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# AMATEUR TAPE RECORDING

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Spotlighting outdoor recording; location recording of sound for films; capturing the realities of daily life on tape; taking a lighthearted look at what can happen to an accident prone taper on

location; and reviewing the equipment which makes outdoor recording possible — portable recorders, microphones, windshields, reflectors and accessories.

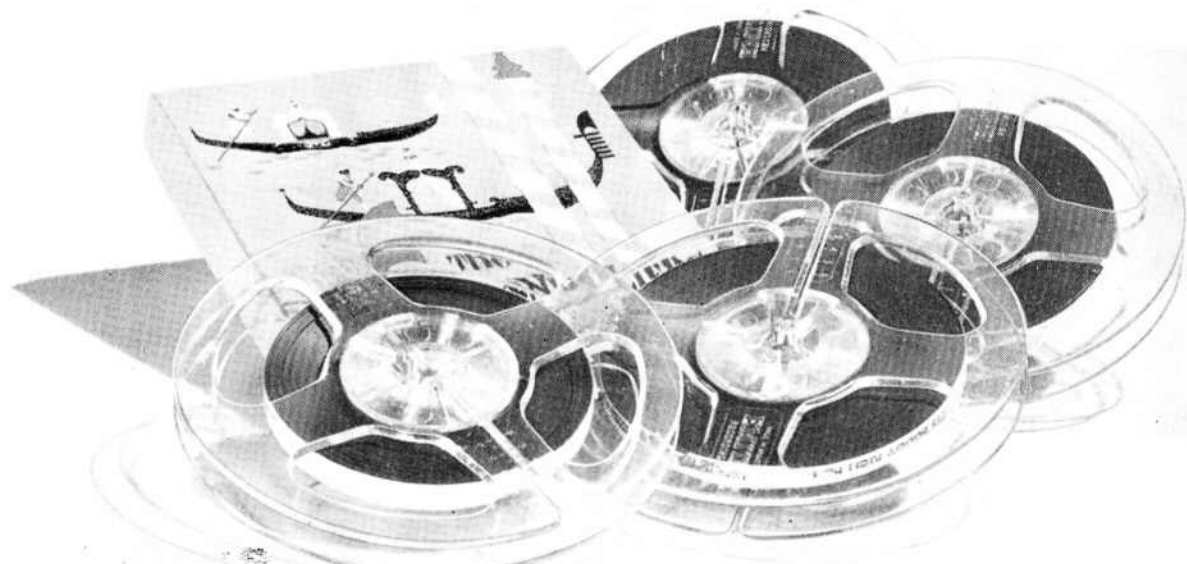
Gordon J King concludes his

series on tape and transistors; F C Judd tests the Armstrong stereo tuner and multiplex decoder; latest news from the clubs. Plus a review of new products and a look at the Sound Scene of today.





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**11** Dvorak Symphony No. 5 From The New World, Leopold Ludwig conducts the London Symphony Orchestra in a dramatic and moving performance. Also in stereo.



**12** Beethoven Eroica, Symphony No. 3, Claudio Abbado conducts the London Symphony Orchestra in a masterly performance of this monumental work. Also in stereo.



**63** Cuban Carnival, Yesterday, Blues in My Heart and eight more great numbers played by George Shearing with vocals by Dakota Staton.



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**108** Mel Tormé's velvet voice in 12 top numbers: Body and Soul, Round Midnight, Blues in the Night, That Old Feeling, Where Can I Go Without You, etc.



**14** Tchaikovsky's Symphonies Nos. 5, Sir Malcolm Sargent and LSO combine to give this famous symphony a dramatic and colourful rendering. Also in stereo.



**44** Leopold Ludwig and LSO combine brilliantly in an exciting 'double' two of the world's greatest symphonies receive vivid new interpretations. Also in stereo.



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**54** Tchaikovsky's last and greatest symphony, is here given a splendidly moving rendering by the Symphonies of London conducted by Muriel Matheson. Also in stereo.



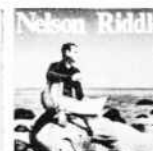
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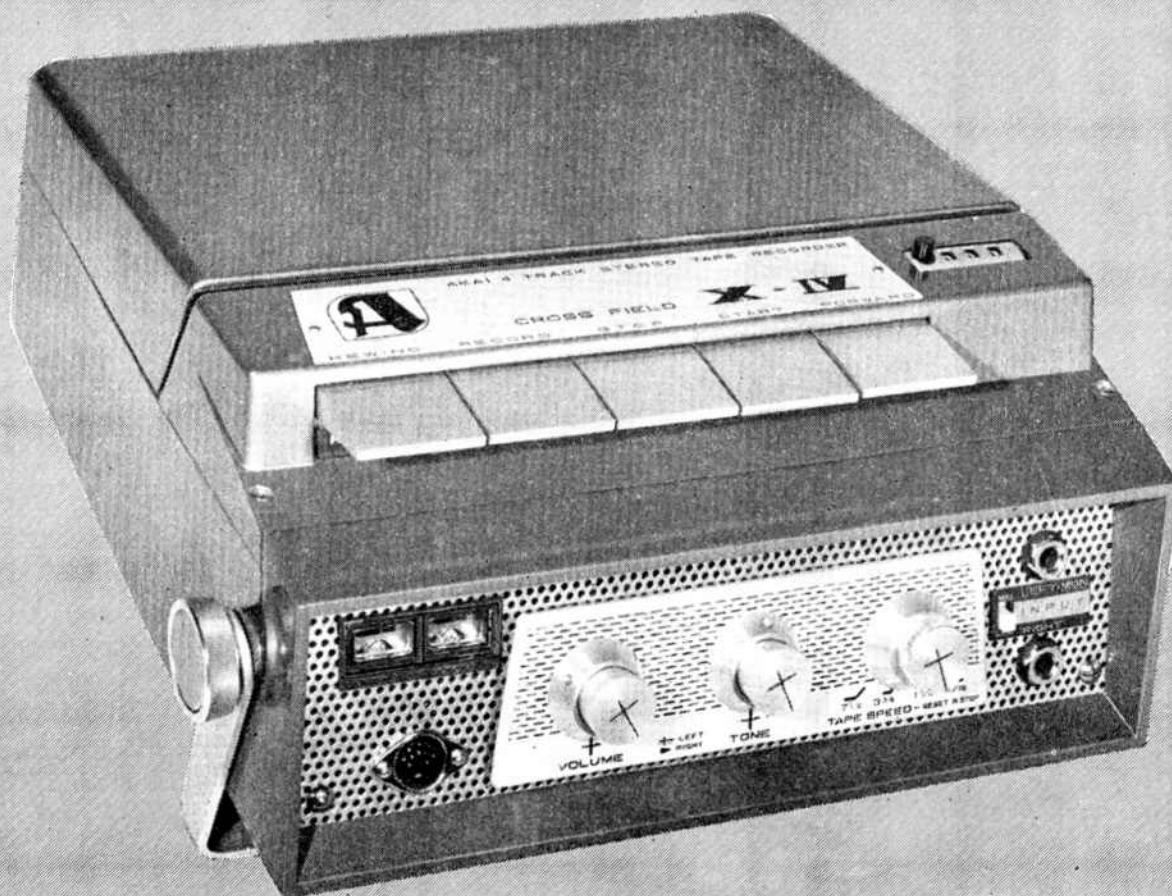
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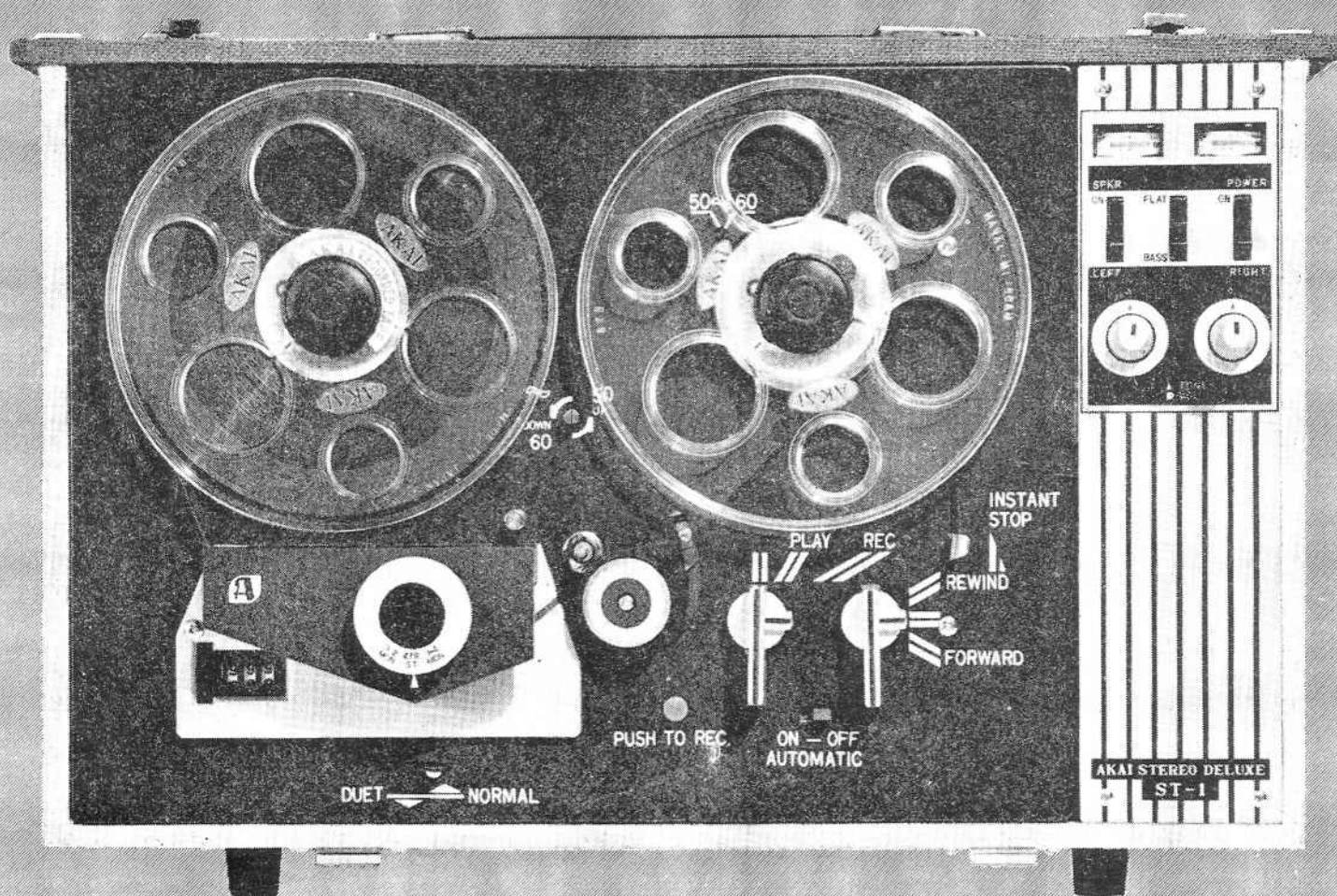
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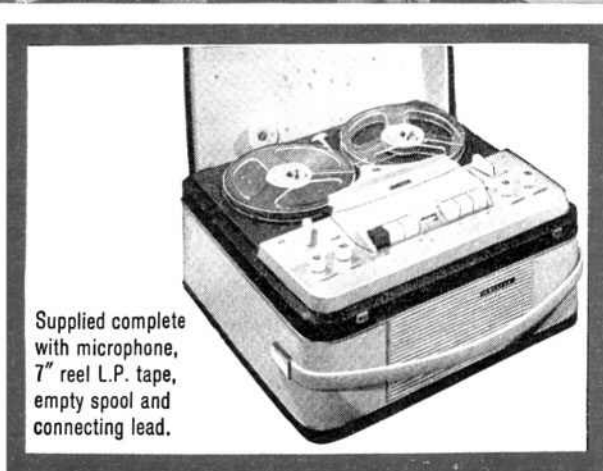
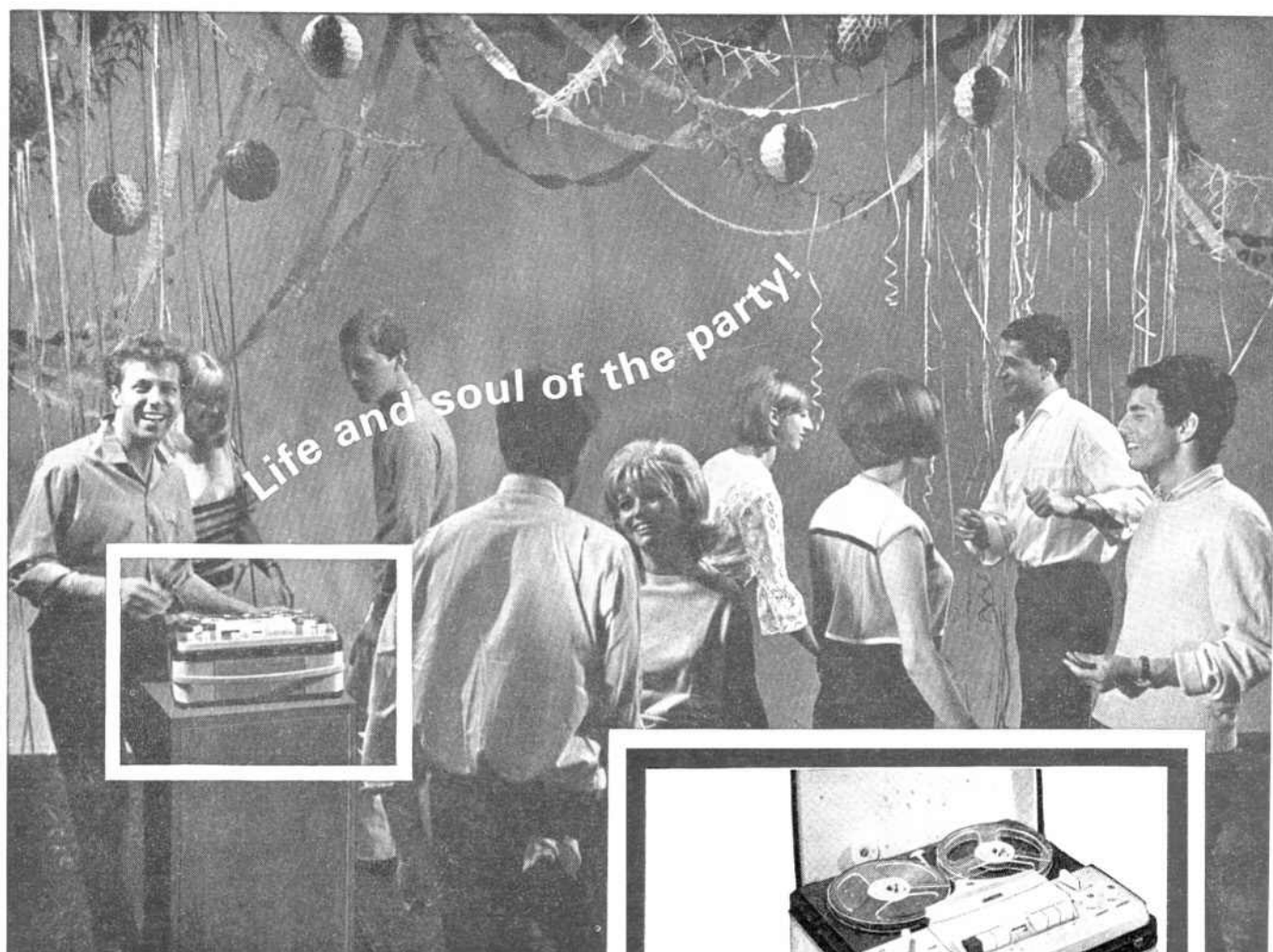
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# AMATEUR TAPE RECORDING

## VIDEO & HI-FI

Vol. 6 No 11 June 1965

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THIS IS THE TIME for all tape recording enthusiasts to think about the great outdoor life and all the new and rare sounds that go with it. By the time this issue is well and truly circulated, several ATR readers will already be off on the "ATR Sound Tour" in search of new sounds accompanied by our contributor and travel broadcaster, Bob Danvers Walker. So bring out your portables and consult our new feature RECORDING DIARY on page 20 in which you will find details (every month) on events worth visiting with a tape recorder.

THIS IS THE TIME to ponder over the tape you have entered for the BTR Contest. Will it be successful? Time alone will tell and of those ATR readers who have entered, we hope that at least one will be a prize-winner. Of course full details of prize winners and their tapes will be published in ATR as soon as they are known. THIS IS ALSO THE TIME to air your views about tape recording and tape recorders, your likes and dislikes about ATR, about dealers and manufacturers, in fact about anything — we are sympathetic listeners and welcome your letters or even a tape, providing you keep it short and to the point. We hate to think of the time involved in listening to dozens of 7" double play tapes recorded on all four tracks at 1½ ips!!

Perhaps after all a letter might be better. So reserve your tapes for tapesponding, because next month we shall be devoting a good proportion of ATR to this subject — don't miss it. F.C.J.

Editor: F. C. Judd, A.Inst.E. Assistant Editor: Kim Cook. Art Editor: Robert Morley. Production Director: Denis Curtis. Advertisement Director: Lindsay Masters. Advertisement Manager E. McKeown. Circulation Manager: David Hughes. Editorial, Advertising and Subscriptions: Amateur Tape Recording, Haymarket Press Ltd., 86/88 Edgware Road, London W2, Ambassador 3200. Amateur Tape Recording is published by Haymarket Press Ltd. © 1965. Printed by Athol Press, Douglas, Isle of Man. Title registered at Stationers' Hall. Subscription Rates throughout the world 30s. 0d. Post Paid for twelve issues.

# FILM RECORDING ON LOCATION

by G. Jones.

I once saw in a recording magazine, happily not this one, a photograph under which the caption read, "Sound and Cine on location". This photo has been recreated in fig.1. I only hope that the original was also specially staged because it broke almost every rule there is for recording with films on location.

The camera is unblimped and far too near the microphone in this condition and if the track contains anything other than camera noise, then it would be sheer coincidence. Incidentally in the film world a silent camera is one on which mute shots are filmed, i.e., sequences for which sound is not recorded at the time. This "silent" camera belies its name because in action it invariably makes a fearful noise. Sound takes are filmed on a "sound" camera which paradoxically makes no noise.

But by far the worst fault in the illustration is the incorrect use of the wrong microphone. This article is concerned with the theory of microphones but next month we can move on to their precise application. It's the wrong microphone because it is a crystal type. Not that the lowly crystal is intrinsically wrong. Some can produce a very pleasant sound, provided that one is not too worried about the diminution of the lower frequencies. However, the crystal type is high impedance which does mean that one is limited to about six feet of cable between it and the tape recorder. Six feet is nowhere near enough for location recording. With longer lengths of cable and high impedance outputs the capacitance effect of the cable

attenuates the lower frequencies quite markedly thereby impairing faithful sound reproduction. An impedance matching transformer can be used, as near to the microphone as possible, but this adds needless extra equipment.

