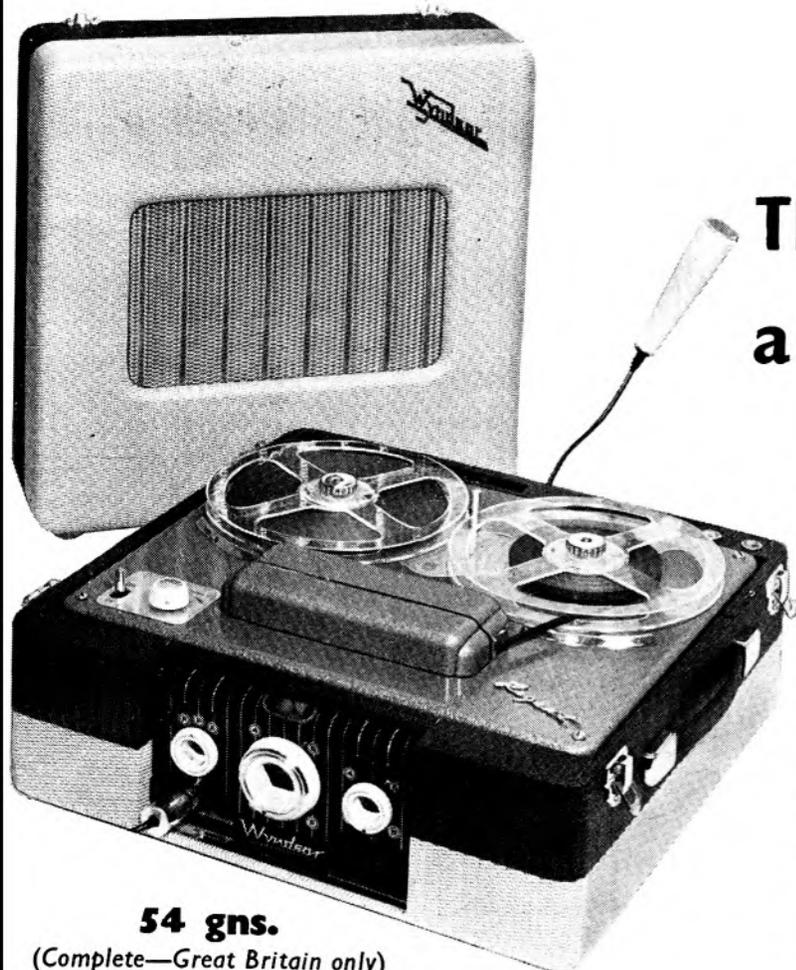
Walter 303



Details from: WALTER INSTRUMENTS LTD. MORDEN. SURREY. Tel. DERwent 4421

BRITAIN'S ONLY PUBLICATION

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54 gns.
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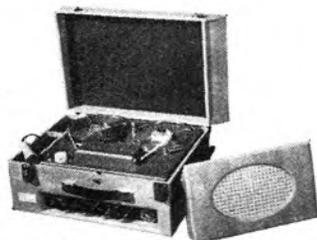
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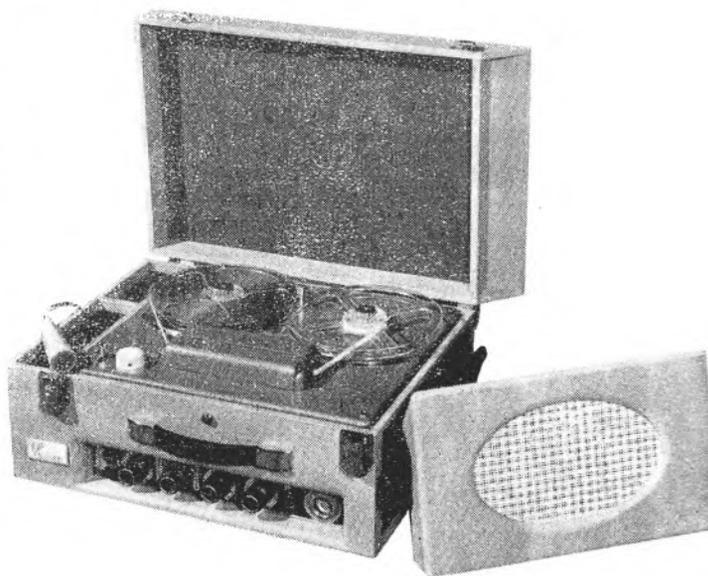
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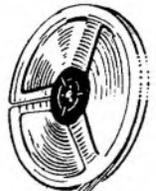
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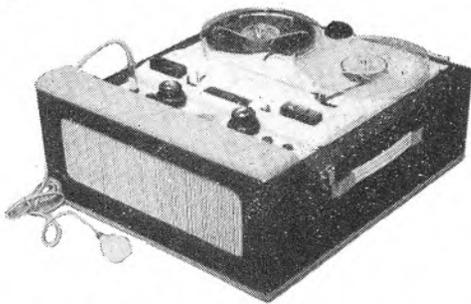
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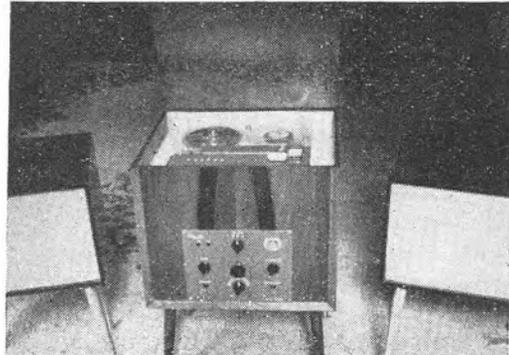
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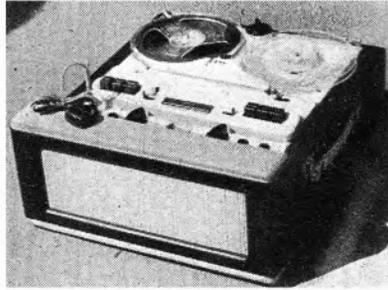
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TR/10/57

NEW RECORDERS

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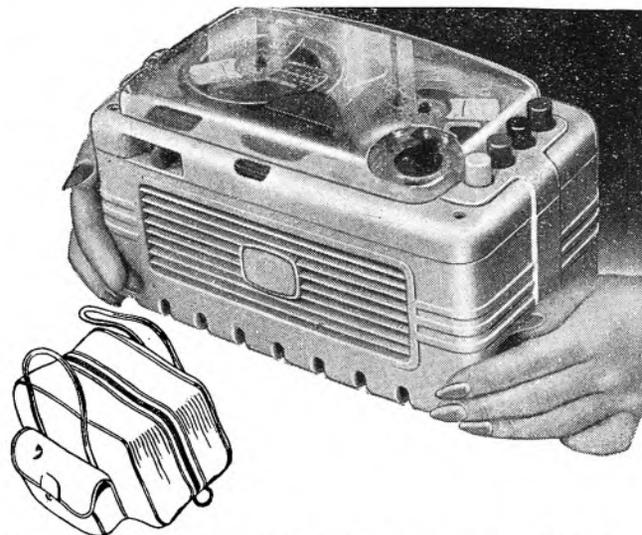
For those who possess a high-fidelity system and, for which, only tape deck is required, the Sonomag Adaptatape is the answer. Simple to instal into your existing cabinet, the Adaptatape costs only 38 guineas and includes the Collaro Mark III deck, pre-amplifier and power pack.

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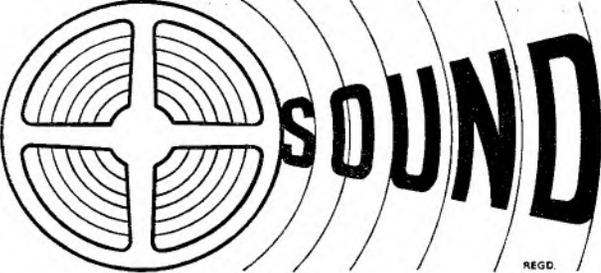
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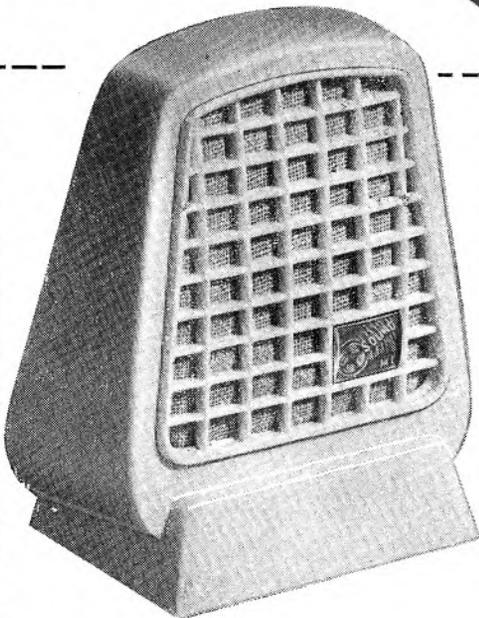
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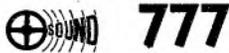
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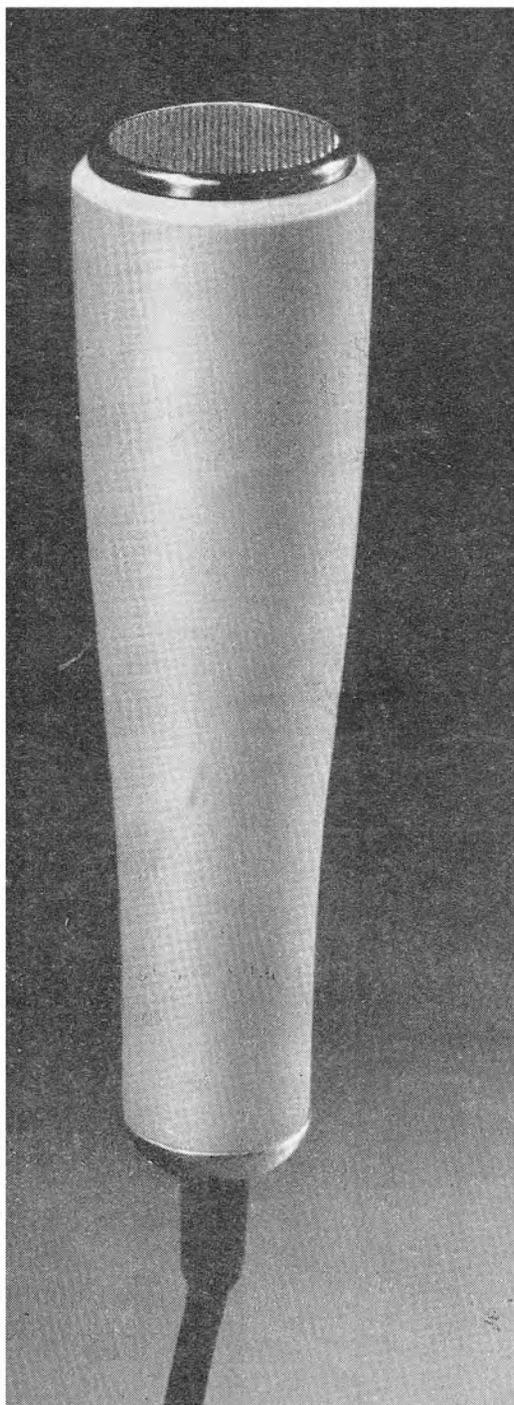
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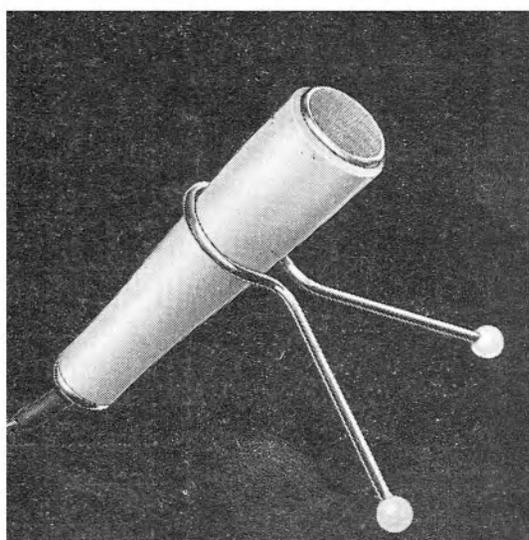
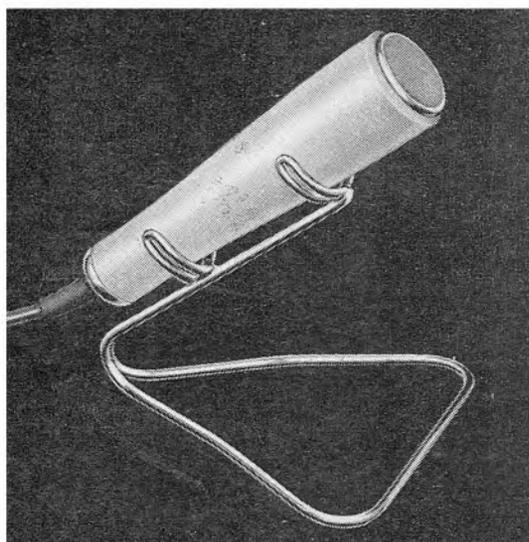
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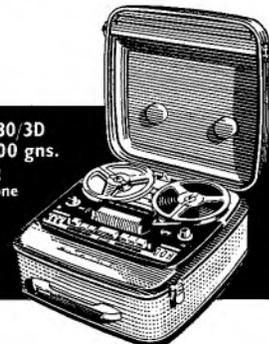
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*reporting on the home, office, factory, school, ciné,
amateur dramatic and musical uses of sound tape*

