

MARCH 1962

TAPE

RECORDING MAGAZINE

1/6



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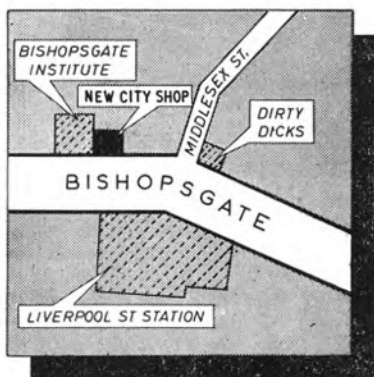


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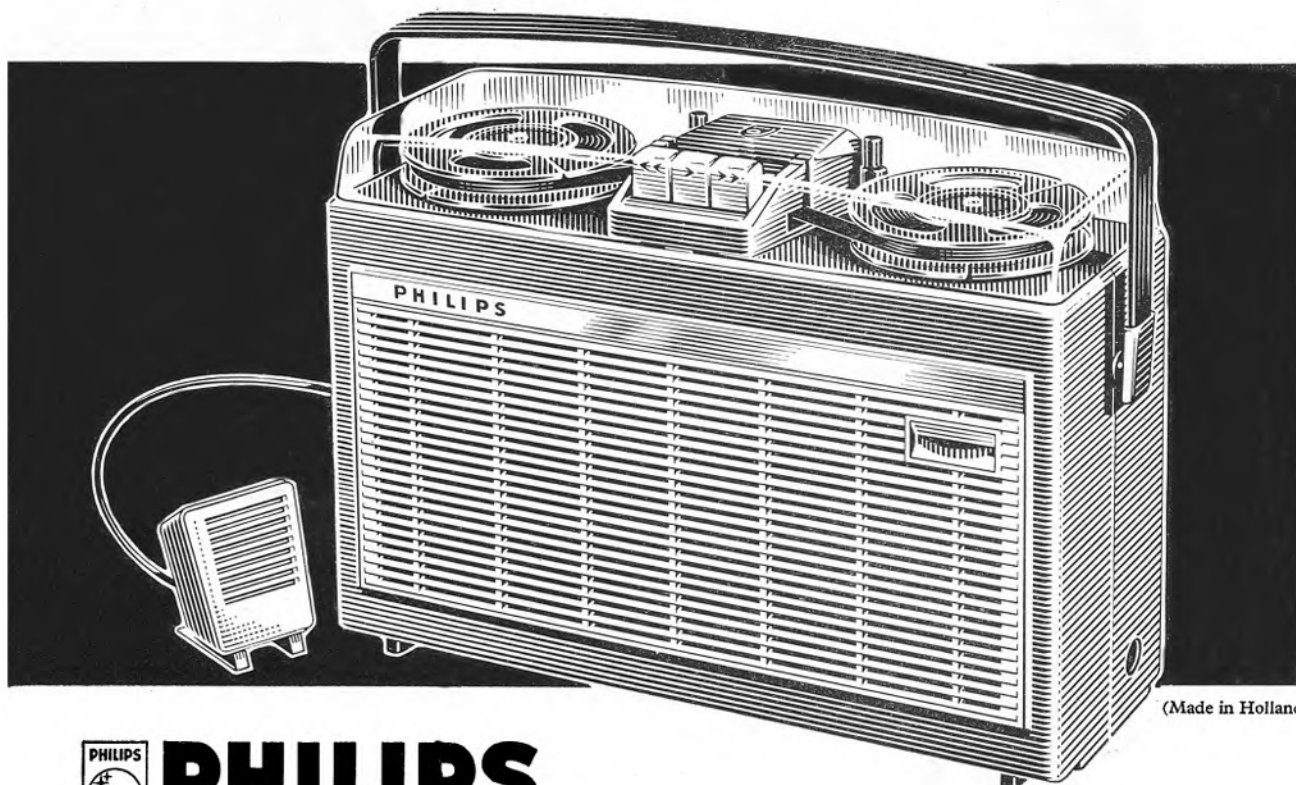
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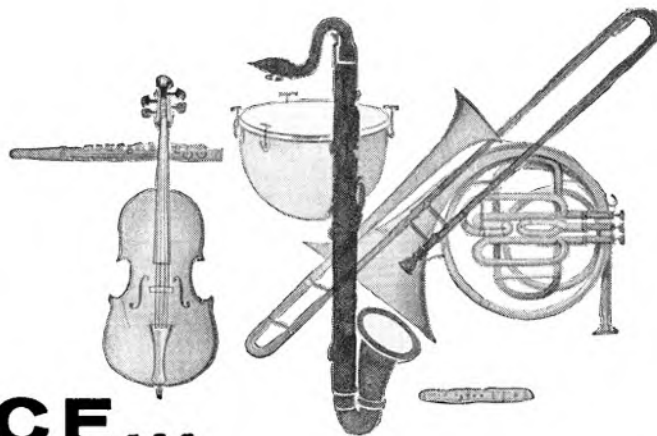
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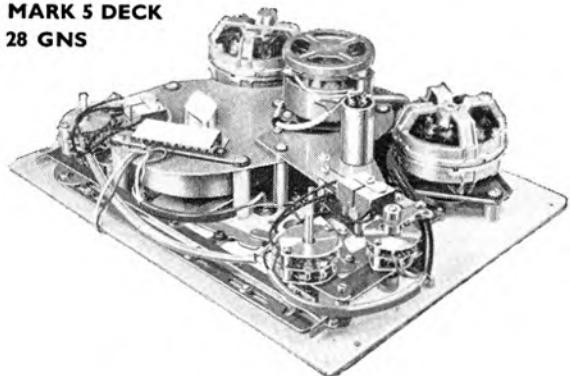
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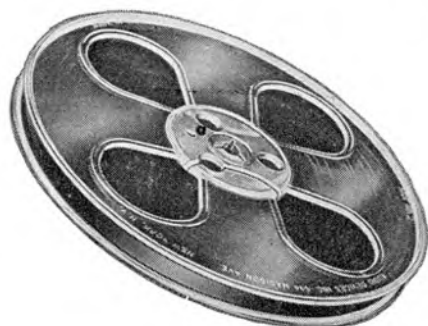