It is far better to use an inherently low impedance microphone, i.e., a moving-coil or ribbon type. However a crystal mic is being used in the illustration. Even so, its method of attachment to the car would horrify any diligent sound recordist. The microphone is hooked over the rear window which has been fully raised until the microphone is wedged against the roof. No attempt has been made to insulate it from mechanical vibration caused by the car. A shilling's worth of foam rubber would have obviated that problem. Finally the microphone has no wind-gag of any kind. It must have been a very, very still day because next to the microphone and the recorder, a wind-gag is essential outdoors. I hope to come back to this point in the next article and explain how a cheap wind-gag can be easily constructed. All in all any recordings made in the manner illustrated would consist of either camera noise, mechanically transmitted noise, wind rumble or a combination of all three — with occasional interruptions by the required sound.

After that brief catalogue of do-nots, a number of positive recommendations follow.

## MICROPHONES

The perfect microphone for location recording has the following characteristics.

- 1 Good frequency response
- 2 Polar diagram constant over frequency range
- 3 Good signal/noise ratio
- 4 Good transient response
- 5 Good dynamic range
- 6 Unaffected by temperature, pressure or humidity
- 7 Unaffected by stray magnetic or electrical fields
- 8 Simple power supply
- 9 Stability in reasonable wind conditions
- 10 Neat and unobtrusive
- 11 Small weight
- 12 Robust
- 13 Reliable
- 14 Usable in any position
- 15 Should not generate harmonics
- 16 Reasonably inexpensive
- 17 Ability to work over long distances without extra attachments

Needless to say the perfect microphone does not exist.

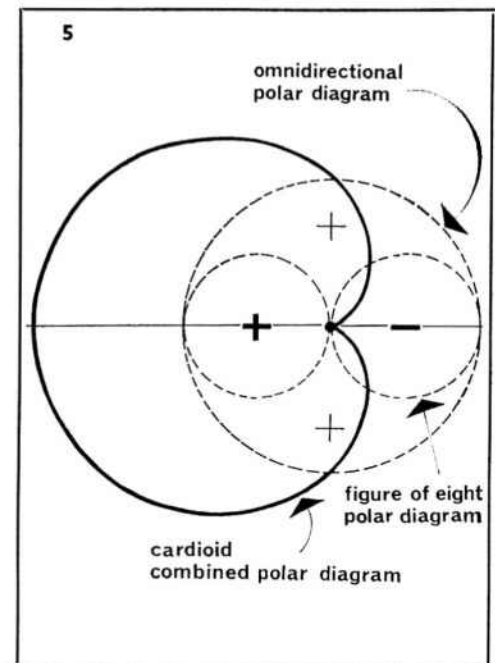
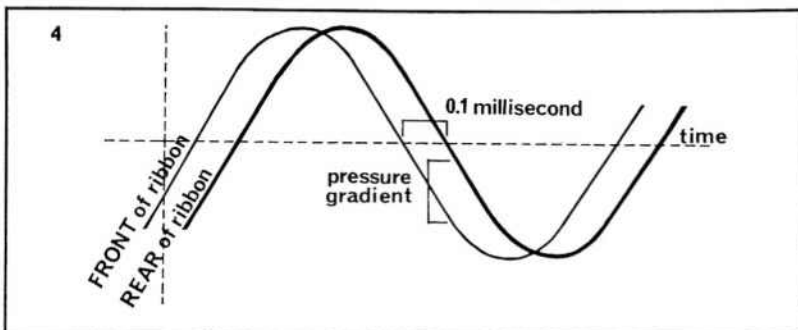
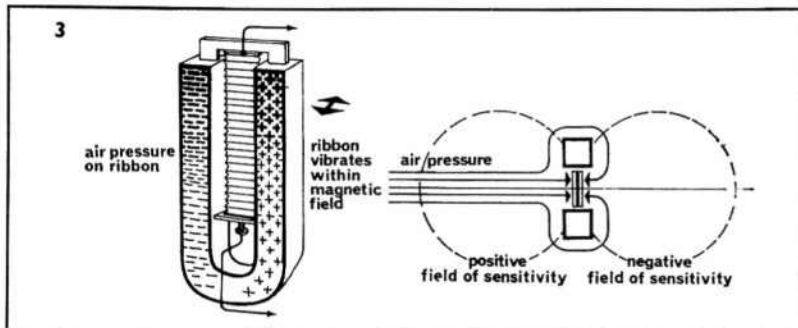
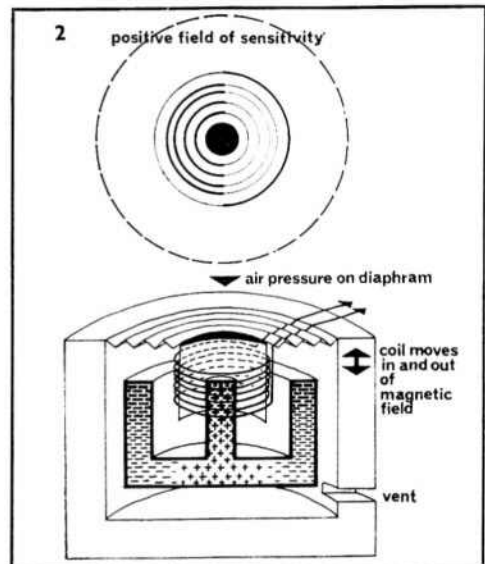
The last proviso rules out crystal microphones. The need for a simple power supply eliminates capacitor mics. Stability in wind eliminates

*Continued overleaf.*

**Amateur Tape Recording, Video & Hi-Fi**



(1) How NOT to take films and record the sound tracks. (2) The basic moving coil microphone and polar diagram. (3) The basic ribbon microphone and its polar diagram. (4) Sine wave graph of "pressure gradient". (5). Cardioid polar diagram.



ribbon microphones and one is left with the moving-coil type. A good moving-coil fulfills all of the provisos to varying degrees and is the one recommended for location work.

#### MOVING-COIL MICROPHONES

These are also popularly known as "dynamic" microphones which is something of a misnomer as all microphones are dynamic. Basically they consist of a coil attached to a diaphragm and suspended in a magnetic field, the whole being surrounded by a protective casing as shown in fig.2. The air vent in the outer casing allows for small changes in atmospheric pressure. Thus atmospheric pressure on both sides of the diaphragm is equalised. The diaphragm responds to the rapidly changing air pressure caused by the sound waves impinging on it. As it vibrates the coil attached to it moves in the magnetic field and generates a small current which is fed to the record amplifier.

#### PRESSURE OPERATION

Because the diaphragm responds to pressure rather than air movement, it is said to be "pressure operated". As the microphone is pressure operated it is immaterial from which direction the sound is emanating. In other words, moving-coils respond just as well to sound coming from the rear as from the front. Technically this is known as an omni-directional polar diagram.

Recently there has been an interesting development in moving-coil microphones which has the effect of giving them a uni-directional or cardioid polar diagram. It has been

achieved by wedding the pressure operation of moving-coils to the pressure gradient operation normally associated with ribbon microphones. A front to back airpath has been made through the magnet so that the diaphragm also acts as a ribbon, though admittedly of impaired efficiency.

#### PRESSURE GRADIENT OPERATION

To consider the effects of pressure gradient operation it is easier to examine a ribbon microphone. The theory is still valid for the modified moving-coil.

The basic ribbon microphone consists of a thin metallic strip suspended between the poles of a magnet (fig.3).

Sound waves strike the front of the ribbon causing it to depress within the magnetic field and thereby generating a current. A finite time later, in the region of 0.1 millisecond, the same sound waves strike the rear of the ribbon impressing it this time and causing another current of equal magnitude. However this latter current is slightly out of phase with the first and so the resultant current to the amplifier is the difference between the two. This is the "pressure gradient" and is graphically expressed in fig.4.

Sound waves travelling in the plane of the diagram will cause no pressure gradient and hence no output because their pressure will be the same simultaneously on both sides of the ribbon. Thus a ribbon microphone has a figure-of-eight

polar diagram, i.e., it is sensitive at the front and back but not at the sides, as shown in fig.3. The modified moving coil combines an omni-directional and the figure-of-eight to produce a uni-directional or "cardioid" polar diagram — cardioid because the shape (fig.5) is said to resemble that of the human heart. The cardioid characteristic means that the microphone will discriminate against unwanted sounds from the rear — not least of which is camera noise.

#### TAPE RECORDERS

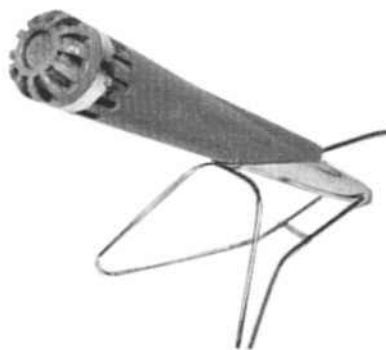
As this is a tape recording magazine I should be trespassing upon other peoples' territory if I devoted too much space to this subject. Obviously the best type is a high quality battery portable but most amateurs find it too expensive to purchase a machine for specialist and limited use. If you can afford it then you will be well rewarded. If not, don't worry unduly. For two years I successfully recorded many exterior sounds on a mains machine with only varying lengths of mains cable, a variety of plugs and the indulgence of the inhabitants of my village. The choice of battery portables is wide but I do, however, urge you *not* to buy the cheap rubbish masquerading as tape recorders in bargain basement stores. Nor should you buy the medium priced machines which have no capstan. Tapes recorded on these are not replayable on standard machines. To try and do so with a long recording results in a beginning that sounds like a colony of demented chipmunks and an ending like the Death March from Saul.



Top: Left. S. G. Brown dual function mic; R. Telefunken TD 300 mic.

Lower: Left. Grampian ribbon mic for indoor work only; Right. Grampian DP4 mic for outdoor use.

# GOING PLACES GOING PORTABLE



No recording enthusiast wants to be static, for these days to be static is to be stagnant. And if you're stagnant, and your recordings show it, then you might as well forget all about tape recording.

The very essence of a good recording is life, and if you want a lively recording you've got to be prepared to go out and get it. Suitable subjects don't just present themselves at your front door and ask to be taped.

Unfortunately, many recorders have one very limiting factor — they're plug-bound. In other words, they're no earthly use if you haven't got a three-pin socket with AC current flowing through it.

Of course, you can occasionally get out with a mains machine, if your ultimate destination is an indoor location, and if you're on the property of some understanding (and wealthy?) person who doesn't mind your consuming his electricity by the kilowatt.

However, there is one excellent solution — if you want to go places, go portable! Neat, lightweight machines, with adequate frequency response, plenty of tape playing time, and the simplest of operating controls make location recording both desirable and delightfully easy.

Mind you, recording is like photography in one way — you start off simply, and then develop a compulsion for all the extra accessories. Just as the amateur photographer finds himself buying flash guns, lens hoods, filters, exposure meters and the like, so the portable recordist finds himself buying carrying cases, windshields, special microphones, remote control units, and even parabolic reflectors and such-like!

But to begin at the beginning, your basic requirement is the recorder itself. If your location recording is likely to involve considerable foot-slogging, you'll naturally plump for a smaller, lighter model that's easy to handle. On the other hand, if you have mechanical transport for your outdoor recording sessions you'll be able to cope with one of the larger portables. Either way you'll need to test the carrying handle first. One of the best — and most expensive — portable recorders at present on the market has the most painfully uncomfortable carrying handle it has ever been my lot to hold. After an outdoor recording session lasting a couple of hours my hands had painful red weals, and I was really thankful when I finished recording and could put the machine away again. Moral: always test the carrying handle first, and if it's not comfortable either

look for another recorder or be prepared to spend a little extra time and money on adapting the handle until it is comfortable.

Also you'll want to know the answers to such questions as "How long will the tape play for?", "How long will the batteries last?", and "Is a microphone provided?"

The answers to these and other important questions can be found in the easy reference chart overleaf. Tape speeds are given in inches per second, weights in lbs., and maximum playing times (on double-play tape) in minutes.

You'll notice that the microphones supplied with these portables are all classed as dynamic or moving coil. Not that you have to stick to the microphone supplied — you can choose from quite a variety of individual mics according to your requirements. Three suitable microphones are illustrated above to give you some idea of the choice available. The fourth is a ribbon mic.

Ribbon microphones, however, should not be considered because, although excellent for indoor work, they are not at all practical for outdoor recording. They

*Continued overleaf.*



Top: left to right. Grampian Reflector; DP4 windshield; Butoba MT22. Lower: left to right. Grundig TK6; Magnetophon 300; Standard Unicorder.

## GOING PORTABLE *continued*

respond to even the slightest puff of wind, and should you use one for outdoor work you'll find you have a recording interspersed with futuristic type wind sounds! Fortunately, dynamic, or moving coil, microphones do not produce this effect, except perhaps on a really gusty day, or if you're recording from anything moving at high speed.

In these circumstances you will need a microphone windshield. These you can make or buy, and perhaps the simplest of all is a handkerchief, folded about twice, and held over the microphone either by hand or by means of a rubber band. Alternatively some microphone manufacturers do produce windshields—both Grampian and Lustraphone have just produced new models that are neat, light and unobtrusive. The Grampian windshield has been specially designed for their DP4 and DP6 microphones and costs only 17s. 6d. Details of the Lustraphone shield should be released any day now.

Grampian also produce an excellent parabolic reflector, which is an absolute essential for recording wild life. The whole purpose of a reflector is to collect diffused sound into one focal point (the microphone head) so that the wanted sound comes over loud and clear and natural, while all extraneous noises are

kept to an absolute minimum. So if you want to catch the chirp of a cricket, or the croak of a frog, your results will be considerably better if you use a reflector. It's not as bulky as you might imagine—the Grampian model is 24" in diameter, 5" deep, and weighs 4½ lbs. Price is £6 10s. 0d. So, with the portable recorder, the right microphone, a wind-shield and perhaps a parabolic reflector, you're all set to go. But what happens if your batteries start running low? The first—and probably most disastrous—effect will be an inconsistency of tape speed. While the power flow is constant, the tape speed of a good recorder (such as the ones we have listed) will be constant. But once the power drops, noticeable variations in tape speed occur. The only cure is to instal new batteries—and, of course, while you're doing this you may miss the sound you've been so patiently waiting for!

Prevention is better than cure, so do check your batteries. The specification of your recorder should tell you how much life you can reasonably expect from the batteries, and if you keep a log of your recording (and playing back) sessions, you should be able to tell, within reason, how much more use you will get from your batteries. But don't forget that batteries used only intermittently will

last more than twice as long as those in constant use. For example, a number of makers quote a battery life of twenty hours for intermittent use, but only eight hours for constant use.

The four main battery manufacturers also use different codings for their respective products, and this can be a little confusing. However, unless a special battery or power unit is made for a particular recorder, you should find that any of the various makes of battery will suit your machine, provided that it is of the same basic specification. Your dealer will be able to give you corresponding code numbers for the varying makes of battery.

Finally, having checked all your equipment and made sure you've all the accessories you need, you have only to find a suitable subject. Nature recordings, interviews, sound effects and other items are all good subjects, but if you're really stuck for ideas, you have only to consult our Recording Diary feature (page 19), which should give you oodles of ideas. And if it doesn't, then you are really stagnant, and (this is where we came in) you might as well give up. But I hope this never happens, for the fun and experience of going portable really does make our hobby come alive. K.C.





Top: left to right, Fi-Cord 202A; Cossor CR1621; Optacord 416. Lower: left to right, Philips EL 3300; Uher 4000S; Sony TC801.

Recorder	Speeds	Tracks	Max Spool Size	Max Playing Time	Batteries	Life	Size	Weight	Microphone	Price
Akai X-IV	$\frac{1}{8}$ $1\frac{1}{8}$ $3\frac{1}{2}$ $7\frac{1}{2}$	4	5"	960	1 x 6V	6h R/c	4 x 9 $\frac{1}{2}$ x 10	12 $\frac{1}{2}$	2 x Dynamic	£137 11 0
Butoba MT5	$1\frac{1}{8}$ $3\frac{1}{2}$	2	5"	240	8 x 1 $\frac{1}{2}$ V	30h	9 x 12 x 6	12	Not included in price	£61 19 0
Butoba MT 22	$1\frac{1}{8}$ $3\frac{1}{2}$ $7\frac{1}{2}$	2	5 $\frac{1}{2}$ "	240	8 x 1 $\frac{1}{2}$ V	6h	12 $\frac{1}{2}$ x 10 x 5	12	Not included in price	£93 9 0
Cossor CR1621	$1\frac{1}{8}$	2	4"	128	6 x 1 $\frac{1}{2}$ V	40h	12 $\frac{1}{2}$ x 9 x 4 $\frac{1}{2}$	8	Moving Coil	£27 6 0
EMI L4	$3\frac{1}{2}$ $7\frac{1}{2}$	1 or 2	4 $\frac{1}{2}$ "	96	1 x 14V	R/c	11 $\frac{1}{2}$ x 7 x 6 $\frac{1}{2}$	10 $\frac{1}{2}$	Not included in price	£128 0 0
Fi-Cord 202A	$3\frac{1}{2}$ $7\frac{1}{2}$	2	4"	64	14 x 1 $\frac{1}{2}$ V	40h R/c	9 x 6 $\frac{1}{2}$ x 4 $\frac{1}{2}$	6 $\frac{1}{2}$	Not included in price	£69 6 0
Grundig EN3	$1\frac{1}{2}$	2	Cassette	45	3 x 1 $\frac{1}{2}$ V	20h	6 $\frac{1}{2}$ x 2 $\frac{1}{2}$ x 1 $\frac{1}{2}$	12ozs	Dynamic	£24 3 0
Grundig TK6	$1\frac{1}{8}$ $3\frac{1}{2}$	2	4 $\frac{1}{2}$ "	192	6 x 1 $\frac{1}{2}$ V	30h	12 $\frac{1}{2}$ x 5 $\frac{1}{2}$ x 9 $\frac{1}{2}$	13 $\frac{1}{2}$	Moving Coil Dynamic	£72 9 0
Magnetophon 300	$3\frac{1}{2}$	2	5"	128	5 x 1 $\frac{1}{2}$ V		10 $\frac{1}{2}$ x 3 x 10 $\frac{1}{2}$	6 $\frac{1}{2}$	Dynamic	£61 19 0
Optacord 408	$3\frac{1}{2}$	2	4 $\frac{1}{2}$ "	60	4 x 1 $\frac{1}{2}$ V	20h	9 $\frac{1}{2}$ x 7 $\frac{1}{2}$ x 3 $\frac{1}{2}$	6 $\frac{1}{2}$	Dynamic	£40 19 0
Optacord 416	$1\frac{1}{8}$ $3\frac{1}{2}$	2	4 $\frac{1}{2}$ "	120	5 x 1 $\frac{1}{2}$ V	20h	15 x 9 $\frac{1}{2}$ x 4 $\frac{1}{2}$	9	Dynamic	£53 11 0
Philips EL 3300	$1\frac{1}{8}$	2	Cassette	60	5 x 1 $\frac{1}{2}$ V	20h	7 $\frac{1}{2}$ x 4 $\frac{1}{2}$ x 2 $\frac{1}{2}$	4	Moving Coil	£27 6 0
Philips EL 3586	$1\frac{1}{8}$	2	4"	128	6 x 1 $\frac{1}{2}$ V	40h	11 $\frac{1}{2}$ x 8 $\frac{1}{2}$ x 3 $\frac{1}{2}$	8	Moving Coil	£27 6 0
Sony TC 801	$1\frac{1}{8}$ $3\frac{1}{2}$	2	5"	256	6 x 1 $\frac{1}{2}$ V	20h	13 x 1 $\frac{1}{2}$ x 3 $\frac{1}{2}$	13	Moving Coil	£70 7 0
Standard Unicorder	$1\frac{1}{8}$ $3\frac{1}{2}$	2	3 $\frac{3}{8}$ "	64	10 x 1 $\frac{1}{2}$ V	15h	8 x 6 $\frac{1}{2}$ x 3	6	Moving Coil	£25 4 0
Stella ST 471	$1\frac{1}{8}$	2	4"	128	6 x 1 $\frac{1}{2}$ V	40h	12 $\frac{1}{2}$ x 9 x 4 $\frac{1}{2}$	8	Moving Coil	£27 6 0
Uher 4000 S	$\frac{1}{8}$ $1\frac{1}{8}$ $3\frac{1}{2}$ $7\frac{1}{2}$	2	5"	512	1 x 6V or 5 x 1 $\frac{1}{2}$ V	20h	11 x 8 x 3	7	Dynamic	£108 3 0

# REPORT ON RECORD

by Paul Beard

The tape recorder is really something quite new in journalism, having only developed to its present stage of use since the last war. Indeed most war correspondents who worked for the BBC still have memories of carrying heavy disc recorders around with them, and few dreamed then of the tiny-transistorised tape recorders that are available today. (Fig.1). The EMI L2 portable led the way and even today many are used by BBC news reporters, although the Fi-Cord 1A has proved very useful because of its smaller size and weight. The actual task of 'sound reporting' is the same of course whether it is on disc or tape — it is to convey to the listener a mental picture of the event or place being described by the reporter in as much detail as possible. The listener must realise at once what has happened or is happening, for unlike the newspaper reader he cannot recap on what he

has just heard. Sound reports can be divided roughly into two categories:

1. The recorded description on location of an event as it actually happens, when more accurately it could be described as a commentary.
2. The report that is written up after the event has taken place and which is recorded under artificial, i.e. studio, conditions, with sound effects mixed in.