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Phenomenal

THE RADIO SHOW has put a spotlight on tape recording. This year, at the end of the first exciting decade of tape development, the man in the street has been made fully aware of the new medium. Popular articles have appeared in many newspapers; tape exhibits at the Show attracted extraordinary attention; two of the biggest T.V.-radio manufacturers broke new ground with a radiogram incorporating a tape deck.

These are some of the outward manifestations of deeply significant developments. As *The Times* pointed out, in its special Radio Show supplement, the growth of the Sound Reproduction branch of the industry has been "phenomenal".

In 1950 its output was put at £1,100,000. By last year it had grown to £7,600,000. This year there seems a real possibility that a record £10,000,000 output will be achieved. This represents a fifth of the total output of the industry; the mere figures represent a tribute to the manufacturers' vision and drive.

The export record is particularly impressive; in many parts of the world the quality of these products has played no insignificant part in maintaining the traditional standing of British industry as a whole.

There remains scope for further expansion—and those who are concerned have shown that they have the right spirit.

Helping the newcomer

The tape recorder is such a versatile instrument, and so adaptable to individual requirements and tastes that it is possible to be temporarily baffled when one is faced with the problem of answering in a few words the question of a potential newcomer: "What are those innumerable uses of the tape recorder? Tell me about some of them."

To describe some of the uses to which one puts the machine oneself may be of little help to a person with very different interests, and the inquirer may be equally unimpressed when you simply urge him to buy a machine and see for himself.

In many cases, in fact, the only effective treatment is for the enthusiast to approach the question from the point of view of the inquirer's chief interests and hobbies and to make some suggestions on that basis—if possible demonstrating the ideas on one's own machine.

There is a double advantage in such a service. First, one helps to prevent the drifting away of possible newcomers, and secondly the demonstrations will help the inquirer to decide on a machine that incorporates all the features that are likely to be useful to him.

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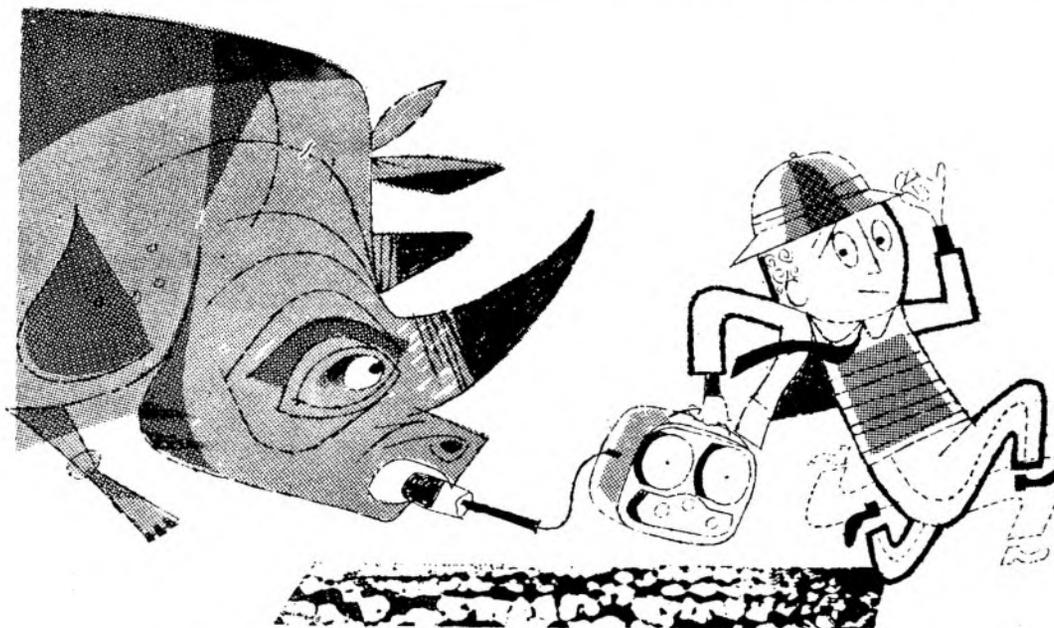
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Full details of Emitape and accessories are available from your local dealer or:—

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TAPE TITTER By ALASTAIR



“ Must hurry! It's got to be in by October 5th ”

ALASTAIR

RECORDING SUMMER IS GOOD FOR YOU

LYING in a secluded Cornish cove—a world of subtle sound pattern, with grasshoppers and bees contributing as much as the stirring stones at the sea-edge—I began to think about the British Amateur Tape Recording Contest, now in its last few weeks.

I wondered how many readers who have been tackling the problem of capturing “Summer 1957” on tape have discovered, as I have while experimenting non-competitively with the subject, that it is not only a considerable challenge to the tape enthusiast, but a great heightener of one’s understanding of the true character of the season. Frankly, I had not previously realised just how much summer, as it presents itself to the average human being, is a matter of sheer sound. One seems to be most acutely aware of its existence, for instance, when one is lying in the sun surrendering oneself, consciously or otherwise, to the galaxy of summer noises near and far.

In the contest, various personal interpretations of the theme will naturally predominate, but I have no doubt that many entrants will have found the incidental attempt to discover and capture the pure essence of summer one of the most fascinating things they have tried.

Of course, one might be drawn so deeply into the pursuit of the ideal that one might, following in the footsteps of Richard Jefferies, find oneself dedicated to the task of making a recording of the sound of grass growing!

HOMO TAPIENS

by *Douglas S. Gardner*

THIS matter of sound consciousness links in a significant way with a discussion I had recently with an expert on relaxation. He assured me that one of the causes of undue tension in city dwellers is their self-defensive habit of shutting out sounds from the conscious mind; and he recommended as a form of compensation, going into the country and deliberately listening to all the sounds that one can detect. Well, plenty of tape recording enthusiasts have been doing just that lately—and it is nice to know that they may have benefited from the work more than they realised.

And, while we are on the subject of relaxing, I can pass on a piece of advice from a Hampstead tape recorder owner. He found that some attempts he was making to achieve complete relaxation were hampered by the fairly obvious difficulty of reading the instructions while maintaining a recumbent posture with closed eyes! Then he thought of his recorder, and the problem was solved. He read the sequence of instructions slowly on to the tape, and after that the process was simplicity itself; he switched on the playback and talked himself into total relaxation.

WHAT really interests me in this idea is its wide potential application. There are many occasions when one wants to perform a series of operations according to written instructions, and when it would be a boon to have one’s eyes and hands free for the job; for example, when learning a golf stroke, developing a film, knitting, setting up a weaving machine, learning opening moves of chess, performing physical jerks, assembling a clock, studying a constellation through a telescope, preparing a dish from a complicated recipe, or learning to use a new camera according to instructions which begin with something like “look for the knurled knob on the right of the shutter release. . . .”

On all such occasions a tape recorder could smooth the way. Sometimes it would be useful to control the timing of the instructions at the record stage, and in other cases use of the stop and start mechanism would be more appropriate.

The only real problem would be when one had to tackle a job covered by the instructions: “How to repair a tape recorder!”

A TEACHING Aids Exhibition, in which the school uses of tape recorders will be demonstrated, is to be held at Crowborough County Secondary School, Sussex, on November 6 and 7. There will be nearly 100 exhibitors. Secretary is H. A. Parks, 52, Framfield Road, Uckfield, Sussex, who has contributed to our pages.

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Books worth reading

TAPE WILL DO OUR BRAINWORK FOR US

THE most spectacular research now going on with tape has nothing whatever to do with reproducing jazz at the fire-side or swapping friendly messages with tape contacts on the other side of the world.

It is the work being done on electronic computers, the machines that are going to do most of our brain-work for us in the years to come. Unless we are careful, they may relieve us of so much thinking, talking and writing that we shall be in danger of forgetting how to think, talk and write.

Most people are only now beginning to learn of the nature of these computers, which were thought about for the first time only ten years ago. But what the boffins in their back rooms have been up to during those ten years is sensational.

And magnetic tape has been a crucial ingredient in their experiments and achievements.

★

The best simple account of this modern revolution comes now in a new Penguin, **Man and Automation**, by L. Landon Goodman (2s. 6d.).

The author tells us of an American milling machine that straddles 20 feet of factory floor and weighs 200 tons, but which goes to work entirely on the directions of a length of magnetic tape.

This is one of the more dramatic examples of the way in which machine tools can be operated by tape, instead of by skilled human beings.

He tells, too, how computers not only handle the most complicated office filing systems, but can actually make decisions; and do it all at prodigious speeds.

Just as humans need brains, nerves, muscles and so on to function, these computers need input, storage, control and processing, and output facilities. The control and processing is provided by masses of valves or transistors, circuitry and so forth, outside the scope of this article. But all the other facilities can be—and often are—provided by magnetic tape.

Information can be fed into the computers on tape—200 characters per inch on 2,400-ft. spools. In effect, instead of slipping a written record card into a file, one records facts in the form of tiny magnetic impulses on a tape.

★

An investigation has recently been made to see if the National Insurance records at Newcastle can be handled in this way. Though big problems have still to be overcome, it is established that all the information now recorded on 190 tons of paper, occupying five miles of shelving, could be carried on 300 reels of one-inch-wide tape.

Now a new technique is being developed, Mr Goodman tells us, so that no human operator will be required to transfer printed information on to the tapes. A "character recognition device" will be able to "read" the printed matter and automatically translate it into impulses on the tape.

Once the information has been fed into the machines, it can be stored on tape, but there are a number of alternatives, such as cathode-ray-tube and magnetic-core storage.

After processing, the results of the computers' calculations can be delivered on tape. These can then be fed into high-speed printing machines, which can print 900 lines a minute.

Readers may also be interested in the latest issue of the popular **Science News**—No 44 in the Penguin series (2s. 6d.). It includes an article on the "First Trans-Atlantic Telephone Cable" and a highly technical contribution about "New Magnetic Materials—the Ferrites".

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National Tape Recording Contest



NOW WE ARE IN THE

CRUCIAL FORTNIGHT

There is just a fortnight left before the closing date for entries in the first British Amateur Tape Recording Contest—organised by TAPE RECORDING MAGAZINE with enthusiastic support from the industry. All tapes submitted must be received at our office by Saturday, October 5.

The panel of judges—Miss Josephine Douglas, the TV star, Mr. Tony Gibson, pioneer of programmes on tape for the BBC, and Mr. Eric Swain, Technical Advisory Editor of this magazine—will then proceed to their task.

They will decide which entry represents the most meritorious effort to record on tape the essence of one individual's experience of "Summer 1957."