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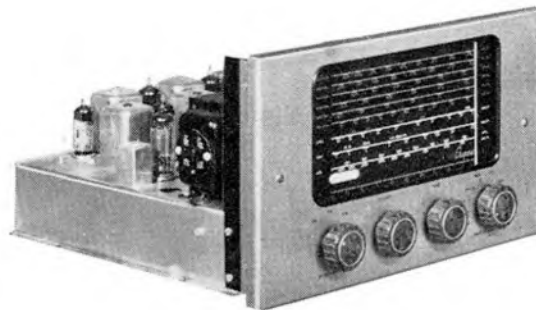
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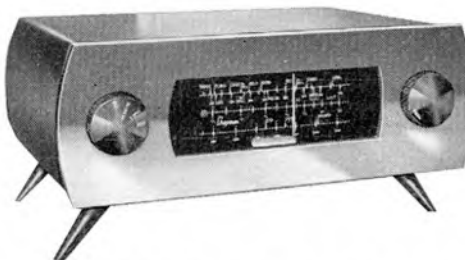
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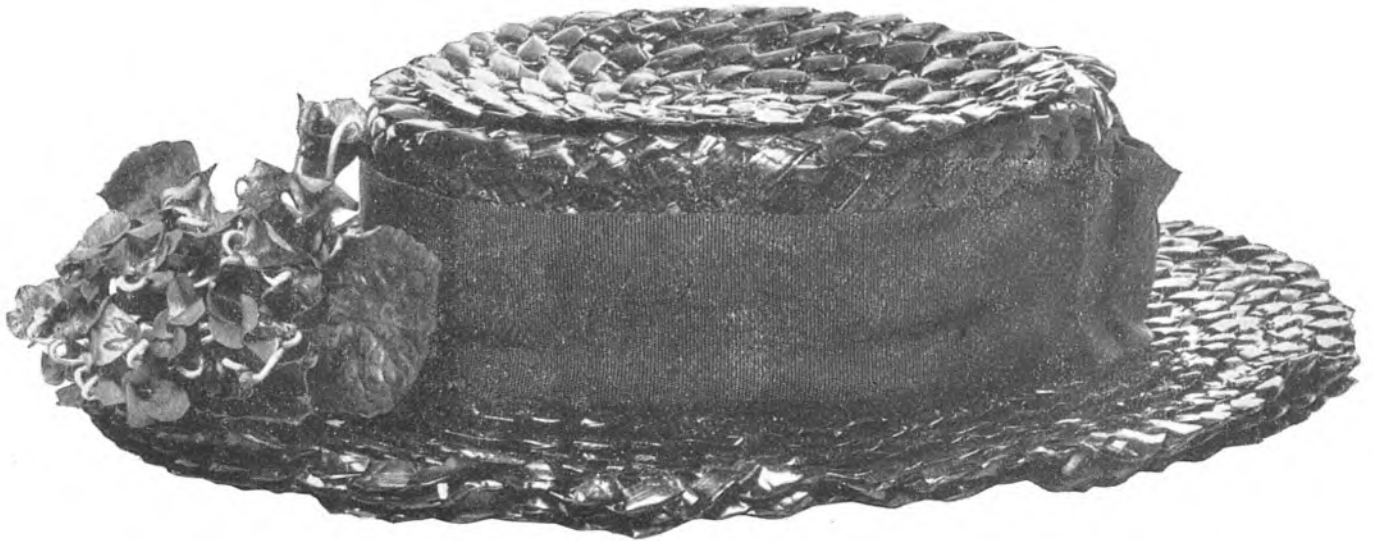
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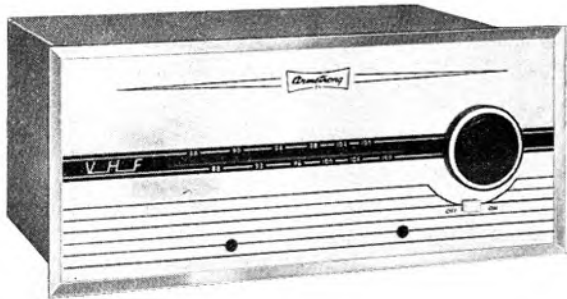
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TAPE RECORDING MAGAZINE

