

the TAPE RECORDER

PRICE 1/6

MAY 1959
Vol. 1 No. 4



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Angus McKenzie in TAPE RECORDING & HI-FI MAGAZINE

⦿ Sometimes, all too rarely, a product received for review has a quite outstanding performance and is reliable and robust. Such a product is the Simon SP4 . . . It has a superb performance in every way, with not one snag in the way of it . . . Staggering Performance . . . Any owner of an SP4 can be very proud of it. *I feel sure that this machine will go far to establishing a new standard of quality by which other machines will be judged.*

Percy Wilson M.A. in THE GRAMOPHONE

⦿ First-class marks for its comprehensive design, for its cleanness and thoroughness of construction, and for its excellent performance . . . *This is a tape recorder that is outstanding by any standards the world over.*

J. Moir in THE TAPE RECORDER

⦿ The novel features incorporated in the SP4 are generally of great value to the user, and are not gimmicks . . . The Simon machine is not cheap but it has exceptional facilities, a good performance, is undoubtedly good value for money.

J. C. G. Gilbert F.R.S.A., Assoc. I.E.E., M.Brit. I.R.E., F.T.S. in MUSIC TRADES REVIEW

⦿ At last with the Simon SP4, I have found a machine that is not only simple to use, but is capable of producing professional results . . . Has facilities only found in truly professional machines costing £350 and upwards . . . This machine, both in performance and appearance, is unlikely to be superseded for many years.

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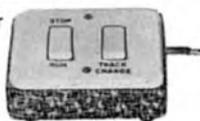
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MODELS

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HOW MANY CYCLES?

From the correspondence we receive it appears that a great deal of importance is attached to the frequency response in its relation to reproduction, generally to the exclusion of the other inter-relating factors—i.e., background noise, harmonic distortion, transient response, etc.

In tape recording a balance must be sought between these factors in order to approach as near as possible to the original sound. The designer must decide at any given speed whether wide frequency response, low distortion or negligible background noise should be given precedence for one can be improved at the expense of the other.

It is generally known that to obtain the best results the bias is adjusted individually on each machine to an optimum level. This implies that a series of recordings are made at some middle frequency, generally 1,000 c/s and the bias current adjusted until maximum output is obtained on playback. The bias is then increased until the output drops by approximately 10 per cent. This is the optimum point at which distortion and background noise† from the tape is at minimum. However, the high frequency output from the Playback Head is attenuated as the bias increases towards optimum; the higher this frequency the greater this effect. It is not known for certain the reason for this attenuation; one theory suggests the bias causes partial erasure, which is accentuated as the bias current increases.

A more plausible answer takes into account that at 7½ in. per second at 7,500c/s a distance of 0.0001 in. between tape and Playback Head results

in a loss of 6db or half the output; this loss is nearly proportional to frequency. Now below optimum bias the surface of the oxide coating on the recording tape is the most sensitive part and no distance loss can occur, subject to the tape making intimate contact with the Head. However, at optimum bias the point of maximum sensitivity or remanence is below the surface of the oxide giving a distance loss. This is borne out by the fact that a thinner oxide coating improves the treble response but with reduced overall sensitivity.

You are by now probably asking what all this boils down to—briefly then, a Playback Head with a very fine gap will not by itself improve the treble range unless:—

1. It is under-biased, which means higher background noise and greater harmonic distortion.
2. Receives large amount of treble boost during record which leads to increased distortion in the treble region, and excessive ringing on the transients.

Finally to see if you really need all those practically inaudible cycles try recording on a really good machine* at 7½ in. per sec. and then at 15 in. per sec. to compare the difference.

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★
EDITORIAL

THIS is indeed a month of betwixts and between. What with Easter and the Audio Fair only a few days behind us, and the threat of a Printing Strike ahead of us, editorial life is, to put it mildly, unsettled. In the event of a strike, we shall of course adjust the subscription cards of all readers, so that they do not lose by missing any numbers of *The Tape Recorder* that we may be unable to produce. Annual subscriptions run for twelve numbers; and any numbers missed would automatically be added on at the tail-end of a subscription. We are by no means taking the gloomy view of this Printing Dispute. There may well be no strike. We hope not. So do the Printing Houses. So do the men. *In fact, no one wants it!* And your remarks are the same as ours . . . "Then what on earth is wrong?" But that is something that no one seems to be capable of deciding, or sorting out. And so we go on. Or do we?

Anyway, to turn to a more pleasant subject, we draw the attention of our readers to our Competition, more details of which are given on page 158. Since the first announcement of this contest in our March number, a great deal of interest has been shown for it in many quarters. Indeed, if the quality of the entries comes up to expectations, this could well be the beginning of something quite big and important in the world of amateur recording. The prizes, so far only announced in terms of £. s. d., may indeed be augmented; and the question of "Tape Oscars" is already under serious consideration. Such things may be premature for discussion here; but we are of the opinion that an entirely new hobby will grow from the production of recorded tapes. Among the thousands of tape users there must already be many to whom the tape recorder is much more than an instrument for casual home entertainment; and this number will grow rapidly as the popularity of tape recording increases. We sincerely hope that readers of this magazine will make the details of our competition known as widely as possible to friends who have recorders. Though the material prizes may indeed be worth the winning, the idea behind the contest can be of far greater permanent value as a new and absorbing hobby.

SUBSCRIPTION RATES

The subscription rate to *The Tape Recorder* is 21/- per annum (U.S.A. \$3.00) from The Tape Recorder, 99 Mortimer Street, London, W.1. Subscription+Index, 24/- (U.S.A. \$3.25).

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COVER PICTURE

OUR Cover photo this month shows the control centre of an experiment conducted recently by the Division of Human Physiology, Medical Research Laboratory, Hampstead, under the Scientific Direction of Dr. O. G. Edholm. The experiment, which lasted six weeks, was designed to demonstrate the beneficial effects of acclimatisation to heat on R.A.M.C. personnel. The apparatus shown was used to control two teams of eight subjects, one team in ambient conditions, and the other in a jungle climate. Instructions to 15 observers were recorded on one tape deck and lasted for five hours. The other tape deck, a gramophone and a wireless set, provided background music for the same length of time. Also shown is an emergency loudspeaker system working off 12 volt supply, allowing observers to contact Controller Major J. M. Adam, R.A.M.C., when necessary. These instruments were connected through the three amplifiers to the 15 loudspeakers which were used. (Photo by J. Carter-Fey).

NEXT MONTH

THIS month we "touch wood" when we say "next month", and we hope that the present trouble, brewing in the Printing Trades, will not boil over into a strike. So, provided that we are permitted to publish a June number, its contents will include final details of our £300 competition: another instalment of Jack Forage's series on *Taking Up Tape*, which will deal with High and Low impedance microphones: another article on the *recording of sounds or sound effects*: the results of our "Tape-Correspondent" contest: a further feature on *Tape and Home Movies*: *Club Notes and News*: *Readers' letters*: *Details of More New Products*: *Reviews of Equipment*—and two more features of Special Tape interest, plus all regular features, and many fine illustrations. Please co-operate with us to ensure regular deliveries of your copy of *The Tape Recorder* by placing a firm order with your supplier.

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The Art of Tape Editing

(2) Editing in the Mind

IN my first article I wrote about the importance of tape editing in the mind, which simply means knowing what you want before you start recording and making the necessary arrangements to help you get it. In that article I wrote about music, effects and the recording of general atmosphere; now I want to tackle a much more difficult subject—editing in the mind while recording the spoken word.

Generally speaking, I think, entertainments made up from heavily edited tape recordings of the spoken word can be roughly divided into five types. Firstly, the straight talk by one person; secondly, unscripted discussion; thirdly, the story, the work, or a single experience of one person, your victim, linked by yourself or a narrator; fourthly, the same sort of piece but bringing in recordings of friends and relations to embroider your central subject; fifthly, a study of one man or one subject as seen through many eyes and spoken of by many speakers.

Five Types of Edited Programme

There is no need to give an example of the first type; the "Critics" demonstrate the second; René Cutforth's series "*Tinker, Tailor*", when he investigated the life and hard times of the eight characters in the old jingle, demonstrate the third; a fairly recent broadcast about Tommy Steele in which his manager, a music publisher and others took part as well as himself, was of my fourth type; and four long programmes I produced with Francis Watson about the life, work and personality of Gandhi are good examples of category five. As the Gandhi programmes included most of the techniques and all the difficulties about which I wish to write, I will concentrate on the part of their preparation which involved editing in the mind.

What we were after was this. We wanted mile upon mile of tape—in the end we had well over fifteen—recorded by friends and enemies, companions, relatives, critics and disciples of their memories and opinions, their praise and their abuse; we wanted all we could get out of them to fit into our pre-determined pattern. This meant a lot of hard homework; before we ever talked to them we had to know what they had inside them and the best approach to get it out of them. We wanted natural talk, not the somewhat artificial speech resulting from reading a script and we knew that we would record far more material than we actually required, for useless conversation may well lead to one or two sentences of illumination on a little-known fact, or bring to light a new one. By patience we would get what we needed.

Linking the Parts Together

Our final object was to link the parts of the recordings that mattered, not only with the narrator in the studio, but with each other—make in fact the four programmes into conversation pieces—live narrator talking to recorded speaker, a record made in London answering or arguing with a recording from New Delhi, a voice in Bombay agreeing with the opinions of one which had spoken in Oxford.

It is, of course, during the recording that the mind-editing comes mostly into action. You have to learn the technique of the unheard interviewer; to put the query in such a way that when the answer



The author is seen here recording the sounds of an oil-rig near Basra. This photograph was taken in 1952, and the recorder is a Ferrograph.

comes it *includes* the question. You learn, too, never to ask for the information or story you really want before you actually record. The first telling is usually the best telling; the second attempt often loses some of the spontaneity and very frequently seemingly unnecessary detail disappears. This detail, even when it seems unimportant in its immediate context, when juxtaposed to other small facts often helps to draw a more penetrating likeness of your subject.

A Long-range Memory is Needed

As you can guess, you have to develop a curious long-range memory which is editing all the time you are at work. "A" may be talking and quite suddenly you remember a sentence of "B's" that he recorded some months before and which links closely and naturally with what "A" is now saying. You sense disagreement perhaps, and ask your question. "No," says "A", "I do not agree . . ." and you know that in your editing "A" can be cut into "B" without the intervening voice of the narrator. With a good and specialised memory of what you have already recorded and hope to record, much of this vocal inter-play can be included in your final script.

Hand in hand with long-range memory goes concentration. The razor-blade can edit fluffs, re-arrange, cut wholesale; it can do a great deal but it cannot change a definite mis-statement of fact. It's easy to miss a mistake, a wrong place-name, an inaccurate date, a simple slip, but it is impossible, very often, to correct those errors if you first notice them at home or in the studio when the recorded speaker is two countries away or in another continent. The time to put things right is when the mistake is made.

Here is an example. A cockney was telling how Gandhi would give him autographs for the children and "at the same time continue with his portable *weaving* machine". "Spinning?", suggested Francis Watson. "Yes, spinning machine", said the cockney. Four simple snips and two joins in the recording tape when editing over a year later and *spinning* replaced *weaving*; the slip no longer existed.

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But, without that quick correction at the time, the whole passage would have been pointless.

So far, I have made three points which I believe to be important when editing with the mind during recording the spoken-word.

One: do a lot of homework and know what you want before you start.

Two: get what you want by asking the right questions which are answered in the way you wish. Or, if the speaker takes a new line which you did not know he knew, follow it if it fits in with what other speakers have said or you expect them to say.

Three: concentrate, not only for the sake of memory but also for quick correction.

There are two further factors that often are forgotten when recording for this type of programme. Indeed, they apply to most of my original categories. They are, *reasonably similar acoustics*, and a *low level of background*, for without these most necessary commodities a final recording made up of extracts from many tapes is disturbing and inartistic.

Let us take acoustics first. If I am working in a B.B.C. studio with static recording gear, helped by a studio-manager to get a good balance, I can forget them. But, you or I, working at home, in an office, a factory or the victim's home, cannot. It may be a small bare room, a huge high room; there may be no soft furniture, no carpet, and painted reflecting walls. Then there will be a quick metallic echo.

The next place we work in may be heavily carpeted, full of arm-chairs, and as a result as dead acoustically as it could be. Then, remember that two recordings made in these very different acoustics and those between these two extremes will ultimately be married in the programme and will be linked to make natural conversation.

If the acoustics vary very much the resultant conversation-piece will be completely unconvincing. I am sure you can hear it already—boom, dead as a door-nail, echo, dead, deadish, a voice in a deep cavern, pleasant acoustic. No, they do not mix and make tidy and satisfactory editing impossible. So, try and achieve a happy mean in the acoustics of the recordings. Do what you can with drawn curtains, blankets taken from beds, a cushion behind the microphone, a soft-sounding side of a room; another room, sometimes even another house. By damping down, or using hard surfaces to enliven you can at least try to get much the same sound from all your recordings. Record tests, listen to them and trust your ears. It's worth it.

The other essential is to record as low a level of background as possible. While on the Gandhi project in India we found this very difficult. Being a hot country the windows are mostly open and in comes the noisy motor hooters of the city, the caws of the crows, the twitter of the sparrows. In a Minister's office the crowd outside laughs and chatters; the patients clamour in a doctor's waiting-room. In the country the grinding engines plonk-plonk-plonk, the birds come into the rooms, the ox-wagons rattle and all these sounds intrude into the sensitive pick-up of the microphone.

I will always remember the heat in a Bombay doctor's consulting room after we had switched off his fan, which hummed, and shut the window to keep out the uproar of the street below; the unavoidable chorus of jackals that backs the last five minutes of the President of India's recording; the crows, kites and children that disturbed the peace of a Polish engineer's room; the chimes of New Delhi's Town Hall that break into a recording by one of Gandhi's secretaries, and, in Kashmir, the cat on the knee of one of the Mahatma's disciples that purred so loudly that we had to wait until it went to sleep.

We were, perhaps, more lucky than skilful in our results but in general we did obtain fairly unobtrusive background to our speakers. It is, I think, obvious why one wants this. While acoustically an echoing voice cut to a dead one only lessens the illusion of two people talking together in the same place, a background of traffic suddenly cut into one of distant birds, utterly destroys it. Develop this further to a mixture of narrator with silence behind him and four or five other speakers with different and heavy backgrounds, all edited together into a short sequence, and the total effect becomes absurd.

The essentials, then, of my own creed in recording the spoken word are these. Know what you want before you start; try and get it; the first take is usually the best although some additions are often necessary; remember what people have said; spot the mistakes in time; study the acoustics; avoid noisy backgrounds and think of the all-over shape of the programme throughout your work. Then, and only then, I believe, will your rough and final editing result in the smooth, natural production you planned.

TAPE AND HOME MOVIES

● This is the first of a regular series of articles devoted to tape and cine. By way of introduction, the author describes adding a sound track from an uncoupled tape recorder.

THE cine enthusiast has a legitimate claim to being one of the earliest users of tape recorders. I remember one enthusiast, in the early 1950's (and the days of the good old Grundig 500L!) who had added a tape transport system to his 8 mm. silent projector. He had extended the feed and take-up shafts to the other side of the spool arms to accommodate the tape reels, and mounted the magnetic head and capstan down by the shutter drive mechanism. It probably worked, but I cannot remember hearing it, as he was one of those many enthusiasts who were more interested in making the gadget than using it. Nowadays we are pampered with a large variety of devices on the market for adding a sound track to the films we have made.

Three Ways of Adding Sound to Film

It is natural for the amateur film producer to want to add a sound track to his film. It is natural for his audience to compare unfavourably his silent masterpiece with what they can see and hear at their local cinema. It is surprisingly easy to do all this with a tape recorder in the home. There are three ways of doing it: running wild; coupling mechanically, and striping the film with the same magnetic oxide material as is coated on the tape running through the tape recorder.

"Running wild" is a professional term for operating two machines, such as a projector and a tape recorder, without any coupling between them, and yet achieving some degree of synchronisation. This is not as difficult as it may seem, as the tape recorder, already runs at a choice of constant speeds, usually $3\frac{1}{2}$ or $7\frac{1}{2}$ i/s. These speeds happen to be as good as equal to 16 frames per second (silent speed) and 24 frames per second (sound speed) on the projector. All that one requires, therefore, is some means to keep the projector at a constant speed. With the 8 mm. G. B. Bell & Howell model 625, and the Zeiss Movilux projectors, to mention two well-known models, this is easy enough, as they are constant speed projectors. The Zeiss Movilux even has three fixed speeds—16 f.p.s., 18 f.p.s., and 24 f.p.s.