Location or commentary recording inevitably calls for some quick thinking by the reporter, and depends much on the individual's capacity to keep up a fair flow of speech without repeating himself. Breaks or slips of the tongue can normally be edited out afterwards, although it should always be remembered that such cuts may mean a break in continuity of any background sound, that might sound distracting. Normally a taped report should begin either by word of mouth or by means of sound effects, by transporting the listener to the reporter's location. This is not nearly as difficult as it sounds, for if for example we use the sound of breaking waves the listener realises at once we are by the sea. Exactly where is not clear and so a few words of explanation will be necessary such as: "I'm standing now on a desolate stretch of beach not far from Hastings on a cold February day . . .". The rest of the commentary or report should then be relatively easy, providing one has done one's homework beforehand! No professional radio commentator or reporter would dream of recording a report without first checking up on his subject either from reference books or press cuttings. Notes are made which can be incorporated in the report, to be given in convenient places, which will add 'colouring' to it. Historical or other factual information is invaluable as 'padding' when you are waiting for something to happen and must have your recorder switched on. On the other hand one should not keep talking for the sake of talking as this is simply a waste of tape and time, and most likely will have to be edited out afterwards.

The sounds being heard by the listener are very often sufficient in themselves to convey to the listener what is happening at a given moment. It would surely be wrong for instance to keep up a commentary while recording an event such as the Ceremony of the Keys at the Tower of London, where most of the talking is done for you. Frequently some of the best reports are those in which the reporter's voice is only rarely heard! This after all is the important difference between the written and taped report—the printed word must rely solely on the writer's ability, whereas the sound record is dependent on the recordist's skill to re-capture the atmosphere of the occasion in sound, and this not merely by word of mouth.

If one is doubtful about giving an on-the-spot commentary, then obviously the second method of recording will be regarded as the best way of doing a report. Unless a portable recorder is available anyway, one will probably be limited to recording reports by this method. Certainly some fine results can be achieved using this technique, especially if effects recorded either on location or artificially are mixed in. In fact I suppose about 70% of broadcast reports and features are done this way. By using this method such excellent results may be obtained that your listeners need never know that it was not recorded on location. For re-creating an outdoor effect one must record under as 'dead' studio conditions as possible — even if this does mean speaking into the mic from underneath a blanket! A big help can be the mixing-in of 'atmosphere' recorded if possible at the supposed scene of the report. This is a technique which I have used often with success both under professional conditions using two TR.90 machines and full size studio mixer, and with the minimum of amateur equipment.

Whichever way you record your reports one thing is absolutely essential — a good microphone. (Fig.2). Nothing sounds worse than to hear indistinct speech due to poor equipment. Far too many British manufacturers appear to be over-

looking this important requirement when marketing recorders. So many are sold that just do not have a microphone capable of reproducing really clear speech. One realises they have to keep the price of machines as low as possible—but at what price quality? So many crystal mics cut off top frequencies or more often have little bass response.

Also invaluable whenever recording on location is a microphone windshield, for even where there appears to be little or no wind the slightest breeze may ruin a passage of speech. If you just cannot get one to fit your mic (I have recently tried without success to get one for a DP4), then the only answer seems to be to fit a handkerchief or other material around the top of the mic, and hope for the best!

The most difficult thing of all when doing a taped report is to choose a subject that will sound really interesting. Not everything which reads well necessarily makes a first-class report on tape, and it is essential to choose something which can be well and truly classified as a 'sound' report. I think, of course, that it is possible to over-do a taped report and have too many sound effects, but generally speaking the reverse is true. Pageants, carnivals, old traditions, musical occasions and historical moments are all generally good subjects. The unusual happening is often of especial interest, and good examples of this type of report can be heard almost daily in the BBC Home Service programme 'TODAY' at 7.15 and 8.15 in the morning.

Do not think that reports on tape have to be of general interest. Rather like snapshots they can bring back memories for the family and they never (providing they are stored properly) fade away. So why not start a family album of sound reports, including in it such occasions as weddings, birthdays, holidays and so on? It is surprising how interesting such archives can become after only one or two years, and everyone will enjoy hearing again the events that perhaps would otherwise have been forgotten. Anyway do have a shot at reporting on tape — it's great fun!

June, 1965



*Top: Interviewing on tape with the latest EMI L4 portable.*

*Lower: The Fi-Cord 801 omni-directional microphone with a frequency response of 50-16,000 c/s.*



# TALL TAPE

*Passengers  
Are  
Requested:  
D. Lazell*

Most of the articles written about portable tape recording demonstrate

the potentialities of this wonderful medium: here's the amateur who meets all the difficulties the knowledgeable folk evade:—

The bus conductor had a red face and an air of considerable authority. "I'm sorry, sir, but you can't bring that onto the bus!"

"Why not?" I asked.

"Because," he said slowly, "portable radios are not permitted on company buses."

"But this," I pointed out, "is a tape recorder."

His finger, about to press the bell button, paused.

"How do I know that?" he sniffed. I opened the recorder and showed him the deck.

"That brown stuff's tape," I explained. "You record on it!"

"There's been a lot of complaints about portable radios on company buses," the conductor snapped. "People keep playing them to distract the driver."

"Well, I'm not going to play this tape recorder," I assured him. "I only want to go to the bus station." The discussion stopped for a moment. Then the conductor said that he would consult the driver, and ambled to the front of the bus. A large lady sitting near the entrance and grasping an overloaded carrier bag looked at me and said sharply, "I've got a dental appointment. All this argument is going to make me late."

I regarded the big box of chocolates protruding from the carrier bag. "They say that eating too many sweets causes toothache," I said.

The red-faced conductor returned, and, with some reluctance permitted me to board the bus.

"Sid—that's the driver—says you can come on board, as long as that thing doesn't make any noise. One of our drivers collided with a furniture lorry one day last week, when one of the passengers suddenly switched on 'Mrs Dale's Diary'. We've had to be extra careful since". The bus trundled along the road. To accommodate the driver's presumed concentration, I tried to breathe as quietly as possible. The conductor took my fare, and continued conversation.

"You know, sir, we don't have a regulation against gramophones or musical instruments. I don't think I could stop someone playing a banjo on board this bus. Perhaps I should tell the Inspector."

"You can always evade regulations," I told him. "Not so long ago, I travelled by train from Leicester to Manchester in a 'non-smoking' compartment. A chap who got on at Derby didn't smoke, but drank whisky, ate almost continuously, scattering paper everywhere, and played his portable radio the entire time. It was a one man party, I suppose."

"Them passengers," the bus conductor said. "They're all the same. I've caught them eating fish-and-chips in here before now."

The enormity of this offence was evident in his sombre voice.

"And we're working to rule, at the moment," he added. "A sort of go-slow. There's a dispute about the new timetables. The company has put them up, but we're not working by them."

"I'm hoping to make some tape recordings at the bus station," I replied cheerfully. "My friend in Aust-

ralia is very interested in our buses". "Haven't they got any buses out there, then?"

I tried to explain the art of swopping tapes to the conductor, but he wasn't interested. He gazed at the large lady with the overloaded carrier bag.

"We're not stopping outside the dentist's," he said casually. "It's not a scheduled stop."

The box of chocolates toppled from the carrier bag, and spilled all over the floor.

We arrived at the bus station, and the conductor, after suggesting that, in future, I disguise my portable tape recorder as a bundle of laundry to avoid difficulties in boarding company buses, wandered towards the refreshment room.

Ted Hopper, my Australian friend, and I had been exchanging tapes for four or five years, and I had been making recordings with authentic background noises for him. These hadn't always been very successful—like the one made in a supermarket, when I accidentally knocked over a large display of canned fruit (the 'crash' came out well at 1½ i.p.s.). Ted was interested in buses, and had asked me to collect some material on tape for him.

So I stood beneath the illuminated timetables, studied by the passengers, but apparently ignored by the drivers and conductors.

"Hello, Ted," I spoke into the microphone. "Here I am at the..." A loudspeaker above my head boomed out an official announcement. "The new timetables are to be ignored by all travellers. Please use the winter timetables, or go to the enquiry office."

A number of people, seeing my microphone, immediately assumed that I was responsible for the

announcement, and I was quickly surrounded.

"Do you realise that I will be home late on my wedding anniversary?" a small well-dressed man shouted. "What have you got to say about that?" "Are buses coming in as late as those going out?" enquired an agitated woman in a large yellow hat. There was a confused babble. Suddenly the woman in the yellow hat noticed my tape recorder.

"He's recording it all!" she shouted in a horrified voice. Immediately, everyone stopped talking.

I attempted to explain my Australian friend's interest in the British way of life.

"Are you a company spy?" growled a driver at my elbow. "Trying to provoke all-out strike action?" The loudspeaker above my head came into action again.

"No standing passengers are to be allowed on any buses leaving the station."

In the confusion, I made a hasty departure to the refreshment room. Over a cup of thick brown tea—enough to make anyone, passenger or driver, 'go slow'—I considered the situation. I had some good stuff on tape; trouble was that most of it was quite unintelligible. Ted, hearing it, would presume that travelling by bus was a sort of civil war. A driver, uniformed and weary, sat opposite me.

"Excuse me," I said. "But I'm making a tape recording."

"Well, if you're from 'Panorama', you'll have to wait until we've had another meeting," he said.

"I'm making a tape for a friend in Australia. He wants to know something about British buses."

"I'll tell him something about buses all right," the driver said grimly. "Just give me the microphone!"

I tuned in the recorder.

"My name's Sid Green," the driver began. "And I say that there are too many private cars in this town. They hold up the buses. They get parked at our bus stops. I say that they ought to be abolished, and that everyone ought to travel by bus!" "I thought that you were on a go-slow because of the new timetables," I exclaimed.

"That's what *they* might be on about," the driver sniffed. "But *I'm* on about these private cars. You can't help going slow the way..." The red-faced conductor approached frowning.

"Been looking for you everywhere, Sid," he said. "We're ten minutes late already!"

The conductor looked at me.

"You again?" he grunted. "They tell me that you're a company spy, recording comments that might get some of our crews into trouble." He put his hand towards the portable tape recorder on the table. I grabbed the machine, but, in doing so, knocked my cup of tea over Sid, the long-suffering driver. He jumped up. "My trousers are soaked," he cried. "I'll have to change."

"I was only going to look at the recorder," the conductor said. "Wasn't going to pinch it!"

The driver half-hopped, half-jumped, to the door. Followed by the conductor, he made his exit.

I started my commentary on tape once more.

"That, Ted, was a typical bus driver, who..."

A thin lady in a green overall tapped me on the shoulder, hard.

"If you're not eating, you shouldn't be in here," she informed me.

"There's a waiting room for passengers!"

"I was drinking a cup of tea..."

"And made a mess all over the table," she said. "You wouldn't make a mess like this at home, would you?"

"Don't get tea that stains like that at home," I smiled.

The lady was not sympathetic.

"If you want something to eat, there are some cream doughnuts left," she said. "If you're not going to eat..." She jerked her thumb towards the door.

I made my final attempt outside the waiting room. A telephone box stood nearby, and I had hardly commenced talking into the microphone, when the telephone began to ring. Who, I wondered, would be calling an empty telephone box in a bus station? No-one else appeared to be interested, so I went into the box, and lifted the receiver.

"Is that the bus station?" a voice asked briskly.

"Yes," I said.

"I want to know what's happened to the bus to Brickley. I've been waiting for thirty-five minutes."

I recognised my acquaintance, the red-faced conductor, nearby, so I opened the door of the telephone box, and beckoned to him.

"It's a call for you," I smiled.

He mumbled something about Sid disappearing, and the bus being half-an-hour-late. As he lifted the receiver, I took a final look at his flushed face, and made my rapid departure towards the road home. That walk gave me the opportunity to tell Ted about the joys of modern travel.

"There's always something new to discover when you travel by bus," I said. "New vistas open up."

But the tape finally ran out about two miles from home. Yes, it was about then that the cloudburst came....

# ENREGISTREMENT VERITE

John Bradley

What on earth is enregistrement verité you may well ask. Well, if the television and film people can coin a word like 'cine-verité' why shouldn't we do likewise? In plain English, if we want to talk about real, out-and-about life recordings, all we have to choose from are words like documentary, actuality or reportage—none really suitable for real, everyday life captured in sound on magnetic tape as only we amateurs can.

At first, I suppose, it takes a little courage to go out alone, with just a portable tape recorder and microphone, and attempt to bring back *alive* some of the enormous wealth of raw material in our town and country streets, in buses and trains, in pubs, in fact anywhere. The rewards are so rich in terms of sound material however, that it is worth taking the plunge. Go out with another person of like interests at first and your feeling of self-consciousness will hardly worry you at all.

Fit, and almost forget, your recorder and microphone—by this I mean have the recorder comfortably slung on a shoulder strap and the microphone in a neck cord (lavalier cord to the initiated!) The clip on this neck cord must allow you to take the microphone into your hand with the minimum of fiddling and without causing any crashes or rumbles on the tape. Comfortable? Right! Now try walking along telling the microphone what you can

see, or rather, what it can hear. Do a stroll of about ten or fifteen minutes like this.

This is a first exercise in making your equipment an extension of yourself so that you are able to operate it without apparent concentration—much as an expert car driver appears to steer, change gear, declutch and all the other motions without thought.

At first, you will probably find you want to record quite specific things—ambulances blowing their sirens, fire engines with bells and kindred dramatic sounds, but far and away the best material is the human being—or rather his rich and varied voice and vocabulary with the other sounds of the country or town as a background. This material holds the listener's interest as almost nothing else can. Stands to reason, doesn't it, when you come to think about it! Just getting into conversation in the bus, on a street corner and so on will give you little glimpses of real live people, astonishing you with their warmth and vitality when you play back your captures.

Don't, I beg of you, do a 'BBC' act—don't "interview" them—this, unless done by a professional (and sometimes even then!) kills stone dead any hope of naturalness. Get interested in your contact and if you find you've been listening, and talking a little, for some time before you realise your tape has run out, very high marks but next time have more tape in reserve!

Your basic equipment is always a matter of personal choice but it certainly need not run you into great expenditure. My own preference for this absorbing work over the last three years has been the simple but excellent Philips EL3585 battery portable (a later model the EL3586 is now available). Its own microphone, although capable of first class quality in speech and music, is very sensitive to handling and this can spoil many a recording. I searched around and finally settled for the Lustraphone LV59 dynamic, a line impedance microphone capable of having almost any length of cable. This microphone can be freely handled without noise becoming obtrusive—and even

without a windshield, can cope with quite a degree of air movement. It can be had with a special bush so that it can be worn in a neck clip, taken in the hand and even put directly on to a stand. Ubiquitous in fact!

As the thinner tapes have become available I have used triple play on the portable (and even quadruple play when I can get it). The very thinness of these tapes, apart from the obvious advantages of extra recording time on the little 3" or 3½" reels, maintains a much better contact of tape with recording head and so gives a vastly improved response. Since, as I said earlier, there is no limit to microphone cable lengths, I usually carry two or three 10-yard extra lengths with me, when travelling by car, each fitted with a plug (Din 3 pin) at one end and similar socket at the other. These can prove very useful when it is convenient to be operating the recorder well away from the microphone.

Camping in Anglesey last year, I noticed that a tree some 50 or 60 feet away from the tent had an attraction for quite a number of different birds. It wasn't long before three lengths of microphone cable were played out and the microphone suspended in the tree with a piece of thin polythene to protect it from the rain. I was then able to sit quietly in the tent entrance and take a recording whenever I could hear birdsong. Results were excellent and are now 'in the can'. From the same trip I also brought home recording of a tour of S. Stack lighthouse with a retired Trinity House man; sheepdog trials; Polyphons and Victorian musical boxes in an antique shop; the local butcher chatting in Welsh as he cut me a juicy steak; wreck buoys; cheerful conversation in a waterfront inn and much, much more besides. And when I play back this material later, I am right back there in that particular moment. For me, at least, sound does this more vividly than any photograph, still or moving. So, what about it fellow amateur tape recordists? Why not start now and capture for all time some of the rich colourful life that surrounds you? You will never regret it I am certain.



# SOUND SCENE

## NEW SHOWROOM IN LONDON

Recently we visited the superb new showroom at 70-71 Welbeck Street, London, W1, where the complete range of Sony and Bang & Olufsen radio and audio equipment can be seen and heard. The sole UK agent for these two manufacturers has had this showroom specially designed for the display and demonstration of top quality audio equipment. Call in and see for yourself — we think you will be delighted.

You cannot actually buy machines here, but the UK agent offers a comprehensive consumer advice service and will be pleased to introduce you to your nearest appointed dealer.

From a wide range of excellent equipment on show, we thought that the Sony TC 801 all-transistor "2-way" portable tape recorder was excellent value at 67 gns. Full details can be obtained from the sole UK agents, Debenhams Electrical and Radio Distribution Company Limited, Eastbrook Road, Eastern Avenue, Gloucester.

## ELECTRONIC NOTEBOOK

Grundig recently introduced a remarkable little pocket dictating recorder which has a great variety of uses, especially in business. It is shown in Fig. 2 and is a twin-track machine giving 45 minutes playing time. A lead is supplied to re-record on to any other dictating machine or tape recorder. The plug-in microphones can be used for both recording and playback and a headset with built-in volume control is also available for playback. Measuring  $5\frac{1}{4}'' \times 2\frac{1}{2}'' \times 1\frac{1}{2}''$  and weighing only 12 ozs., this tiny instrument makes the perfect pocket notebook and costs only 23 gns. Further details of the EN 3 Electronic Notebook and its range of accessories can be obtained from Grundig (G.B.) Ltd., Newlands Park, London S.E. 26.