They will carefully weigh all relevant factors in reaching their decision—such things as the limitations or advantages of particular recorders used, and imaginative insight shown, the way in which the programme has been put together.

After they have decided the winner, they will pick the three best runners-up, who will receive prizes as shown below. Then they will list the next deserving entrants, who

—in common with the first four—will receive special presentation certificates.

Every tape sent in **MUST** be accompanied by a fully-completed entry form, which can be obtained from TAPE RECORDING MAGAZINE, 426, Camden Road, London, N.7.

No tape must exceed 15 minutes playing time.

If you have not already completed a tape to enter in the Contest, there is still time. Get together the recordings you have made this summer, which in the years ahead will recreate for you the events of 1957. Edit and arrange them, with a linking narrative, to form a coherent feature tape. You may manage the sounds of a holiday on the beach or a farm; but you may be limited to sounds of your children at play, father at work with the lawn-mower, and mother at the sewing machine making sun-suits; or it may be a record of new friends made by exchanges of tape or by short-wave radio activity.

Get to work now—and be a pioneer entrant in the Contest which is going to become an important annual event in British tape recording activity.

PRIZES

We announce this month a further addition to the impressive list of prizes. Simon Sound have kindly offered one of their handsome new "Cadenza" ribbon microphones and Messrs. Film Industries an M.8 mike with L6 desk stand. This makes it possible to award **THREE** second prizes in the Contest.

The full prize list is now as follows:—

THE WINNER:

£10 cash from T.R. Magazine.

£10 worth of tape equipment, given by Messrs. Howard Photographic.

MIC 39-1 pencil microphone, given by Messrs. Cosmocord.

Presentation album of photographs of Contest events on October 25, given by Fleet-Street Photographer Brian Worth.

7-inch spool of tape and membership privileges, offered by the British Amateur Tape Recording Society.

In addition, Messrs. Walters Instruments will give a further £10 cash, if the winning entry has been recorded on a Walter machine.

THE RUNNERS-UP:

There will be three second prize-winners. One will receive the Simon Sound "Cadenza" microphone. The others will get the Lustraphone LFV/H59 pencil-type moving-coil mike, given by Messrs. Lustraphone Ltd. and the M.8 mike offered by Film Industries Ltd.

Then there will be three runners-up, who will receive certificates of merit.

You can be at the finale

WHEN the judges have picked the best entries, the first British Amateur Tape Recording Contest will come to a grand finale on Friday, October 25. For the seven fortunate competitors there will be a full programme of events throughout the day. For every reader of TAPE RECORDING MAGAZINE there will be an opportunity to hear the winning tapes, meet the judges, attend the prize-giving, and join in a pleasant social gathering during the evening.

This will be in the Cowdray Hall, which is in the Royal College of Nursing Building at la Henrietta Place, London, W.1. This is a minute's walk north of Oxford Street at its junction with New Bond Street. The nearest tube stations are Bond Street and Oxford Circus.

Refreshments will be available during the evening, at popular prices. Attendance at this gathering will be strictly by ticket only, as accommodation is limited. If, therefore, you have not yet applied for your tickets, do so immediately. Not more than four can be sent to any one applicant.

Now for the programme for the seven top entrants. Each one, with a partner, will be invited to be the guest of Electric and Musical Industries for the day. They will be picked up by coach at Charing Cross at 9 a.m. and will go to Hayes for a conducted tour of the factory where the famous "Emitape" is made.

They will return to London for a special celebration lunch at the Savoy Hotel.

Then they will go, by coach, to the E.M.I. Recording Studios, where it is hoped they will be able to see a professional recording session in progress.

The coach will then return them to the West End in good time for the evening event at the Cowdray Hall.

This is a programme which no one taking part in is likely ever to forget.

The dark winter evenings are coming. Tape recorders, like their owners, will move away from open windows towards the fireside. These articles provide some ideas for effective and amusing use of tape recordings to add to the fun at a party.



By PETER FIELD

ABOUT a week before the date of a party I was preparing to transfer on to tape a programme of dance music, to last the whole night through, if need be. And that was when I first began to feel deeply grateful for my recently-acquired recorder. Gone was the nightmare of the old disc-only days, with half of the best records unplayed and the two top ones getting slammed on and off for hours at a stretch . . . gone the pile of casualties discovered at dawn under the sofa . . . gone the agony of

racing to prevent more sabotage and confusion at the end of each number, while a charming guest was left high and dry for the predatory swoop of the nearest bore.

Now the sorting could be done in advance, with tunes arranged in a sensible sequence, lengthened or shortened at will, and with the precious old 78's stowed safely out of harm's way when the job was done. And on the night of the party I knew I should be almost as carefree as the guests themselves.

I decided on a musical compromise

between unity and diversity, giving a fairly long session of each type of dance music and switching from one band to another. This was to enable the dancers to settle down to a style they liked, or give up for a while in favour of a session at the buffet. I thought it might also help me to arrange a second or third run through, according to the type of thing that proved most popular. It worked very well in practice.

While I was preparing this tape it occurred to me there should be scope in

STANLEY JEPSON SAYS

"Transferred ideas" will bring laughs

AN average group of people not yet familiar with the ways of recorders can be entertained quite easily by asking them to "guess who" from disguised voices. Until you have tried, you may not realise how hard it is to disguise one's voice; but it can be done most successfully with a little effort.

But don't make them all too difficult. The first few should be easily recognisable as an encouragement. One sentence is enough in each case, followed by a pause and the announcer's "Voice number two . . ." etc. The party can be provided with slips of paper and the interest is heightened if you announce the solution after each voice.



The idea is capable of extension to a church bazaar or similar "local effort." Sixpence a guess, with a small prize, and for an extra shilling the competitor can hear his or her own voice recording for a few minutes. It is surprising how many folk have not yet heard their own voices.

Music played backwards provides another good guessing game. Well-

known pieces should be selected. Some of them, especially organ music, sound quite acceptable!

But one of the best ideas to raise a laugh is what might be called "transferred ideas."

Here is a fair sample. You prepare a few sentences in a separate room on the lines of: "*Here's Lucy Jones, who will tell us how to make a Christmas pudding.*"

The unsuspecting victim is then invited on her own into the room, which is apart from the party, and is told (not on tape): "*Now Lucy, we're going to record your voice and I suggest you tell us what you put into your dustbin.*"

Then, on tape: "*So Lucy, will you just tell us what you put into it?*"

And Lucy says something like this: "*Well, old tins . . . bottles (and of course I'm careful to separate and wrap up broken bottles) . . . ash . . . and, well, any other rubbish.*"

Interviewer: "*In fact, you chuck in any old thing?*"

Lucy: "*That's right . . . but it mustn't all get too wet, of course.*"

Keep your hand on the volume control because Lucy might say "into the

dustbin," which must not be recorded. But you can always erase it before replay.



Other ideas will readily occur. One of the best we had was a young lady describing how she would like to dress for her wedding, but the question she *thought* she was answering was what she would wear on a very hot day to be comfortable and glamorous on a beach.

In another case, the pre-announced title was "How to wash the baby," but the victim was actually asked about washing a car. So he described how he would first hose off the mud, and eventually finish off with a polishing.

A further bright example had a pre-announced title referring to the removal of a tooth in the absence of the dentist. But the person interviewed was asked how he would pull down a tree. So he vividly described hacking it near the base with a sharp axe. What, he was asked, if the root would not come out? He actually volunteered the idea of a tractor and a rope round the stump!



AMPLIFY the Party fun with tape

it for some extra amusement, and I began to try a few interpolations. The idea developed rapidly, and I called in my wife and the bright friends from round the corner. We finally settled for a series of mock commercials designed to "advertise" the individual guests we were expecting—for the amusement of everyone else.

By the time we had done very rough justice to all, midnight was far behind us, but we agreed that no party could ever be more enjoyable than the preparation of this tape had been.

We began each interruption of the dance music with a loud cymbal clash and drum roll to achieve the necessary silence. Then came the plug—short and simple and with just a shade more unctious and false enthusiasm than the real thing.

We were proud of some of the results, but I can assure you that the plugs that caused the most delight on the night were the worst and weakest. Here are one or two samples, purely for reference. They are naturally personal and would amuse only people who know the victims and their weaknesses, but they illustrate the idea.

For a barrister (delivered with earnest sympathy):—

"Do you suffer from superfluous wealth? ... bulging pockets? You can soon be cured. Hire Jim Squire."

For a tall story merchant (with punch):—

"For true baloney... come to Tony."

For a lady named Jill who conducts research at various museums (confidential tones):—

1st voice: *"Jill, dear; where did you*

get that wonderful Egyptian necklace?"

2nd voice: *"Darling, I get EVERYTHING from the V. and A."*

3rd voice (male): *"Open daily from 10 to 6."*

For a language tutor bound for the Middle East:—

Usual cymbal clash followed by slow, rhythmic stick-on-wood beats, then (in dull tones): *"Fred-er-ick,*

Fred-er-ick; good diplomas very quick."

That should be enough to show the potentialities of this particular application of the music-interruption technique. Possible variations are endless: *"Here is a message for...; Stand by for a special announcement... a sense of decorum has been lost... will the finder please return it to John Jones. Please hurry... delay may be dangerous..."* and so on.

If it's a birthday

By JOAN HARPER

SOME of the greatest successes scored by our domestic tape recorder to date have been recordings we've made in advance to celebrate family birthdays, and I can recommend them as fun for everybody. They add to the sense of occasion, and they're appreciated by all ages.

We usually find ourselves adopting a line of humorous exaggeration, and that's a line that should suit nearly everybody.

If I can help to get you started, the rest should follow naturally. Ours usually follow a similar opening pattern—some "pomp" phrases of music, followed by a dramatic announcement of the date and something like "Here's a programme specially devised to mark the occasion of the twelfth birthday of Sally Jane..."

The "programme announcer" can then induce members of the family individually to recite a specially composed poem or song (the worse the better, from the point of view of effect), or otherwise to do honour to the occasion. A "piece of advice" for the year-to-come usually goes down well.

If you have a telephone pick-up you can collect some messages from the "victim's" friends, arranging them to break in at various points of the programme, preceded by the ringing telephone sound effect.

The rest of the programme must go according to talent and inspiration and one's personal knowledge of the recipient. All kinds of sketches and interludes can be devised on the useful "now taking you over" technique.

Perhaps Sally has been given a violin for her birthday. In that case you can "go over" to the Wigmore Hall where "the famous Sally Smith is just about to give a recital." A few ineffectual squeaks are followed by enthusiastic applause and some rapturous comments by the critics.

Or if Sally has just managed to swim ten yards you can set the scene on the beach at Dover to give a commentary on the final moments of her "fantastic channel swim across the Straits of Dover in seven minutes, without water wings."

You can give an excerpt from a recording alleged to have been made at Sally's school, in which the teacher is confounded at her brilliance in a subject which we know to be her worst.

Of course, after all the affectionate leg-pulling, there is bound to be an appropriate note of sincerity, and you'll know best how to introduce that.

In any case, you'll find that preparing such a recording is at least as much fun as having it played to you.

LETTERS TO THE EDITOR

An African holiday

Recording the Victoria Falls

IN your July issue you mentioned you would like to hear from readers who use a portable tape recorder.

For the last four years, whenever I have gone on holiday, I have always taken my portable recorder with me. Consequently I have built up an interesting library of sounds. I use a Boosey and Hawkes "Reporter" and have found it a wonderful machine and I am very sorry to see that these recorders are no longer manufactured. My machine was originally a 3½ ips Travacorder, but, with a little alteration here and there, I have converted it into a 7½ ips.

My latest holiday sound pictures were made only a few weeks ago when I visited the Victoria Falls, in Southern Rhodesia. The recordings include sound pictures made in the Vickers Viscount plane which flew us over to the Falls. There are interviews made with the pilot, co-pilot and communications officer in the cock-pit while we were in the air, and also a very friendly contact with the air hostess. Although a bit noisy, the recordings were very good, the sound of the engine in the back-ground adding to the picture.

Of course, I also got the roar of the

mighty Zambesi as it crashes over the side of the mountain, thus preserving for myself the sound of the world-famous Victoria Falls.