The Difficulties of Running Wild

G.B. have introduced the model 625C which has a variable speed control. But there are snags to this system, when used with tape. Perfect synchronisation is not possible unless both projector and recorder have synchronous motors, and very few tape recorders have this desirable feature. However, this is not of very great importance as the machines should run with a fair degree of accuracy. Trouble only occurs when there is a drop in the mains voltage, or when the sound track is recorded in one house, and then played back in another with even a slightly different mains voltage. The other snag that usually occurs is that some projectors have a tendency to speed up once they have warmed up! This is more apparent in the majority of projectors which are fitted with variable speed controls, and there is nothing more maddening than attempting to keep a projector in synchronisation with a tape recorder by keeping one finger on the projector speed control! Usually, the projector slows down, and the sound track goes ahead of the picture. The projector is then speeded up in a vain attempt to catch up with the tape recorder. Before you realise it the picture is ahead of the sound. And so the game of leap-frog continues to the end of the film, with a triumphant blast from the tape recorder as the projector is switched off!

Fortunately, there is one simple device available for keeping a variable speed projector in line with a tape recorder. It is called a



A Specto projector fitted with a "Specto" Speed Controller. This device governs the speed of the projector accurately to 16 f.p.s.

stroboscope, and it can be attached to either the projector or the tape recorder. In either instance the idea is to keep the projector running at the constant speed, as visually indicated by the stroboscope. It requires a beam of light playing on it whilst the machines are running; but this is not so difficult as it may seem. The average projector emits light from the lamphouse top, the side of the gate, and underneath the machine—apart from the lens, which is supposed to be pushing all the available light on to the screen! The 8 mm. Bolex M8R projector has an accessory strobe disc, and the latest models have this feature built-in. There is a gadget on the market called the *Strobe-o-disc* for the modest sum of 35s. 6d., which is intended to attach to most tape recorders. The stroboscope certainly works well, but it suffers from the same voltage troubles as the fixed speed set-up. Also it requires fairly constant attention, and the proud film producer is more interested in watching the screen with his audience.

The Specto Speed Controller

One important accessory now on the market is specifically designed for Specto projectors. Many thousands of Specto projectors must be in use, the basic design has been going strong since before the war. The device is called the Specto Speed Controller, and is attached to the side of the projector. It consists of a fixed speed governor, to run the projector at 16 f.p.s. The projector and tape recorder are not coupled, but should be started at the same instant, with cue marks on the tape and the film. If for any reason the projector and the tape recorder become out of synchronisation, possibly by fluctuations in the mains voltage, there is a remote control which plugs into the speed controller with a temporary speed adjustment. The remote control has two buttons, fast and slow, and after use the speed controller returns to the governed speed. As Specto have found it necessary to allow for a temporary speed adjustment, it is obvious that the system, like the stroboscope and other devices, is not perfect all the time. The logical step is to couple the tape recorder to the projector in some way. I shall deal with the coupling devices more thoroughly next month.

HOW TO RECORD NATURE'S SOUNDS



Hen and cock Curlew change places for egg sitting duties (Photo by Eric J. Hosking)

★Eric Simms first became interested in birds at the age of two and a half. After the war he was a schoolmaster and then, in 1951, came into the B.B.C. to direct natural history recording. He now produces natural history programmes for B.B.C. Schools Television. In addition to making over three hundred broadcasts, he has written four books—the last (with Myles North), “Witherby’s Sound-Guide to British Birds,” was published last November. He is a member of the Council of the Royal Society for the Protection of Birds and of the Department of Ornithology of Cornell University. His main ornithological studies have been into the language of birds but he has also carried out research into visible migration and the bird-life of suburbia.

NOT so long ago the quest for birds only too frequently meant that the ornithologist, pitting his wits against those of the birds, chose to exercise the final sanction—that of death. Bird identification was based on the axiom “*What’s hit is history; what’s missed is mystery*”! Today, the chase has changed its character and the bird watcher devotes his time, effort and patience to catch birds for marking and release, to study their behaviour and displays, to take photographs or cine films, or to record sounds.

There are many factors indeed that help to make bird and animal recording the most glorious sport of all. From 1951 to 1958 I was able wholeheartedly to follow this sport for the B.B.C. and, with recording engineer Bob Wade, to travel many thousands of miles in Britain and Europe in search of new recordings. Among the creatures of the wild, sound is often an important part of their behaviour, and an understanding of the part that it plays in nature adds enormously to our appreciation and understanding.

Recording for the B.B.C. Library

The British Broadcasting Corporation has a remarkable library of natural history recordings and it was my pleasant task to help to increase its range and size. With the aid of microphones and recording apparatus I have been able to study intimately and at close range the domestic life of many animals. Although birds have naturally taken up much of my time, I must not forget the 800 hours spent at night, recording badgers, or the quests for rutting red deer stags, the search for coypus in East Anglia and the recording of stridulating water boatmen or wing-vibrating moths and bats.

Until a few years ago most recording of the voices of the wild was carried out by means of disc-recorders and many fine recordings were made this way. It was clear that there were some disadvantages with disc-recording in the open air, and the drawbacks encouraged Bob Wade and myself to concentrate on the use of magnetic tape. Early in 1951 I made some direct comparisons between the portable-type disc-recorder and a tape recorder, using the output of the same microphones and keeping a constant equal level for the dominant singer—a song thrush. It was found that more birds were audible on the tape than on the disc, and the tape medium consequently gave a natural perspective and depth to the recordings.

Battery-operated Recorder is Preferred

We have used a tape-recorder which is light and portable, with a low power consumption which therefore gives an extended life to the batteries. This recorder has two units and is operated by a 12-volt battery, and we have successfully landed this equipment on small islands for bird or animal recording. In 1955 we made the first

recordings of Sandwich terns on the Inner Farne off the Northumberland coast, and we stayed a week in November of the same year on the Brownsman—another Farne island—to record the grey seal.

This equipment has been taken by us to the Scottish Highlands, as well as many other places in Britain, and over more than 2,000 miles of Spanish roads in search of griffon vultures, azure-winged magpies, great spotted cuckoos and other exciting birds of the Iberian peninsula. By using tapes of half an hour’s duration we have had the advantage of reasonable periods of continuous recordings on a single machine. Two single yet really valuable bird-calls of some seven second’s total duration were recorded over a period of eight and a half hours on the one tape; but to have made absolutely certain of recording these two sounds we would, in the old days, have wasted 115 discs.

Not all my assignments, however, have been suitable for the bigger equipment and so I have taken out a “midget” tape recorder that weighs less than twenty pounds and is completely self-contained. In March, 1952, I carried one of these recorders at low tide from Hilbre Island in the Cheshire Dee to the adjoining island of Middle Hilbre. The two islands were separated by low sandstone reefs which were covered with a black, viscous mud. With the recorder clasped to my chest I slid from reef to reef until I reached firm ground. Then I put up a hide on the rocks and retired within. I was waiting for the tide to come in. Then the sand and mud banks around the island would begin to shrink and then to disappear; and soon, I hoped, the waders of the Dee estuary would come to the higher ground.

Birds Flock in with the Tide

In my little world I made myself comfortable with the recorder at my feet and all the reserve spools of tape conveniently near my hands. The microphone had been placed ten or twelve feet from the hide. Slowly and inexorably the tide came up, and then I heard a roar of wings behind the hide. From a look-out hole in the wall of the hide I could see hundreds of knot circling above the island. Flock after flock began to pour down from the sky in a torrent and there were oystercatchers, dunlin, redshank, sanderling and purple sandpipers joining the knot. Soon the ledge of rock around the hide was carpeted with a grey mass of birds. Four thousand birds were sitting within 40 feet of me! The clamour of bird sounds assailed the ears and stunned the senses, and, when they left, my little recorder captured a sound like that of an express train as thousands of wings began to beat the air.

On one occasion I carried a “midget” recorder some three-quarters of a mile through 3–3½ feet of water to make the first recordings of the wild flamingos in the Rhone delta. I have also carried one to the summits of Scottish mountains at nearly 4,000 feet to record

HOW TO RECORD NATURE'S SOUNDS

By Eric Simms

the beautiful dotterel or the bucolic-noted ptarmigan. These have been great moments in my bird-recording; but so too have been the recording over three years of my own resident blackbird at Dollis Hill in north-west London. To listen to, and to have a permanent record of its development as a performer was most exciting; this is certainly the kind of interesting and yet valuable pursuit that the amateur can follow. Many birds in towns use gutters, roof-tops, and privet hedges as song-posts, and many of them can be recorded with ordinary open microphones, especially in the early morning before the rumble of cars, buses and trains becomes too heavy.

To get acceptable results the equipment must be up to the job, for the frequencies of many bird sounds are high, and both microphone and recorder must be able to cope with them.

Use of Parabolic Reflector

Bob Wade and I have employed the dynamic, or moving coil, microphone with our tape recorders, but the use of parabolic reflectors has increased the pick-up of sounds coming from the direction in which the reflector is sighted. We believe that we were probably the first to use this device for recording birds in the British Isles. The principle is quite simple; sound waves hit the curved surface of the reflector and are then reflected to a focal point just in front; at this focal point is a dynamic microphone facing the bowl and with its back to the source of sound.

The use of reflectors, clear of nearby reflecting surfaces, has greatly increased our success. Their great value has been in the way we have recorded birds at long range; this has meant absolutely no disturbance to the birds which have gone about their affairs in an entirely natural way. We have brought birds in inaccessible places within satisfactory recording range: a little crane calling deep in a Camargue reed-bed, courting shoveler in the middle of a Norfolk lake, kittiwakes nesting on a sea-cliff, a mistle-thrush eighty feet up in a tree or pink-footed geese flying 1,000 yards away. It was not until August 1954, that swifts, screaming in flight, were recorded, for previously there had always been a drop in pitch as a fast-moving sound-source passed a fixed microphone. Reflectors have allowed us to track birds in flight and so to overcome this difficulty.

We have been using two types of reflector—one with a diameter of eighteen inches, and the other of three feet. With the bigger of the two we have recorded many birds in flight, including rooks and jackdaws at 200 yards, geese at 1,000 yards and a cuckoo at 420 yards. In many cases the smaller reflector has proved more convenient and easily carried, and with its aid we have made many recordings. In May 1957, we hauled 1,800 feet of cable up a cliff-face to an eyrie of the golden eagle; at the top end of the cable I fixed the small reflector to a rocky ledge some seven feet from the nest and pointed it at the centre of the eyrie. The level of the incoming "cheeps" from the eaglet and the rarely heard barks of the adult was such that we were able to reduce it and so to lessen the atmospheric background which was to be expected on a cliff-face some 2,600 feet above sea-level.

For work at the nest we have often used a reflector some distance away, or an ordinary microphone concealed nearby. A pair of stone-curlews in Suffolk chose to nest on some stony ground, and laid two eggs in a shallow scrape from which the largest stones had been removed. I put an ordinary microphone three feet from the nest and covered it with some pieces of coarse turf. As soon as the cable had been connected, I concealed the first few feet of it under more turf and walked back to the recording truck. In this way recordings were made of the very low level conversational notes of the adults at the nest.

On the next day I removed a large black stone from the edge of the scrape and substituted the microphone for it. Just after ten o'clock one May morning we listened with amazement and fascination to very faint vocal sounds coming from inside one of the shells—a shell

that we knew was still unbroken! Our tape recorder faithfully captured for us this unique recording, and we also succeeded in obtaining the sounds of the complete hatch with the shell cracking as it fell apart.

We have also on occasion used a light-weight pack-set transmitter and receiver with a built-in battery power supply. This has saved us the use of cables and has also greatly increased the effective range. We have recorded wild geese where the range between reflector and recorder has been some three-quarters of a mile, and we also recorded snow buntings in Norfolk over a distance of one mile—three times the maximum distance we had ever reached with cables. From the gallery of the Dungeness lighthouse I have broadcast the calls of migrating waders, thrushes and goldcrests at night to a recording car half a mile away. I have also sometimes gone on a roving commission with a transmitter, unhampered by cables, and in constant radio contact with the recording vehicle.

However, careful field observations and the study of the subjects are essential to success, whatever pieces of apparatus may be available. Such success may come by anticipating the actions and behaviour of the birds to be recorded, but the element of chance still remains—the sudden rainstorm, the passing aircraft, the rattling goods train, the persistent silence of the subject! Patience and determination are perhaps two of the prerequisites of the bird-recorder.



The author (left) with James Fisher shows a penguin on TV

It is important, too, to remember that at all times the welfare of the birds comes first, and this is especially important during the breeding seasons. There is much still to be done in this field and great enjoyment to be gained in the quest for more and more faithful recordings of the sounds of nature.

RECORD NEWS

MONTHLY 1/6d.



● Look for *Record News*, with its "pillar-box" red cover, and its full colour photo illustration. The above (April) cover is a reproduction of porcelain figurines used on a recent DGG sleeve. The May cover is of *Cherry Blossom* in Regents Park.

RECORD NEWS is produced by the same Editorial Office as *Hi-Fi News*, *The Tape Recorder*, and *Hi-Fi Year Book*. It is the world's most outstanding review magazine for works from the Classical Repertoire. Finely produced and illustrated throughout, it is a reliable guide for all discerning record buyers.

SUBSCRIPTION RATES

The subscription rate to *Record News* is 21/- per annum (U.S.A. \$3.00) from *Record News*, 99, Mortimer Street, London, W.1. Subscription+Index, 24/- (U.S.A. \$3.25). Send 6d. Stamp for free Specimen Copy.

CLASSICAL RECORD NEWS LIMITED
99 Mortimer Street, London, W.1

£300 COMPETITION

● First details of our Competition were published on page 115 of the April number of this magazine. Next month, full entry details will be given, together with an entry form which must be completed and returned by contestants.*

Summary

BRIEFLY, this is a competition in Music—the new type of music that is built up from basic sounds, and put together by the manipulation of tape recorders and electronic circuitry. Such music is well established on the Continent of Europe, where it is styled "*Musique Concrète*", and is already in wide use in this country in T/V shorts, and in the cinema and in radio as background music for Science Fiction, etc. It has been described, with examples, on the new BBC programme "*Sound*". It will be described still further, for the benefit of competitors, in "*The Tape Recorder*", June and July numbers.

What you have to do

IN order to keep a subject of boundless possibilities within bounds, the requirements of this competition are that entries shall be limited to tapes of 2-minutes duration. They can be less, but not a second more. Further, to keep the subject matter in channels which will ensure all-round fairness, and also simplify judging, we are setting five alternative subjects, which are given below. Apart from these limitations, there are no restrictions; and ingenuity, imagination, artistry, clever use of equipment, and good workmanship will be the factors which the judges will consider.

The basic sounds may be taken from any source, so long as no copyright is infringed. They may be musical notes, backwards, forwards, clipped or changed in speed, they may originate from a dripping tap, a motor horn, a rustle of leaves, or chopped up words—in fact, anything. Help yourself to the sounds that surround you!

The Subjects

The subjects selected for the contest are:—1. An interval signal for a radio station. 2. A sound track for film or T/V, advertising Holiday Camps or Foreign Travel. 3. A "Theme" for use in part (or parts) of an X certificate Science Fiction film. 4. Sound track for advertising a new detergent. 5. A composition intended to be listened to for its own sake, not as an accompaniment.

Notes for Contestants

YOU may begin right away, basing your experiments on the above details. There will be two classes of entries, and the same subjects apply to both. **Class 1** is for entries made on one machine. **Class 2** is for entries made on two or more machines. Group entries (for schools or clubs) can be submitted in either class. The final date for the receipt of entries will be October 7th, 1959.

* In the event of a possible printing strike, which might affect the publication of a June number, final details of the competition, together with a numbered entry form, may be obtained from this editorial office on receipt of a 6d. stamp or postal order. Apart from this emergency, no correspondence covering the competition can be entered into.