## NEW HI-FI HEADPHONES

Amplivox have just announced their new 'Jetlite' headset for high-fidelity listening. The headset employs moving-coil headphones, specially shaped to prevent discomfort during long periods of use. The frequency range is 20-20,000 c/s. The Jetlite headset is available with or without microphone and boom arm. Earphone impedance is 200 ohms, and the microphone has a frequency range of 100 to 15,000 c/s. No price has been quoted, but further details can be obtained from Amplivox Limited, Beresford Avenue, Wembley, Middlesex.

## KODAK TAPE TESTED

We have tested various samples of Kodak tape, including their standard play, P200 double play, P300 triple play, and last but not least, P400 quadruple play. Needless to say, these tapes are of excellent quality, but we do not advise using quadruple play tape if serious editing is envisaged. Both the triple and quadruple play tapes are, however, ideal for long playing on tape recorders that will accommodate only small spools.

As with all recording tape, the optimum performance is obtained when the recording bias is correctly set for that particular tape. This is not always possible, of course, since few tape recorders have provision for adjusting the recording bias. However, here's what Kodak say about bias requirements with their tapes:

Where possible, Kodak Limited recommend setting up the bias for each Kodak tape in the following way: Increase bias until the output at 1 Kc/s. reaches a maximum. Then increase the bias further until the output falls by 1 dB.

This bias setting corresponds to the maximum signal-to-noise ratio. Reducing the bias slightly (e.g., to maximum output at 1 Kc/s.) will improve the high frequency responses, at the slight expense of signal-to-noise ratio.

The thinner Kodak tapes progressively each require slightly less bias for maximum signal-to-noise ratio to be achieved with each tape. Over-biasing these tapes will have the effect of reducing their high frequency response and signal-to-noise ratio.

## NEW AEI APPOINTMENT

R. F. LLOYD, M.A., has been appointed Education Manager of the Woolwich group of Associated Electrical Industries Ltd. He succeeds Mr. K. Keiser, who has resigned.

## THE VOICE OF SIR WINSTON

Any tribute we could make now to Winston Churchill would be superfluous. However, the great man himself authorised the publication of a unique record which is in itself a fitting tribute. This 12-inch LP contains extracts from his most famous speeches, woven into a whole by passages from his War Memoirs, which Churchill himself reads. Everyone will want this record — sound collectors, students of politics and history, and the ordinary man in the street who was so moved and encouraged by his brilliant oratory during the war years. The Voice of Sir Winston Churchill is on Decca LXT-6200, and should be available from all record dealers, price 37/6.

*continued overleaf*

**WYNDSOR FIRE**

The recent fire at the WyndSOR works at Friern Barnet unfortunately damaged the offices there, but luckily did not reach the production lines. However, delivery of some machines has been held up because of damage to order notes and other office paperwork.

**MODEL GIRL RECORDS AT THE TOP**

Ginny Stafford started her working life not long ago as a model, and already she's gone to the top. One of her recent assignments took her to the top of Irazu, an erupting volcano in Costa Rica which rises 11,500 feet above sea level. Working as an assistant to a documentary film maker and using a Fi-Cord 202 recorder to make all the necessary sound tracks, Ginny either recorded these simultaneously with the shooting of the film or arranged to synchronise them with the movie at the editing stage. While there, she actually taped the roar of an erupting volcano — a sound not many people have had the chance of gathering on location.

**AMPEX VIDEO TRAINER**

The latest Ampex equipment is an easy-to-operate closed circuit television recording system for a wide range of training uses in schools, industry and many other fields. The Ampex Video trainer incorporates a new compact video-tape television recorder, television camera, receiver, microphone and all accessories needed to record and replay television programmes off the air or live via camera and microphone.

**THE AMPEX VR-303 VIDEO TAPE RECORDER**

Also just released by Ampex is the VR-303 recorder for live action (camera) or TV programmes off the air. Price in this country is not yet known but Ampex announce also the possibility of a luxury console combining home television for colour or black and white with a built-in VR303 video recorder, stereo high fidelity tape deck (sound) and F.M. tuner. Called 'Signature', this special system is designed to demonstrate the feasibility of home TV recording and is capable of recording 'home movie' tapes for instant playback.

The VR-303 video tape recorder on which this dream outfit is based will record up to 50 minutes of programme material on a 12½ inch spool of tape. The tape speed is 100 i.p.s. and carries the video and sound tracks simultaneously.

# RECORDING DIARY

WHERE TO RECORD IN JUNE

WHITSUN is the start of carnival season, with fairs and festivals at Harwich (5-12), Morecambe (5-12), Oulton Broad (7), Southampton (4, 5, 7), and Watford (5, 7).

CARNIVALS continue throughout the month, with the Trinity Fair at Southwold (14-16), and carnivals and fairs at Abingdon (21), Bexhill (22-24), Coventry (19), and whole weeks of celebrations at Margate (19-27) and Worcester (27-3 July).

FESTIVALS of Music and Drama are also in full swing. The famous Glyndebourne season opens this month (16), and there are festivals at Aldeburgh (17-27), Bath (9-20), and Llandaff (15-25).

OLD CUSTOMS are much in evidence. Well-dressing ceremonies, peculiar to Derbyshire, take place at Ashford-in-the-Water (13), Hope (26), Tideswell (26), Wirksworth (5-8), and Youlegreave (19-23). Gloucestershire displays its cheese at the traditional Bread and Cheese Distribution ceremony at St. Briavels (6), and at the famous Cheese Rolling event at Coopers Hill, Brockworth (7). Meanwhile, north of the border, the Scots have Common Riding ceremonies at Hawick (11, 12), Linlithgow (15), and Selkirk (17-19).

SPORT, in all its forms and fashions, and with all its associated noises, is abundant. Cricket matches and race meetings are too numerous to mention—almost every county has its share, and your local papers should provided you with a good guide. The unique echoing sounds of the swimming pool can be captured at the international match at Crystal Palace (11, 12), and of course, there is Wimbledon Fortnight (21-3 July), when you can spot stars of the tennis court, and personalities from almost every branch of entertainment.

ENGINES at peak revs. and the sounds of a good gear change are always popular subjects for recording. A rather unusual version is the Rest and Be Thankful Hill Climb for cars, at a place called (believe it or not) Rest and Be Thankful, Argyllshire (26). But if it's the really high speed sounds you're after, there's car racing at Crystal Palace (7), and heaps of two-wheeler noises in the Isle of Man, with TT Practice Week (5-12), International TT Races (14, 16, 18) and the National Scooter Rally (26-3 July).

NOISIEST place of all however, is probably the Festival Gardens at Battersea (open all month, and through till October), complete with gigantic fun fair, although for one day (12) it might be outdone by the noise and colour of the Trooping the Colour ceremony in Horse Guards Parade, London.



# NOW! PORTABLE PROFESSIONAL SOUND FOR ONLY £120

Professional quality recordings, anywhere, anytime. That's the new EMI L4, a professional transistor recorder of the highest quality, fully tropicalised, yet weighing only 10 $\frac{3}{4}$  lbs. complete with re-chargeable batteries. Tape speeds are 7 $\frac{1}{2}$ " and 3 $\frac{3}{4}$ " p.s., wow and flutter less than 0.2% r.m.s. and frequency response at 7.5" p.s.  $\pm$  2dB, from 50 c/s to 12 Kc/s. Signal to noise ratio is better than 45 dB unweighted. A fourth head can be provided for film and sound sync. Other features of this impressive specification include ■ fully equalised replay amplifiers ■ two microphone inputs with separate gain controls ■ re-chargeable batteries (charger available) ■ full erase facilities ■ motor rewind ■ press-button operation ■ remote control ■ A-B switch, meter and audio ■ loudspeaker with separate 200 mW amplifier ■ half or full track versions ■ line in and line out jack sockets ■ microphone bass cut switch ■ meter monitoring of battery, RF bias, modulation ■ MICROPHONES, PROTECTIVE COVER, BATTERY CHARGER, HEADPHONES ARE OPTIONAL EXTRAS.



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# TAPE AND TRANSISTORS

Gordon J. King

*Gordon J. King concludes this interesting series of articles by dealing with transistorised replay amplifiers.*

Last month we saw how frequency-selective feedback in the playback head amplifier can provide an output which is flat over the audio spectrum in spite of the E.M.F. induced into the head winding from a tape of constant magnetic induction rising at the rate of 6dB/octave up to the turnover frequency. The output of the head amplifier can then be coupled to a conventional transistor audio amplifier, via a tone control system if required, to work a loudspeaker in the ordinary manner.

## PLAYBACK CHANNEL

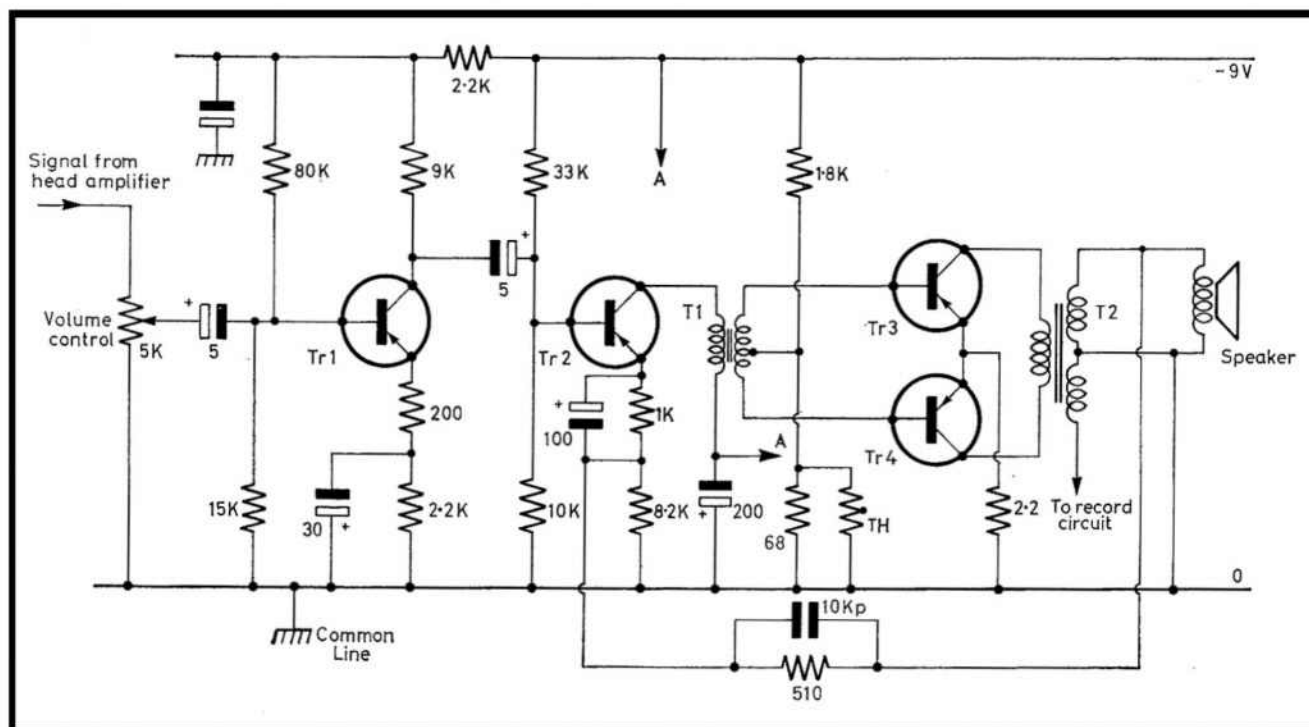
A typical playback channel is shown in fig.1. Here the output of the head amplifier is connected across a volume control, the slider of which selects the required level of signal and passes it on to a straightforward amplifier, this being Tr1 in the circuit. The output of Tr1 is fed to the base of Tr2 which is a driver transistor working via a transformer (T1) to operate the push-pull pair of transistors, Tr3 and Tr4.

All the transistors in this circuit are arranged in the common-emitter mode; that is, with the input signal applied to the base and the output taken from the collector, the emitter thus being common to both the input and output signals.

## MATCHING ARTIFICE

The volume control is invariably positioned at the output of the head amplifier, whether this employs one or two transistors, so as to provide the best possible signal/noise ratio. To facilitate matching from the output of the head amplifier to the base of Tr1, negative feedback is applied to Tr1 by virtue of the unbypassed 200-ohm resistor in its emitter circuit. This feedback has the effect of increasing the input impedance of the stage so that this is more like the impedance at the output of the head amplifier.

The push-pull output transistors are biased by the potential-divider connected to the centre-tap of the secondary of T1 for class B operation. The collectors of these transistors are loaded across the primary of the output transformer, T2, in the usual way, and the second-



dary of this transformer drives the speaker. There is a second secondary winding shown. This is concerned with the "record" function and will be explained later.

Negative feedback is applied from the secondary of the output transformer to the emitter circuit of the driver transistor Tr2, via the 510-ohm resistor in parallel with the 10 kp capacitor. The amount of feedback is governed by the value of this resistor and also by the value of the resistor connected from the emitter circuit of Tr2 to the common line.

This feedback reduces the amount of "crossover distortion" which can otherwise result under certain conditions from class B transistor stages, particularly at low temperatures and at low battery voltage. Crossover distortion is further minimised by arranging for the biasing of the output pair of transistors to produce just a little standing collector current under conditions of zero signal drive.

Temperature compensation is taken care of by the thermistor in parallel with the bottom arm of the base potential-divider network. With increase in ambient temperature, the thermistor decreases in resistance and thus pulls down the base current which combats the tendency for the collector current to rise with increase in temperature of the transistor collector junction. Further compensation in this respect is afforded by the 2.2-ohm resistor in the emitter circuit of the output transistors.

#### COMPLEMENTARY OUTPUT STAGE

Another type of output stage which is now becoming popular both in transistor tape recorders and transistor amplifiers (and radio receivers) employs a p-n-p tran-

sistor in conjunction with an n-p-n type. The arrangement is known as a "complementary output stage". This type of circuit has the great advantage of requiring neither a driver transformer nor an output transformer, as can be seen from the circuit in fig.2. Note that the n-p-n transistor is symbolised by the arrow on the emitter pointing away from the base, opposite to the arrow direction on the emitter of a p-n-p transistor symbol.

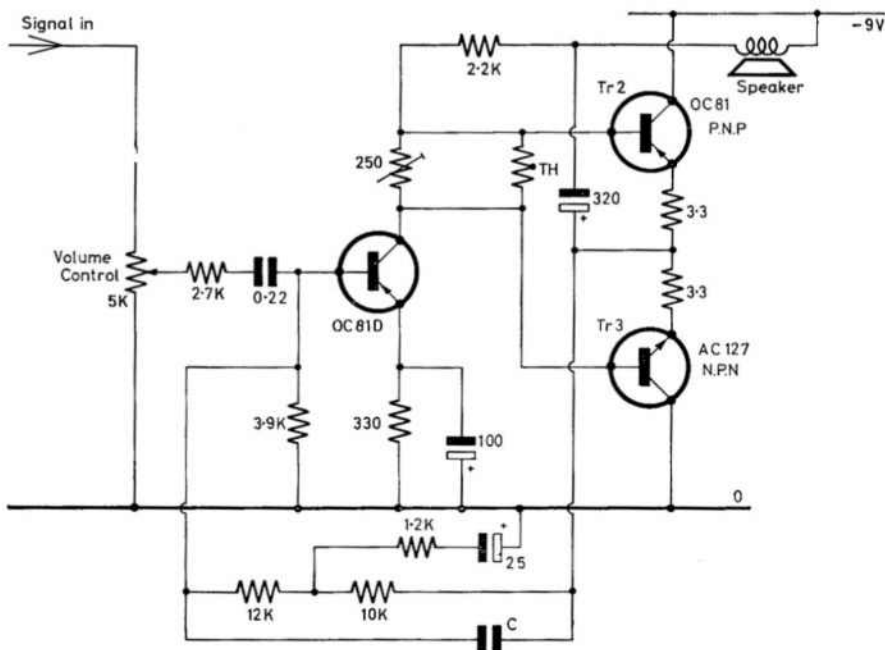
Tr1 is the driver transistor in the common-emitter mode, and the collector of this transistor is directly coupled to the bases of the output transistors Tr2 and Tr3. The compose circuit is stabilised from the d.c. point of view by d.c. feedback applied from the emitter circuit of the output transistors to the base of the driver transistor through the 12k and 10k series-connected resistors at the bottom of the circuit. The circuit's elements are selected in value so that under conditions of zero drive the output transistors are just about conducting (e.g., for class B working), while the driver transistor is biased for class A working.

The circuit can be balanced from this aspect by the 250-ohm preset resistor connected to the collector of Tr1. Adjustment is made to this until the output pair of transistors just conduct and under that condition least crossover distortion occurs. To keep the circuit similarly conducting over a range of temperatures, the thermistor TH is connected in parallel with the preset resistor. With rising temperature the value of this component falls and pulls back the bias on the output transistors so that the collector current is held reasonably constant. Such temperature compensation will be found in the majority of push-pull output stages.

*continued overleaf*

*Fig.1. The replay channel of a typical transistor tape recorder.*

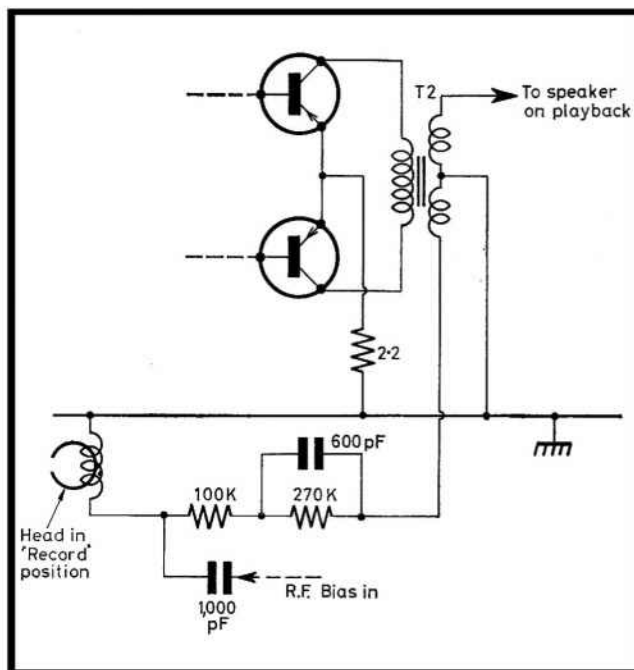
*Fig.2. A complementary output stage which is now finding its way into very recent designs. In some cases the stage is switched on "record" as bias and erase oscillator, the winding in the erase head actually being used as the oscillator tank circuit.*



Now let us consider the circuit from the signal point of view. On positive half-cycles of drive signal from the collector of Tr1 to the bases of the output transistors, the n-p-n transistor is pushed into conduction (as this needs a positive-going signal at its base to increase the collector current), while the p-n-p transistor is pulled out of conduction (as this one needs a negative-going signal at its base to increase the collector current). Thus, the positive half-cycle switches on Tr3 and switches off Tr2. On the negative half-cycle of signal the reverse happens. Tr2 switches on and Tr3 switches off. The required push-pull action is thus secured without a driver transformer or phase inverter stage, since both bases can be fed from the collector of the driver transistor direct.