Other interesting recordings I made were of a sea trip up the east coast of Africa, when I visited Mozambique. Here sounds of the foreign cities of Beira and Lourenco Marques were "captured," the peoples of these cities telling us about them and so adding flavour. On board ship, too, I captured the dinner gong and the ship's orchestra, with the background sound of the dancers and the noises at the harbours; the sirens of the tugs, sounds of the cranes and even sea-gulls.

One is surprised how readily people will co-operate when you want to make a recording—in nine cases out of ten, everyone is willing to make your "picture" interesting.

A portable tape recorder now-a-days is as important as a camera when you go on vacation. I dub my sound pictures onto tapes and these I send to my many taping friends throughout the world.

MAX H. NICHOLS.

Pietermaritzburg, Natal,
South Africa.

FITTING A BUILT-IN MIKE

I must take advantage of your invitation to write to you on the subject of portable tape recorders. My machine is a Boosey and Hawkes "Reporter" battery portable.

I am in the process of modifying the machine by fitting a crystal insert into a hole drilled direct into the detachable end, so making it possible for the machine to be put down and switched on, thus picking up sounds going on around it without the need for either a hand-held or platform mike.

The only difficulty I am experiencing is the effective sound-proofing of the insert, to prevent it picking up motor hum, in spite of this being very slight.

Using the standard crystal mike supplied with the machine, speech is produced very well indeed, especially if the tape is played back on good-quality equipment. At 7½ ips, music is reproduced with a considerably better quality than was expected. Vigorous Scots reels of the Jimmy Shand type seem to record best, followed by music in the higher

tone ranges, and vocal pieces. Full orchestral pieces, however, are not really acceptable.

Recording sound effects—the real purpose of the recorder—can produce some excellent results. Trains, planes, buses, etc. give very true results.

R. F. D. SIBBRING
(Pilot Officer)

Officers' Mess, R.A.F.
Hillingdon, Mddx.

WHEN YOU ARE WRITING

The address for all editorial matters is **TAPE RECORDING MAGAZINE, 426, Camden Road, London, N.7.**

But all advertisement communications, including Classified Advertisements, should be sent to **Advertisement Manager, TAPE RECORDING MAGAZINE, 178, Fleet Street, London, E.C.4.**

Continental Competition

AS a resident in Germany, with a fair knowledge of current German tape machines, I am always puzzled to hear or read remarks such as "Continental speeds only" or "German tape direction of record," coming from British enthusiasts.

The Continental Standard is now, and has been for three years, record from left to right, top track, with speeds of 1½, 3½ or 7½ ips.

The most common speed is 3½ and, on the majority of machines, 10,000 cycles is claimed, which I have confirmed on laboratory instruments.

Having recently visited the Hanover Trade Fair and seen the latest recorders on the market, I am prompted to warn British manufacturers to make their products more attractive and pay more attention to weight. They are certainly up against stiff competition from the Germans.

Hoping your magazine flourishes.

C. LUGER.

32 Armd W/shops R.E.M.E.,
B.A.O.R. 32.

NO LUXURY

I LOOK forward to more articles on ciné and tape sound.

The main purpose of my letter is to take friend John E. Amphlett to task for one item in his excellent article on "Making a feature tape." In describing the various, and, as he puts it, essential, tools for editing tape, he says: "... and (luxury!) a tape jointing block."

Now, I ask you, a tape jointing block a luxury! The average tape recorder costs in the region of £60—one can pay over £100 for one. Tape costs some 27s. to 54s. per spool. A really efficient, indeed a precision, jointing block or splicer costs less than £1.

Hardly a luxury. I should say an absolute necessity—and cheap at the price.

FRED W. HOLMES.

Bexleyheath, Kent.

TWIST IT

I READ the problem of M.S. of London, W.9., with interest. I have two recorders, a Grundig 500 and a Grundig 700, and was faced with the "Gabble" effect when playing a tape sent me from Cyprus—obviously recorded on a T.K. Grundig.

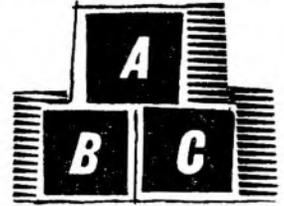
I overcame my difficulty by putting a twist on the tape, and perfect speech came through my recorder.

Two other similar instances I have been faced with when friends asked me to play a tape for them. But not having heard the original, I don't know whether there is a loss of quality or volume when this method is used.

GEOFFREY C. SANDERS.

Sheffield.

The tape-enthusiast's



(Continued from the September issue)

By **ERIC J. LEWIS**

(Sales Supervisor of the Magnetic Tapes Division of Minnesota Mining and Manufacturing Co. Ltd., the makers of "Scotch Boy" tapes)

O

OUTPUT: An electrical voltage coming from an amplifier and normally fed into a loudspeaker.

OXIDE: Microscopically small particles of ferric oxide dispersed in a liquid binder and coated on a tape backing. Red oxide is most common, although a dark green oxide is also used. These oxides are magnetically "hard," that is, once magnetised, they remain magnetised permanently, unless they are demagnetised by exposure to a strong magnetic field.

P

POLYESTER BASE: Plastic film used for magnetic tape. It is very tough and flexible and has outstanding mechanical properties over a wide range of temperatures and, because of its extremely low water absorption, it retains these properties at high humidities and is highly resistant to fungi and bacteria. Although thinner than standard tape it is as strong and enables 50 per cent more tape to be wound on a spool.

POWER AMPLIFIER: An amplifier designed to operate a loudspeaker.

PRE-AMPLIFIER: An amplifier that raises extremely weak signal levels such as those from a microphone, magnetic playback head, of a gramophone pickup to a level useable by the power amplifier. Some tape recorders combine the pre-amp and the power amplifier. Others, especially the tape recorders designed for use in high fidelity music systems, may feature a separate pre-amplifier. In such cases, the pre-amp includes an equalisation circuit. In addition, the bias oscillator (necessary to record on tape) is often mounted in a unit with the pre-amp.

PRESSURE PADS: Felt pads mounted on spring-brass arms which hold the magnetic tape in close contact with the heads on some machines.

PRESSURE ROLLER: Also called "capstan idler." A rubber roller which holds the magnetic tape tight against the capstan by means of spring pressure, to ensure constant tape speed and prevent slippage.

PRINT THROUGH: Transfer of the magnetic field from layer to layer of tape on the reel. Virtually non-existent in high-quality magnetic tape today.

P.V.C. (Pol-vinyl-chloride) BASE: Plastic film base which is tensilised or stretched especially for making magnetic tape. It will not easily break and is suitable for long-term storage.

R

RAW TAPE: A term sometimes used to describe tape that has not been recorded. Also called "virgin" tape.

RECORDED TAPE: A recording on tape that is commercially available. Also called a "pre-recorded" tape or, in the case of music, "music on tape." However, any tape that has been recorded, whether commercially available or not, is called a recorded tape.

RECORDING NOISE: Noise induced by the amplifier and other components of the recorder. High quality magnetic tape itself is inherently noise-free.

S

SELF-POWERED RECORDER: Tape recorder containing its own power supply, either a combination of wet and dry cells to power the unit, or dry cells in conjunction with a spring-driven motor.

SIGNAL-TO-NOISE RATIO: The ratio between the loudest, undistorted tone recorded and reproduced by a recorder and the noise induced by the recording system itself. Normally measured in decibels.

SINGLE TRACK RECORDER: A tape recorder which records only one track on the tape. Usually a full-track recording head is used which covers the full width of the $\frac{1}{4}$ in.

tape although some machines use a narrower, half-track recording head which records a single track down the middle of the tape. Output of a full-track recording is theoretically double that of a half-track recording, although actually the output is only slightly greater because of improved half-track head design.

SPLICING TAPE: A special, pressure-sensitive, non-magnetic tape used for splicing magnetic tape. Its "hard" adhesive will not ooze and consequently will not gum up the recording head, or cause adjacent layers of tape on the reel to stick together. (Cellulose tape should never be used).

STEREOPHONIC RECORDERS: Similar to binaural recorders, but in general the two microphones are positioned differently and loudspeakers positioned apart from each other are used in place of headphones. Normally "stacked" or in-line heads are used, but stereo tapes are also available in America made with "staggered" heads where one track on the tape is used slightly in advance of the other. Stereo tapes made on one system are not suitable for playing on the other.

T

TAPE GUIDES: Grooved pins of non-magnetic material mounted at either side of the recording head assembly to position the magnetic tape on the head as it is being recorded or played.

TAPE LOOP: A length of magnetic tape with the ends joined together to form an endless loop. Used either on standard recorder, special "message repeater" type units, or in conjunction with a cassette or cartridge device, makes it possible to play back a recorded message repetitively without rewinding the tape.

TAPE SPEED: Speed at which tape moves past the recording head. Standard tape speeds for home use are $3\frac{1}{2}$ in. per second (abbreviated in./s or ips) and $7\frac{1}{2}$ in./s. Faster speeds are 15 in./s and 30 in./s. Slower speeds sometimes used are $1\frac{1}{4}$ in./s and $15/16$ in./s. Faster speed makes possible improved high-frequency response, while slower speed means greater tape economy. If a tape is recorded at $3\frac{1}{2}$ in./s, then played back at $7\frac{1}{2}$ in./s, all sounds will be raised one octave in pitch. Cutting the speed in half lowers a tone one octave.

TELEPHONE PICKUP: Type of induction coil device in close proximity to a telephone receiver, or upon which entire telephone may rest, used to pick up both voices during a telephone conversation for recording on tape.

THREADING SLOT: Slot in recording head assembly coverplate into which tape is slipped in threading up the reels for use of the recorder.

TONE CONTROL: Control knob on tape recorder amplifier used to vary bass and treble response to achieve most desirable balance of tone.

V

VOLUME: An acoustic, rather than electrical, measurement, which refers to the pressure of the sound waves in terms of dynes per square centimeter. The louder the sound, the greater the pressure. Most technicians prefer to talk in terms of decibels.

VTR: Video tape recording. Recording and reproducing television picture tube signals on standard, but highest quality, magnetic tape. It is extremely difficult to design a tape recorder capable of handling wide frequency range up to 4 million cycles per second. One method uses several magnetic tracks, recorded side by side on a $\frac{1}{2}$ in. tape at a considerably higher speed than used in home recording, each track recording a certain range of frequencies. Improved quality and lower operating cost are expected to enable it to replace ciné film for television use.

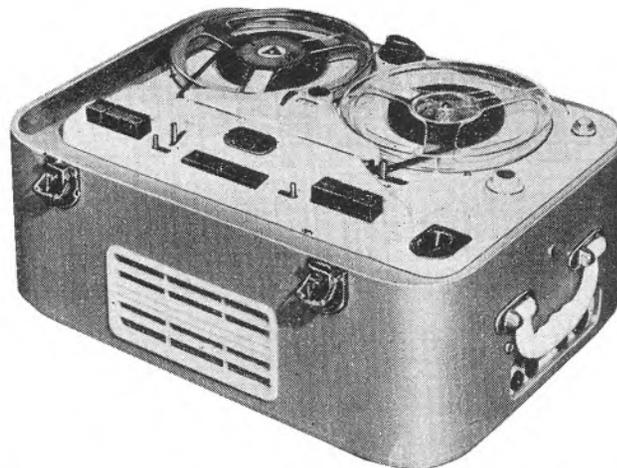
VU METER: A "volume unit" meter which indicates the relative levels of the various sounds being recorded by measuring the electrical voltages.

W

WOW: Slow variations in tape speed causing similar variations in sound volume and pitch not present in the original sound. A form of distortion.

TAPE RECORDERS REVIEWED

**THE
SOUND**



THIS attractive looking recorder is finished in simulated pigskin, with cream speaker fret and handle, and the metal fittings on the case are finished in gilt. The instrument is fitted with the Collaro latest deck, which includes the digital counter to facilitate accurate position location on the tape. The cover plate of this deck, which is made in plastic, is finished in cream and the maroon of the push-button controls makes an attractive contrast.

Three speeds are provided—15, 7½ and 3½ ips. The deck will take up to 7" spools, accommodating 1800 ft. of tape, giving playing time per track of 24 minutes on 15 ips, 48 minutes on 7½ ips, and 96 minutes on 3½ ips.