Vol. 6 No. 3 March, 1962

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EDITORIAL

Editor,
R. DOUGLAS BROWN

ADVERTISING

Advertisement Manager,
KENNETH P. WILSON

Cover photograph: If music be the spice of life—tape it. An energetic study provided by courtesy of Grundig.

THE EDITORIAL VIEW

What will they think of next?

CURIOUS that critics should be so ill-informed on the matters they discuss! If you listened to the BBC programme "The Critics" discussing the BBC programme *Sound*, you may have been astonished at the horror of two members of the team at the (to them) sudden revelation that amateurs are engaged in recording interviews.

Alan Brien was appalled at the thought that people "with these terrible tape recorders" should knock on the door asking for an interview. Eric McKeown declared it an intrusion into personal privacy.

Brien thereupon promised to throw sand at any recordist who approached him on a seaside beach. As a final thought, one of the critics moaned: "Next thing, people will be bringing TV cameras into your homes and making you up . . ."

Then, the final words in the programme, Stephen Potter punctured all this humbug with the remark: "You can refuse, of course."

Of course anyone approached can refuse, and doubtless some do. One of

the points made by amateurs in the radio discussion on interviewing, which the critics were, in fact, reviewing, was that remarkably few people do refuse.

On the whole, *The Critics* dealt fairly with the *Sound* programme, but special thanks to Stephen Potter, who seemed the only one to be informed on the background of tape recording clubs and their habits.

* * *
ALL the most important discoveries are simple ones: so simple that, once made, they appear utterly obvious. Can it be that Philips have made one of the most important discoveries in the popularisation of domestic recording?

Their new Starmaker recorder has what is termed "vertical styling"—that is, it is taller than most recorders (9½ inches), but it occupies much less standing area (13½ x 4½ inches).

And this, according to Philips, is why it will be successful. "You can put it on a shelf or mantelpiece," they explain. "The temptation to 'put it away' in a cupboard—from which it will emerge less and less frequently—is removed."

Another, incidental, advantage is that the vertical design makes it possible to include a 6½-inch speaker; the reproduction on the model I heard was very good indeed.