This alternate switching action causes the voltage at the

Fig.3. Showing how the circuit in fig.1 is switched in the "record" position.



junction of the 3.3-ohm resistors in the emitter circuit of the output transistors to rise and fall in sympathy with the audio signal. These rises and falls of voltage are, in fact, the audio signal and pass to the speaker through the 320 $\mu$ F electrolytic coupling capacitor in terms of current. In that way the speaker is driven without a transformer.

Signal feedback, to avoid crossover distortion and to reduce the general distortion, is effected by the capacitor C across the d.c. feedback resistors in the feedback loop already considered. Phase correction over the audio spectrum is provided by the RC network to the junction of the d.c. feedback resistors.

### SWITCHED FUNCTIONS

As intimated in previous articles, the stages of a complete transistor recorder are switched so that they can operate both on record and playback. The head amplifier is sometimes switched to take a microphone input instead of signal from the playback head when the machine is switched to "record". The output stage may also be switched so that on "record" it works as a bias and erase oscillator.

In some models an intermediate playback amplifier, such as Tr1 (or even Tr2) is arranged to provide a constant-current feed into the record head when the stage is not being used for playback. Alternatively, the record signal may be derived from the playback output stage, in which case a separate bias erase oscillator is utilised.

In the Sanyo MR200, for example, a separate winding on the output transformer comes into action on "record", as shown in fig.3. Here are depicted the basic elements of the output stage (from fig.1). The bottom secondary winding on T2 applies signal to the record head, via the current limiting 100k resistor and the frequency correcting network comprising the 270k resistor in parallel with the 600pF capacitor. This gives a rising record current with increase in frequency and bass attenuation, which is often desirable on "record" relative to the portable type of machine.

Bias and erase signal is obtained from a separator, single-stage transistor oscillator, and bias is fed into the record head through the 1,000pF capacitor shown in fig.3. The erase head is energised directly from the oscillator, as is conventional. Switching cuts the oscillator on "playback" and utilises the record-level indicator then as a battery-voltage indicator.

It is interesting to note that on some very recent models employing a complementary output stage, the erase head is actually used as the oscillator tank circuit, thereby making oscillator coils redundant. One of the big troubles in the design of transistor tape recorders has been in obtaining sufficient amplitude of pure r.f. signal to give a complete and noise-free erasure. This trouble is now being overcome by the use of erase heads which are also coils being driven from the switched complementary output stage.





# THE THINGS YOU SAY

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## WANTED — CARTRIDGE TAPESPENDENTS

I have recently bought my first tape recorder, and I must let you know what great pleasure I have already derived from this small magic box.

Now I would like to meet people dotted around the globe, in different spheres of life, and I realise the potential of my recorder. For this reason I would be most appreciative if you could put me in touch with some of your readers so that I may tapespond with them. I am aware that my recorder, a Philips model EL 3300, may not yet be universally obtainable — in this country it has been available only since November, but I would certainly be interested to see what response I get from abroad. My interests include sport, music, photography, reading, interior design, pottery, travel and philosophy. At present I am 24, and a sales rep in mosiac, but in about two years' time I will be doing some extensive globe trotting and hope to be able to meet some of my tapespondents.

I look forward to hearing from anyone over 21 years old, anywhere English speaking, who has a sense of humour. I am also learning French, and am confident that in about six months will be able to speak the language reasonably fluently, for anyone who would be interested in tapesponding in that language at a later date. Well, I guess you are cursing me for supplying too much dope about myself, so I'll end off here. Many thanks in advance for your help.

*Johannesburg, S.A.*

MITCH CRAIG.

No, we never curse people for telling us about themselves and their taping interests, although this would have made rather a long entry for the tape directory! Any letter or tapes for Mr. Craig, sent c/o ATR, will be forwarded to him.

## GOOD, CHEAPER TAPES

Mr. W. H. Lloyd (May issue, page 16) would be well advised to turn to page 47 of that issue for details of a good, cheaper-than-most tape. Used on my high class machine (also mentioned in the May issue, by R. C. Gouzens, page 17) it is very satisfactory. There is a row of excellent tapes of this make on my shelves to prove it. I prefer to use long play, or, on 4-track or slower winding machines, double play. Why not give it a try? *Tiverton, Devon.*

D. J. SHAW.

## ANY GAVIOLIS?

I am a keen fairground organ addict, and the Mammoth Fair Organ recording, as advertised in ATR recently, and of which I have a copy was, I understand, made from an organ owned by a M. Charles Reuter in or near Paris. Can any reader supply me with the address of M. Reuter?

This organ is a Gavioli 110 key instrument, and I believe there may also be a Gavioli organ in this country. It may now be in private hands, but in pre-war days was travelled around the north-east by John Murphy. This was a magnificent instrument of superior tone and precision in the playing of classical music, etc., and a distinctive feature in the organ case design is a canopy in the centre. The organ is also distinctive in that it is entirely gilded, not painted different colours. Some years ago, when I was unfortunately out of town, there was, at a function in Stewart Park here, a mammoth fair organ which was advertised as the biggest in the world, and I have since wondered if this is the one I am looking for, and who owns it. Can anyone help? Letters or four-track tapes at 3½ i.p.s. more than welcome.

*Middlesbrough.*

A. W. MANN.

# INTRODUCTION TO STEREO

## MICROPHONE TECHNIQUE

H. Burrell Hadden

We have now considered the two basic systems of stereophony, one developed in the United States, and one in this country, both of them as a result of work done in the early 1930's. Both systems are still currently in use, although in different ways they have of necessity become somewhat intermingled. The film industry tends to use the American system, with its spaced microphones, usually with three or more channels; some systems use five or even seven, because with this method the stereophonic effect is better reproduced over a large auditorium, where a large proportion of the audience is seated away from the centre line. This is because the larger number of "fixed points" available with the greater number of loudspeakers reduces the tendency of sounds to move into false positions, that is, positions different from those intended by the producer of the programme.

We are, however, more concerned in this series of articles with domestic stereophony, and for most of us, if only for economic reasons, this will mean only two channels. In any case, the extreme difficulty of recording more than two channels, and of reproducing them, on domestic equipment, must rule out the more complex systems. Fortunately, a two-channel system is capable of giving excellent results under domestic conditions, where the audience is small in number, and can sit close to the centre line between the loudspeakers. The BBC, for example, estimates that the average audience in any one household for a broadcast programme is less than three people until 11 p.m., and less than two after that time.

The choice of system, spaced microphones or coincident microphones, still remains, and this can be governed by a number of factors. The major recording companies are divided in their use of the two methods, most of the American companies favouring the spaced microphone system, whilst many of the European companies use the coincident technique. All the recording companies

and broadcasting organisations frequently use additional microphones to reinforce the basic system whatever the system in use. These additional microphones are often single monophonic types, and are introduced into the studio set-up in such a way that their outputs can be steered to the appropriate places in the reproduced sound picture (fig. 1). The method by which this is done is known as "pan-potting."

The panoramic potentiometer, or "pan-pot," is a device which takes the output from a monophonic source, and divides it between the two channels in any desired proportion so that the sound appears to come from the required place. Fig. 2 shows a simplified circuit. The device can be used in two main ways; it can help to reinforce weak images in a stereophonic balance using either spaced or coincident microphones, or it can be used in a set-up with no stereophonic microphones at all. It can also be used to create movement from monophonic sources when normal stereophonic techniques are not possible.

The first of these uses of the pan-pot is more normal in serious music than in light or popular music, and the operation is as follows. In this case there will probably, almost certainly, be a basic balance using one of the simple systems, and all the sound sources will be placed in their correct positions in the reproduced picture. However, some of these sources may well sound weak, for one reason or another, and may need reinforcement in order to reproduce the correct musical balance between the instruments. In this case, a monophonic microphone is placed in front of each of the weak sources, and its output applied to a pan-pot. The microphone fader is then adjusted so that the sound can be heard, and the pan-pot turned up so that the sound overlaps the weak sound from the stereophonic microphones. Having adjusted the position, the volume of sound from the microphone is then set to give the correct musical

balance. This procedure is then repeated for all the other reinforcing microphones.

The same procedure can, of course, be adopted for light music, but for this type of work, and more particularly for popular music, many technicians employ a rather different technique. No stereophonic microphone pair is used, but a large number of monophonic microphones are set up, one in front of each section of the band or group, and, if necessary, in front of single solo instruments. Each of these microphones is fed via a pan-pot, and the whole stereophonic picture is built up using these. This is, in fact, an extension of the normal technique of multi-microphone balancing, and by its use both monophonic and stereophonic recordings can be made simultaneously. Compromise adjustments can be made so that the best possible balance for each case can be achieved.

This may sound a simple system, but it is not without its difficulties. It is quite possible for two of the microphones, one near to one side of the stereophonic picture, and one near to the other, to act as a stereophonic pair, and produce spurious images of all the instruments in between them (fig. 3). These will appear in addition to the wanted images from the "intended" set-up. This danger of spurious images can, of course, occur whenever additional microphones are added to a stereophonic balance, but with care the fault need not be a serious one. So far we have considered only the use of monophonic microphones to reinforce a stereophonic balance, but there may be cases when it may be more advantageous to use stereophonic microphones for this purpose. Such occasions occur when the source to be reinforced is wide in nature, for example a piano, or a group of instruments within an orchestra (fig. 4). However, the images due to a stereophonic pair of microphones, with one microphone of the pair fed to each channel in the normal way, will cover the whole sound stage, whereas the instruments themselves only occupy a small,

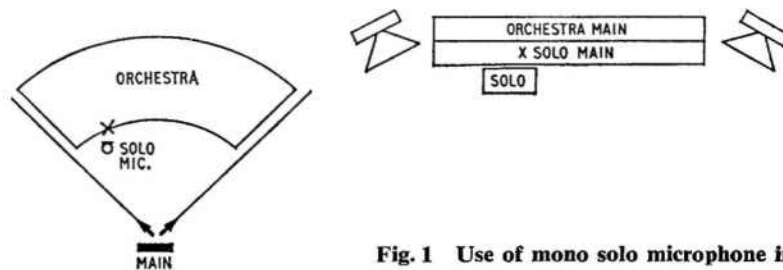


Fig. 1 Use of mono solo microphone in concerts

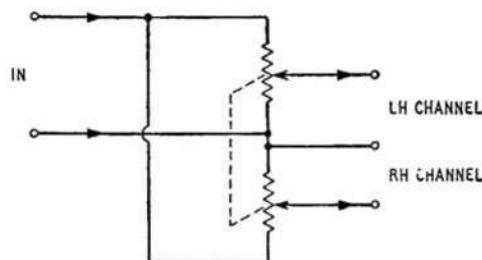


Fig. 2 Simplified circuit for a panoramic potentiometer or pan-pot.

but finite, part of it. It is necessary, therefore, to make some provision for narrowing down the effect of the added microphones, and to move the images due to them into the right part of the reproduced picture. The narrowing can be accomplished by introducing some crosstalk, better in this case termed "crossmix" to distinguish it from the unwanted variety, between the two halves of the added pair (fig. 5). As the crossmix is increased, the image will narrow, until it collapses to a point when the two channels are shorted out. The movement of the images from the reinforcing stereo pair is simply achieved by unbalancing the levels of the two halves, thus moving the images away from centre in the required direction.

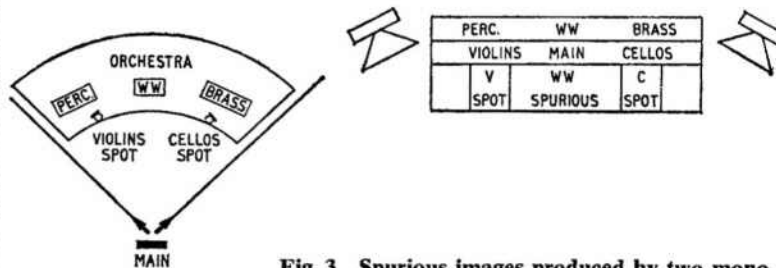


Fig. 3 Spurious images produced by two mono microphones

So far we have been considering only balances for music, but of course it is equally possible to produce drama in stereophony. In this case, much that has already been said still applies, and the pan-pot comes into its own as a means of introducing movement to monophonic sources, such as recordings of sound effects. This can be especially useful when stereophonic recordings of sound effects are not available. This is not to say that stereophonic recordings would not be superior, they would, but monophonic effects can be quite convincing when used in this way.

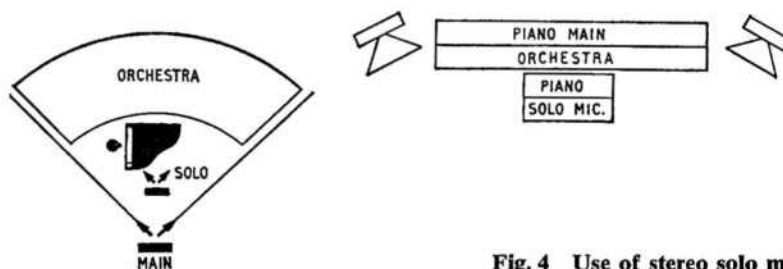


Fig. 4 Use of stereo solo microphone

To end this short series of articles, here is a description of how the microphones were set up and balanced for the recording of a large dance orchestra (fig. 6). In this case, four stereophonic microphone pairs were used, together with five monophonic microphones. The stereophonic microphones were, in fact, mounted in single units, the individual capsules being of the capacitor type, two capsules with their head amplifiers being mounted in a single outer case, the microphones thus being coincident pairs. The particular make of microphone used is capable of being switched so that a number of polar responses can be

*continued overleaf*

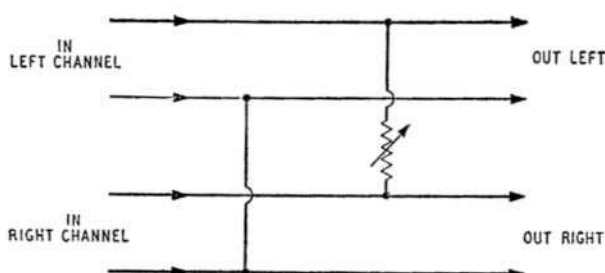


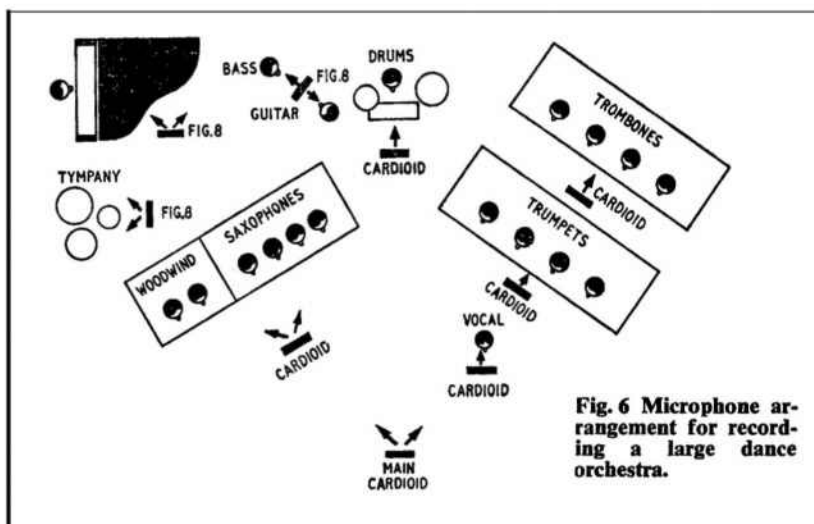
Fig. 5 Crossmix used as a simple width control.



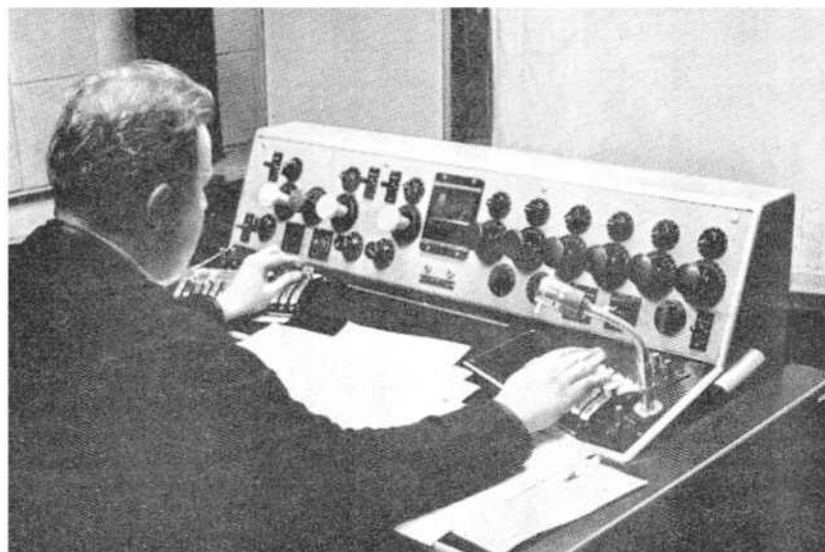
obtained, and in the present set-up two of these stereophonic microphones were set as cardioids and two as figure-of-eight. This control of polar diagram enables the acceptance angle of the stereophonic pair to be varied, the cardioids, for example, giving a wider angle, so that these pairs can cover a wider source without having to be placed so far away that other instruments would be picked up. In the diagram, stereophonic microphones have two arrows, pointing on the same side, and monophonic microphones one or two, depending on whether they are single or double sided.

The main microphone is set up first, and the physical placings of the instruments on the stage adjusted to give the required reproduced sound picture. This done, the relative balance of the various sections of the orchestra will almost certainly need adjustment. In order to do this, stereophonic reinforcing, or spot, microphones, were added in front of the widest sources, such as the woodwind and saxophone section, and also in the case of the tympani and solo piano. By suitable width adjustment and offset of the left/right balance, the images due to these spot microphones are made to coincide with the weak images in the main microphone. Similarly, other instruments are reinforced by means of monophonic microphones, and these adjusted to position by means of pan-pots. Having made certain that these additional microphones are not causing any spurious images, the musical balance can be finally adjusted. The studio control desk shown in the picture was one of those developed by the BBC to facilitate operations of the kind described above.

Much more could be said on this subject of stereophonic microphone technique, but there is not room here. I hope that this introduction will give some food for thought and experimentation. Elaborate equipment is not necessary, and several firms are now marketing mixing units incorporating many of the facilities described above.



**Fig. 6** Microphone arrangement for recording a large dance orchestra.



**Fig. 7** BBC portable stereo control desk, showing operation



Monday



Tuesday



Wednesday



Thursday

## CAPTURE SOUND 7 DAYS A WEEK



Friday



Saturday



Sunday

**AND  
BRING  
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# NEW FI-CORD



# 202A

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Built to the same specification which made the Fi-Cord 202 the first choice of broadcasting and film companies, the new Fi-Cord 202A offers still more refinements. Among these are a button-operated battery tester with separate indicator scale, and a redesigned control panel, giving greater ease of operation, finished in silver-anodised aluminium.

Match the standards of the most exacting professionals with the new Fi-Cord 202A—the hand-made portable battery/mains recorder that captures every sound as faithfully as studio equipment.