Twin track facilities are available merely by reversing the direction of movement of the tape by means of a push-button switch, which also brings into operation the record/playback head sited at the correct level for the track selected. This facility of almost instantaneous change of track without the necessity of reversing the spools constitutes one of the major advantages of the Collaro deck.

E. SWAIN

A.M.I.E.E., A.M. Brit. I.R.E.

The deck controls are fitted symmetrically at the front of the deck, the three buttons marked "Fast," "Record" and "Play" which control the operation for the upper track (i.e. with tape moving from left to right) being placed on the left-hand side, while a similar bank of buttons controlling lower track operation (with tape moving from right to left) is placed on the right-hand side. Between these two sets of buttons is a large push-bar marked "Stop;" this of course, operates on either track. A special pause control is fitted, which enables the operator to stop the deck instantly during recording without switching off the motors. This is particularly convenient if one is recording music from the radio and wishes to stop the recorder in order to omit announcements between items of a musical programme. Finally, there is a safety button associated with each set of buttons which has to be operated before the record position can be en-

The makers:

**TAPE RECORDERS
(Electronics) Ltd.**

The size:

**Overall dimensions
18" x 12¾" x 8¼"**

The price:

Fifty-five guineas

gaged on either track. This minimises the possibility of unwittingly switching to "record" position and erasing a recording previously made.

The amplifier is fitted on the right-hand side of the instrument and is provided with a tone control and a volume control; a pilot light and a sensitive "magic eye" indicator completes the amplifier panel. The instrument is designed to work from 200 to 250 volts, 50 c/s supply, and a three-position mains adjustment panel is provided. Two input sockets, one for microphone and one for use when recording from either radio or gram, are provided. A further socket is supplied for operating an external loudspeaker.

On the left-hand side of the recorder a compartment is provided for storage of tape, microphone and mains lead, etc.



I will not give here more than a brief description of the operation of the Collaro deck, as this will itself be the subject of a review in the near future.

The deck is provided with two motors, each of which is dynamically balanced. A large-diameter flywheel is employed, with a ground and lapped steel shaft running on a ball at the bottom of a long bearing. This is claimed to reduce friction and virtually eliminate wow and flutter. Four heads are provided—two

record/playback heads and two erase heads, sited at two levels; two of the heads are for the upper track and two for the lower track. The record/playback heads are both of high impedance and are provided with azimuth adjustment.

An unsatisfactory feature of this deck was the exceptionally long time taken to rewind the tape in either direction. While this was bad enough when rewinding on the lower track, the time taken being approximately 3½ minutes, it seemed to me fantastic when I rewound on the upper track, as the time taken on the recorder under review was eight minutes. The magnitude of the time taken for the rewind on the upper track is such that I feel sure there was a fault on the recorder receiver. The normal time should have been 3½ minutes, as for the lower track. Even this standard of re-winding in either direction must be regarded as unacceptable.

I understand that the deck is now being fitted with a more powerful motor to overcome this fault and reduce the rewind time in either direction to approx. 60 seconds. I understand from the manufacturers that all current models have been so modified.

When engaging the "fast" rewind position on the upper track, a tendency to spill-over was encountered from the supply reel.

The noise from the deck when in operation, while not inaudible, is quite acceptable, and the amount of mechanical vibration is negligible.

The amplifier consists of three valves plus rectifier and "magic eye" tuning indicator. During the recording process the output from the microphone is fed directly into the grid of the first half of the double triode (ECC83) the output of which is taken to the grid of the second triode. The output from the anode of the second triode is fed into the triode section of a triode-pentode (ECL82), the output from which is taken directly to the record head and to the "magic eye" tuning indicator (EM81).

When recording from the gram/radio input socket the procedure is the same, except that the input is attenuated by means of an approximately 100 to 1 potentiometer. When recording, the pentode section of the ECL82 is acting

(Continued on opposite page)

(Concluded from previous page)

as a tuned anode oscillator supplying the necessary bias voltage.

When the playback position is engaged, the triode and pentode sections of the ECL82 are connected in cascade, the pentode section feeding the loudspeaker via the output transformer. Compensation on playback is effected by a feedback network from the secondary of the output transformer to the grid of the pentode section of the ECL82.

The rectifier (EZ80) is of the indirectly heated full wave type, and adequate smoothing circuits give a hum level that is quite acceptable at normal volume control settings.



Tests made on this recorder for both speech and music, no matter whether the input was directly from the sensitive crystal microphone supplied, pick-up or radio, were extremely satisfactory. In fact, the reproduction on the 15 ips position was quite outstanding—particularly when played back on an external loudspeaker. The wow and flutter content for this machine is claimed to be less than .1 of 1 per cent and the quality of reproduction obtained gave no reasonable grounds to doubt this figure.

If there is any criticism that might be made of the reproduction it is that the general background noise tends to be rather high; this is not due to the amplifier as it disappears when the tape is stopped, and the cause possibly lies with the shape of the waveform of the bias oscillator.

It is, nevertheless, my opinion, and the opinion of most of the people who have heard this machine in my presence, that the "Sound" recorder does indeed represent very good value for money and it should offer great appeal to the tape recording enthusiast working within a limited budget.

An outstanding development at the Radio Show was the announcement by T.R. (Electronics) Ltd.—and the prototype on view—of a tape recorder to be marketed shortly at 24 gns. We hope to refer to this model more fully in a future issue.

American Bureau

Our United States bureau—announced last month—is now operating under the direction of Mr. Wm. Farquhar.

For the moment readers wishing to contact Mr. Farquhar are urged to address their inquiries to him via the office of T.R. MAGAZINE, 426, Camden Road, N. 7. They will be forwarded promptly for his personal attention. This will save time and organisation.



NEWS FROM MANUFACTURERS

On the following pages we again report important news from several manufacturers, including a new firm in the tape field. The list is headed by the forty-guinea three-speed recorder described below.

And now the Sound 777 brings price cut

REMARKABLE value is obviously represented by the Sound 777 tape recorder in view of the fact that it employs the most up-to-date Collaro deck with three speeds (3½, 7½ and 15 ips), digital counter and pause control.

Below deck there is a high sensitivity ultra linear amplifier with Mullard miniature valves, giving approximately 3-watts output, and a built-in high flux elliptical speaker. Other features include a magic eye recording level indicator, combined on-off switch and volume control, and sockets for a 3 ohms impedance external speaker. The weight is approximately 30 lbs.

Radio/gramophone connecting lead fitted with screened jack plug is a 10s. 6d. optional extra. Complete with spool of

standard tape and take-up spool, the price is 40 gns., and available as an optional extra at £2 15s. is the new Sound piezo-electric crystal microphone, Type M.1.

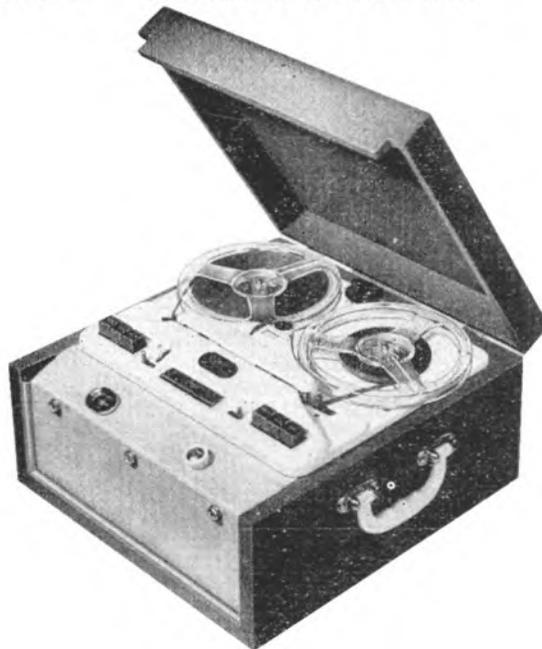
The Sound M.1. microphone is the first of a series of Sound microphones, which will include dynamic types. Housed in a contemporary polished plastic case of the desk or hand type, with lead loaded base for stability, the M.1. is neat but robust. The piezo-electric insert is vacuum sealed, damp proof, precision ground and mounted in a floating foamed plastic suspension.

The makers claim crisp and clear reproduction with remarkable freedom from amplitude, phase and harmonic distortion.

It carries a two years' guarantee.



Although moderately priced, the new Sound 777 is a highly presentable tape recorder, as can be seen from this photograph. It is neat and portable, weighing about 30 lbs. and possesses all the advantages of appearance and performance provided by the latest Collaro tape deck.



RADIO SHOW SURPRISES

R.C.A. OFFER LOW PRICE STEREO

TAPE enthusiasts had plenty to keep them busy at the Radio Show, and there were several surprises. Two of the chief innovations were, significantly enough, in the stereophonic field, and they complemented each other perfectly.

Most of the many hundreds who heard the General Electric Company's demonstration of stereophonic reproduction combined with the G.E.C. Periphonic loudspeaker system must have come away feeling that the margin between this and the real thing is scarcely measurable, and that the only problem is that of finding the £420 to pay for it.

At this point RCA put before us "the world's first add-on stereophonic sound converter." This is a hi-fi tape recorder which can be treated in the same way as any other recorder on a single channel basis, or used in conjunction with the Vice-President hi-fi record player (also usable separately) to play stereophonic tapes. The "converter" is about 69 gns. and the record player about 43 gns., so that stereophonic equipment becomes available for less than £120, obtainable in two "bites".



The demonstration room of Tape Recorders (Electronics) Ltd. was a hive of activity, with the 55-guinea Sound recorder going through its paces together with the new Sound 777 at 40 gns., including Collaro deck. There was also an advance model of a 65-guinea tape recorder to be available soon, with a better amplifier and case than the 55-guinea Sound, four speakers and a moving coil microphone.

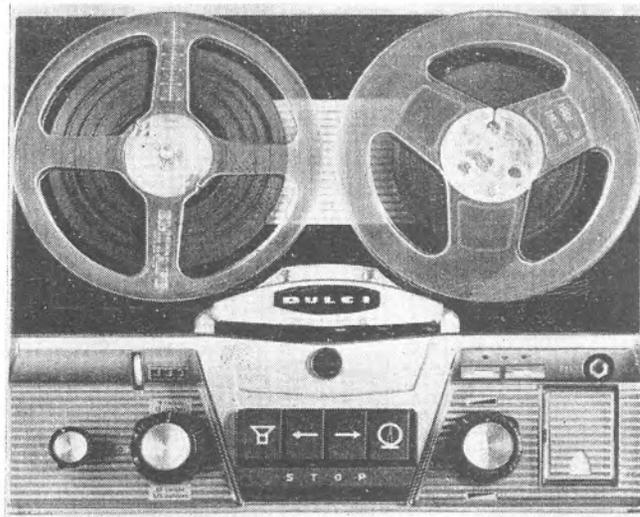
A stir was also caused by the introduction of the "Winston Thoroughbred" by Winston Electronics Ltd.—U.K. distribution by Hobday Bros. Ltd. This is a high quality instrument at a very modest price considering its specification. It gave a remarkably good performance on the stand, and those who know Mr. F. Winston Reynolds and the work of his four research teams at Shepperton will be confident of first-class engineering. (See page twenty-four.)

Several years of research lie behind this instrument, and Mr. Reynolds set himself the task of finding out exactly what tape enthusiasts wanted, and giving it to them. This accounts for the built-in mixer unit with separate volume controls for the two microphone inputs, monitoring facilities, tone control, switch for disconnecting internal speakers and other features. The price, including crystal microphone, is £67.

A great deal of interest was also being shown in the new Elizabethan recorder, originally introduced as the Triple Three but now known as the Essex; the new Baird in its basic portable form and incorporated in an Ambassador console; and in the 110-gns. Portogram TR/100 Console Transcriber tape recorder, with 10-watt hi-fi amplifier, Collaro deck and provision for FM tuner.

Among other new items was a neat mixer unit, the Wessely HF 101, by Lintronic Ltd. It is a four-channel unit, with individual control, priced at 15 gns.