ENTRY FORM NEXT MONTH*



Mr. Jeffrey Langley, a clerk from Ilford, Essex, and a fellow student from the Tape Recording course held at the Rose Bruford training college interviewing boys and girls in Sidcup Place during the "Opinion" programme field trip. The recorder in use is a Stuzzi Magnette. (Photo by Page)

A New Kind of Course in Tape Recording

IN the week after Easter—from 31st March to 4th April—residents of Sidcup in Kent must have thought they were living through an invasion. Altogether 50 people interested in tape recording attended the special "Tape Recording Course" at the Rose Bruford Training College, and their activities included rounding up the local inhabitants—"for questioning". It is true the invaders were armed with nothing more lethal than a dozen or so portable tape recorders, and they carried giant-sized visiting cards assuring interviewees that their co-operation would "further the advance of learning", or some other "strange device". Nevertheless our Technical Editor, John Borwick, reports that habitués of a certain Sidcup Café frequently found a microphone pointed at their heads, and it was impossible to feel completely safe even in the "Railway Hotel".

The basic aim of this course was to give practical advice on using tape recorders to compile documentary or dramatic programmes. More than half of the 50 attending were connected with education—either as school-teachers or college lecturers. Not surprisingly, therefore, the terrific value of tape recorders in schools was emphasised.

Geoffrey Hodson, special courses organiser of the Rose Bruford Training College is to be congratulated on planning and running the course so successfully. In order to bring the groups down to more manageable numbers, and introduce a lively spirit of competition, he divided the students into two groups of 25, and everyone had a go at each type of production.

"Opinion" was the name given to a controversial programme about topics of the day. For this, the students were instructed to go out and interview a "significant cross-section" of people in the district. The final programmes were compiled from edited parts of these "mobile" tapes, interwoven with an organised and partly-rehearsed discussion in the Studio. All the editing and other tasks were performed by the students themselves, and I. W. Jarman, who contributed the popular series of articles on "Tape Splicing", was in attendance.

A magazine type programme was put together by each team, entitled "Come with Me". This set out to evoke the atmosphere of a particular locality, by means of a scripted narrative linking together a number of recordings made on location. Three well-known types of battery-operated portables were used for this exercise—the EMI L/2, Fi-Cord, and Stuzzi Magnette. In addition to the above assignments, students were given a Topical Magazine Item—at very short notice—to go out and record.

While all these outside activities were going on, other students were busy on a full-scale studio drama production. The script chosen was a 15-minute play with a fairy-tale atmosphere. It told of a demobbed Russian Soldier, in the time of the Tsar, who acquired a magic nose-bag and a magic pack of cards. He used these to rid the Tsar's palace of a horde of devils by first beating them at cards and finally making them

NEWS PAGE

jump into the bag. A surprisingly high degree of acting talent was discovered amongst members of the course, and the producers Tony Gibson, Geoffrey Hodson, and Desmond Briscoe were able to create recordings of near professional standard.

Classroom work included lectures, illustrated by tape recordings, on "Getting People at Their Ease" by Tony Gibson, and "Getting Sounds at Their Best" by John Borwick. Other sessions were devoted to "Tape Editing", and "Choosing Equipment".

To wind up the course, the various recorded programmes were played back for criticism. George Dixon, Senior Producer of BBC School Broadcasting had been invited to attend. He made a number of friendly comments on the recordings, and struck a nice balance between compliments and constructive criticism.

New Factory for Tape Recorders (Electronics) Ltd.

OWING to the increased demand for "Sound" Tape Recorders, Tape Recorders (Electronics) Ltd., have taken possession of a third factory in the Wingate Estate, Tottenham, N.17, which is now in production and will enable not only a larger production of all models, but also a faster turn round of service and all other facilities.

They also announce that the price of the "Sound" Screened Jack Plug designed to reduce pickup from external sources, formerly 4s. has been increased to 5s. owing to the increased cost of distribution, etc. Trade and preferential discounts remain the same as before and manufacturers are invited to apply for bulk quantity prices.

A Fi-cord in Action for the B.B.C.



B.B.C. commentator Bob Danvers-Walker about to be hoisted 100 feet in the air over Notting Hill Gate by a crane operating on a new building site recently. While aloft he taped a commentary on a miniature Fi-Cord recorder (strapped to his chest) for transmission on the B.B.C. programme "Roundabout". (Fox Photo)

SIMON SOUND SERVICE LIMITED announce the appointment of the following Sales Representatives: Mr. John R. Merrick will cover the Midlands area and Mr. James W. Tant the South and South-West of England. They will be introducing themselves to Simon Dealers in the areas concerned shortly after the London Audio Fair.

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BUILD THIS 3-WAY

MIXER

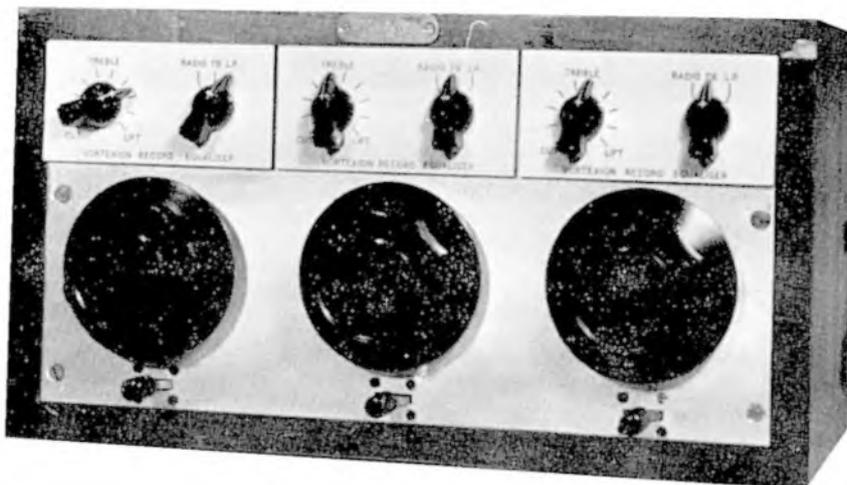


Fig. 1. The author's 3-channel mixer. The three sets of knobs along the top are for the record equalisers and below them are the large knobs for the mixer itself. Directly beneath each mixer knob is the key switch which selects either the "programme" or "cue" output for each channel.

IN one way this particular mixer is unusual, since it was designed to mix the outputs from three turntables instead of the usual three microphones or so. In actual fact the original idea was to experiment with my own record programme, largely for the fun of it, and in order to have something to play over to any friends, who invariably showed curiosity in my recorder when they came to visit. Since the principle of this particular mixer is much the same as a normal microphone mixer, the construction of it may prove of use to anyone else contemplating building one.

Equalisers are Optional

The wiring diagram shows the basic circuitry. If the record equalisers are eliminated (the small passive variety manufactured by *Vortexion*), the circuit becomes that of a simple microphone mixer, suitable for use with high-impedance microphones. Alternatively, you can use low-to-high impedance matching transformers in place of the equalisers. The connections for one channel are shown in the inset diagram, the other two channels being identical.

The number of combinations is limited only by the needs of the recordist. The inputs are fed to the top ends of 100 K ohm potentiometers, and since only very low levels occur in this mixer, I found it desirable to use high-quality cracked carbon pots instead of the

usual volume control, the idea being to reduce tracking noise as much as possible. The resistors connected to the sliders of each control were also high-quality for the same reason, the value being 250 K ohms.

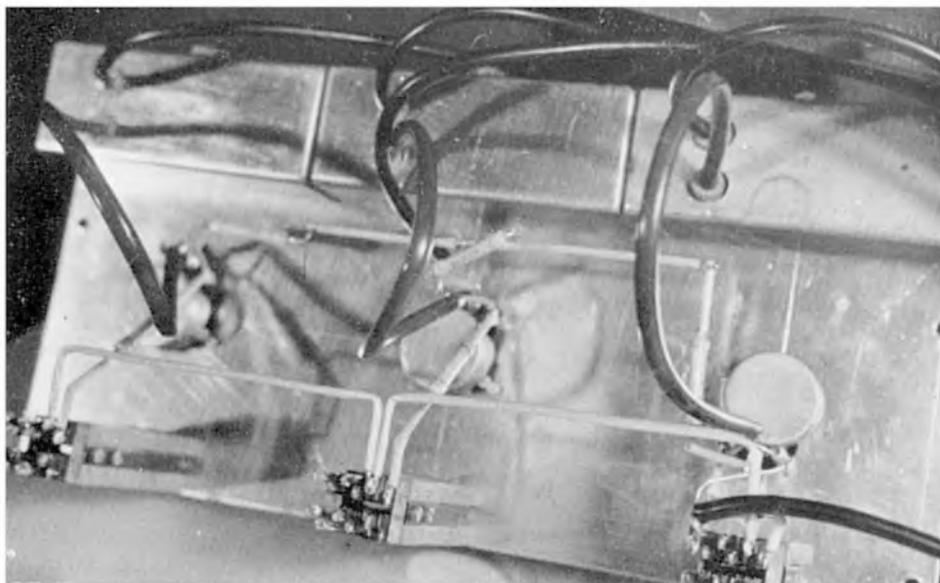
At this point a word is in order about the values of the components used. These particular values were carefully chosen to allow as little loss as possible while still keeping the crosstalk between channels to a minimum. If the reader wishes to build a similar mixer he might find it desirable to increase the values somewhat up to a maximum of 1 megohm for the controls and $\frac{1}{2}$ megohm for the isolating resistors, particularly if he plans to eliminate the equalisers and use crystal microphones.

Switched Outputs for Pre-listening

One feature not usually found in microphone mixers of this type is the alternative or "cueing" output. Each input can be switched either to the main output or to the "cueing" output, and since the switches are ahead of the level controls for each channel, the level of any particular source can be faded down altogether, the switch thrown and the source heard on the "cueing" output without anything being recorded. In my own case, I fed this second output into a small pre-amplifier which was used to drive a pair of headphones. Should the reader find he can do without this feature, the switches

Fig. 2. (Right) An interior view of the mixer showing the simple construction. The metal covers along the top edge enclose the record equalisers, the input and output cables being brought out through holes cut in the back of each cover to allow closer spacing of the covers.

Fig. 3. (Opposite) The circuit diagram is easy to follow, and may be modified according to the types of input required. For example, crystal microphones may be substituted for the pickups by merely omitting the record equaliser units. The inset diagram shows the connections for one channel, when low impedance sources are to be used, such as moving-coil or ribbon microphones. The appropriate step-up transformers may be wired into the mixer chassis.



BUILD THIS 3-WAY MIXER

By John W. Berridge

A "DO-IT-YOURSELF" FEATURE FOR CONSTRUCTORS

and the second output can be eliminated without detriment to the mixer.

Equalisers Mean a Loss of 20 dB

Calculation showed that the loss of the equalisers was about 20 dB each, and the insertion loss of the mixer circuit a little over 4 dB per channel, a total of 24 dB from any one input to the output. Crosstalk between channels proved to be a little high at only -30 dB but was sufficiently low not to prove particularly disturbing when a recording was played back. A loss of 24 dB could be serious in some applications. However, I use crystal pickups with an output of 100 mV. Thus the output from the mixer is still a little over 6 mV, this being enough to drive the microphone input of my recorder which is sensitive to 5 mV. If no equalisers are used the overall insertion loss becomes very much less and the reader should have no problems in obtaining an adequate recording level. The usual figure for the insertion loss for a microphone mixer of this type is 7 dB.

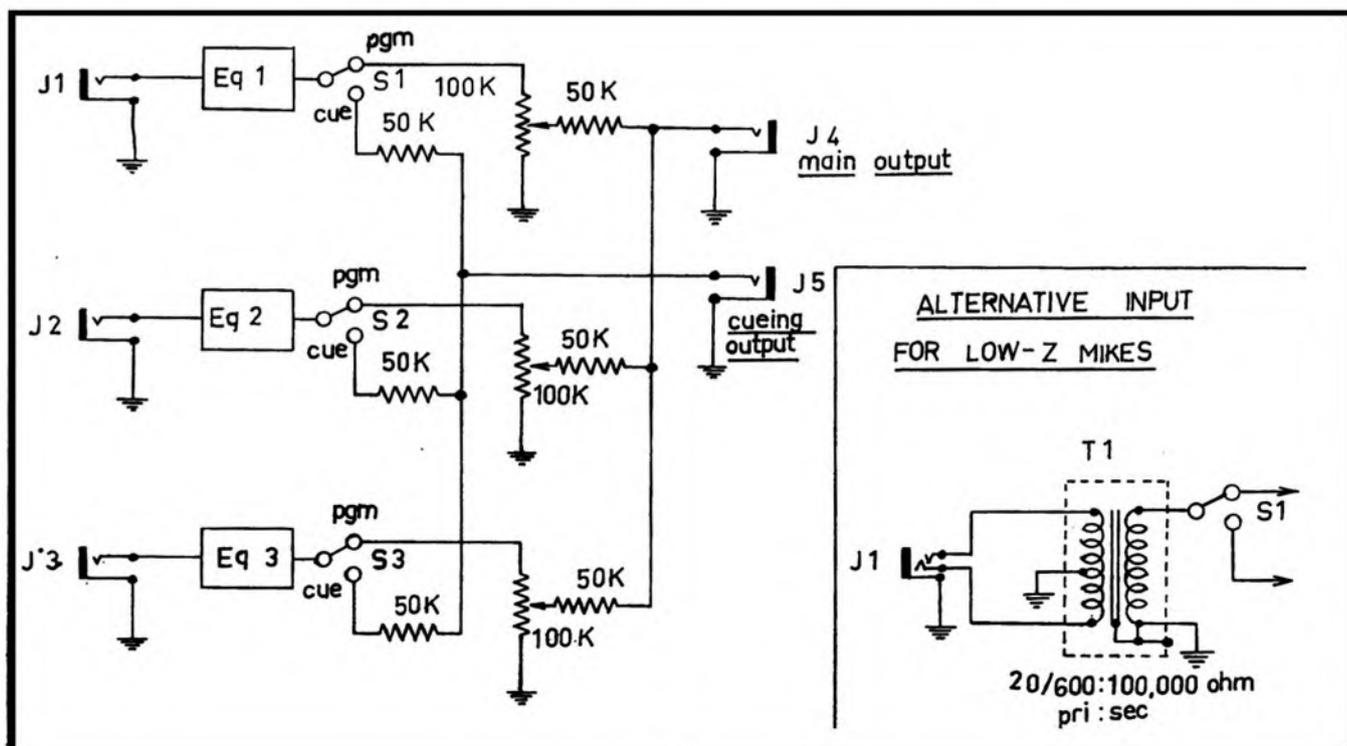
The construction of the mixer turned out to be much easier than I expected. For a few shillings expenditure in a radio surplus store, I acquired a small telephone-type switchboard containing a number of relays, several key switches (three of which I was able to use for the cueing switches) and a couple of terminal strips which proved very useful for the inputs and outputs. More important was the fact that these came in a solid wooden case complete with mounting brackets

for the front panel. Should the reader have other ideas about mounting his mixer, almost any suitable cabinet would do. No dimensions for the panel have been given since this will naturally depend on the size of the cabinet the reader wishes to use.

Cutting and Finishing the Panel

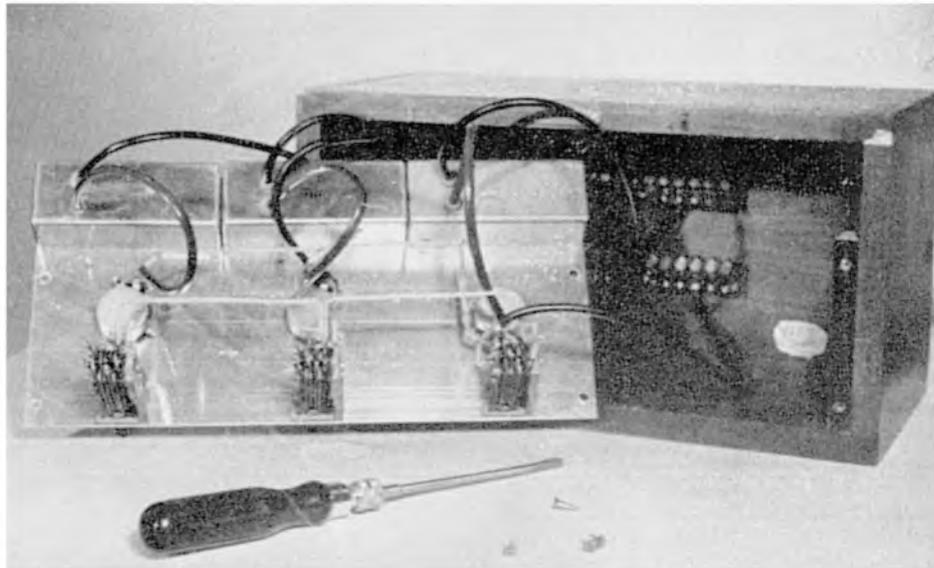
The panel itself is of $\frac{1}{8}$ inch thick aluminium and was obtained, cut to the correct size, from a store specialising in metal supplies. This panel is rather thick but gives a substantial feel to the mixer. A smaller front panel could, of course, afford to be somewhat thinner. After I had cut all the necessary holes in the panel, I found I had a number of scratches on the front side. I tried several methods of finishing the metal but in most cases the scratches showed through and also it proved difficult to apply any transfers or other lettering to the panel. The finish I eventually arrived at looks very much like the satin chrome seen on modern miniature cameras, and was done by brushing the metal with a rotary wire brush held in a high-speed portable electric hand-drill. A little care will produce an even finish free from all scratches that will take lettering in Indian ink very well, particularly if the lettering is afterwards brushed over with clear cellulose lacquer.