### ***Brief specification***

- \* Frequency response: 50-12000 c.p.s.  $\pm 3$ db at  $7\frac{1}{2}$  i.p.s.
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- \* 2 speeds:  $7\frac{1}{2}$  and  $3\frac{3}{4}$  i.p.s.; standard 4" spools and  $\frac{1}{4}$ " tape.
- \* Vu-meter for recording level.
- \* Input socket for any microphone with an impedance from 20-1000 ohms.
- \* Constant motor speed with wow and flutter figure of less than 0.3 r.m.s. at  $7\frac{1}{2}$  i.p.s.
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- \* Size: 9" x  $6\frac{1}{2}$ " x  $4\frac{1}{2}$ ".
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- 2 Long life mercury batteries.
- 3 Power Pack for use with 12v car battery.
- 4 Power Pack for use with AC mains 110-240v.

## TEST REPORT

# AUDIOVIEW

The Armstrong 224 F.M. Tuner and Stereo Multiplex Decoder.



The wide frequency range of F.M. transmission is the only answer to high fidelity recording and reproduction from radio programmes. The Armstrong Model 224 tuner is one we have selected for review mainly because of the ease with which it can be used for F.M. stereo broadcasts using the G.E. Zenith multiplex system. Although the BBC are transmitting F.M. multiplex stereo only on a limited basis, it is at present anticipated that this will soon be extended to a regular service. All Armstrong F.M. tuners and stereo tuner amplifiers have complete provision for the addition of a multiplex decoder and stocks of these decoders are available. One can therefore purchase a model 224 F.M. tuner with or without a multiplex decoder.

So first what of the tuner itself? Well it has an elegant appearance and covers the usual F.M. broadcast band of 87 to 108 Mc/s. Accurate tuning can be achieved quite easily by the centre zero reading meter and this, together with the high sensitivity and wide band Foster Seeley discriminator contri-

butes to an F.M. performance of outstanding quality. In addition the high stability of the local oscillator and the use of temperature compensating capacitors ensure complete freedom from drift. Tests involving long running periods proved this to be exactly as claimed by the makers. Incidentally the 224 tuner is self powered and has more than sufficient output for any tape recorder or hi-fi amplifier. The output can be attenuated if desired. The makers' specification of the 224 tuner is as follows:—

Frequency Coverage—87-108 Mc/s.  
Sensitivity— $1.5\mu\text{V}$  for 20 dB quieting at 75Kc/s. deviation.

Intermediate frequency—10.7 Mc/s.  
I.F. Bandwidth—220 Kc/s at 6dB down.

I.F. Rejection—60dB.

Aerial Inputs—70-80 and 300 ohms.

The Armstrong 224 tuner employs a grounded grid r.f. stage, mixer, two I.F. amplifiers, limiter and Foster Seeley discriminator and normally has one common output socket for mono reproduction. When fitted with the multiplex decoder, two

output sockets are brought into use for left and right hand stereo channels respectively and each has its own attenuator.

When employed with the decoder the tuner has an additional 'green' indicator showing that a stereo transmission is being broadcast. The specification of the decoder is as follows:—

Frequency Response—40-15,000 c/s  $\pm 2$  dB.

Channel Separation—Better than 30 dB.

Sensitivity (19 Kc/s. signal)—15mV.

Hum and Noise—-60 dB.

Transistors — 4 - OC81, 2 - OC45, 2 - O481 (diodes), 1 - RS240 (diode).

Power requirement—Automatically supplied from tuner.

If you already have a 224 tuner, the multiplex unit is quite simple to fit and accordingly full instructions are provided.

Tests with the 224 were carried out about 20 miles from the BBC Wrotham F.M. transmitter, using a dipole aerial for reception. This provided adequate signal but for greater distances from F.M. trans-



mitters a two or three element beam aerial is advisable, particularly for stereo. On mono broadcasts the tuner excelled itself with more than adequate output for any hi-fi amplifier or the radio input on a tape recorder. Tuning with the centre zero meter is accurate but simplicity itself.

On stereo one has to be careful to ensure a good signal from the aerial, hence the previous comment, but even with only a dipole quite excellent results were obtained from BBC test transmissions which were announced recently in ATR. Although the noise level is about 3 dB higher on stereo, it is not unduly noticeable, except possibly when there is no signal at all. Channel separation is all of the 30 dB claimed and so the location of sounds from left, right and centre as the case may be is not spoiled in any way.

Further tests were made by recording in stereo to find out whether the pilot carrier would cause whistles by beating with the bias oscillator in the tape recorder. Two different recorders were used for this and no trouble was experienced. It is however, essential that the bias oscillator frequency is fairly high, otherwise beat notes might be produced. The pilot carrier is of course fairly well suppressed before the output circuit of the tuner.

Although only current models such as the 224 have specified provision for fitting the decoder, some previous models such as the Stereo Mk.12 and Stereo 55 tuner amplifiers and the ST-3 and T4 tuners were supplied with multiplex outputs. It is not quite as simple to adapt these models but should owners wish to do so, a special adaptor kit and instructions are available.

The Armstrong Model 224 tuner and stereo multiplex decoder are manufactured by Armstrong Audio Limited, Wartlers Road, Holloway, London, N7, to whom all enquiries should be addressed. The 224 tuner retails at £22 10s. 0d. (optional case £2 15s. 0d. extra). The multiplex decoder retails at £14 10s. 0d.

F. C. Judd

## NEW PRODUCTS

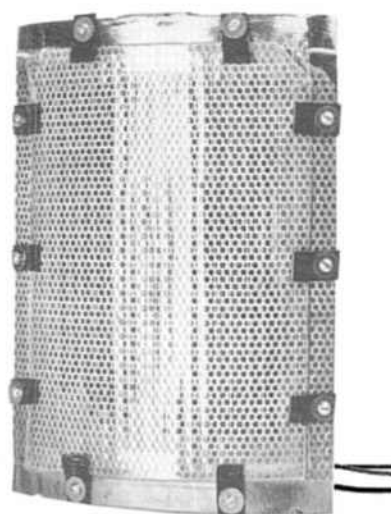
## AUDIOVIEW

A brief look at some of the newest audio accessories.

**The Dynastatic Loudspeaker (fig.1)** Claimed to have a revolutionary improvement in efficiency, and the subject of a provisional patent, the Dynastatic loudspeaker has been announced by Audio Services Limited. It is an electrostatic unit at present made for the frequency range beyond 1000 c/s. and extending almost to the supersonic. The high rate of efficiency claimed by its designer provides a notable improvement in reproduction of the upper harmonics which all musical instruments produce but which are not always heard at comparable strength over ordinary moving coil.

Dynastatic units can be heard working at Audio Services Limited, East Barnet Road, Herts., and anyone interested is invited to write or phone for a demonstration (Barnet 6605). We took the opportunity of doing this and went along to Audio Services to hear for ourselves. There is no doubt that this new loudspeaker does really deliver the upper frequencies without colouration or distortion.

Audio Services Limited say that before long they will have a full



The interior of the new Dynastatic electrostatic loudspeaker which is claimed to give a tremendous improvement in efficiency. This is the upper frequency range speaker only, but full range speakers should be available shortly.

frequency range electrostatic speaker available with a much higher efficiency than any on the market. However, why not hear for yourself if you happen not to be far from Barnet. No charge — no obligation and the Audio Services Dynasonic stereo equipment is worth seeing and hearing at the same time. This is an excellent 'package deal' outfit comprising a stereo record player and tape recorder complete with amplifiers all in one cabinet.

**Radio and Audio Servicing Handbook** — by Gordon J. King

This excellent book covers in great detail the problems in servicing tape recorders, radio receivers, amplifiers, turntables, radiograms, etc. It is an essentially practical guide to fault finding and contains ten chapters devoted to modern radio and audio equipment, mains superhet receivers, FM tuners, portable radios, transistor circuits and sets, record reproducers, turntables and last but not least, tape recorders. The chapter on tape recorders deals with construction, track designation, tape speeds, frequency response, test tapes, fault

*continued overleaf*

finding in tape amplifiers, tape transport mechanism, motors and transistor circuits. The book also contains fault finding charts for receivers and amplifiers, etc., including tape recorders and is profusely illustrated with photographs and line drawings.

Gordon King is a practical man and writes for those with a practical turn of mind. His presentation is faultless and the book is extremely easy to read. Radio and Audio Servicing Handbook is published by Odhams Books Limited, price 25s.

#### Tempotapes

A new series of pre-recorded music on tape but with a unique difference, Tempotapes are recorded only on one track of top quality tape, leaving

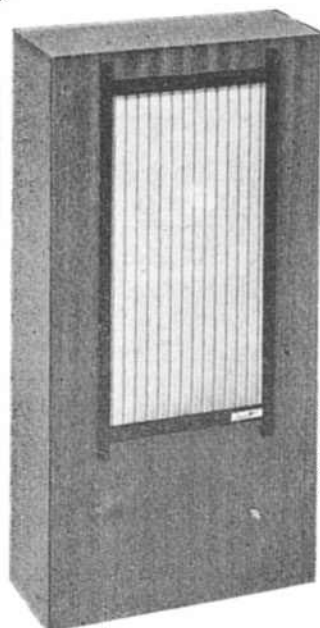
the other half track for the owner's use. You therefore get a 600 ft tape with full length and value of recorded music with the remaining track for other recordings. Price only 21s. each. There are 26 titles to choose from covering pop, classics, jazz, organ, flamenco and tunes from shows and films. All are packed in attractive boxes with colour labels.

A review and report on some of these tapes will be in our next issue, but having played the first sample of Tempotapes (No. 14, Flamenco, containing nine separate items) we find the recording excellent. Meanwhile an illustrated brochure containing full details of all recordings and titles is available from: Tempotape Limited, Hereford

House, North Court, Vicar Lane, Leeds 2.

#### Tandberg Recording Tapes

Tandberg GB (Elstone Electronics) Ltd., have announced that Tandberg TGB recording tape is now available from all Tandberg dealers in the UK. The tape is specially recommended for all Tandberg recorders and is manufactured to specification by the Minnesota Mining and Manufacturing Co Ltd., for Tandberg. The characteristics of the tape are specially suited to the recording bias setting on Tandberg tape recorders. Further details are available from Tandberg stockists or Tandberg GB Limited, Edward Street, Templar Street, Leeds 2.



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# LOUDSPEAKERS FOR TAPE RECORDERS

by D. J. Barnett

Most tape recording enthusiasts fail to realise the full potential of their machines to reproduce good quality sound, due to lack of attention to the output stages, and in particular to the loudspeaker. The tape recorder manufacturer generally provides a speaker mounted within the recorder cabinet, and this is intended mainly for monitoring purposes. Due to restrictions in the physical space available and also the cost of the speaker, it is usual to mount a small commercial elliptical speaker which would measure either 6" x 4" or 7" x 3". Many of these speakers have extremely good characteristics, but they are of course very limited when required to reproduce either very high or very low frequencies. Also the unit will not handle much power. The specification for such a monitor speaker is shown below. This particular speaker is used by a major manufacturer of recorders, who is very quality conscious, and this unit is amongst the best that are provided.

Speaker size 5½" x 3½"

Maximum power handling 3 watts

Fundamental free air resonance  
160c/s

Flux density 9,000 gauss

Voice Coil size ⅝"

Frequency response 100c/s to 10kc/s

A quick examination of the above specification will reveal that the speaker is very limited with regard to power handling, sensitivity and frequency response. Now the per-

formance of a good quality tape recorder will certainly quote a frequency response of 40 c/s 15 kc/s at 7½ ins/sec, and as it is easy to see that all signals below 100 c/s and above 10 kc/s are not reproduced as shown by the shaded area in fig.1. In order to reproduce the full frequency range of the tape recorder it is therefore necessary to replay through an external speaker. The choice of the speaker and the enclosure for any particular tape recorder is a matter for particular care. Just as it is illogical to have a good frequency response on the recorder not reproduced by the speaker, it would be almost as bad to have a speaker which has a much better response than the recorder. At least the better speaker would reproduce the whole signal range, but it would of course, be more expensive. Firstly then, balance the frequency range of the speaker to that of the tape recorder, such that the speaker will at least reproduce all the signals from the recorder.

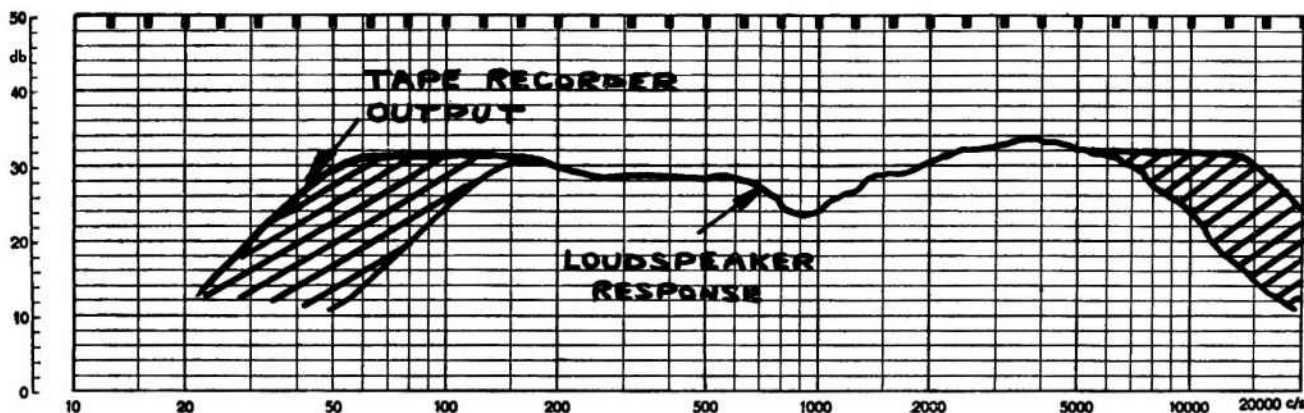
Secondly, the power handling of the unit must be suited to the playback amplifier. The amplifier contained within the recorder will probably only have an output of about 3 watts, and in this case any high fidelity loudspeaker system will handle this amount of power. If the output signal is fed into a higher powered amplifier as is usual, then the speaker should be able to handle the complete amplifier output power.

This would require a power handling of 8 watts for normal domestic use, up to about 15 watts to 25 watts if the system was to be used for public address work in small halls.

Physical size is always of importance to the tape recorder enthusiast, as often, portability is a foremost requirement. Recent developments in loudspeaker enclosure design have led to smaller and smaller units. The smallest true high fidelity system, now measures only 10½" x 5½" x 7¼" and has extremely good response down to 50 c/s. Naturally there are also disadvantages to such systems, and in this case the power handling is only 8 watts, and the sensitivity of the unit is low. All closed box designs tend to have reduced sensitivity, as the free air resonance of the speaker must be kept to a minimum, if the cabinet resonance is not to be too high. In order to do this, the weight of the cone must be increased, and thus as the moving mass is increased, so the sensitivity drops. With reasonable amplifier outputs, this drop in sensitivity is not usually significant, but if the tape recorder output is limited then one should make sure that the total sound output will be adequate for the particular application. However, these types of speaker systems are ideal for domestic use, can be easily transported and will of course ease any domestic problems regarding size, particularly if stereo reproduction is required from the very small-

SPEAKER SIZE	POWER HANDLING	RESONANCE	FREQUENCY RANGE	CABINET VOLUME
8" dia.	6 watts	60 c/s	40-15,000 c/s	3,000 cu. ins.
10" dia.	10 watts	45 c/s	35-15,000 c/s	5,000 cu. ins.
12" dia.	15 watts & above	35 c/s	30-16,000 c/s	7,800 cu. ins.





est system. There is a wide range of closed box cabinet systems available, and generally the larger the cabinet, the better the bass response and the greater the sensitivity.

If a cheaper system is required then it is a good idea to build one's own cabinet. Most major manufacturers make a range of suitable drive units ranging from 8" diameter to 18" diameter. For tape recorder use the 8" and 10" units are the most popular and compare very well regarding power handling and frequency res-

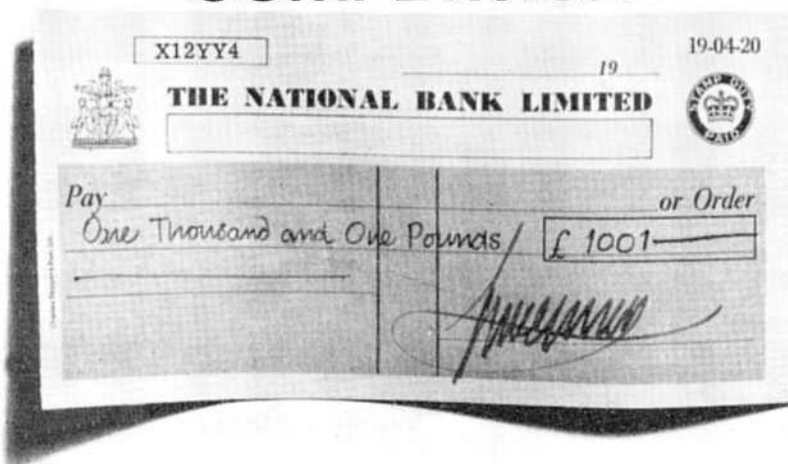
ponse. For better quality 12" speakers can be used but cabinet sizes now become quite large. Cabinet designs are usually a version of the reflex enclosure. Specifications of typical speakers systems are shown in table 1.

Most of the cabinet construction is fairly simple and can be readily undertaken by any handyman. Full design details are available, usually free, from the speaker manufacturer, who will also help if any particular problems arise. Particular attention should be paid to the use of the

correct thickness of wood, and the rigidity of the construction. All joints should be glued and airtight. To build a typical 8" cabinet would cost about £2 unfinished, so that with a speaker cost of around £5 it is possible to have an adequate system for well under £10.

One final technical point is to make sure that the loudspeaker system has the correct impedance for the output amplifier. If this is incorrect then a matching transformer will be required.

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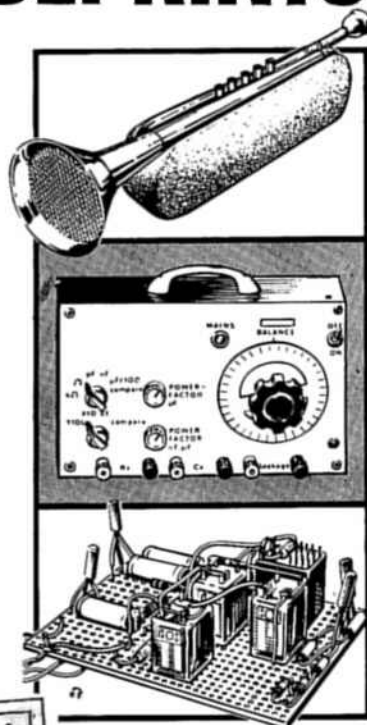
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## VIDEO NEWS

# PICTURES ON TAPE

by C. G. Dixon.

Basically, any picture which can be reproduced by electrical means is capable of being recorded on magnetic tape. If one wants to record 25 pictures per second, each containing a large amount of fine detail then one is faced with the problem of recording frequencies up to 3,000,000 cycles/sec. Television recorders, or video tape machines, are therefore very complicated and expensive. In the early days of television the BBC broadcast rather crude 30 line pictures which were received by a handful of enthusiasts who made their own receivers with whirling Nipkow discs. To assist these early TV amateurs some records were produced on which pictures were recorded with a maximum frequency of 10,000 cycles/sec.

A third type of picture transmission is that which is used for sending newspaper photographs from one part of the world to another by radio; this is called 'facsimile' and it involves the transmission of single photographs in great detail. Each picture takes several minutes to transmit and is reproduced on a piece of photographic paper wrapped round a drum. This type of picture transmission was also broadcast by the BBC in the 1930's but the idea never caught on and broadcasting finally ceased.