E.A.P. (Tape Recorders) Ltd., have moved into new and larger premises at Bridge Close, Oldchurch Road, Romford, Essex (phone Romford 62366-7), from which production, sales and service are now operating.



DULCI DECK COMING

OWNERS of existing hi-fi systems will welcome the new Dulci-Harting tape deck to be introduced shortly by the Dulci Company Ltd. A recording amplifier is incorporated, together with erase and bias oscillator.

A playback equaliser and preamplifier is also mounted on the deck, so that all that is required is some form of audio amplification. Other features include a numerical position indicator, electronic recording level band indicator, preset bias control and erase cut-out.

This permits bias level adjustment to suit tape characteristics of various makes, and also makes it possible to superimpose new recordings over existing ones. The price of the complete unit is 55 gns.



NEW MIKE FROM LUSTRAPHONE

LUSTRAPHONE have introduced a new ribbon velocity microphone, the VR (illustrated here) of relatively miniature dimensions. It is 5 $\frac{7}{8}$ inches high, with a maximum diameter of 1 $\frac{1}{2}$ inches, and weighs 12 ozs.

The VR 64 is primarily based on the design of the Lustraphone Studio ribbon microphone, and uses the well-proven corrugated aluminium ribbon and ribbon clamping arrangement.

The frequency response characteristic is stated to be substantially maintained up to 14,000cps. The microphone is available with low, line or high impedance.

An automatic swivel mounting permits any positioning to within 30 degrees rearward from the vertical.

Lustraphone have produced a new edition of their complete catalogue of microphones and accessories and readers may obtain a copy from St. George's Works, Regents Park Road, London, N.W.1.

EMICASE FOR EMITAPE

The Emicase

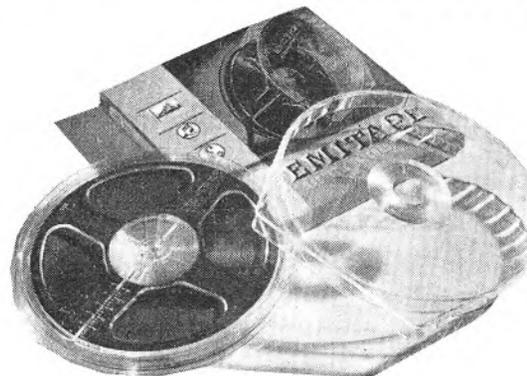
SIMPLIFICATION of tape storage and handling, protection from dust and damage, and rapid identification of titles are the three important advantages achieved by the Emicase introduced as a surprise at the Radio Show by E.M.I. Sales and Service Ltd., the makers of Emitape.

The Emicase is a tough and durable perspex container with a flat base which enables it to be stood upright on a shelf. The leader tape is visible through the perspex so that the spool can be identified at a glance. In operation, the Emicase proves to be noticeably speedy and efficient, with opportunities for fumbling reduced to a minimum both in extracting and replacing tapes.

Emicase containers are available for 5, 5½ and 7 inch spools of Emitape for an extra charge of 2s. 6d.

VALRADIO CONVERTERS

Valradio Ltd. have completely re-designed their popular range of DC/AC Converters, the 60-300 watt type of which is specifically intended for operating A.C. only equipment, such as tape recorders, from D.C. mains, country house plants or from car batteries. The units are now totally enclosed, resulting in quieter operation, and other improvements include the reduction of the stray magnetic field from the transformer so that the converter can now be operated within two feet of the tape recorder.



MAESTROVOX IMPROVE THE MAJESTIC

A Goodmans 10 × 6 elliptical speaker is a feature of the improved Maestrovox "Majestic" tape recorder; other refinements include the provision of 3-watt output, equalisation control and sockets for an extension speaker.

The Majestic employs a Collaro deck and incorporates mixing facilities for record and playback, magic eye, high fidelity amplifier for record reproduction and P.A., record monitoring and feed to power amplifier. The price, including a Collaro studio microphone and 1,200 ft. of tape, is 62 gns.

Stolen Decks

Notification of stolen Truvox tape decks has been received from Phillips and Bonson Ltd., Pond Works, 8, Millfields Road, London E.5. (Amherst 4331 and 8789). Among them are stated to be six Mark IV decks Nos. 024684, 5 and 6, 024283, 024721 and 024695; and four Mark III decks 011954, 011525, 011747 and 011917.

* A Recipe for perfect reproduction

- * ● First design to professional standards.
- Next put the experience of many years of tape recording manufacture into the production.
- Mix in versatility and many new features.
- Ensure brilliant reproduction by a flat frequency response.
- Introduce a multi-speaker system capable of handling the 6 watts output.
- With a little British "know-how" make it simple to use.
- Decorate in contemporary style.

Add a "Cadenza" ribbon microphone for perfection.

Serve complete with microphone, L.P. tape and accessories ready for use at 75 gns.

AUDIO FAIR
HARROGATE
OCT. 25-27

The Sensational ELIZABETHAN "ESSEX"

Yes, a sensational tape recorder in a medium price range. It has everything usually found only in high priced professional machines.

Elizabethan
TAPE RECORDERS

SEND YOUR NAME AND ADDRESS NOW FOR FREE ILLUSTRATED LEAFLET AND FULL DETAILS



E.A.P. (TAPE RECORDERS) LTD.
BRIDGE CLOSE, OLDCHURCH ROAD, ROMFORD, ESSEX.

Telephone: Romford 62366-7

FOR THE TECHNICALLY-MINDED

The makers' specification includes the following details:—

Wow and flutter: better than 0.1 per cent.

Microphone: Omni-directional crystal.

Amplifier inputs: microphone socket—2 mV impedance 0.5 Megohm; gram socket—200 mV impedance 0.25 Megohm.

External speakers socket: 3 ohms impedance.

Frequency response: 50 to 16,000 cps at 15 ips; 50 to 12,000 cps at 7½ ips; 50 to 7,000 cps at 3½ ips.

Oscillator: Frequency to 50,000 cps.

Valve line-up: 6BR7, 12AX7, EL84, 6X4 (American).

THOROUGHbred FROM WINSTON STABLE

ANOTHER new firm enters the recorder field this month—with a machine which carries the bold claim: "more facilities than any existing instrument at less than half the price of its nearest partial competitor."

The firm: Winston Electronics Ltd., of Shepperton, whose earlier products have included the electronic lung, the world's fastest camera, and an automatic monometer for medical use.

The machine: The "Winston Thoroughbred," a three-speed recorder using the Collaro deck, with three built-in speakers, facilities for mixing the input from two sound sources (microphones, radio or gram), and a frequency response of 50 to 12,000 cps quoted at 7½ ips.

The price: £67, including microphone and 1,800 foot spool of tape.

The "Winston Thoroughbred" was shown for the first time at the Radio Show and attracted a good deal of attention.

It is one of the few machines on the market which enables one to superimpose a commentary over a recording from another source or to add musical or vocal accompaniment to a recording of a radio programme, or to make other similar dual recordings.

The Collaro deck provides 3½, 7½ and 15 ips facilities, with double track recording without changing spools, pause control, and counter-type cueing indicator.

There is one 7-in. x 4-in. high-flux PM elliptical speaker, and two 3-in. electrostatic treble units. An additional socket enables a remote speaker to be brought into use, with or without the built-in speakers.

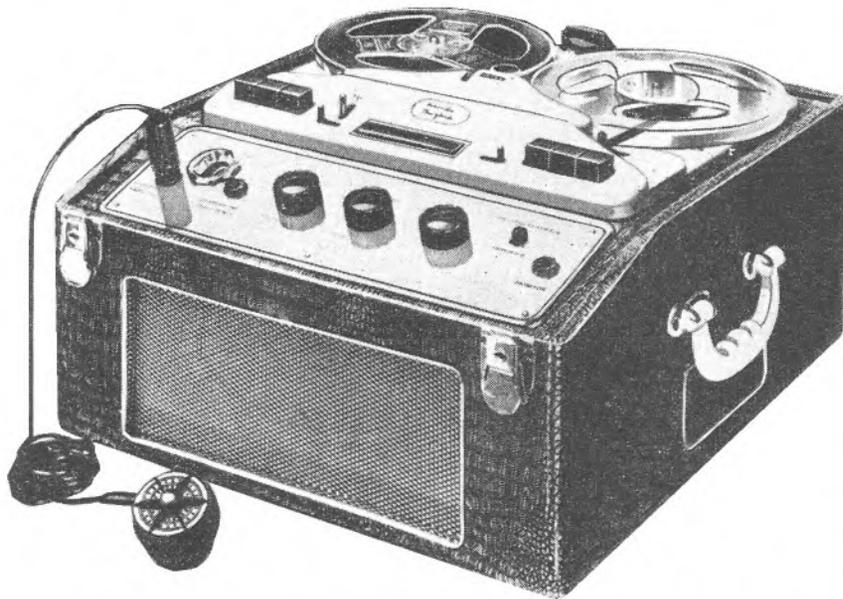
The output of the amplifier is given as approximately four watts. There is a monitor and hi-fi output socket for other amplifiers.

The sloping control panel at the front of the recorder includes:—

1. Socket and circuit for a microphone or radio jack, with its own volume control;
2. Socket and circuit for a microphone or radio tuner, with a separate volume control;
3. Magic eye level indicator;
4. Combined tone control and on/off switch;
5. Monitor jack, to check what is being recorded;
6. Record/playback amplifier switch, which will cut out the motors and enable the machine to be used as a public address system, reproducer for radio or disc player, or for superimposing microphone input on to radio or disc material.

The "Thoroughbred" weighs 48 lb. —"because of the size and robustness of the components," say the makers, who add: "Once an equipment leaves Shepperton, it is hoped that it will never darken the doors again as a maintenance casualty."

Overall size is 17½ x 15½ x 9½ ins. The case is finished in grey crocodile, with gilt-finish lock and fittings. There is a built-in pocket for microphone, mains lead, etc. The instrument control panel, which slopes from the tape deck at 15 degrees is also gilt-finished.



"A complete portable sound studio." That is the claim of the "Winston Thoroughbred". It also claims to possess more facilities than any other existing instrument. The sole U.K. distributors are Messrs. Hobday Bros. Ltd.

Record with magnetic sheet

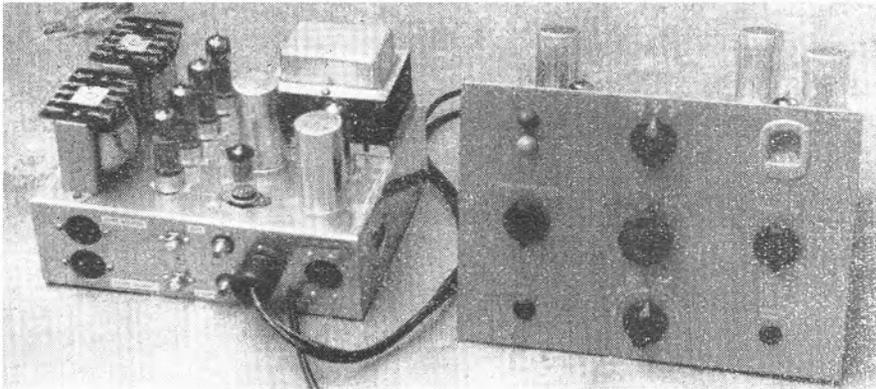
The use of a light plastic sheet as the recording medium is one of the notable features of the Remington Ultravox dictating machine. This material can be filed, folded or posted in the same way as paper, and by using two sheets at a time in the machine a "carbon copy" can be obtained. The sheets are usable indefinitely.

The machine is elegant and particularly easy to operate. It is possible to move from one section of the recording to another more or less instantaneously. Back spacing is uniform and an index strip permits accurate location and the pencilling of notes. Correction is by overspeaking. Other features include automatic volume control, press-button

cleaning of the sheet for re-use, and microphone or foot control of operations.

There are two models. The Executive model, for dictation and transcription, costs £111 10s. 0d., and the Secretarial model, for transcription only, costs £91 10s. 0d. Earsets, foot controls and telephone attachments are extra.

When writing to manufacturers for leaflets or information, please mention that you "saw it in T.R. Magazine."