Mounting the components raised no problem. The equalisers were mounted by the simple process of removing the knobs and the



HOME-BUILT MIXER

Fig. 4. Wiring of the mixer has been kept simple by eliminating tag strips, using heavy gauge tinned copper wire and covering it with suitable sleeving. All connections soldered direct to this wire are thus rigidly supported.

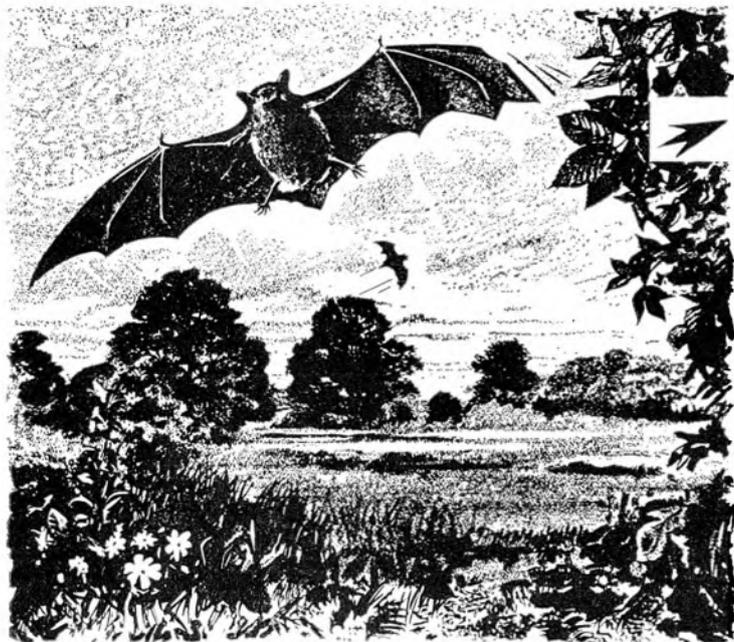


escutcheon on the front of each equaliser, drilling holes in the panel to clear the shafts of the two controls then remounting the equaliser, the panel and escutcheon together with the nuts holding the controls. Finally I replaced the knobs. The only changes necessary in my case were to trim off the excess ivory on the edges of the escutcheons to allow all three within the confines of the front panel. For similar reasons I re-located the output leads from each equaliser, and added an input lead to replace the existing jack socket.

I chose the large knobs for the level controls deliberately and their spacing, together with that of the cueing switches, is also carefully chosen. With the switches directly under each knob and moving horizontally, I can throw the switch with my finger-tips as I turn the control down. I have also found that the larger a knob is, the easier it operates provided it is perfectly round. An elongated knob, however large it may be, needs a twist of the wrist to turn it and this sometimes makes it impossible to get a smooth fade from one end of the control to the other. A round knob can be rolled under the fingertips provided it is freely operating. In addition, if I limit the spacing between knobs to a little over the diameter of a knob, I can, with a

certain amount of practice, operate two adjacent knobs simultaneously, turning them in opposite directions, with one hand. This leaves me one hand free at a time when it may be badly needed.

Finally, should the reader find that he is unable to get sufficient output from his mixer to give him a good recording level, he could try adding a small pre-amplifier between the mixer and his recorder. The *Wal-Gain*, manufactured by Wellington Acoustic Laboratories, and priced at £5, is ideal for the purpose. Transistorised (and consequently free from hum) it is sensitive enough to overcome almost any losses incurred in a mixer of this type.



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YOUR LOCAL CLUB? (4)

The Middlesbrough Tape Recording Club

THE Middlesbrough Tape Recording Club was formed on September 4th, 1957, when after some local publicity, several keen enthusiasts met at the town's Settlement Community Centre, premises which were being used by many active groups. The club's founder member was Mr. F. Lumb who was unaware, at the time, that he was forming the very first club in the U.K. for the purpose of Tape Recording enthusiasts.

The club soon boasted 25 members, and the weekly subscriptions were fixed at 6d. per person (an initial annual subscription of 10s. being made to the Settlement Community Centre). A great variety of equipment was now available for use and each meeting produced a different tape recorder, the owner of which was called upon to give a 'lecturette', and in time the internal workings of the 'tape recorder' became more and more familiar to the entire club. Costly models were more the exception in those days, but a visit to the Northern Audio Fair at Harrogate in late 1957 gave food for thought—Stereo.

One or two members took the daring step and bought bigger and better machines with track change and 2 speeds, modifications which extended the scope but increased the price. In the club it was decided to inaugurate a 'Message Service' which allowed any member of the public to record a greetings message to friends at home or overseas; this has proved most popular.



A service for the hospitals was inevitable. Six of their members with a flair for programme production got together and produced a monthly programme in conjunction with the local Toc H. O.B. teams went out and about for material which included a report on Breadmaking, an evening with teenagers in a dance, and reports from tops of bridges and local seaside resorts.

Throughout the first year they contacted several other newly formed clubs and offered assistance and help in their formation. It was not long before they decided to join the British Tape Recording Society. World Tape Pals in the U.S.A. gave some of their members a chance to contact enthusiasts in many countries. Under the heading of Construction the club has made a boom microphone, multi-switch box, which together with mixer units and recorders, enable them to record anywhere.

At the last A.G.M. of the club it was decided to raise their subscription to 1s. per member, and this has allowed them to set up a comprehensive Library, to subsidise such events as their Annual Dinner and visits to the Audio Fair, etc.

In general, they are a forward-looking group with a strong desire for more knowledge about their hobby. The Committee: Mr. D. H. Allison, Chairman; Mr. G. W. B. Harrison, Secretary; Mr. S. Stobbs, Treasurer; and Mrs. Z. Harty and Mr. R. Shepherd, have striven hard to produce the kind of instructive activities which their members enjoy. They have the backing of the local press who report their meetings regularly.

The photo, taken last year, shows Mr. R. Shepherd at the controls of his home-built recorder whilst Mr. D. Lonsdale records his piece for B.T.R.S. Others in the picture include Mr. S. Greener (seated), and Secretary G. W. Brian Harrison.

TAPE CLUBS

Notes and News

CLUB ROUNDABOUT

● **The Birmingham Tape Recording Club.** The Headquarters are situated not far from the City Centre at:—The White Horse Cellars, Constitution Hill, Hockley, Birmingham, 19. Their Chairman is Mr. T. Cuff, Secretary, Mr. D. Osborne, Treasurer, Mr. A. Greenway. The Secretary would greatly appreciate a new member who possesses a good quality Battery Portable Recorder. Those interested please contact Mr. D. Osborne, 75 Millmead Road, Birmingham, 32.

● **Bournemouth.** The Club meetings have been altered to a Tuesday, and are to be held every fortnight as from March 10th last. The meeting on the 10th of March was held in St. Aldhelms Hall, Branksome, at 7.30 p.m. Demonstrations and lectures are being fixed so that the members will have something different at each meeting. For particulars write to the Secretary, Mr. H. R. Jones, 442 Poole Road, Branksome, Poole.

● **Catford.** On Friday the 6th of March, The Catford Tape Recording Club was officially formed. It was agreed by the members that they should meet once a fortnight, and their last meeting was scheduled for March 20th. They welcome all prospective members irrespective of their qualifications. For details write to the Secretary, Mr. Derek C. Harker, 62 Barmeston Road, Catford, S.E.6.

● **Catholic Tape Recorders of America, International.** C.T.R.A. is the name of a group of people who exchange recorded tapes which contain items of general interest, in addition to running a library of recorded religious plays, liturgical music, and religious talks. Although the members include priests, religious and layfolk in various parts of the world, membership is not restricted to Catholics alone. There are several blind members, and anyone who would be kind enough to read a book, or magazine, should contact the Secretary.

For further details of C.T.R.A. please write to the Executive Secretary, Mr. Jerome W. Ciarocchi, 26 S. Mount Vernon Street, Uniontown, Pennsylvania, U.S.A., or Father Robert Warren, Church of Our Lady Immaculate, Pateley Bridge, Harrogate, Yorkshire.

● **Coventry.** Their programme for the meeting held on the 19th March consisted of a demonstration of a Geloso Tape Recorder by Gordon Robbins, Howard Freer—"Mystery Tape"; Contribution by Dan Woodcock; Further sounds from Roy Penfold; "Into Space" with Messrs. Gibson Brothers; Dora Newall "Asks You"; Time out for members comments and suggestions on Club activities. Members were invited to give their ideas for material towards the competition tape "Our Town".

● **Crawley and Sussex Tape Recording Club** held a very successful meeting on Monday, April 6th, in Crawley. Fifteen members were enrolled. Messrs. Runki, Wales, Woodjetts and Wale were elected to the committee. The annual subscription is 12s. 6d. (including wives) plus 1s. per meeting. Members were invited to take part in a small competition by submitting a tape to be played at the next meeting. A prize is being presented by Messrs. Telesound of Ifield for the most original tape not exceeding five minutes duration. Club activities will include co-operation with local amateur dramatic clubs, recording for non-members (Weddings, etc.). Meetings will be held monthly in summer and fortnightly in winter. Their next meeting will be held on May 4th. Members are welcome with or without equipment. Details from Mr. R. C. Watson, Crawley and Sussex Tape Recording Club, 32 Southgate Drive, Crawley, Sussex.

● **Glasgow.** One of their enthusiastic new members travelled 54 miles to be at one of their meetings. For details of meetings, programmes, etc., contact the Secretary, Mr. D. Craig, 55, Ledaig Street, Glasgow, E.1.

● **Kettering and District Tape Recording Club.** At the last meeting held on April 1st, at "The Rising Sun", Donald Eaton provided a very interesting and varied programme. He is a keen recordist, and his talk and demonstration included, "How to take care of your tape recorder": A live demonstration of the capabilities of various types

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TRUVOX ...	59 gns.	*TELEFUNKEN KL75 ...	50 gns.
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KL75T Table Model (Deck and Pre-amp only) 45 gns.

KL75K Complete Recorder, 50 gns.



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CLUB ROUNDBABOUT—(continued)

of commercial microphones: A demonstration of several tape recorders ranging from the Ferrograph to the latest model "Fi-Cord" portable. He rounded off the evening with a demonstration of recording from an FM tuner and suggestions for taking down radio performances from a domestic receiver by other means than the usual "Extension Speaker Sockets". For details of meetings, etc., write to Mr. A. M. Webb, 93 Regent Street, Kettering.

● **Leeds & District Tape Recording Club.** On Wednesday the 8th of April, Mr. T. Quigley, who is now Acting Secretary, formed The Leeds and District Tape Recording Club. The subscription is 3s. a quarter and 1s. 6d. for members under 21. The next meeting will be held on Thursday 23rd April, when a Committee will be elected, and from then on Meetings will be held fortnightly. For further information, write to Mr. T. Quigley, 32 Derby Road, Rawdon, Nr. Leeds, Yorkshire.

● **Leicester.** The Leicester Tape Recording Club's third meeting was held on March 13th, 1959, and four new members were enrolled bringing the membership up to 20. Due to poor attendance the meeting was turned into an informal night, and everyone discussed the recorders on view and recording in general. Their last meeting was held on April 3rd when they demonstrated a GMU3 Mixer Unit and various microphones. For details write to Peter Starie, 56 Minehead Street, Leicester.

● **Rugby** The Rugby Amateur Tape Recording Club held a very well attended meeting on the 12th of March. Approximately 30 persons including five guest speakers and representatives from the Coventry and Leicester Tape Clubs were present. A tape from Leicester Club was played. Mr. John Bannister, the President, took the meeting, and the main item was a recording of talks by representatives of the Fire, Police, and Ambulance, also the Civil Defence Services. Members' questions were also recorded. Copies of the tape can be obtained by sending 5 in. @ 3½ tape, together with return postage to the Secretary. At their last meeting on Thursday 2nd April they showed photos and tape on the Brussels Exhibition made by Mike Story of Wakefield. All members are invited to bring a short tape of their own choice for playing. Members recently recorded the "Oh Boy Rock 'n' Roll Stage Show" at the Granada Theatre, Rugby, and they hope to produce, in co-operation with the Percival Guildhouse, a tape survey of mass hysteria, which, they hope, will be broadcast over the national radio network some time in the near future. On Easter Saturday, Society members recorded a wedding at Rugby Parish Church. The next meeting will be held on Thursday, 23rd April, at the Gatehouse, North Street, Rugby.

● **Sheffield.** The Sheffield Tape Recording Society met on March 11th, and the members were given a demonstration of high fidelity sound reproduction by Mr. M. J. Thomas. A Swedish pick-up, with a tracking weight of three grammes, a high quality transcription motor and a Wharfedale sand filled enclosure and an electrostatic speaker were used.

Their last meeting was held on the 25th of March at the Y.M.C.A., Division Street, Sheffield at 7.30 p.m. Mr. B. T. Jeeves gave a programme of his tape, and Mr. F. Shepherd presented a sound quiz. For information on meetings, etc. contact Mr. F. Shepherd, 4 Birchitt View, Dronfield.

● **The Tape Recording Society of Great Britain.** The formation of the new Tape Library is going ahead very well indeed. Peter Eames, their Librarian, is collecting a vast assortment of sound effects, and has purchased a new battery portable recorder for the purpose. He now has a total of four tape recorders, and is able to dispense sound effects to members upon request and as requested, i.e., at any speed, etc.

Sound Magazine editor John Walford, has temporarily vacated the splicer. He has gone to the BBC college at Evesham, to learn how to produce better magazines on tape. Michael Nyman is the temporary editor. The March edition contains many new features, amongst them is a talk from Sir Mark Dalrymple on the packing and posting of tapes.

Technical Tape Topics No. 5, produced by John Buckler of Leicester, struck a new high in dubbing quality, being dubbed for the first time on two wearite decks. Chas. Horrell, continued the series of reviews of tape recorders. For further information please contact Mr. R. Walters, 29 Pitt Street, Broadwaters, Kidderminster, Worcester.

● **The Voicespondence Club** announce the formation of a special section to cater for the requirements of sightless members in the U.K. The Section proposes forming a panel of readers—recorder owners who are willing to read material of various kinds on to tape for their members.

Then they intend to form a modest (but interesting) library of tapes for sightless members to borrow.

● **Warwick & Leamington Amateur Tape Recording Society** are in the process of taping a sound picture of the two towns. Mr. G. Harris has written the script, and the producer is Mr. D. Randall, and the secretary, Mr. B. Race, will be the narrator with Mr. K. Wilkins as the sound technician. This tape will be available to anyone who may be interested. Tape competitions are held every month. A mutual exchange of tapes with Australia has been going over the past four months. A tape and slide show dealing with London, Ontario, was given by Mr. Race recently, and was much appreciated.

Local enthusiasts will be welcomed to meetings, and for all details should contact Mr. B. J. Race, 30, Ashford Road, Whitnash, Leamington Spa, Warwickshire.

● **The West Middlesex Tape Recording Club.** At the meeting held on Tuesday, 24th March, it was decided to hold an anniversary party in May or June. The total membership is now 34. Future meetings will be held at St. Andrews Hall, High Street, Uxbridge, on April 23rd, May 28th and June 25th. They plan to meet on the second Thursday in each month at the Co-operative Hall, Station Road, Hampton, Middlesex, and on the fourth Thursday in the month at the Uxbridge Headquarters.