Intermediate between true television and facsimile we have a system which has been called "slow scan television" in which the rate of scanning is such that a picture is built up on a cathode ray tube in a time of 1 to 10 seconds and is continuously being renewed. The type of cathode ray tube used for radar display is eminently suitable for this purpose as it has a persistent phosphor which retains the light and shade imprinted on it for several seconds. It is impossible, of course, to portray movement and this system is thus limited to still pictures; nevertheless pictures can be sent in quick succession one after the other, and this is undoubtedly the technique used by the Ranger VII rocket which sent back pictures from the moon. The first successful slow scan pictures were produced by Copthorne Macdonald in the USA, although members of the British Amateur Television Club had already been experimenting along similar lines. 'Cop' Macdonald's system involved a line

frequency of 20 cycles/sec. and a picture read-out time of 6 seconds thus giving a 120 line picture. The signal was impressed on a 2,000 cycles/sec. carrier which carried positive going synchronising signals in addition to the video signal. J. Plowman, of Yeovil, and I, each built monitors to display tapes received from the USA and these were successfully demonstrated at various radio shows in different parts of the country. In addition, a very remarkable event occurred on November 22nd, 1959 when J. Plowman received transatlantic pictures direct from 'Cop' Macdonald who was transmitting in the 10 metre amateur radio band.

Since then, tests have shown that a frequency modulated system is much to be preferred as this combats the effects of fading, during radio transmission, and varying amplitude of recording due to slight variations in the magnetic coating. The use of an F.M. system, however, implies that each frequency must be reproduced faithfully and "wow" and "flutter" can cause variation in light and shade in the picture, so a good recorder is essential.

When faced with the task of designing a completely new system of image transmission and recording, one is faced with the problem of what standards to choose. The Americans, having a mains frequency of 60 cycle/sec. have chosen for their F.M. system a line frequency of 20 cycle/sec. and a frame time of 8 seconds giving a 160 line picture. As most radar tubes have round screens it was felt that a 1:1 picture ratio would make the best use of the screen area. With these figures we have 160 x 160 picture elements to transmit in 8 seconds which gives 3,200 elements/sec. and requires a maximum frequency of 1,600 cycles/sec. as each  $\frac{1}{2}$  cycle of carrier wave can transmit a picture element. The Americans are thinking in terms of radio transmission over the crowded amateur radio bands where a band width of 2 or 3 kilocycles is usually all which is available.

On the other hand I am more interested in the tape recording of pictures and have chosen standards which make better use of the response of the average tape recorder which extends to 10, 12 or even 15 kilocycle/sec. As the British mains are at 50 cycle/sec. this was taken as the line frequency and with a frame time of 4 seconds this gives a 200 line picture. By simple arithmetic we get a frequency of 5 kilocycles/sec. and about 10 or 11 Kilocycles/sec. being at the lowest frequency during the sync. pulses and at the highest for peak white. It is interesting to note that if this variable frequency constant amplitude signal is passed through a system whose H.F. response falls off rapidly, there emerges a variable frequency signal with amplitude variation. In this way, Aubrey Black in Abersychan and Henry Chenery in Ringwood, Hants., have both resolved F.M. pictures transmitted by me, using monitors which were originally designed for amplitude modulation. When seen on a proper F.M. monitor, the detail is only slightly better than that obtained with American standards but the system scores heavily in its more rapid vertical scanning for the following reason. As the scanning takes place, a bright line is seen to travel slowly down the screen leaving a picture behind it; the glowing phosphor



which holds the picture detail now fades away and is renewed when the scanning line reaches it during the next frame. When there is an interval of 8 seconds or so between successive renewals, the top of the picture has faded badly when the scanning line reaches the bottom; but if the interval is 4 seconds or less the difference in brightness is not too noticeable. (This is with a 5FP7 cathode ray tube). Ideally, we should have a display tube with a screen of infinite persistence coupled with a means of erasing the picture by an "erase beam" immediately preceding the "writing beam" — such a device has not been invented yet but it would resemble in its action the normal tape recording practice of placing an erase head just before the record head. Infinite persistent tubes or *memotrons*, are available which hold the whole picture on the screen for as long as desired and then erase the whole picture to make way for the next picture — such devices, however, are costly.

The camera, which is illustrated in figs. 1 and 2, uses a 7290 special Vidicon camera tube and is entirely transistorised. The Vidicon and its scanning coils are mounted between two Veroboards which carry most of the circuitry. On the board visible in fig.2 are the time bases with D.C. amplifiers feeding the scan coils; the other board carries the video amplifier, sync pulse mixer and final oscillator whose frequency is recorded on the tape. The power supply is at the rear of the case and power lines have to be provided at +300v. and -100v. for the vidicon and at +6v. and -6v. for the transistor circuitry. For focussing purposes, the whole Vidicon assembly is mounted on a slide and a simple lever positions it; focussing can also be accomplished by an adjustment on the lens. This latter is a 2" f1.9 lens of Japanese manufacture which has no shutter as it was built for closed circuit TV use.

The results from this camera are shown in figs.3 and 4. It will be noticed that the picture which is being reproduced from tape has a dot pattern in the shaded areas; it is thought that this is due to a resonance effect connected with inductive components in the tape recorder. The original pictures were reproduced on a 5" diameter screen and the discontinuity near the bottom is caused by the camera (photographic) exposure being not quite a whole frame. The original picture was illuminated by two 150 watt lamps the vidicon camera lens being set at f5.6. In daylight the vidicon gives a good picture at f8 or f11 and so compares favourably in sensitivity with a normal photographic camera.

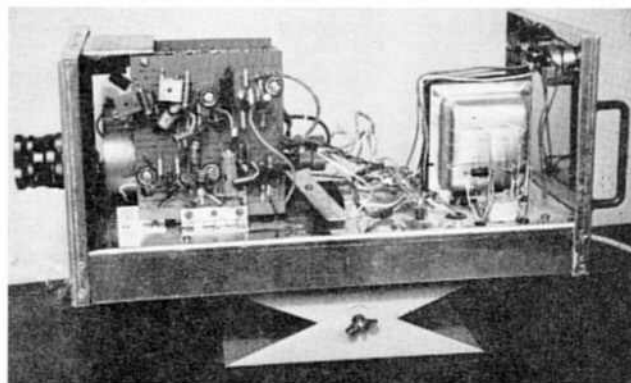
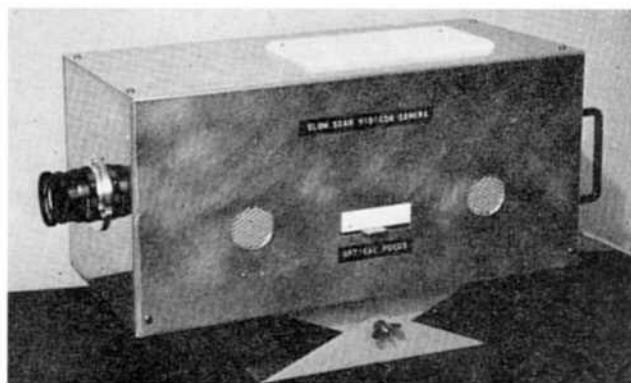
The uses of slow scan television will necessarily be limited as the system is unable to cope with rapid movement, but it might prove useful for advertising purposes or for certain industrial TV jobs where a TV camera is used to monitor a dial, check a water level, etc. The possibility of recording slow scan pictures in the above application might even place slow scan television in a more favourable light than standard industrial television — particularly where records have to be kept. The system might also be used to store visual information by recording it frame by frame, though this would demand the use of the more sophisticated playback devices mentioned earlier.

(1) Home constructed camera for Slow Scan television.

(2) Interior of the Slow Scan Television Camera designed.

(3) Picture seen on 5 inch monitor when coupled direct to camera.

(4) The same picture as (3) from a recording on tape.



# A REAL HAMATEUR

by Lynn Setford

*Below :  
The Grundig  
TK60 as  
used by Mrs.  
Setford for her  
one-character  
rehearsals.*

When my husband generously gave me a tape recorder for a birthday present, he was giving me more than just the fun of finding out how it worked, and the pleasure of being able to record our children's voices to keep among other treasures of their childhood.

As an amateur actress, I find the problem which inevitably arises is that of learning lines. The usual attempts to memorise my parts as they came along, were sandwiched between household chores, preparing meals, dealing with two lively youngsters, and journeys to the shops for those items of groceries I nearly always seem to need at the most inconvenient times.

The evenings also were not conducive to quiet study, there being just the one living room, and television programmes, of interest either to the children before bedtime, or to husband later on, going full blast.

If I could manage to prise one or other of the family away from whatever they were engaged in doing to hear me say my lines, they did it with such obvious reluctance that I was beginning to get quite a guilt complex.

The arrival of my Grundig TK60 changed all that.

Having got used to the various controls, I quickly put the recorder into really helpful service. Reading from a copy of whatever play my society is in the process of doing, I read everybody's lines except my own. On reaching the cue lines for my part,

I stop reading aloud, but allow the machine to keep going, while I say my lines softly and inaudibly to myself. I then carry on reading the other characters' lines, and in this way go through the whole play. It can take quite a time taping the whole play like this, but there is the advantage of being able to do it act by act whenever there is time, until it is completed.

Once taped I am able to go about my household chores etc., and with the tape recorder playing back, I can cheerfully stand at the sink peeling potatoes or doing the wash, at the same time declaiming my lines whenever given the appropriate cue, and if I have recorded correctly will have the right length of silent tape while I put over my lines. It's great fun, and has helped immensely to increase the speed with which I can learn a part.

The tape recorder has of course many other uses in Amateur Dramatic Societies, many of whom use it for the purpose of recording sound effects. Building up a tape with all the effects one is likely to need can be most interesting.

My early efforts brought many problems of course, and I had to watch the different speeds. A mistake made in this connection once led to a group of singers who were to mime a certain number, opening their mouths and emitting a noise very much like the Chipmunks, much to their utter amazement, and the hilarity of our audience. Was my face red! However, it's all in the fun of being a keen 'Hamateur'.



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## *the incredibly versatile portable tape recorder*

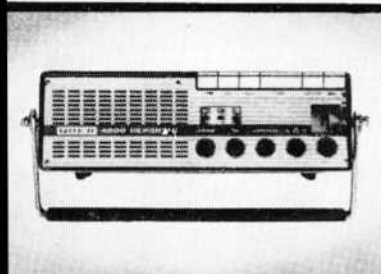
Ready for recording and playback anywhere and at any time the UHER 4000 Report-S satisfies the most exacting demands of both amateur and professional and offers virtually every facility provided by a mains-operated recorder. It requires only five flashlight cells as a power supply, and is even more economical when operated from a re-chargeable "dryfit" battery. It can also be used with any type of storage battery from 6 to 24 volts.

Four tape speeds provide a wide variety of recordings—from HI-FI to extensive conference minutes. Compact and light in weight the UHER 4000 Report-S permits the use of tape reels up to 5"—and a playing time of up to 8 hours per reel of tape. It is the *complete* portable—operable in any position and undisturbed by normal manhandling during recording or playback.

The many accessories available include the AKUSTOMAT—an automatic switch which will start and stop the tape motion whenever sound begins or ceases.

An award winner for industrial design at the HANOVER TRADE FAIR in 1963 and 1964, the UHER 4000 Report-S has won enthusiastic approval in professional circles and is now widely used in industry and commerce, in Government Departments and by the B.B.C.

It is one of a range of superb recorders—which also includes the UNIVERSAL 5000 and the ROYAL STEREO—demonstrated by discriminating dealers throughout the U.K. In case of difficulty write for descriptive literature to the address below.



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**Technical Specification:** Two tracks to international standard reel size: up to 5" four tape speeds: 7½ ips, 3½ ips, 1½ ips, ¾ ips frequency response (±3db): 40-20,000 cps at 7½ ips, 40-17,000 cps at 3½ ips, 40-10,000 cps at 1½ ips, 40-4,500 cps at ¾ ips contrast ratio; 55 db wow and flutter: ±0.15% at 7½ ips (audible frequencies only) output power; 1 watt (push-pull power stage) power supply; five flashlight cells (1.5 volts each) or "dryfit" storage battery model Z 211 or model UHER Z 114 mains-operated power unit and battery charger or an automobile battery via automobile adaptor cable inputs; Micro 0.1 mV at approx. 2 kilo-ohm; Radio 1 mV at 47 kilo-ohms; Phono 25 mV at 1 megohm outputs: 2 volts at 4 ohms; 1 volt at 15 kilo-ohms. Operating time: intermittent operation of approx. 12 hrs; continuous operation and intermittent operation respectively from the "dryfit" storage battery—approx. 8 hrs. Dimensions approx: 11" x 8" x 3" weight without batteries: approx. 6 lbs. Price 103 Gns. Including microphone and L.P. Tape.

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# TAPE CLUB NEWS

FIRSTLY, may I say how pleased I was to meet so many of you at the Audio Fair. It was very enjoyable to be able to make so many tape friends and to renew old acquaintanceships. I hope, too, that club members made the most of this unique chance to meet each other, to swap ideas, and generally to discuss club life, its development and its problems. It certainly seems that there are plenty of the latter around at the moment, and it may be that this getting-together has helped solve a few of them. I hope so.

## CLUB OF THE MONTH

**Birmingham** Tape Recording and Audio Club have had a very full and entertaining programme. One evening which they recommend to all other clubs is a five-minute tape night. Members are invited to play short recordings on any subject and this rapid succession of surprises never fails to keep everyone interested. It's also amazing what people can find in their archives — sometimes even tapes they had forgotten about themselves! Another recent club evening was spent trying out all the wires, plugs, holes and knobs on a new transistor stereo amplifier. In spite of this over-thorough testing, the amplifier is still working happily. B-TRAC was among a number of other clubs who attended the 8th Birthday celebrations of the Coventry club. This proved a hilarious evening and, despite teams running in all directions, balloon fighting and other hectic games, at least one member from Birmingham (in true tradition) interviewed most of the guests on his new portable.

Following the club's recent AGM, Mrs. Dawn Knee remains as club secretary — she was voted irreplaceable!

## CHANGES IN SIGHT

With an Extraordinary General Meeting being called for this month, and the AGM only a few weeks away, members of the **Rugby** club are anticipating changes. The most important proposed changes include a special subscription rate for the under-21's, a revision of the terms of service of club officers, and a possible change of title of the society. Rugby was another of the clubs represented at the Coventry party, and also report that they thoroughly enjoyed themselves. Certainly Rugby beat Coventry at balloon football (so that's what it was!) by 10 goals to 2. On another evening the Spencer Dallington Camera Club of Northampton provided Rugby's entertainment, including an unusual slide show of a "fairy story" compiled around slides of inn signs. The only part of the programme presented by Rugby was their regular quiz, one prize being won by Arthur Harding of the camera club, and the other by Alec Russell of Rugby.

## BEDSIDE JUDGMENT

Following his success in last year's Tape of the Year competition, Morris Webb was appointed judge for the year of all **Thornton Heath** club's competitions. Unfortunately, Morris was away on sick leave for a couple of weeks, so after entries for the current competition had been played over to all members at the meeting, Ed and Margaret Bashford rushed the tapes and a Brenell off to Morris's bedside, while John Bradley

held the fort by playing through the last 'Interclub' tape magazine from Catford. At 10.15 pm the gallant pair returned with tapes, recorder, and judging duly recorded on tape. The contest, entitled 'Why I don't like Tape Contests' was won by Margaret Bashford, with Christine Thompson taking second place.

The club was asked by the Selsdon Stagers, a local drama group, to do the sound effects for their production of Ustinov's play 'Love of Four Colonels.' This very complicated four-plays-within-one play demanded everything from mysterious music and baby crying to train siren and car stopping, having a total of 33 sound cues.

The Russian-Yugoslav Theatre Dance Club have asked for a tape to be prepared for their use, and the local spiritualist church have forwarded a list of dates on which they will require music and P.A. services. If the club can't make the dates, the church organisers will rearrange the events to accommodate the club! Negotiations are going on for the re-opening of the Croydon General Hospital programme.

The club is never short of things to do — if anything their programme is overloaded, but the committee runs everything so smoothly that all members were re-elected for the third year running.

## DOUBLE FIRST

When the Forth Road Bridge was opened last year, members of the **Radio Scotland** Tape Section made what they believe is the first taped crossing of the bridge. This involved a convoy of four vehicles. However, to complete their double first, the club had a much more arduous time when the pedestrians' footpath was opened earlier this year. Interviews with fellow walkers were recorded by the foot-sore team, who crossed the 1½ mile bridge both ways, complete with recording gear.

Tape exchanges with Middleton club continue, and similar tapesponding arrangements have recently been made with the Dundee club. One tape which should provide plenty of amusement is a recording of the club's light-hearted panel game 'Can the Team Think'!

## LOOKING TO SUMMER

With their thoughts on the anticipated outdoor recording sessions of the summer months, members of the **Brighton** Tape Recording Club recently staged a 'portable' evening. All the members who own portable machines put them through their paces, so that prospective buyers in the club could see something of the choice of machines available. Club members also enjoyed a demonstration of a Scophony Baird recorder, believed to be about 20 years old, and

having a full track recording system and decidedly limited frequency response. New members are always welcome at the club which meets every Wednesday between 7.30 pm and 10 pm at the Downs School, Grantham Road, Brighton.

## KEEN RESPONSE

Derek Chatterton, organiser of the **Overseas Students** Tape Recording Group tells me he is very pleased by the keen response by club members to two recent club projects. The first was a tape and slide session, originally planned for one evening. However, so much work was put into the show that the finishing of the programmes overflowed into another session. Because the club room normally at their disposal was not available on any other day, members gave up their peaceful Sunday at home to complete it, and finally the commentary was made at Derek's home, taking 6½ hours to produce.

The second successful project was entitled 'Compiling a Radio Programme.' The initial work was carried out by individual members in their own homes and in their own time — only the finished product being brought to the clubroom for playback. One member, Belay Abbebe of Ethiopia, produced an excellent programme on the national music of his country and the instruments played and how they work. Another excellent tape, on the lines of the zany Jack Jackson show, was produced by Rawle Jeffrey of Trinidad.

## GALLANT EFFORT

Members of the **Dartford** Tape Recording Society recently made a very gallant effort to secure their contribution to the 'Interclub' tape (the one heard by Thornton Heath while waiting in suspense for that bedside judgment?). Having arranged to visit a house in which was installed a large Jennings electric church organ, members were horrified when weather conditions became almost tempestuous. They trudged their equipment across Dartford Heath through inches of snow, in temperatures well below freezing, only to find that severe weather conditions had caused a power cut. However, all the difficulties were eventually overcome, and two good recordings were obtained — one by chairman G. A. Pulham, using a Film Industries ribbon mic and Brenell deck, the other by Mr. A. C. Wood, using an STC mic with the new Revox 36. Showcards designed by member Mr. Green and displayed in local libraries and tape recorder dealers, have resulted in a steadily increasing membership.