A NEW STEREO SYSTEM

MAGNAFON LTD. have produced stereophonic equipment designed for use with the Wearite or Truvox stereo tape decks. The system comprises a control unit, a double-power amplifier and power unit, twin matched speakers—and the tape deck.

The deck and amplifiers are normally supplied fitted in a contemporary cabinet to match the speakers, but the various items are available separately.

Using the Truvox deck, the complete system costs £147, made up thus: deck, with leads and plugs, £38 17s.; recording amplifier and control unit, £31 10s.; power amplifiers and power supply, £31 10s.; matching cabinet, £11 11s.; C.Q. senior speakers, per pair, £33.

The recording amplifier and control unit provides for playback; recording from radio, mike or gram (equalised for 78's and L.P.), with monitoring through speakers or headphones, and equalisation switch for the three speeds; and for use as a hi-fi pre-amplifier for radio, mike or gram (separate switched inputs).

Controls provided are: stereo/monitor volume; 9-position function switch; speed equalisation switch for tape; stereo shift control; recording gain; microphone and monitor jacks; magic eye level indicator.

The power amplifier and power supply comprises two independent ultra-linear power amplifiers, giving an output of 10 watts per channel, with frequency response from 30 to 30,000 c.p.s., plus or minus 1 dB. Distortion at 10 watts is stated to be less than 0.5 per cent. The channels are balanced to within 0.5 dB.

The two C.Q. senior speakers are carefully matched and incorporate a moving-coil tweeter. Though these are recommended, other 15-o.h.m. speakers can be used.

The Elizabethan Essex Recorder



THE new Elizabethan tape recorder marketed by EAP, described in last month's issue, has been named the *Elizabethan Essex*. The original name was changed to avoid confusion with another machine. The *Essex* makes a point of its "three speeds—three speakers—three uses."

The price of the *Essex* is 75 gns.

NORTHERN AUDIO FARE

An Autumn Audio Fair is to be held in Harrogate on October 25, 26 and 27. Over ten thousand high fidelity enthusiasts are expected to visit the Grand Hotel, where the Fair will be arranged on similar lines to the popular Spring Audio Fairs in London.

The event is being organised by the same concern and "some special events and lectures" and "new style demonstrations" are among the attractions announced.

Next year's London Audio Fair is to be extended to five days.

I.B.C. SHOW on 28th and 29th

THE International Broadcasting Company is organising the first exhibition of high-quality recording and reproducing equipment to be staged in professional recording studios in London for a number of years.

It will be at 35, Portland Place, London, W.1, on Saturday and Sunday, September 28 and 29—a week after the BSRA Convention—from 1.30 to 9.30 p.m. on each day. Admission is free by invitation ticket only, obtainable direct from I.B.C. at the above address or from Thermionic Products Ltd., Hythe, Southampton, or Lockwood & Co., Lowlands Road, Harrow, Mddx.

This is an exhibition which will be of interest to the more professionally-minded of our readers. Visitors will be able to inspect the studios and equipment, meet the engineering staff, and hear professional-quality recordings reproduced under the best possible conditions. Discs, monaural and stereophonic tapes will be used. Demonstrations will be timed for 2.30, 4.30, 6.30 and 8.30 p.m.

The exhibition has been devised by Mr. Allen E. Stagg, I.B.C. Manager.

The new "Tutor" recorder, being manufactured by the Tutor Tape Company and described in our last issue. Its unusual flat appearance will appeal to many buyers

TAPE FOR TEN YEARS

CAPACITY to meet the estimated magnetic tape demands of the entire world for the next ten years is claimed for the new 3M factory opened by the Minnesota Mining and Manufacturing Co., Ltd. at Hutchinson, U.S.A.

Covering 78,000 square feet, the factory is the largest magnetic tape factory in the world, and it is now working round the clock, more than tripling the American 3M company's former production capacity. Production is still going on at St. Paul.

3M Scotch Boy tape is manufactured in this country by the company's British associate, and also in France.



A second deck for dubbing

"I use a Grundig TK 820 3D and would like to know what additional equipment is needed for dubbing. Can it be done with a tape deck only or does it need a complete second recorder?"

R. P. HART, Farnley, Lancs.

IT is not necessary to purchase a second recorder. The essential items of equipment are a tape deck and pre-amplifier. This pre-amp would have to incorporate lower register compensation to comply with the internationally accepted arrangement of applying top register compensation during recording and lower register compensation during playback. The output from the amplifier could then be fed into the high impedance input socket on your TK 820/3D.

I would suggest that you decide on a tape deck and contact the manufacturer concerned on choice of a suitable pre-amp to match the deck, bearing in mind that, providing you wish to use the deck for purely dubbing purposes, it is not necessary that the pre-amp should incorporate erase facilities.

Adjustment for mains variation

"Can you advise me on the purchase of a tape recorder which can be operated at both AC 220-240 V 50 cycles and, later on, at 110-115 V 60 cycles, either through a change in tappings or adjustments in spindles, or . . . ?"

L. P. PALMERINO, London, W.14.

I REGRET to say that, to my knowledge, there is no recorder in this country which can be operated on both 220/240—50 cycles and 110/115—60 cycles. The trouble lies, not in the voltage range, but in the change of frequency, because, as you are no doubt aware, this would change the speed of the motor.

Your main hope would appear to be in the adjustment of the spindle. If you buy a 50 c/s machine, then it will be necessary to have the spindle turned down on a lathe and then a collar fitted to bring it back to its original diameter; when required to be used on 60 c/s the collar will be removed. This variation in spindle diameter will compensate for variation in motor speed.

ADVICE BUREAU

Queries on all tape recording problems will be answered by our Technical Advisory Editor. Always send a stamped, addressed envelope for reply; only a selection of questions and answers are published in the magazine.

By E. SWAIN
A.M.I.E.E., A.M. Brit. I.R.E.

SUPERIMPOSING ONE RECORDING ON ANOTHER

"I am interested in the purchase of a tape recorder, but I am uncertain of the meaning of 'twin track' and 'mixing.' For instance, I should like to sing and accompany myself on a musical instrument over a previous recording.

"Can this be done with one machine, or is it more complicated than that? Further, how much does it cost to run a recorder from a car battery for outside recording?"

J. KING, Bilston, Midlothian.

IN order to extend the available playing time on a given length of $\frac{1}{4}$ -inch tape, the top $\frac{1}{2}$ -inch is used for one recording and the bottom $\frac{1}{2}$ -inch for another. Thus, the actual length of tape available for recording is twice the physical length of the tape.

To conform with standard British specification, recording on the top track must be with the tape moving from left to right. With some machines, once the recording has been made on the top track, the two spools must be reversed so that what was the bottom part of the tape becomes the top, and again the recording is made from left to right.

On other decks, once the recording has been made on the top track and all the tape wound on to the right hand, or pick-up, spool, change of track is effected by reversing the direction of the tape, i.e., from right to left, and recording on the bottom track by means of an extra head fitted on the deck.

"Mixing" involves simultaneous recording from two or more sound sources. It is unlikely that any particular recorder would incorporate mixing facilities for more than three sources—probably two microphone inputs and one radio or gram input. There are, however, special mixers available for a greater number of inputs. So while it is possible to record from a gramophone and at the same time record on top of the gram signal, it is not normally possible to superimpose such recordings over an earlier one.

The reason is that, on most tape recorders, as you record you automatically erase any earlier recording. You could achieve your objective if your machine was modified to avoid the automatic erasure of previous recordings; this would entail the open circuiting of the erase head at such times as it is desired to record over an existing recording.

This modification, I suggest, you should leave to an engineer. I would put the problem to the dealer from whom you purchase a recorder.

(STOP PRESS: The new Grundig TK830, and other new machines include facilities for super-imposition).

Your second point can be answered briefly. It is possible to operate a recorder from either a 6-volt or a 12-volt car battery by means of a convertor. Suitable convertors are available from Valradio Ltd., Browse Lane, Feltham, Middx. The price is around £10 to £12.

BOOKS ON TAPE RECORDING

"Can you advise me what textbooks are available dealing with tape recording?"

WALTER R. HUXLEY, Chester.

I AM aware of only two books that deal exclusively with tape recording—"Magnetic Recording Handbook," by R. E. B. Hickman (Newnes), and "Magnetic Recording," by S. J. Begun (information available from Thermionic Products Ltd., Morris House, Jermyn St., London, S.W. 1).

There are also the following books on "hi-fi" reproduction which contain chapters dealing with magnetic recording: "Hi-Fi Techniques," by John H. Newitt (Reinehart, New York); "Sound Recording and Reproduction," by J. W. Godfrey and S. W. Amos (Iliffe); "Elements of Sound Recording," by Frane and Wolfe (Chapman and Hall); and "Hi-Fi Simplified," by Harold Weiber (Rider, New York).

The first two I have mentioned will probably best suit your purpose.

THERE is nothing quite like the full blooded music of a mighty theatre organ, and the "Deroy" company, of Little Place, Moss Delph Lane, Aughton, near Ormskirk, Lancashire, has now made available a useful selection of tunes on tape.

This firm specialises in recording theatre organs and the results are available on 850-foot dual-track 7½ ips tapes selling at 50s. or, alternatively, as 12 inch discs at 32s.

Tape enthusiasts will find it a never-to-be-forgotten experience to listen to these high-fidelity recordings, which are of superb quality.

Bryan Rodwell, an organist with a unique flair for playing in the modern idiom, is heard on ADM 38 at the console of the Wurlitzer organ in the Granada at Clapham, playing such well-known jazz standards as *Sweet Georgia Brown*, Duke Ellington's *Sophisticated Lady*, and the Fats Waller favourites *Ain't Misbehavin'* and *When Somebody Thinks You're Wonderful*.

Rodwell uses the pedals as though they were a Double Bass and his improvisation is magnificent. He is a perfectionist. Even when he brings the whole works into play, he never falters and it is sheer enjoyment to hear the organ given the chance to speak with everything it has. The reproduction is such that this mighty sound is conveyed with no distortion at all.

The same high quality is maintained in several other tapes I have heard: Stanley Tudor giving several delightful recitals on the Wurlitzer at the Gaumont, Manchester, Bryan Rodwell at the Wurlitzer of the Granada Tooting; and



Gerald Shaw personally introducing his selections on the huge Christie organ at the Regal-Odeon at Marble Arch.

Here are the details of selections available on tape (on LP disc):—

STANLEY TUDOR

(Organ of the Gaumont, Manchester)

ADM 24: *Powder your face with sunshine; Charmaine; Tell me I'm forgiven; The petite waltz; John Peel Rag; Singing in the rain; Deep in my heart Selection; Love's last word is spoken; three tunes from Can Can.*

ADM 26: *Over the footlights Selection; Memories of the ballet; Swing medley; Flirtation waltz; Song of the trees; Cornflakes; Put your arms around me; Ready, willing and able.*

ADM 30: *Medley of Strauss waltzes; La Golondrina; The King steps out Selection; Coronation Rag; Can I forget you; Buzzing Bees; "Bingo" Crosby Rhythm Hits Selection.*

BRYAN RODWELL

(Organs of the Granada's, Tooting and Clapham)

ADM 36: *Black eyes; Speakeasy; Punch (Puppet suite); Embujo Gitane; Louis; Samum; Harlem Nocturne; Malaguena; Toy trumpet; Valse grise.*

ADM 38: *Sweet Georgia Brown; Don't blame me; Lover; Sophisticated Lady; Aint Misbehavin'; When somebody thinks you're wonderful; Honey-suckle rose; Stars fell on Alabama; Red*

(Continued on page 30)

DON'T MISS THIS—Classic Electrical Co. Ltd.—"BRITAIN'S LEADING HI-FI SPECIALISTS"

SPECIAL OFFER OF TAPE RECORDERS

CLASSIC Britain's LEADING Tape Recording Specialists offer the following selection of Tape Recorders for delivery from stock. Easy terms with no interest charges available. Credit Sale and Hire Purchase terms with FREE INSURANCE, FREE TECHNICAL ADVICE and FREE DELIVERY.