● **Wolverhampton.** We have received a request from the Secretary of the Wolverhampton Tape Recording Club for exchange of tapes between the various Clubs. They will also be pleased to receive any ideas for activities, etc., from other Club Secretaries, and speakers who will give talks and demonstrations of subjects of interest. They have a small club room where they meet twice a week. For information write to Mr. E. M. Mountford, c/o 35 Berry Street, Wolverhampton, Staffs.

The Editor would appreciate receiving all items of information on Tape Clubs by the 1st of the preceding month, i.e. 1st of May for the June edition, etc., so that this can be included under Club News.

Anyone interested in starting up a local Tape Club is invited to write in to this magazine, and we will be pleased to publish details.



"Tape hiss is a bit high, Charlie"

THE BRADMASTER 5D

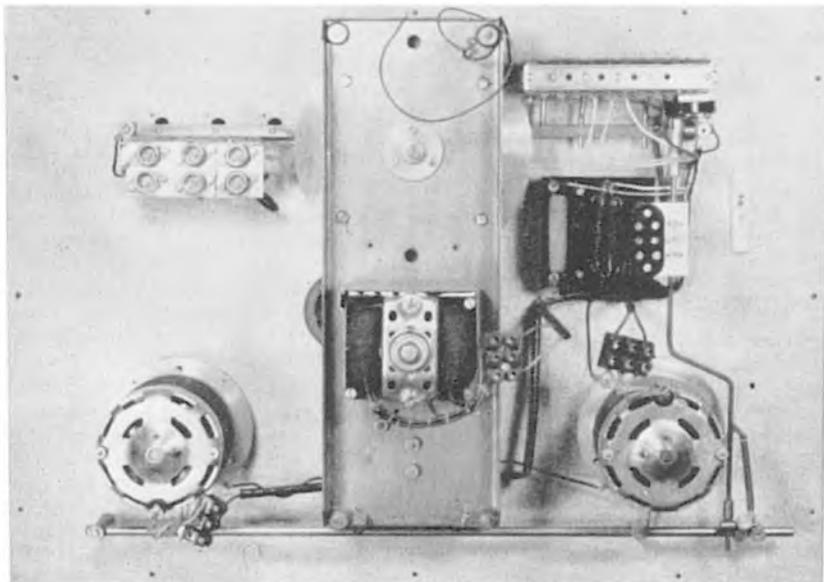


Fig. 1: As this "below-desk" view shows, the "Bradmaster" is an extremely simple piece of equipment—which is as it should be. Top left are the grouped co-axial sockets, placed immediately under the heads. Top right is the push-button switch unit. Below that is a tag panel holding mains connection terminal strip and load resistors for motors. The lower bearing of the capstan fly wheel is top centre, and the edge of the idler wheel can be seen on the right, just above the capstan motor. The counter-shaft "rod" for brake control runs across the bottom, and its connections to push-button assembly and brake drums (behind each spooling motor) complete the arrangement.



Fig. 2: The brake connection, noted above, can be followed in more detail here, with the tension spring immediately below it. To the left of the spooling motor is the link for that particular brake. Adjustment is effected by slackening off the grub screw and altering the angle of the lever on the shaft.



Note: This is a report and not a full-scale review.

BRADMASTER decks are made in four basic types—5B; 5CS; 5CD; 5D. The different code letters indicate different sizes of spool accommodation. All models may be obtained with any specified arrangement of heads, with four as the normal limit. The model described here is the 5D, which was ordered by the *Hi-Fi News* and *Tape Recorder* editorial office. It has the following head arrangement (left to right): Top Track Erase; Lower Track Erase; Mono/Stereo Record; Mono/Stereo Replay. As illustrated above, it has been fitted with two "Record Amplifiers" by Cape Electrophonics Ltd., and mounted with them in a half-inch teak case. The small unit between the two amplifiers contains a "mains" on-off switch for deck and amplifiers, and a second switch for

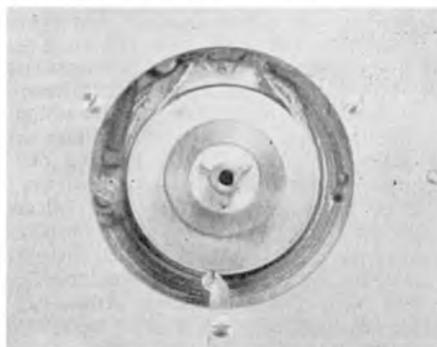


Fig. 5: The actual brake arrangement can be seen here. A drum, immediately beneath the spool holder, is surrounded by a length of webbing, which is "spring-anchored" at top right and attached to a short lever at top right. At "run" button positions, this lever is forced inwards: at "stop" it flies back, tightening the webbing.



Figs. 4 and 5: Above, is the speed control, $3\frac{3}{4}$ i/s on left, neutral in centre, and $7\frac{1}{2}$ i/s on right. The photo on the left shows the push-button arrangement. As can be seen by the engraving, the centre three buttons are grouped for pre-set control. The right (green) button is for "run" and the left (red) button is "stop".

THE BRADMASTER 5D

controlling the erase/bias ("off" for replay; erase and record, for mono or stereo).

The Bradmaster 5D takes spools up to 10½ inch diameter (NAB type), and the NAB adaptors are removable, allowing standard spools to be used. The deck has two speeds of 3¾ and 7½ i/s, which are selected by rotation of the knurled pillar between the spools. A central position, "zero", keeps the rubber tyred idler wheel clear from stepped wheel and capstan flywheel when the deck is not in use.

Control of the deck is by means of push-buttons in pre-set arrangement. From left to right these are: Stop (Red); Wind, Run, Wind, Start (Green). The centre three are pre-selected as desired, and come into operation when the "Green" is pressed. These buttons control the brakes, stop and start the motors, and also bring pressure pads and pinch roller into position on "run".

The two spooling motors are powerful, and wind 1,800 feet of tape in about 65 secs. The braking system is simple, smooth and (if needed) easily adjustable by anyone with a sense of mechanics. The various photos illustrate the system. A rod, running from the push-button

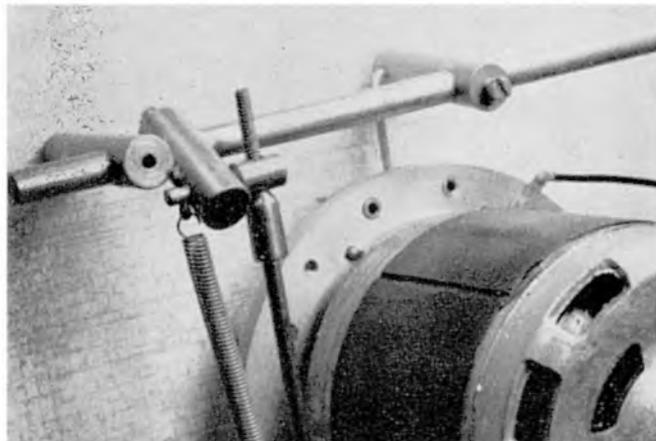


Fig. 6: Above is an additional photographic breakdown of the brake arrangement, which will enable the system to be followed in clearer detail, from fig. 1, through figs. 2 and 3.

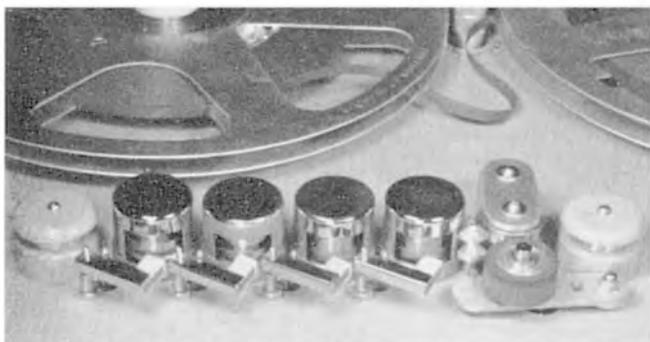


Fig. 7: The layout of tape guides, heads and capstan drive can be seen here, with the tape loop removed. The heads fitted here are (l to r) top track erase; lower track erase; stereo/monaural record; stereo/monaural replay. Between the latter head and the capstan drive is an additional tape guide. Pressure pads and pinch roller are shown in the "stop" or "spooling" position.

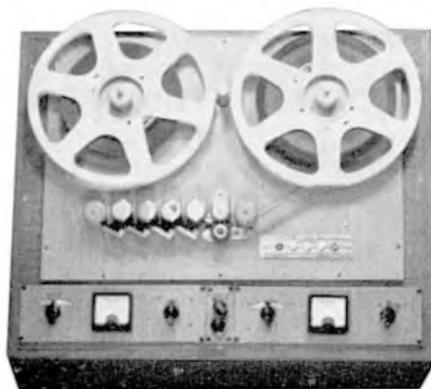


Fig. 8: In this photo the deck is shown, with 10½ inch N.A.B. spool in position (4,800 ft. of Double play tape!). The two "record" amplifiers are at the foot of the assembly. Left-hand knob in each case is "record" level; right-hand knob is CCIR connection for different tape speeds. The small centre panel holds the main ON/OFF switch and, above it, the erase/record switch for stereo or monaural (top back wipe, or both).

assembly to the rear of the deck, is linked (crankwise) with another rod running along the rear of the deck. From this second rod are two adjustable links, which either add or release pressure to a small lever (one for each spooling motor). These levers either tighten or release loops of fabric webbing, which encircle brake drums at the top ends of the spooling motor shafts.

The capstan motor and capstan drive run completely independently. With the speed change control in its "zero" position, the capstan motor is completely free. When in the 3¾ or 7½ i/s positions, the stepped motor pulley and the capstan flywheel are linked by the idler wheel. The flywheel—heavy and of 6-inch diameter—is mounted in stout bearings between brackets above and below the deck. The capstan wheel and the flywheel are on the same shaft, and this assembly is thus also completely free when the idler wheel is disengaged.

Two bobbin type tape guides, in alignment with the two spools, hold the tape in position across the heads—and slightly clear of them when spooling. An additional guide, between the right hand head and the capstan, accepts the tape when the "run" button is pressed, and when the pressure pads and pinch roller bring it forward.

The pressure pads are fitted to the ends of short metal arms, which are spring-loaded and hinged at their left-hand extremities. When

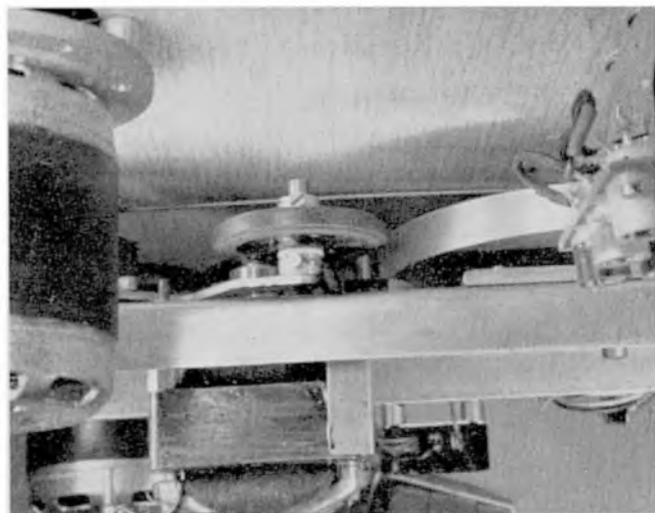


Fig. 9: This close-up shows the arrangement of the capstan fly wheel, the rubber-tyred idler wheel which drives it and, immediately to the left or behind it, the drive wheel of the capstan motor. The general layout can be followed by reference to the other photograph, and by noting that the rewind spooling motor is front left—the forward spooling motor—rear left.

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THE "BRADMASTER 5D"—(continued)

the "Stop" button is pressed—and during spooling—they are moved away from, and held clear of, the tape by metal rods which protrude from beneath the deck. Being hinged, they can be swung back from the heads for editing and other purposes.

The Bradmaster deck is supplied by the manufacturers with either "standard" or "semi-professional" heads. The latter are fitted to the deck illustrated, because it is required for mono as well as stereo work; and for mono reproduction the cross-talk factor must be exceptionally good, because the lower track (not in use and recorded in the reverse direction) must be completely inaudible.

As a matter of interest, this deck is now installed as part of a hi-fi system which is made up of a "Hi-Fi News" stereo pre-amp and two "Hi-Fi News" HFN 5/90 amplifiers. This combination accepts the output from the 4th (monitor) head on the deck, and feeds the speakers. On the "Record" side, a second "Hi-Fi News" stereo pre-amplifier accepts stereo or mono signals from tape, disc or radio, and feeds the two record amplifiers. All types of "dubbing" and super-imposing are thus possible—and, by using one channel for the "live" signal, and the second channel for the recorded tape signal, continuous and instantaneous comparisons are possible.

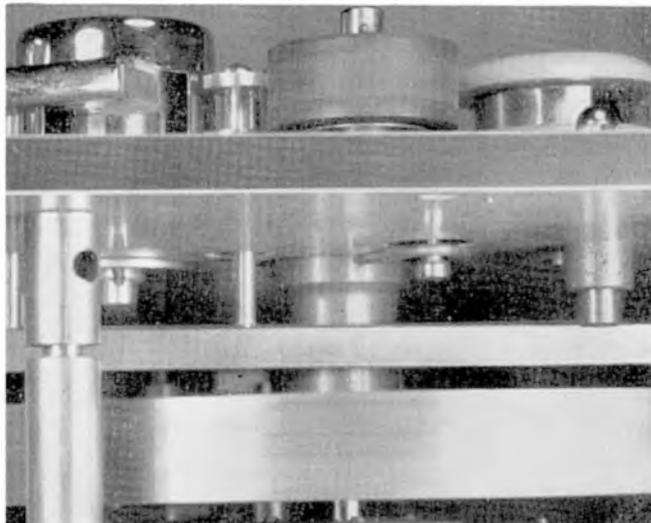


Fig. 10: This picture, taken from the front of the deck, shows the main board in section, and the capstan fly wheel and shaft beneath it. The pinch roller, "above deck" in its neutral position, is flanked by the right-hand tape guide and the guide which accepts the tape when the pinch roller and pressure pads move forward.

The Maker's specification of the "Bradmaster" decks are as follows. Models 5B, 5CS, 5CD, 5D Semi-prof. tape deck. $7\frac{1}{2}$ and $3\frac{3}{4}$ i/s. 3 motors. Model 5B 7-in. spools; 5CS and 5CL $9\frac{3}{8}$ -in. spools; 5D $10\frac{1}{2}$ -in. N.A.B. spools. F.r.: $7\frac{1}{2}$ i/s, 40–15,000 c/s; $3\frac{3}{4}$ i/s, 40–7,500 c/s, both ± 4 dB (dependent on amp. used). Size and weight dependent on model Price 5B £42; 5CS £45 10s.; 5CL £47 10s.; 5D £50.

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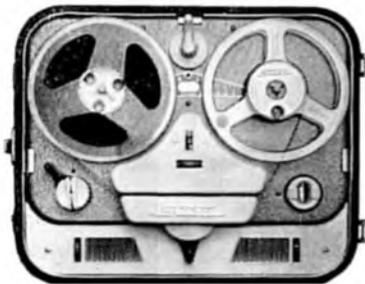
TAPE RECORDERS

and accessories

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EQUIPMENT REVIEWED



★
THE STUZZI
MAMBO
Model 368W
★

★ **Manufacturer's Specification:** Tape speed: $3\frac{1}{2}$ i/s; Reel size: $5\frac{1}{2}$ in. standard; Voltages: 110/220 A.C. only.; Consumption: 45 w. approx.; **Mains switch:** Combined with transport lock on recording motor; **Inputs:** Mic: 2mV at 1 Megohm, Radio: 100 mV at .5 Megohm; **Outputs:** Extension Speaker: 5 ohm approx. **Monitor Earphone:** 1v. at 20 K. or Power Amp; **Output power:** 2.5 w; **Noise level:** Better than 40 dB below; **Wow and Flutter:** Less than .3%; **Frequency range:** 50-12,500 cycles \pm 3 dB; **Bias and Erase:** 55 Kc/s; **Modulation:** Magic Eye (EM81); **Rewind speed:** 15 fold; **Counter:** Digital type, 3 Figures and Resetting Knob; **Tone control:** Combined bass/top lift and cut control; **Safety control:** Prevents accidental erasure; **Size** $13\frac{1}{2} \times 10\frac{1}{2} \times 6\frac{1}{2}$ in. **Weight:** 19 lb. approx. **Price:** Complete with tape and microphone: £40 19s. Distributed in the U.K. by, Recording Devices Ltd., 95, Villiers Road, London, N.W.2.