*continued overleaf*

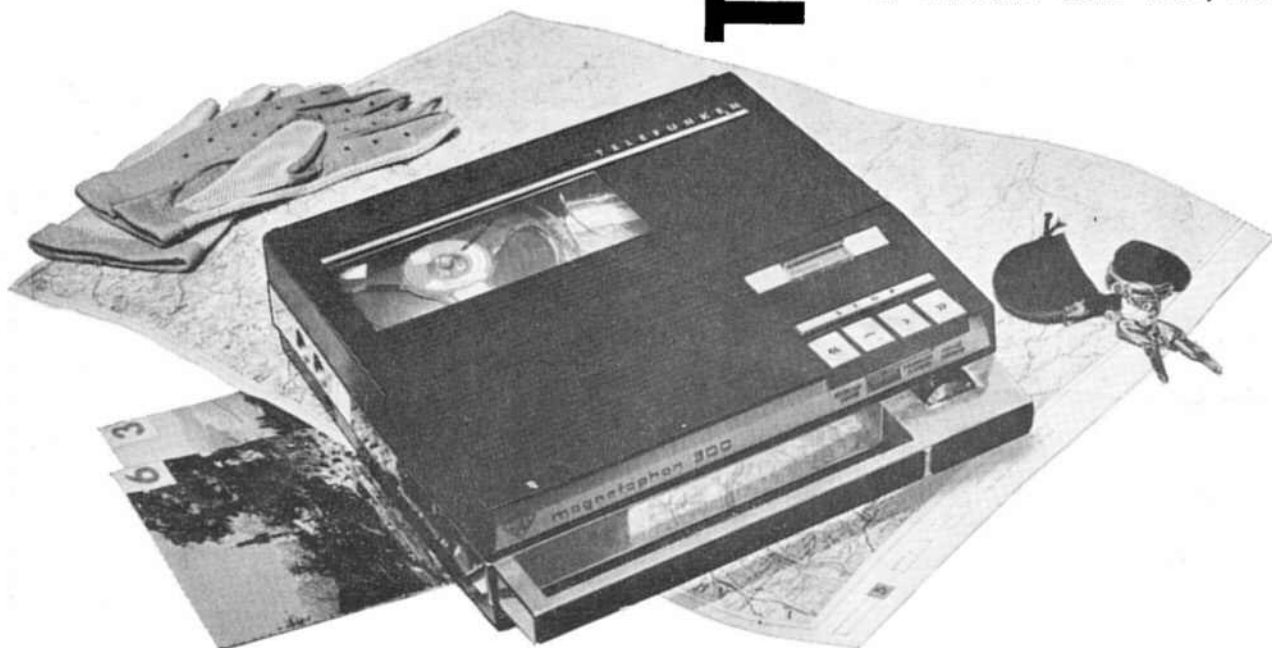
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June, 1965

**Amateur Tape Recording, Video & Hi-Fi**



# **Tape Club News—continued**

## **GRAVE EMBARRASSMENT**

Douglas Morris, secretary of the London Tape Recording Club was gravely embarrassed recently, when, having arranged a special outside demonstration at a well-known London dealer's which included demonstrations by the representatives of manufacturers, only three members turned up. In fact, there were more demonstrators than audience. Not only was this a downright insult to the dealer and manufacturers concerned—it was a very bitter blow for the hard-working committee. The committee does in fact have plans to forge ahead with several new ideas which have been approved by word of mouth at recent meetings, but they understandably feel that if this spoken approval is backed by what is virtually active disapproval, there isn't much point in going ahead. However, the club has entertained members of the Southall club and has also managed to help local organisations by providing P.A. and other assistance.

## **TOUCH OF THE BLARNEY**

A recent edition of the *World Round Robin Club's 'Sound Magazine'* news tape had a touch of the blarney about it, with a selection of Irish songs. Also included was a talk by president Matt Ewart on tape recorder maintenance, which many members found extremely enlightening. Following the reduction of the membership fee to 10s., the club now has over 100 members and is hoping to double this in the near future. Club Secretary is John Page of 45 Elgin Avenue, Belmont, Harrow, Middlesex.

## **BIRMINGHAM, U.S.A.**

The Slade Radio Society, which has its HQ in the Church House, High Street, Erdington, Birmingham, tapesponds regularly with its counterpart in Birmingham, USA—the Catalpa Radio Society. Another activity shared with tape enthusiasts is centred around electronic organs—the society recently spent an evening enjoying a talk and demonstration on the design of an electronic organ, and had the opportunity of trying their hand at playing it.

## **STIRRED INTO ACTION**

A programme presented to his fellow members by John Smith of the Derby Club really stirred things up. After demonstrating his own recorder, pointing out its merits and disadvantages, John then went on to play back on the machine two pieces of music of very high recording standard through his new loudspeaker. This he had built from instructions in books loaned to him by the club library, and other members were so impressed by the results that quite a few more are having a go at building their own speakers. It just shows you that even if good possibilities are sitting under your nose, you just don't realise until someone else takes them first!

## **CRIME STORY**

When North London Tape and Hi-Fi Club held another of their competitions recently, the subject set was 'Crime Story in Sound.' Police whistles, sirens, radio cars and 999 calls, breaking glass and gunshots all featured in the five-

minute entries. The general standard of entries was high, and the competition winner was David Barker. Later, David and John Burton gave an off-the-cuff talk and demonstration on how to create imaginative recordings. Club members welcomed members of Friern Barnet club and visited also the Walthamstow and District club.

## **TOP TEN FOR MAY**

- 1 Thornton Heath
- 2 B-TRAC
- 3 Walthamstow
- 4 Harlow
- 5 Montrose
- 6 London
- 7 North London
- 8 I V A S
- 9 Reading
- 10 Brighton

## **TOP TEN FOR JUNE**

- 1 B-TRAC
- 2 Rugby
- 3 Thornton Heath
- 4 Radio Scotland
- 5 Brighton
- 6 Overseas Students
- 7 Dartford
- 8 Derby
- 9 North London
- 10 London

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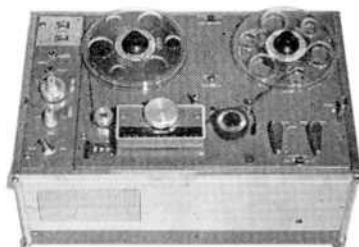
**218 HIGH St.**

**BROMLEY. KENT.**

**RAV. 4000**

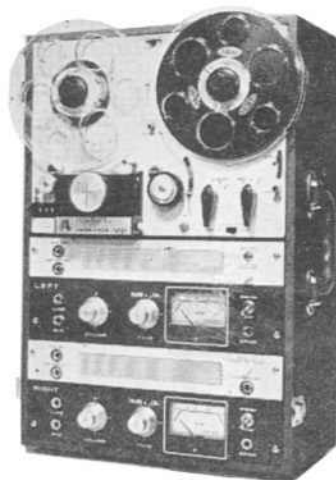
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To: The Tape Directory, ATR, Haymarket Press Ltd.,  
86-88 Edgware Road, London W2.

I would like you to include the following particulars in the Tape Directory, and agree to acknowledge all replies I receive in response to my entry. (USE BLOCK LETTERS)

Name .....

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

Address .....

Special interests .....

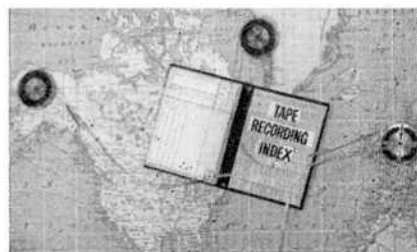
Tastes in music .....

Tape Recorder used .....

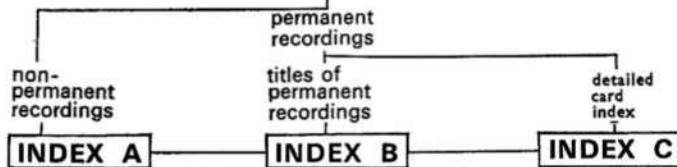
Maximum spool size ..... Speeds .....

Countries you wish to contact .....

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Pops, tapes before editing, empty, tapesponding, etc. **16 TRACKS**

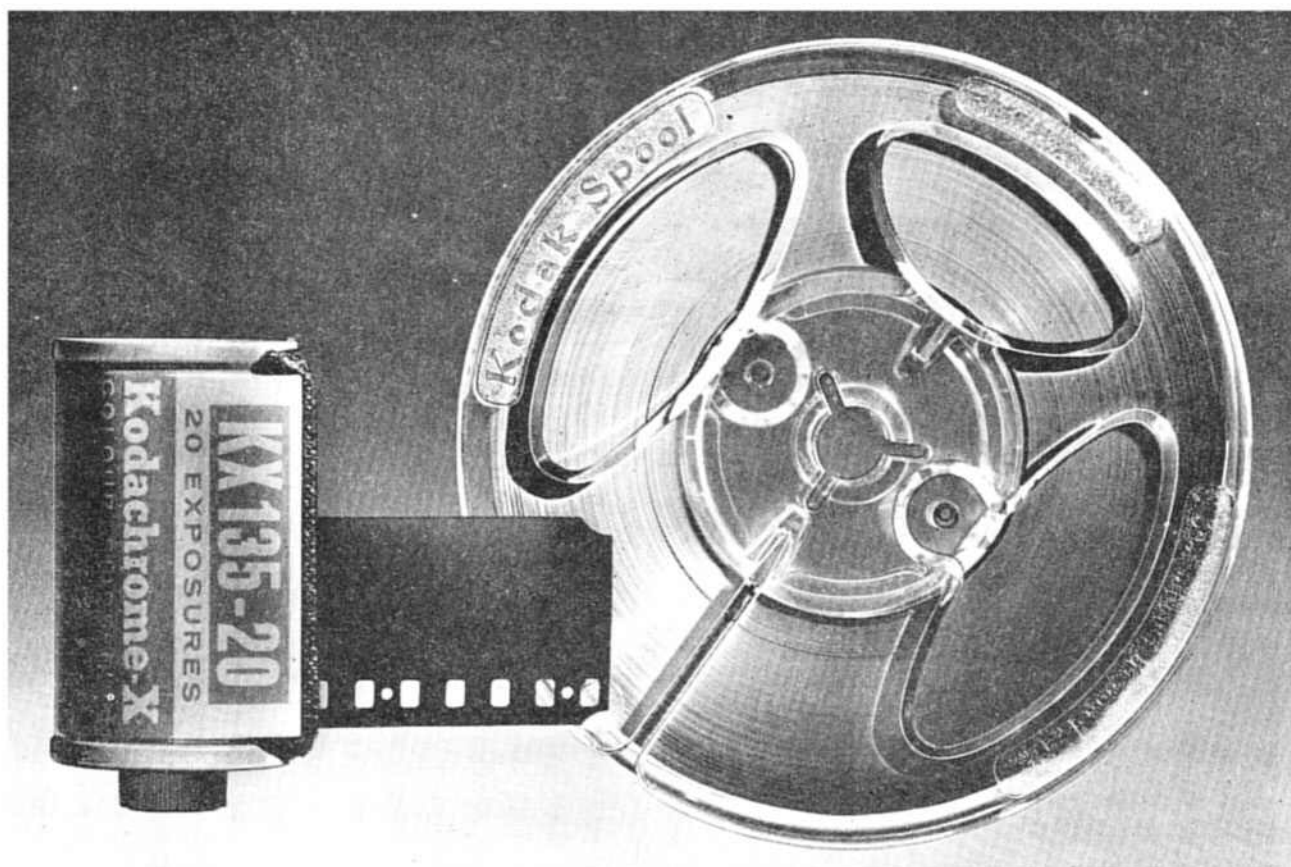
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Now, Kodak have applied these advanced coating skills to the manufacture of sound recording tape. The result is a tape whose magnetic oxide layer is accurate to within *millionths* of an inch. No wonder that sound recording engineers all over the world have acclaimed it as the finest tape ever made. Play it as soon as you can. You'll be getting a higher signal-to-noise ratio, better frequency response, a remarkable freedom from drop-out and print-through, and, above all, a *total* uniformity in performance.

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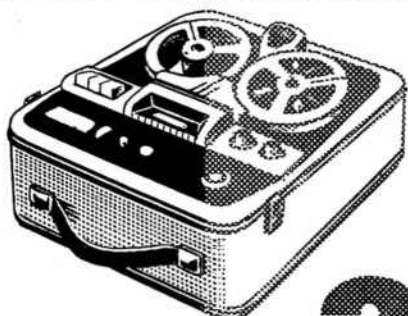
with battery portables (5½ hours playing time on a single 3½" reel!). So next time you buy tape, do the sensible thing and specify Kodak Tape. It will do full justice to your equipment. And it costs no more.

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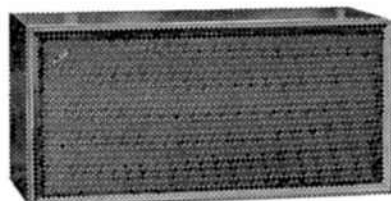
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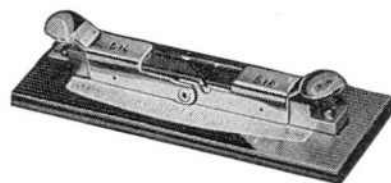
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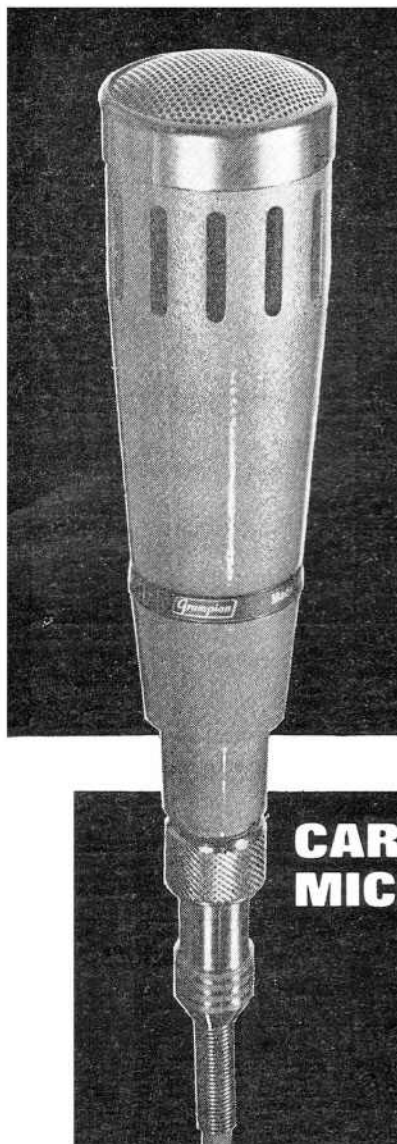
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Side 1—Male and female Lions, Gibbons, Chimpanzees, Bell bird, Rattle-snake, Baboon, Viper, Emperor Geese, Fish Eagles, Mountain Lion (Puma), Kookaburra (Laughing Jackass).

Side 2—Elephants, Mississippi Alligator, Indian Tiger, Sea Lions, male Lion. In the jungle (a background of typical sounds).

### C BGX/1—BACKGROUND SOUND EFFECTS

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Side 1—Space ship—take-off. Space vehicle—imaginary take-off. Space vehicle—imaginary landing. Ring modulation—tonal. Modulated tone glide (descending). Modulated tone glide (ascending). Sibilant—white noise (pitch octave low).

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Side 2—Police car and bell, chase. Police launch and siren. Steam goods train and whistle. Car door slam, and starter. Storm at sea, thunder, wind and gulls. Tube train, stop, doors and start.

### G MPX/1—AUTHENTIC HIGH-FIDELITY SOUND EFFECTS

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Side 1—Lion roaring. Twin piston aircraft landing. Building and debris falling. Road drills and compressor. Ship's siren. Steam train leaving station. Small steam loco and whistle. Cell door, keys and lock.

Side 2—Police car and bell, chase. Police launch and siren. Steam goods train and whistle. Car door slam, and starter. Storm at sea, thunder, wind and gulls. Tube train, stop, doors and start.

### H MPX/2—AUTHENTIC HIGH-FIDELITY SOUND EFFECTS

Price 7/6

Side 1—American police car with siren—arriving. American police cars with sirens—departing. American police car escort with sirens—passing. American police motor-cycle patrol with siren—stopping. Applause (hand clapping). Orchestra tuning up. Car crash. Glass breaking (repeat).

Side 2—City and Waterloo tube train—arriving. City and Waterloo tube—departing. Footsteps (continuous track), in subway (mixed), in narrow streets (female), on pavement (mixed), running in street (female), running in street (male), up and down wooden stairs. Workmen hammering and sawing.

### I MPX/1—MILITARY PARADE AND WARFARE SOUNDS

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Side 1—March past—Guards and crowd sounds, etc. Royal Salute—Parade commands and National Anthem. Drums and pipes—with parade commands.

Side 2—Aircraft—low-level attack (bombs, machine-gun fire, aircraft). Artillery—tanks—rifle fire, etc.

### J TFX/1—AUTHENTIC BRITISH TRAIN SOUNDS

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# ATR/July

**The fascination of taping!** . . . Patrick Copinger writes on the art of tape correspondence as enjoyed by many enthusiasts. All the whys and wherefores of this fascinating hobby are explained, and there's a bumper Tape Directory too. Also in the July issue, Gordon J. King discusses the marriage of tape and slide, and E. Edwards contributes a comprehensive test report and review of the Scott 200 B stereo amplifier. Stereo listening, ribbon microphones and windgags, tape club news and loads of other features are all in the July issue of ATR, on sale June 25th. Order your copy now !

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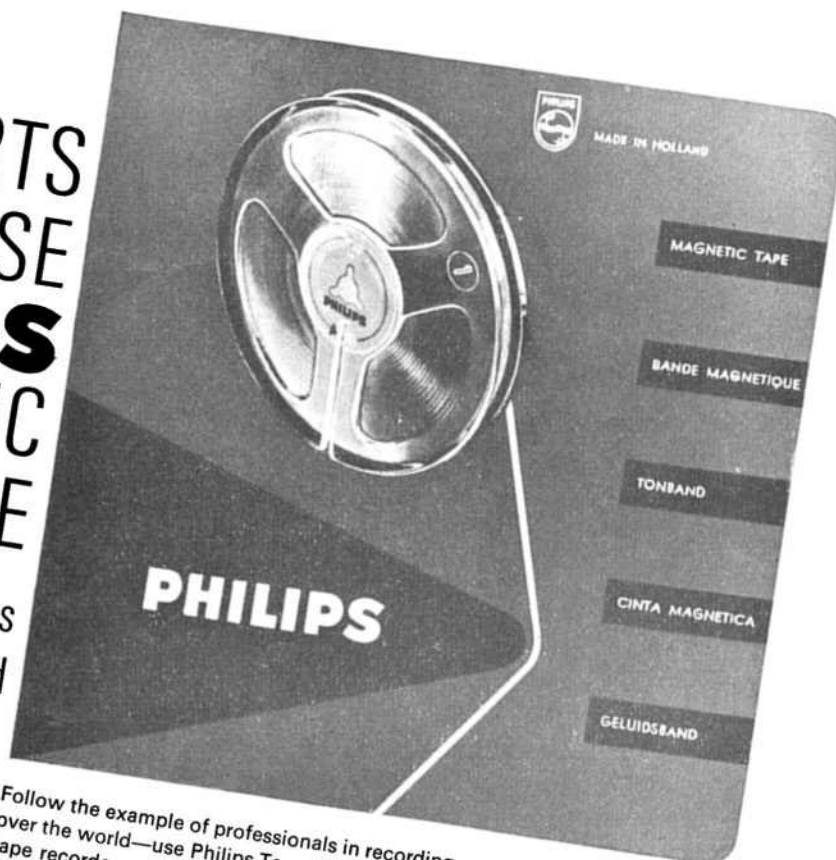
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