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Brennell Pre-Amp...	18	18 0	2	1 6	C.S. 9 of 41/6
			9	9 9	H.P. 12 of 17/8
Collaro Tape Deck	22	10 0	2	10 6	C.S. 9 of 48/10
			11	5 0	H.P. 12 of 21/1
Collaro Pre-Amp....	21	0 0	2	6 6	C.S. 9 of 46/2
			10	10 3	H.P. 12 of 19/8
Bradmatic Tape Deck	42	0 0	4	13 0	C.S. 9 of 92/4
			21	0 6	H.P. 12 of 39/4
Bradmatic Pre-Amp	75	0 0	8	5 0	C.S. 9 of 165/0
			37	10 9	H.P. 12 of 65/3
Truvox Tape Deck	23	2 0	2	11 5	C.S. 9 of 50/9
Type III-U			11	11 9	H.P. 12 of 21/7
Truvox Pre-Amp	16	16 0	1	17 4	C.S. 9 of 36/11
Type "C"			8	8 0	H.P. 12 of 15/9

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M.S.S. Type	65	0 0	7	3 0	C.S. 9 of 143/0
PMR/DE			32	10 3	H.P. 12 of 60/11
Simon Type SP/2...	65	0 0	7	3 0	C.S. 9 of 143/0
			32	10 3	H.P. 12 of 60/11
Spectone 120 Shop-soiled	72	0 0	7	19 6	C.S. 9 of 159/6
			36	0 0	H.P. 12 of 67/6
Spectone 122 Shop-soiled	58	0 0	6	7 9	C.S. 9 of 127/7
			29	0 6	H.P. 12 of 54/4
Elizabethan '57.....	68	5 0	7	10 1	C.S. 9 of 151/1
			34	3 4	H.P. 12 of 63/11
Vortexion 2A.....	92	0 0	10	3 0	C.S. 9 of 202/4
			46	0 0	H.P. 12 of 86/3
Ferrograph 3 A/N...	82	19 0	9	3 1	C.S. 9 of 182/5
			41	9 9	H.P. 12 of 77/9
Grundig TK8.....	75	12 0	7	11 10	C.S. 9 of 166/3
			37	16 0	H.P. 12 of 63/2
Grundig TK830.....	105	0 0	11	11 0	C.S. 9 of 231/0
			52	10 3	H.P. 12 of 98/5

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NEWS FROM THE CLUBS

THE BATRS has reached almost 400 members, which includes three affiliated Clubs. The target is to double the numbers this winter. Secretary Ted Yates is full of ambitious plans for the future. Given the support, he proposes—in addition to development of the existing Hospital and Blind Services—the issue of four or more types of tape bulletin, pre-recorded tapes of various kinds, a dubbing service, and a sound effects tape library.

As part of the development plans, G-0007 Jack Talling has now become Deputy General Secretary of the BATRS, an appointment made possible by his posting to an R.A.F. station at West Kirby, near the Society's HQ.

Mr. Talling, who was the founder of the British Round Robin Tape-Splicing Circle, has consequently ceased to be BATRS Roving Reporter. This job has been taken over by Mr. Arthur L. Mallory (G-0162/T), whose reports will be heard in the BATRS tape bulletin each month in future.

THE Council of the BATRS has accepted with regret the resignations, because of other commitments, of J. McBaird, Scottish Secretary, and Eric E. Payne, Blind Services Secretary. The latter office has now been filled by Mr. William J. Rawle (G-0217/T), of 12, Glenfield Road, Darlington, Co. Durham.

REGIONAL representatives of BATRS are now being appointed. They are: E. Yates (North Western), F. R. Arnold (West Midlands), R. Holliday (Eastern), S. Jepson (Channel Isles), E. G. Aslin (London), A. D. V. Young (South Eastern).

There are vacancies in eight other regions—North Eastern, East Midlands, South Wales, North Wales, East Scotland, South East Scotland, West Scotland, and Northern Ireland. Names of members willing to take office, pending local by-elections, should be sent to Chester HQ.

INCORPORATED BRITISH AMATEUR TAPE RECORDING SOCIETY (B.A.T.R.S.)

Personal membership 17s. 6d. for 1957. Affiliated membership for public bodies £1 1s.

All subscriptions include a copy of *TAPE RECORDING MAGAZINE* monthly by post

APPLICATION FOR MEMBERSHIP

Please find enclosed £ subscription to the B.A.T.R.S. I certify I am a tape recorder owner and I am over 16 years of age.

Signed.....

FULL NAME.....

POSTAL ADDRESS.....

Age..... Occupation.....

Make of Recorder.....
Speeds: 15/7½/3¾/4.8/1¼ ips

Hobbies/Interests:

I am willing to take part in the B.A.T.R.S. Blind Service (Yes/No)—
B.A.T.R.S. Hospital Service (Yes/No).
This application is no proof of membership.

All Cheques, P.O.'s and Money Orders should be made payable to the Society. All applications for membership/reports/letters or contributions, etc., should be addressed to the Society and not to the individual.

**E. YATES, GENERAL SECRETARY,
210, STAMFORD ROAD, BLACON, NR. CHESTER,
CHESHIRE.**

New BATRS Members This Month

The following new members have joined the BATRS in the past month. Membership numbers are given first, followed by names and addresses, ages in brackets, then recorder speeds, lastly members' two major interests, coded.

- G-0252/T. Raymond A. Berks, 7 Wilmer Cres., Kingston-on-Thames. (28), 7½ and 3½. 74a,b,d, 9.
 ZE-0253/T. Y. M. Young, 1 Apsley Cres., Bradfield, Bulawayo, S. Rhodesia. 7½ and 3½. 42, 8.
 GM-0254/T. Leonard Douglas, Catecune House, Gorebridge, Midlothian, Scotland. (22), 15, 7½, and 3½. 84, 74.
 G-0255/T. James D. Foster, 4 Kent Rd., Atherton, nr Manchester. (29), 3½. 89f, 66.
 GW-0256/T. Walter R. Huxley, "Crompton", Park Ave., Shotton, nr Chester. (51), 7½ and 3½. Model Engineering.
 G-0257/T. George S. Teeling, 17 Albemarle Rd., East Barnet, Herts. (37), 15, 7½ and 3½.
 G-0258/T. Cpl. Donald B. Cooper, 19054287, No. 61p., 52 Squ., 17 Port Trg. Regt., Marchwood.

- Southampton. 7½ and 3½. Modern Music Underwater Swimming.
 G-0259/T. Alfred R. Davis, Cpl. 12 Veh. Dept. wks., R.E.M.E., Elmwood Ave., Feltham, Middx. (45), 3½. 74b, 88h.
 G-0260/T. John A. Fenton-Leader, 5 Rockley Cottages, Cumnor, Oxford. (54), 7½ and 3½.
 GW-0261/T. Glynor Howell, 1 Heol Newydd, Cefn. Cribbwr, nr Bridgend, Glam. (25), 3½, 74, 32.
 G-0262/T. Roy Penfold, 48 Holbrook Lane, Coventry. (36), 7½ and 3½. 8, 13.
 GI-0263/T. William N. Larmour, 3 Farnham Pk., Bangor, Co. Down, N. Ireland. (37), 7½ and 3½. 32, 67.
 G-0264/T. S/Sgt. Roy Hammond, Sgts.' Mess, Technical Training School, R.E.M.E., BFPO 34. (26), 3½. 98c, 50.
 G-0267/T. Maurice Nichols, 53 Sundon Pk. Rd., Sundon Park, Luton, Beds. (30), 3½. 89f, 88e,h,g.
 G-0268/T. Henry G. Burridge, CPO's Mess, H.M.S. Harrier, Haverfordwest, Pembro. (43), 7½ and 3½. 48f, 50.
 G-0269/T. Frederick Todd, 15 David St., Stacksteads, nr Bacup, Lancs. (20), 7½ and 4.8. 74d, 67.
 G-0270/T. Sgt. Ernest Armitage, 646172, 216a A.M.Q., R.A.F., Alhorn, BFPO 25. (36), 3½. 98e, 67.
 G-0265/T. Jeffrey Nutter, Killaspy, North Road, Chesham Bois, Bucks. (23), 7½ and 3½. 74b, 107.
 G-0266/T. Brian J. Watts, Section House, 5 High St., Ealing, London, W.5. (20), 3½. 74, 98c.
 G-0271/T. Alfred A. Sweetland, Beaumont Hall, Greenbank Ave., St. Judes, Plymouth. (40), 7½ and 3½. 67d, 102.
 MO/0505. William C. Eaton, P.O. Box 1967 Las Vegas, Nevada, U.S.A. (34), 7½ and 3½. 35, 40.
 MO/0506. A. L. Toff, 234-19-133 Ave., Laurecton, LI NY, U.S.A. (41), 7½ and 3½. 8, 19.



Tape Enthusiasts

No. 2

DOROTHY STEWART

A glamorous newcomer to the ranks of BATRS is Miss Dorothy A. Stewart, of Bromley, Kent (G-0240/T.)

She shares with her brother—also an enthusiast—a Philips Ag8107 recorder, with 3½ ips dual-track recording. And she likes "chatting on tape," or taping with others in the 19 to 23 age group.

She lists her special interests as ballet dancing, films, music, people, reading, popular records, tennis, and TV.

And we guess she'll be receiving plenty of tapes from other enthusiasts with similar tastes.

MORE HOSPITALS USE TAPE SERVICE

THE BATRS Hospital Service (described in the June issue of *Tape Recording Magazine*) is expanding rapidly.

Two hospitals in the Weymouth area are now covered as a result of an affiliation from Weymouth Toc H branch to the BATRS.

Mrs. Nan Moorman is covering another two in the Nottingham area. Shortly it is hoped there will be an exchange of tape programmes between all these hospitals.

Members of the Society who can help to produce programmes or answer a hospital "S.O.S." call are again asked to contact Alan Lovell, 12, Longmore Road, Ashton, Bristol, the Society's hospital secretary.

Bulletin

MR. ERIC E. PAYNE has now issued the second edition of his Bulletin-on-tape for the blind and has achieved a definite improvement on the first issue, with a variety of interesting material. He has circulated a special overseas edition.

Mr. Payne has now put all BATRS literature on to tape for blind members, and is in process of building up a tape library for the blind.

every inch is tested

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POPS ON SPOOLS

(Continued from page 27)

resin; After the rain; Irish legend; Bach goes to town.

ADM 40: Up with the curtain; If I should fall in love again; Jazz pizzicato; Deep purple; Tyrolean chase; Children's overture (Quilter); King's Rhapsody Selection.

GERALD SHAW

(Christie organ of the Regal-Odeon, Marble Arch)

ADM 44: Gershwin Selection; Berlin in London Selection; Czardas; Come back to Sorrento; Jamaican rhumba; By the sleepy lagoon; Liebesfreud; Grain of Rice; Bela Marques; Sassetti.

ADM 46 and **ADM 48** also contain recordings by Gerald Shaw. A stamped addressed envelope to "Deroy" records will bring fuller details. Organists likely to record for this company in the near future include Reginald Porter Brown, Phil Finch and Bobby Pagan.

The address of Mr. Alan Stableford, new BTRS member whose name appeared last month, is 9, Normandy Terrace, London, E.16.

We regret to record the death of Mr. Martin C. Dinkel, a director of Magnafon Ltd., which occurred following a road accident when he was returning from the Sussex Audio Fair on September 7.

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 Magazine, 178 Fleet Street, London, E.C.4.

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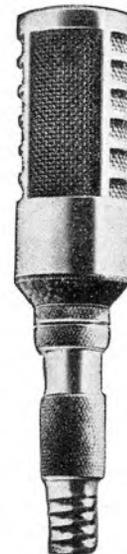
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R. FEINBERG, Dr-Ing., M.Sc.

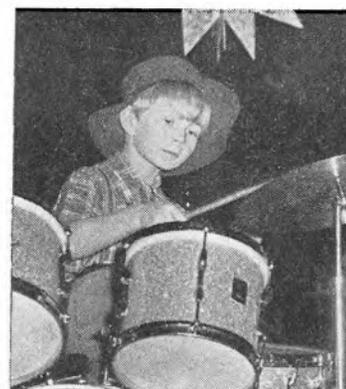
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