THE Stuzzi "Mambo" is a very compact little tape recorder of Austrian origin, its particular merits being its small size, $13\frac{1}{2}$ in. \times $10\frac{1}{2}$ in. \times $6\frac{1}{2}$ in., and its low weight, 19 lb. A machine of these dimensions is really portable by any interpretation of the word. However, the small size inevitably involves some sacrifice, and thus the "Mambo" is a single speed ($3\frac{1}{2}$ i/s) machine only, and the maximum size of spool that can be accommodated is the Continental standard of $5\frac{1}{2}$ in. diameter. These limitations prevent it being used for reproducing any of the commercially-recorded tapes, for which a tape speed of $7\frac{1}{2}$ i/s has been standardised. This may be no disadvantage to the would-be purchaser requiring a machine for recording and replaying his own programme material, but this reviewer finds it a serious limitation.

The "Mambo" is above average in styling and finish, the case being covered in an attractive dark green imitation leather cloth which contrasts nicely with the lacquered brass trimming and the cream moulded top plate. A simple form of spring retainer is fitted inside the detachable cover to hold the spools in position during transport—a simple device that might be more widely adopted. In spite of the small size, adequate space has been found in the machine for storing the mains lead and its plug, also a spare input lead and a microphone.

"Operation is Extremely Simple"

Operation is extremely simple, for the controls have been reduced to the absolute minimum. Between the spools, at the rear of the deck, is the *wind* and *re-wind* control; while on the left-hand side is the volume control, used for both recording and replaying, and a concentrically-mounted mains switch. In the front centre is a three-position, lever-operated switch that selects "record" or "replay"—and this is also used to lift the tape out of contact with the capstan when an "instantaneous stop" is required while dictating or transcribing. An edgewise-mounted tone control on the right-hand side is balanced by a similar knob on the left-hand side, operating the recording interlock, which prevents the central lever being accidentally moved into the record-

ing position. A volume indicator, of the EM81 magic eye type, and a three-digit counter, are fitted; but the restriction to single speed operation allows a "minutes-of-tape-still-to-run" indicator plate to be fitted under the spools.

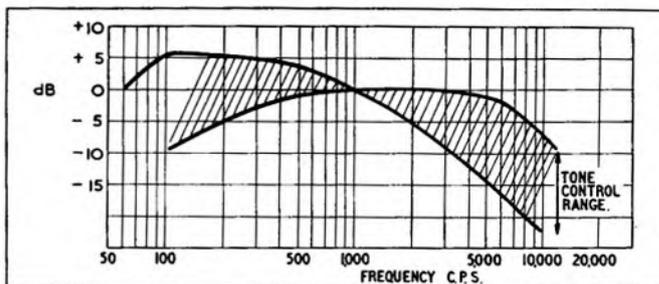
Input sockets for "radio" and "microphone" and an output socket for an "extension loudspeaker" are concealed behind a neat trap at the rear of the machine.

Objective Tests

The combined record and replay response is shown in fig. 1, which also indicates the range of the tone control. The tone control is unusual in that it tips the frequency response curve about a point in the 1,000 c/s region, to produce "bass boost" as well as "top cut". This is probably the most effective form of single-knob tone control. Though the frequency response is too restricted to allow the performance to be classed as "high fidelity" it is undoubtedly more than adequate for the vast majority of applications for which a portable machine would be used.

The signal/noise ration (the ratio in dB of a 1 Kc/s signal, recorded at full modulation to the residual noise remaining after the recorded tape had been erased on the machine) was 38 dB, there being no significant difference between the weighted and unweighted values. This is probably due to the attenuated low-frequency response indicated by fig. 1.

At 0.32 per cent., the total wow and flutter was a little on the high side for the reproduction of music, but it is perfectly adequate for speech reproduction. There are vague signs that commercially-recorded tapes, suitable for $3\frac{1}{2}$ i/s may appear in the future, but if they do it will be necessary for the machine designers to improve the mechanical performance of most existing tape recorders. Many machines operating at $3\frac{1}{2}$ i/s have a frequency response that would do justice to commercially-recorded tapes, but very few machines have low enough values of wow and flutter.



● Frequency response curves of Stuzzi Mambo.

The *Acos* microphone, provided with the machine, gives acceptable quality if it is not used too close to the speaker's mouth.

A single EL84 is employed in the output stage, giving a claimed output of 2.5 watts.

General Comment

Apart from its inability to replay the commercial tapes recorded at $7\frac{1}{2}$ i/s, the Stuzzi was liked by the friends who used it. It is mechanically quiet; the braking system is exceptionally effective; and the tape spools evenly and neatly on the high speed rewind. The number of controls has been reduced to the absolute minimum and, in consequence, the operation is extremely simple and is almost foolproof. No trouble was experienced during a month's use. The machine is not a high fidelity reproducer in the strict sense but the performance is adequate for most uses and, in fact, it is far better than the performance of the vast majority of radio receivers.

James Moir

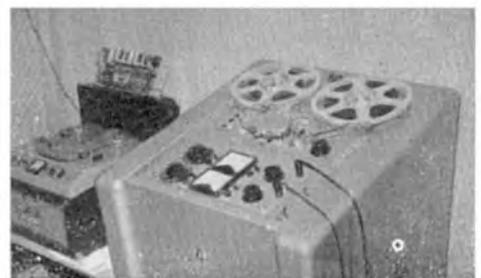


TAPE AT THE 4th AUDIO FAIR

● *Outer column on this page (top). Three senior members of E.M.I. Sales and Service staff (l to r) L. W. Saunders, L. Goddard, J. Wooler. (Centre): Dr. Cunningham Sands is not "lifting" a Reflectograph! He designed it. (Bottom): A demonstration show of the Ampex Stereo recorder. Inner column (top, l. to r.): G. Spark of MSS, this year's Chairman of the Audio Fair Committee; M. Fishot, President of the Paris Hi-Fi and Stereo Exhibition; M. Bossinot, the Paris Exhibition's Permanent Secretary; Chas. H Frank of the American Ercona Corporation; Mrs. White, late of the MMS Co. (Bottom): The latest E.M.I. TR90 Stereo recorder for professional use.*



AT this year's London Audio Fair at the "Russell Hotel," "Tape" was literally everywhere. No fewer than 26 exhibitors out of the total 66 were showing tape and tape recorders, several more were demonstrating tape accessories, four more were exhibiting microphones—and many more were using tape as a programme source. These are surely eloquent pointers to the current trend, if not the actual tape Writing on the Wall. The "foreign invaders" included Ampex, Tandberg, Grundig, Saba, Stuzzi, Harting, Telefunken. Tape manufacturers were BASF, EMI, MSS, and Scotch Boy. British Recorders



TAPE AT THE 4th AUDIO FAIR

● Outer column on this page (top) : At Multi-music's "live" stereo show Gerard Snoeck plays the accordion for a comparative demonstration between the live performance and the stereo replay. This proved to be a most popular show to queue for! (Centre): R. W. Merrick, Director of British Ferrograph, shows off the new details of his Company's latest recorder (Bottom l. to r.): Michael Babani, with his father B. Babani of T.S.L., and Mr. Chitris of the German Elektron Company. Inner column (top): Recorders in profusion in the Veritone "Dem. Room." (left): Two very interesting Telefunken recorders in that Company's Room.

were by Brenell, EAP, EMI, Ferrograph, Fi-Cord, Reflectograph, Simon, Spectone, Trix, Truvox, Veritone, Vortexion, and Walters, while Cosmo-cord, Grampian, Lustraphone, Reslo Sound, Simon and S.T.C. showed a wide range of micro-phones in crystal, moving coil and ribbon. In the "Spill-over" non-Audio-Fair show, at the Imperial Hotel, Reps, Tutor Tape and Verdik were amongst the "Pirates" with very interesting demonstrations, plus Sound Sales & Wellington Acoustical Laboratories, who wanted more space than they had at the Russell.





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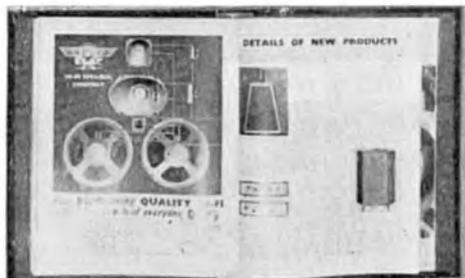


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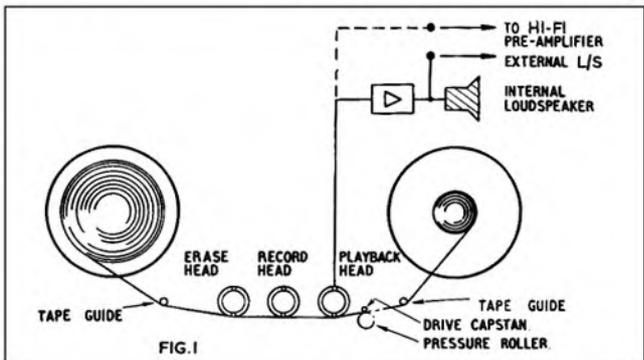
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TAKING UP TAPE

● This is the last of three chapters devoted to describing how a tape recorder works and defining some of the technical terms. It takes us up to the drive mechanism.

Fig. 1: During recording and playback the tape is held between the Drive Capstan and Pressure Roller. The former rotates at a fixed number of revolutions per second, so pulling the tape at the required speed. The tape guides are often channelled, to keep the tape at the correct height relative to the heads, and will be either free rolling or highly polished to avoid "tape squeal". The External Loudspeaker output is obtained from the playback amplifier, as shown. There is usually an ON/OFF switch for the internal loudspeaker. The broken line indicates the output available on a few machines direct from the playback head.



WE saw last month that pre-emphasis of high frequencies is necessary in tape recording. The main reason for this is the inability of the playback head to respond to—or scan—recorded signals at very short wavelengths. We defined the *wavelength* as the distance measured along the tape occupied by one vibration or cycle of the signal. Defining *frequency* as the number of cycles per second, we found that the wavelength can be calculated by dividing the frequency into the tape speed in inches per second.

By way of an example we took a tape speed of $7\frac{1}{2}$ i/s, and worked out the wavelengths for notes at 75 c/s and 7,500 c/s. These come to 0.1 in. and 0.001 in. (one "thou") respectively, showing that at high frequencies the wavelength becomes comparable with the head gap—approximately 0.0007 to 0.0003 in.—and the response will fall considerably.

Frequency Correction or Equalisation

It is not only at high frequencies that the frequency response in tape recording differs from the ideal straight line. Over the low and middle register it is found that the output voltage depends, not on the strength of the magnetic signal, but on its rate of change. This means that, going down the frequency scale, where the recorded wavelength is longer, the rate of change falls steadily. This is shown in fig. 2. The broken line represents the output voltage to be expected in the absence of any correction—or so-called equalisation.

To oppose the high frequency losses, as we have already stated, pre-emphasis is resorted to in the *Record* amplifier. The falling bass response is usually counteracted by a bass boost equaliser in the *Playback* amplifier. These effects are indicated in the diagram.

Gain of the Playback Amplifier

Since the output voltage at the terminals of the playback head varies so much with frequency, it is not possible to be precise about its value—i.e., the sensitivity. But an output of 2-5 mV (millivolts) is a fairly average value to be expected from normal programme. To bring this up to the 10 or 20 volts necessary to drive a loudspeaker, the playback amplifier needs a gain of anything up to 10,000 times.

As well as connecting to the built-in loudspeaker, the playback

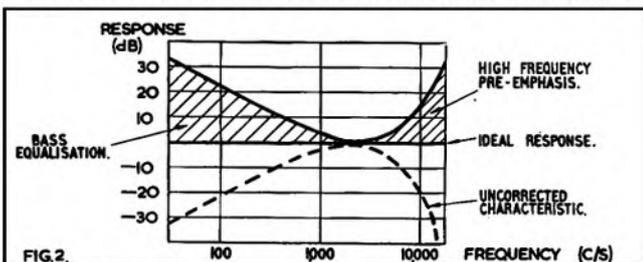


Fig. 2: The fall in response at low and high frequencies (broken line) is offset by bass lift in the playback amplifier, and treble pre-emphasis on recording.

amplifier of many recorders feeds a socket labelled "External Loudspeaker". This allows you to employ a larger loudspeaker system, and perhaps do more justice to the quality of your recordings than is possible with the small or light-weight speaker inside the recorder. For really Hi-Fi results, it may be possible to take a lead direct from the playback head to a high fidelity control unit and amplifier, thereby cutting out the built-in circuitry altogether. The recorder's own amplifier and loudspeaker will be perfectly good enough for monitoring, checking tapes, etc., but for serious listening, or when a power output in excess of about 10 watts is required, the extra equipment will probably be desirable.

In professional circles, it is an invariable rule to monitor whilst recording. That is to say the signal put on the tape by the recording head is continually listened to as it passes the playback head, using the playback amplifier and either loudspeaker or headphones.

In addition, a switch is usually incorporated to give instantaneous comparison between the input signal and the recorded signal, as a check that everything is in order. Now most domestic recorders do not possess this facility.

In the first place, to economise in size and weight, many tape machines have a single head and amplifier which have to cope with both recording and playback. So clearly we can have one or the other, but not both together. For another thing, when you record with a microphone on a fairly short cable, it is impracticable to have the loudspeaker in operation as "howl round" is likely. That is the name given to the loud whistles that we get when sound from a loudspeaker is picked up by a microphone, re-amplified, and emerges from the loudspeaker till sound builds up into oscillation.

The Transport Mechanism

We have dealt so far with the electronic side of tape recorders, namely the amplifier, equalisers, heads, and input and output connections. All the actual machinery or mechanical components are referred to as the Transport. In a perfect transport system, the tape will (a) move past the heads at an absolutely constant speed (b) maintain close contact with the heads (c) wind and rewind at a fast speed when required (d) brake rapidly but equally on both spools, and (e) wind evenly and at a steady pressure on to the take up spool.

Let us take each of these requirements in turn, see what standards we can expect, and define the various terms used.

(a) Speed Constancy

A moment's consideration will show that driving the take up spool at a constant speed is not the answer, since this would result in faster and faster tape speeds as more tape accumulated on the reel. It is necessary to apply a constant drive to the tape direct, and this is usually done by passing the tape through the gap between two rollers. These are known as the drive capstan, and the pressure or "pinch" roller. One of these, usually the latter, is rubber-covered, and is spring-loaded to pinch the tape between the two surfaces when the machine is switched to Record or Playback.

The electric motor used to drive the capstan is usually of the

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synchronous type—which runs at a speed more or less locked to the A.C. Mains frequency. This has the advantage of giving the same nominal speed when tapes are played back on different machines.

To assist in maintaining a steady driving speed, most transport systems include a fly-wheel. The inertia of this fly-wheel must be sufficient to iron out fluctuations due to changing voltage supply, etc., but not so large as to make the machine slow in getting up to speed.

Speed variations which give rise to a kind of vibrato are referred to as "wow" or "flutter". The term wow is usually reserved for fluctuations at rates of 10 times per second or less, and flutter for faster pitch vibrations. An article was devoted to wow and flutter on page 77 of our March issue, and it was stated that 0.3 per cent. represents an acceptable figure for the lowest priced tape recorders, with 0.1 per cent. as a desirable standard for professional machines.

A likely source of wow is uneven surface of the pressure roller, and it is for this reason that it is usually suggested that a tape machine should be switched off at the recorder itself, and not at the mains. Otherwise there is a risk of leaving the capstan and pressure roller engaged for long periods which may introduce a permanent indentation or "flat" on the rubber surface.

(b) Close Contact between Tape and Heads

A considerable loss of efficiency can arise if the tape does not make the closest possible contact as it passes over the heads—erase and record/playback. Pressure pads are often fitted which are spring loaded to hold the tape against the heads. As the magnetic coating on the tape is very abrasive, it is necessary to withdraw the pressure pads during fast wind or re-wind.

In case any of the tape material or other dust has accumulated on the polished front surface of the heads, it is desirable to wipe these periodically with a clean cloth, either dry or lightly dampened with methylated spirits. Tapes which have been creased or which buckle will give uneven signal strengths due to failure to keep in intimate contact with the heads.

It is also important that the tape should pass the heads at exactly the right height—remembering that the track width is only 1/10th of an inch, in half-track recording. Polished or free-running tape guides are usually fitted to assist in this direction, and to lead the tape through the sound channel at a suitable angle no matter how much or little tape is wound on the two spools.

(c) Fast Wind and Re-Wind

We have said that the tape is driven by an electric motor which turns the capstan at a fixed number of revolutions per minute. In addition to this, a consistent turning force must be applied to the take up spool to enable it to collect the tape, and a weaker torque is applied to the supply spool.

In professional grade tape recorders, three separate motors are usually used to perform these functions. Fast wind and re-wind are then obtained by applying the full supply voltage to whichever motor is taking up tape.

The majority of domestic recorders employ a single motor, which drives the capstan during record and playback, and at the same time applies the appropriate forces to the two spools by friction via rubber bands or idler wheels.

(d) Braking

Applying brakes equally to both spools, so as to stop the tape accurately at a chosen point when winding or re-winding at speed, calls for a very sensitive and well adjusted mechanism. Unequal braking can cause either the spilling of tape from the unwinding spool, or over-tensioning so as to break or stretch the tape.

Ideally, the tape will be brought quickly to rest still lying correctly in the guides, and at just the correct tension. It will usually be possible to adjust the braking of your recorder, but you should not attempt this until you have fully read and understood the maker's instructions.

(e) Even Spooling

A tape which is correctly wound on to its spool has all its turns at exactly the same level, and does not touch the sides of the reel. It is thus supported on the hub alone. The tightness with which the tape is wound is also fairly critical.

When storing tapes, it is a good habit to fasten the outer end of the tape, for example, by means of a small piece of jointing tape. Buckled spools should be avoided, both for their effect on even spooling and the risk of wow due to rubbing of the spool either on the edge of the tape, or on the top of the deck.

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TAPE, RECORDERS & ACCESSORIES

FIRST DETAILS OF NEW PRODUCTS

● We remind our readers that notices of equipment listed and illustrated in this monthly feature are in no sense reviews. When figures, specifications and diagrams are published, these data are extractions from manufacturers' lists. When samples of this equipment are submitted for test, they are passed to our technical contributors, whose reports are published in a separate section.



★
A new recorder
from Telefunken
The 75-15
★

A new Telefunken tape recorder, the 75-15 has been announced by Welme Corporation, 147 Strand, London, W.C.2, the sole distributors in the United Kingdom for Telefunken tape recorders.

This machine is similar to the existing Model 75 recorders, but it takes larger spools, 5½ in. in place of 5 in. There are separate control knobs for the two inputs, non mixing; bar type level indicator and replay tone control. Other features are the same as the 75K, which is still being produced, two speed operation 3½ and 1½ i/s, frequency range 60-16,000 c/s ± 3 dB at 3½, and 60-9,000 c/s ± 3 dB at 1½ i/s, signal to noise ratio -45 dB, distortion 5%. The price is £56 14s., microphone extra.

Telechron Synchronizer

FOR Telefunken recorder users the Telechron I is available for the fully automatic control of a lantern slide or film-strips in exact synchronisation with a pre-recorded sound track on tape. The operating impulses are imposed on the second track of the tape by pressing a countersunk white knob whenever a change of picture is needed. When the tape is played back, the picture will change without fail at each impulse.

The unit itself consists of a printed circuit and valve as well as a magnetic head which is in contact with the second track of the tape. When the operating button is pressed, an impulse of 1,000 c/s is imposed on to the tape and this, when played back is picked up, amplified and works the relay contacts controlling the slide or film moving gear. The impulses can be erased easily by reversing the tape, so that the second track comes into contact with the normal erase head. The tape is of course run through in the "record" position with the modulation turned down as far as possible without actually switching off the machine. The list price of the unit is £12 15s., and there is a fitting charge of £2 2s.; fitting is undertaken by the Welme London Service Depot.



★
The B.S.R.
Monardeck
★

PRELIMINARY details were given of the B.S.R. "Monardeck" last month, the following is the full technical specification:—

Single speed: 3½ i/s; Half Track: Upper track, left to right; Reel Size: Up to 5½ in. reel of standard tape=850 ft. 5½ in. reel of Long Play tape 2 hrs. 8 mins.; Winding facilities: Fast forward wind and fast rewind; giving a rewind time of 3 mins. for 5½ in. reel of standard

tape; Motor: Wound for 240v 50 c/s A.C., as standard. Other voltages and frequencies to order; Wow and flutter: Total wow and flutter 0.4% R.M.S.; Switching facilities: a 4-pole 2-way wafer switch is fitted and this is mechanically interlocked with the tape transport mechanism to avoid accidental erasure of recordings; Heads: A high-quality record/playback head and double gap supersonic erase head are fitted; Frequency response: 30 c/s to 8 Kc/s ± 3 dB. With careful attention to the equalisation in the amplifier this can be extended upwards to 10 Kc/s.

At the present time the deck will only be available to trade manufacturers, and a number are working on prototype machines. J. & A. Margolin expect to have a machine in production by the time of the Radio Show; Fidelity Radio Ltd. have announced details of their recorder. This is called the Argyll and will sell for £30 9s. complete with a microphone and spool of tape.



★
The first recorder
to use the
Monardeck,
The Fidelity
Argyll
★

The recorder has two inputs with mixing facilities for crystal microphone and pickup. There are a number of additional features, erase cut-out button (for superimposing); monitoring through the internal 7 × 4 in. loudspeaker while recording; 3-5 ohms extension speaker socket; combined tone and mains on/off switch; an automatic locking device to prevent accidental erasure; the amplifier can be used "straight-through". The claimed frequency range is 60-10,000 c/s; signal to noise ratio -50 dB; Bias oscillator frequency 50 Kc/s and erase damping 70 dB at 1,000 c/s. The size is 17 × 13½ × 7¼ in. and the weight 22 lb.

Further details are available from the manufacturers Fidelity Radio Ltd., 11-13 Blechynden Street, London, W.11, on mention of this magazine.

Transportable Stereo Recorder

MULTIMUSIC, who produce the Reflectograph tape recorders showed their new Model 510 Stereorecorder for the first time at the Audio Fair.

This unit is transportable and is suitable for monaural and stereophonic recording. The lid is in two halves, each of which contains a Goodmans drive unit, these are used for monitoring and are supplied with ten feet of lead and a jack plug. The amplifiers are positioned on each side of the desk, each channel has separate record and replay amplifiers and a peak level meter. Inputs are provided for microphones and radio or pickup. The amplifiers each have a 3 watts undistorted output which can be fed into external loudspeakers or there is also a high level output for feeding external amplifiers.

The Reflectograph 500 deck is used, this has variable speed from 3½ to 8 i/s with a built-in neon lit stroboscope giving the precise speeds of 7½ and 3½ i/s. Spools up to 8¼ inch can be used, the deck is also equipped with a clock-type tape indicator and a Bib tape splicer.

By means of a switch provided on the instrument panel of each channel, instant comparison can be made between the input signal and the signal

high-fidelity amplifiers



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TAPE, RECORDS & ACCESSORIES—(continued)

recorded on each channel of the tape. As a full track erase head is used a switch is provided in the erase circuit for use when recording monaurally, the erase head is kept in circuit on the first track and then switched off when recording on the second track. It is also possible to record monaurally on both tracks at the same time with different programme material, also to record a programme on the right hand channel and then re-record it on the left hand channel, and to superimpose one on the other.



The new stereo recorder, as it appears with "lids" removed. The lids contain the two speakers. The makers describe this instrument as transportable. Weight, unless wasted, is essential with such apparatus. The term "portable" is too freely used. Congratulations!

The frequency response at $7\frac{1}{2}$ i/s is claimed to be 50-10,000 \pm 2 dB, 45-12,000 \pm 3 dB; Wow and Flutter better than 0.2 per cent. total; signal to noise ratio, -45 dB unweighted; cross-talk, better than 45 dB between tracks. Separate treble and bass controls are provided on both channels. Frequency response is corrected to CCIR standards, but by use of the tone controls it can be adjusted to conform with the NARTB characteristics. At the moment recorders are only being produced suitable to work from a mains voltage of 200/250 50 c/s.

The case is finished in Luxan hide and Pigskin colours and the size is, length with handles at both ends 29 in.; height 11 $\frac{1}{2}$ in., 8 $\frac{1}{2}$ in. without the lid; width 14 $\frac{1}{2}$ in. The weight is 65 lb. The price complete with two screened jack plugs, a spare spool and special demonstration tape that includes a metronome signal, useful for setting up the playback amplifiers, £156 9s.

It will also be available, to special order, without the case or loudspeakers for mounting in a console, price £145 19s. It is hoped that it will be possible, shortly, to convert existing model 500 monaural recorders in good condition to a Model 570. The price of £81 18s. will include the provision of a new case.

For further details write to, **Multimusic Ltd., Maylands Avenue Hemel Hempstead, Herts.**



★
The R.G.D.
Mark 107
a new
2-speed portable
recorder
★

R.G.D. well known for television and radiograms recently announced a portable tape recorder, the Mark 107.

The following is a brief specification of the recorder, it takes 7 in. spools, runs at $7\frac{1}{2}$ and $3\frac{3}{4}$ i/s with a claimed frequency range at these speeds of 30-18,000 c/s and 40-13,000 c/s; signal to noise ratio -45 dB; wow and flutter 0.3% at $7\frac{1}{2}$ i/s and 0.1% at $3\frac{3}{4}$ i/s. Features of this recorder include, single motor drive, electro-magnetic control of operating buttons; special button for erasing during playback; magic eye level indicator; 3-digit footage indicator; switched input connection for microphone, telephone and pickup; 4 watts peak

output, the amplifier can also be used "straight through"; connection for extension speaker and external amplifier.

There is provision for a remote foot control and the Dynamic microphone which is supplied, also has a stop/start switch and a special speech/music switch. The lid has storage space for a spool of tape and connecting leads. The measurements are 16 $\frac{1}{2}$ x 13 x 7 $\frac{1}{2}$ in., and the weight 29 lb. The price is £72 9s. including microphone and 7-in. spool of tape.

Manufactured by **Radio Gramophone Development Co. Ltd., Eastern Avenue West, Romford, Essex.**

Scotch Brand Double Play Tape

AT the London Audio Fair the Tape and Electrical Products Division of the 3M Company (Minnesota Mining & Manufacturing Co.), introduced a new Double play tape to their range. Called "No. 200 Double-Play" a 7 in. single-track spool will give 2 hours continuous recording at $3\frac{3}{4}$ in. per second—twice as long as 'ordinary' tapes of similar size. Base of the new tape is tensilized polyester, a very thin, but also very strong plastics material. Despite its thinness, No. 200 Double-play is claimed to give a better signal-to-print ratio, better high-frequency response, and a very low print-through factor. Three spool sizes are being made— $3\frac{3}{4}$ in., 5 in. and 7 in.—which are suitable for use on nearly all types of recorder.

As with all "Scotch" brand tapes, it is 'dry-lubricated' by a special silicone process to protect sensitive recording heads, and the manufacturers say that it will not deteriorate even in severe conditions of temperature and humidity.

The Minivox Battery Portable

THE Minivox, manufactured by Challen Instrument Co., is the first battery operated transistorised portable recorder to be wholly designed and manufactured in this country. Next month *The Tape Recorder* will feature an exclusive article on this recorder, which sells for the remarkably low price of £35 14s. with microphone.

This machine is bound to arouse an enormous amount of interest as it will open up completely new fields for the average enthusiast. It operates at 1 $\frac{7}{8}$ i/s, is powered by 3 motors, takes $3\frac{1}{2}$ in. spools (36 mins. playing time on each track with long play tape); has a Magic Eye level indicator. An outstanding feature is the battery life which given normal use is well over 3 months. 250mV output. The size is only 10 x 7 x 5 in. and the weight 9 lb.

E.M.I. Double Play Tape

E.M.I. have produced a new double play tape, "Emitape 100"; this is on a special double stretched base, thereby minimising the risk of further stretch. The performance characteristics are claimed to be the same as for Emitape "88" and "99". It is, at present, being produced in 3 spool sizes, $3\frac{1}{2}$ in. 400 ft., price 17s.; 5 in. 1,200 ft., price £2 5s.; 7 in. 2,400 ft., price £4.

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What benefit do I get if my Recorder needs no service during the year?

At the end of twelve months a free check to ensure that the machine retains top efficiency, and replacement of any dubious parts.

I'm still doubtful. It sounds too good to be true! Are you sincere?

We expected this comment. You are at liberty to investigate the matter to the full, even if a trade competitor. There may be flaws in the scheme, that remains to be seen. All we can say is that it works, has worked well in fact for some months now on a pilot basis. As to sincerity the guarantee you get is as clear-cut, as legally binding, perhaps more so than any trade guarantee of which we have knowledge.

Aren't there risks to you in such a scheme?

Of course there are! But none to you! We'll cover ourselves by offering this GO plan initially up to August 31st. A full twelve months service if you come in now, but you may not have the advantages of the scheme, at least at such small outlay after that date.

If I buy on H.P. do I still enjoy the GO service?

Yes, but remember we can only afford to do this since we do not offer inducements such as "Free tapes", "No Interest terms", and the like. Dealers who do so are in danger of losing for their customers any protection afforded by recorder manufacturers' guarantees, that are only valid if full price without hidden discounts are given. Our H.P. terms are fair, even generous.

Perhaps this is a startling venture, you'll think. We think so too, but there isn't any doubt that it is sensible, factual, good business. You'll get a better deal. Not every Recorder is covered, we can only afford to sell the best in each price class, some as cheap as £30-40, others over £150. We know this market. Our knowledge can help you.

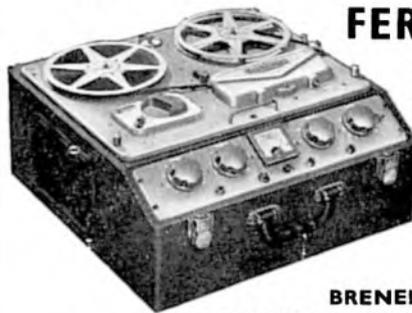
Write today for further details to Mr. Botterill at the address below, and if you want particulars of any specific machines don't forget to mention it.



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Ferrograph Stereo-Ad ... 30 gns.	*Telefunken KL75 ... 50 gns.
Grundig TK20 ... 52 gns.	Verdik ... 45 gns.
*Grundig TK25 ... 62 gns.	*Vortexion WVA ... £93 13s.
*Grundig TK30 ... 72 gns.	*Vortexion WVB ... £110 3s.
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our readers write

★As regular readers will know, the first three letters printed each month have been placed in the order which, in the Editor's opinion, merit 1st, 2nd, and 3rd awards of a spool of tape. The prizes are 7-inch, 5-inch, and 3-inch spools respectively. If you send us a letter which you don't want to be published, please mark it NOT FOR PUBLICATION.

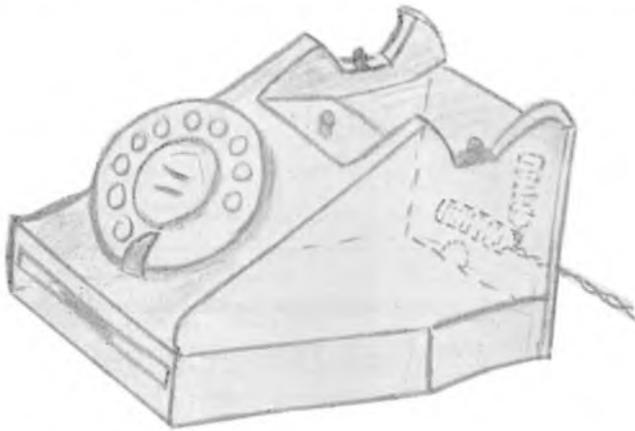
. . . about a telephone adaptor

From:—L. Reid, 31, Abbey Park, Knock, Belfast.

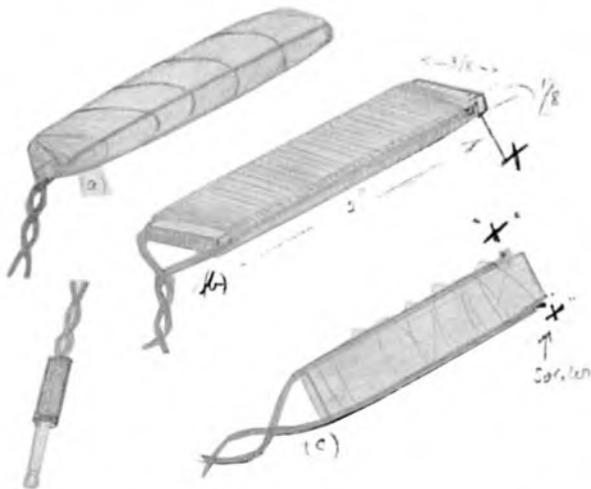
Dear Sir:—Like Mr. Walkering, who described his useful gadget in last month's issue, I am sending details of my useful accessory which was made from scrap for the cost of a few pence. It works perfectly with my Vortexion recorder, and not only records two-way telephone conversations but also the dialling and ringing tones.

Materials used were: about 12 yds. of fine enamelled copper wire (No. 30 gauge was available and proved suitable); a soft iron armature approx. $2 \times \frac{1}{2} \times \frac{1}{4}$ in., and a few yards of twin bell flex to connect up.

First insulate the armature with sellotape, and bind one wire of the flex length-wise along the narrow edges (to secure a firm anchorage).



This sketch by Mr. Reid shows two alternative positions for the telephone adaptor. It should be fastened with sellotape or elastic.



The three steps in the construction are (a) cover with insulating tape and bind one wire of flex; (b) wind on the wire; (c) solder flex to wire, and cover with P.V.C.

Over this wind about 200/300 turns of enamelled wire; the ends being soldered to the flex. A neat finish is given by binding the coil with black P.V.C. adhesive tape. Attach a suitable jack plug to the free end of flex and connect to low impedance mike input, the coil being held against the back of the telephone rest (just above where the leads enter at rear). If your recorder only has a high impedance input a microphone transformer will be needed; otherwise many more turns of finer wire would be required on the coil, which would have to be well screened to avoid hum. Low impedance connection is simpler and better.

Yours faithfully

. . . about choosing a recorder

From:—L. G. Brown, 43, Southbrook Road, Lee, London, S.E.12.

Dear Sir:—With so many tape recorders on the market it must be a very exhausting job for anyone choosing his first machine. Apart from reliable reviews (of which I am sure this magazine will prove to be the best source), and recommendations of friends, what else has the prospective buyer to go on? There must be many hints on buying that other readers may be able to supply, and I offer the following in the hope that they may be of use to some bewildered newcomer.

Recently I bought a new machine and in my search I rejected quite a number purely on account of the poor signal/noise ratio. My method of testing may not be too technical but at least it served my purpose. It was to take a reel of unused tape and to run a little through the machine on replay. Then with all the input controls set to zero I would make a recording of a few seconds. On playing back the tape from the beginning the volume of noise that the machine actually puts on the tape can be roughly measured by ear. This noise may be in two forms; a high pitched hiss, and secondly a low irregular rumbling noise rather like gramophone turntable rumble. As this noise level will be present on all recordings made and will be very noticeable in quiet passages of orchestral music, it is a factor that is of considerable importance. This test is best carried out with the recorder coupled to a high quality amplifier and speaker to eliminate any inherent noise in the recorder's own replay amplifier and speaker(s). The recorder's own amplifier is best tested coupled to a good quality external speaker, and the hiss level can be ascertained audibly when the machine is set to replay with no tape running.

If the machine is fitted with a placing indicator this should be tested for accuracy. This depends a great deal on the quality of spooling achieved on the recorder. Almost always when using a place indicator it will be after fast wind or rewind. If the machine cannot spool neatly and tightly on fast wind it follows that, as most indicators work from a coupling to the take-up reel, there will be an inaccuracy which on some machines is such as to make the counter worthless.

All the tests that I have outlined above can be carried out easily at the shop and the salesman will be only too pleased to do them. If he will not, or worse if he hasn't the facilities, then you are in the wrong shop.

Yours faithfully

. . . about tape loops

From:—S. Fortescue, 103, Torrington Way, Morden, Surrey.

Dear Sir:—I have been recording now for over 2 years—possessing a very fine Philips 2 speed recorder—and have 27 fully recorded tapes. Some time back, I wanted to record a continuity announcement for open-air public use to advertise a special function. So I made a "continuous belt" of tape, about 12 foot long, recorded on it my message and then inserted it on my machine, anchoring one end of it round a smooth wooden broom handle tied to a chair. This gave an excellent result with no apparent damage to the recording or tape—even after several hours of running. This "belt" method saves tape and needs only one recording of the message.

Yours faithfully

★NOTE: With our compliments, a three-inch prize will enable you to make bigger and better loops. EDITOR.

. . . about tape indicators

From:—B. L. Hensman, 347, Fell Lane, Keighley.

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7"	35/-	50/-	35/-	50/-	35/-	50/-

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Escort	4 15 0	3 1 5	45
Sound 444	4 15 0	3 10 10	45
Viscount	5 3 0	3 17 2	49
Grundig TK20	5 12 0	4 1 8	52
Telefunken KL75	5 15 0	4 6 8	55
Brenell 3-Star	6 4 0	4 11 2	58
Fi-Cord	6 4 0	4 12 11	59
Philips AG8108	6 11 0	4 17 7	62
Sound 555	6 17 0	5 2 4	65
Grundig TK25	7 3 0	5 7 1	68
Stuzzi Magnette	7 5 0	5 8 8	69
Brenell Mark V	7 5 0	5 8 8	69
Essex	7 18 0	5 18 1	75
Grundig TK30	8 4 0	6 2 10	78
Telefunken KL85	8 8 0	6 6 0	80
Harting HMS	9 3 0	6 17 0	87
Grundig TK35	9 5 0	6 18 7	88
Simon SP/4	10 10 0	7 17 6	100
Reflectograph 500	10 18 0	8 3 10	104
Tandberg 4-Track Stereo	13 4 0	10 3 9	129

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readers letters—(continued)



position indicator on most of the popular recorders? Most of us have experienced the difficulty of deciding how much time is left when using different sized spools for take up and supply. Using one edge the indicator reaches a certain number, but change the spools over and on the same length of tape you get a very different reading. (I lost a valuable recording due to not realising this.) Of course it is due to the diameter of the tape decreasing.

Why cannot the indicator be driven from either the pinch wheel or a special idler pulley? I can see difficulties in using the capstan for this purpose, but my suggestion should not be too difficult to manage. The advantage would be that for any size reels and no matter how much tape had been used, the number on the place indicator would be a direct indication of time. There may be difficulties which I have not appreciated but it seems a worth while line for experiment. Of course there may be recorders with this sort of thing incorporated—I have not a very wide knowledge of makes, but I do not know of a popular make of this type.

Yours faithfully
NOTE:—This is a very sore point for the amateur. On professional machines, such as TR 90 and Telefunken, the counter is driven off the tape loop. EDITOR.

... about tape and Scouting

From:—Albert E. Greenway, 211, Frederick Road, Aston, Birmingham 6.

Dear Editor:—With the help and co-operation of the International Scout Club and "World Scouting", Jac. Hovenier of Arnhem, Holland, Don Rivers, of Cheshire, and I have been sending tapes to each other regularly. The language barrier makes it difficult for some of the boys in the Arnhem group to express their thoughts, but with coaching and practice they will improve.

Here are a few ideas that have been tried out:—(1) 'Spoken' correspondence with other Scout Groups. (2) Making a 'sound' log book of the troop, camp fires, concerts, investiture ceremonies, etc. (3) At meetings of the groups:—"Sound" Kim's game, Observers Badge, disguised voices and discussions. (4) Visits to handicapped groups, or individuals in which even the smallest Tenderfoot has the opportunity to play his part.

A tape speed of $3\frac{1}{2}$ i/s on a 300 ft. 'message' tape is the international standard used, as this covers nearly all machines. In corresponding with tape we have a definite means, and a potent method of spreading the Scout friendship and Laws to every corner of the earth. In our own group, where the Aston Villa Football Club started from in 1874, we record messages from parents, relatives and friends, and then send them to our members serving in Her Majesty's Forces. It has generally been found that the education officials will co-operate in the use of recorders, and replaying and recording ready to send back to the Group. Any member of the Scout or Guide movement who is sufficiently interested in this medium, should contact me at the above address, and I will try and put them in contact with others who are interested.

Finally I should like to congratulate you on raising the standard of T/R magazines, but may I suggest that you give more space for Tape Club notes and Readers Letters. *Yours sincerely*

... about a simple gadget

From:—L. J. Aston, 23, Goldsmith Avenue, Acton, W.3.

Dear Sirs:—Perhaps you have found at one time or another, viewing the magic eye on the average recorder is impossible unless you are almost on top of the machine. My answer to this problem was to mount a small budgerigar mirror at an angle of about 45 degrees in a saw cut in a large toothpaste cap. This enables the "eye" to be seen anywhere in the room. Obviously the shape of the mirror depends upon the shape of the eye fitted to the recorder. However, my two machines, Walter 303 and Telefunken KL75, are quite successful with the same mirror. *Yours sincerely*

... about a large installation

From:—John M. Bellord, Honeywood House Convalescent Nursing Home, Rowhook, Horsham, Sussex.

Dear Sir:—I am enclosing a photograph of our stereophonic Hi-Fi equipment, in which you may be interested.

We have recently built this cabinet and installed Brenell and Pye equipment, firstly for use in this nursing home, and in our private chapel. However, we are hoping to interest the Church authorities in this area, and as the second cabinet we have built is without wireless

receivers and loudspeakers, we can produce these "tailor made" to suit any individual requirements. Another model which will be constructed shortly will incorporate the Reflectograph stereo deck and amplifiers, or Ferrograph.

As you can see this model incorporates the Brenell stereo deck with staggered heads through Brenell pre-amplifiers, and Pye 10 watt amplifiers to a pair of Goodman 12 in. speakers. A matching Pye tuner is included, and a completely separate Echo F.M. set with its own speakers. The separation of about 4 ft. 6 in. between the two speakers gives remarkably good stereophonic effect, and of course the equipment enables one to give very excellent monaural reproduction together with any combination of dubbing or transferring from one track to another.

Yours sincerely

... about tape speeds

From:—J. E. Chamberlain, 5 Almond Road, Shrublands Estate, Gorleston-on-Sea, Norfolk, England.

Dear Sir: As a newcomer to tape recording, I would like one of your experts to answer a question for me if possible. I have just bought a machine which has speeds of $7\frac{1}{2}$ i/s and $4\frac{1}{2}$ i/s. What I would like to know is can I play a tape pre-recorded at $3\frac{1}{2}$ i/s or not? I feel sure this question will interest many of your readers who have this type of machine. I don't know if this point has already been raised, as I'm sorry to say I missed the first 2 issues. *Yours sincerely*

NOTE:—The answer is the machine will not play at $3\frac{1}{2}$ i/s as it stands. However, the next letter is from a reader who has successfully modified his recorder to play at $3\frac{1}{2}$ i/s instead of 4.8 i/s, which proves that ingenuity can overcome all odds. EDITOR.

From:—H. Bennett, 18, Feldon Lane, Blackheath, Nr. Birmingham.

Dear Sirs:—I have made a couple of small modifications to my recorder which may be of interest to other readers with similar equipment. The machine is an early Elizabethan (Vintage 1955) with a Motek deck. Originally there was no interlock to prevent Rapid Advance and Rewind being carried out whilst the amplifier was switched to the Record function, with consequent loss of recording, patience, temper, and the respect of everyone having the misfortune to be within earshot.

I overcame this shortcoming by mounting above the deck a Perspex flap, capable of pivoting on a Meccano pillar to cover the "Rewind" and "Fast Forward" buttons. The amplifier function knob was then drilled to take a 16G. wire, which could then actuate the flap.

The second modification enables me to operate the deck at 3.75 in. per second, in addition to the built-in speeds of 7.5 and 4.8 in. per sec. This was achieved by transferring the driving belt from the motor pulley to its boss, the diameter of which has been increased slightly by wrapping on jointing tape. It was necessary to move the pulley a little way up the motor spindle to reduce mis-alignment of the belt, when it runs either on the pulley or on the boss.

To achieve transfer from normal running to slow running, it was my intention to rig a Meccano mechanism through the deck, but that



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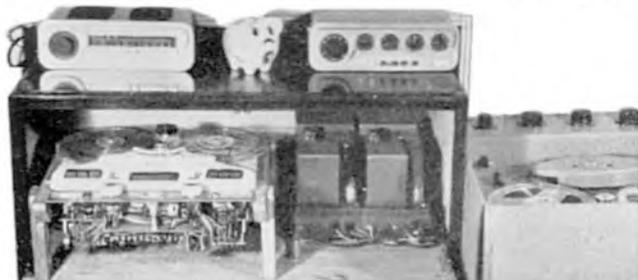
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READERS' LETTERS—(continued)

has not proved practicable. Instead, I have a small hole drilled through the deck, through which I fish with a suitably bent wire. To prevent the belt from slipping off at each speed change, an oversize Perspex disc has been affixed to each end of the pulley. No doubt a reader with better facilities at his disposal than I have would improve on my rather Heath-Robinson solution, but the rig as described does work. And I have not had to replace the driving belt. The quality of the recording at this speed is not, of course, what one would expect from a more modern machine, but is quite acceptable for most popular music, it is eminently suitable for correspondence, and besides being more economical than the 4.8 in. speed, it eliminates the question, "How will I cope with existing recordings at 4.8 i/s if I buy another machine?"

Yours faithfully

... with a solution to a mystery



From:—Julian Petrasky, B.B.C. Club, Television Studios, Lime Grove, W.12.

Dear Sir:—I read with great interest the latest instalment on "Taking up tape" for beginners. Unfortunately I was unable to identify positively a piece of equipment that appeared in the photograph that accompanied the article. The object in question is placed midway between a "Quad" pre-amplifier and a "Quad" tuner unit. On consulting some of my friends learned in HI-FI, the most sensible suggestion forthcoming was that the "Thing" is a Helmholtz Resonator tuned to some special frequency; ?? tape deck grunts! It appears to be tuned by a slot in the top, there are also four legs?, are they of a critical length?, and are they insulated from the table? Is there any significance in the strange markings on the front end of the device?

A rather hurried search of current technical literature revealed only one example of this remarkable innovation, I enclose for your files a special cutting that reveals in greater detail the unusual features of this handy little gadget. I am sure an article on it would appeal to all your readers that are wondering how they are going to afford next year's HI-FI extravaganzas.

I am learning a lot from your worthy magazine and I look forward to next month's edition.

Yours faithfully

★NOTE: So that's what it's for! Having seen the technical literature referred to (see opposite page) we at once sought and bought a specimen of the ceramic; but having placed all the other components according to circuitry, we could find no room on the chassis for this decorative item. Having positioned it, as in the photo, we of course noted an immediate improvement in everything. Now we know why. Again, many thanks; EDITOR.

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A number of organisations can provide plays of all types, and there are hundreds to choose from. When deciding on a play you should (a) decide whether you want a thriller or a light comedy etc.; (b) check the list of characters against your available "bodies"; (c) see if any special effects or noises off are required, and if you can cope with them.

The summary or synopsis of a play gives a good indication of its scope, and we reproduce one below to whet readers' appetites. We have read this play through, and there is a great deal of scope for improvising sound effects, and playing in "atmosphere" music.

Permanent Way. (Play). 1 Act. By Anthony Booth. Cast: Male: 1 Young, 1 Young to Middle-aged, 3 Middle-aged. Female: 1 Young, 2 Young to Middle-aged. A living-room. Jim Reed is a quiet, middle-aged train driver living in a house beside the railway, with his attractive second wife Sue and his daughter Liz, of whom he is very fond. Lodging with them is another driver, a younger man, Phil Pope; for some time he has been Sue's lover but neither of them thinks that Jim suspects. One night after Phil has gone on duty Jim finds that Liz has left the house with a worthless young man and angrily he accuses Sue of driving her away. Dropping her pretence Sue boasts that she is in love with Phil, but is surprised when Jim shows no reaction. Instead he calmly tells her that her lover is about to die—he has fixed a piece of wood on the line to derail the train. Sue is frightened, and as she catches Jim's burning look of revenge she hysterically pleads for mercy; but it is too late; relentlessly Jim's hands find her throat and strangle the life out of her, while outside can be heard the crash that signifies Phil's death.

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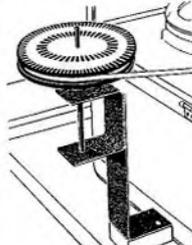
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