Philips are taking a very confident view of the future of domestic tape recording. "There are 16 million homes in Britain," said a spokesman. "We hope to see a recorder in every one of them. The market has hardly been scratched."

* * *
THE Earl of Snowdon's newspaper abilities have caused plenty of discussion of late; perhaps it would have been better had he turned to tape. According to a recent report, he is equally knowledgeable about that.

During his recent holiday in the West Indies he visited Radio Antigua. In the studio he arranged an impromptu interview between the island's information officer and a visiting journalist, then popped into the control cubicle and supervised the recording.

He checked the tape, pronounced a satisfactory minute and a half recording, and the radio station's administrators promptly slipped it into a programme.

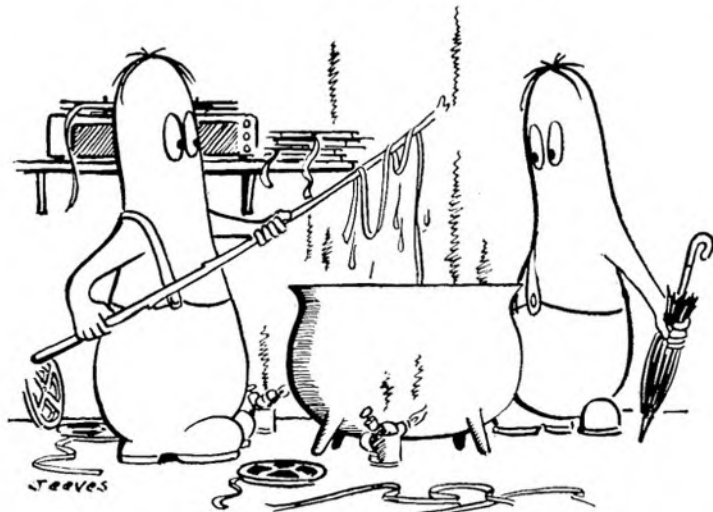
* * *
THE Americans are looking for an up-turn in tape business this year. For three years now it has been much more modest than the initial enthusiasm of several years back suggested probable. Current thinking over there is that salesmanship has been deficient.

A survey has shown that the retailers who sell most recorders always have one or more machines turning in their showrooms and make every effort to induce a customer to hear a playback of his own voice—even if he came into the shop to buy only a new gramophone needle. "The biggest mistake," said one successful dealer, "is to wait for a customer to ask about tape recorders."

There are some British dealers who should take this lesson to heart.

THE EDITOR

LAUGH WITH JEEVES



"I dye the stuff red, then sell it to the Civil Service."

SPECIAL ASSIGNMENT

By Denys G. Killick

OF the many letters I receive requesting me to undertake recording assignments it's always a pleasure to hear from someone who is interested in the common-place rather than the spectacular kind of subject. The medium of recorded sound is so eminently suited to the presentation of ordinary, everyday life in a way that can awaken in the listener a new awareness of daily events hitherto regarded as trivial.

This was the idea behind the request received from Mr. Barry Higgins of Ashford, Kent. He asked me to talk about recording in shops, in the High Street, in fact recording the ordinary, day-to-day life of any town or village where people gather, things are bought and sold and the business of life and living takes place before our eyes and ears.

It so happens that I've given quite a lot of thought to problems such as this recently, because my students at evening classes have been busily engaged in taking a series of recordings under the general title of "In the High Street." I can therefore give you the benefit of their experiences as well as my own.

Recording of this kind has one great advantage; most of us live within easy reach of a main shopping centre. Instead of having to plan long journeys well in advance one can relax in the knowledge that the subject is only a few minutes away from home and always accessible.

If this is a subject worth recording, why don't more brilliantly finished tapes appear on this theme? The material is obviously there, but is it so very difficult to record? Having taken a number of recordings, what is the best way to turn them into a programme with a beginning, a middle and an end, each following in logical sequence from the other?

To get some idea of the vast possibilities of this subject try taking a walk along your own High Street one Saturday afternoon. Don't bother to take your recorder with you, just stroll around and *observe*. It takes a highly trained eye and ear to absorb and analyse every-



RECORDING DAY-TO-DAY LIFE

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

thing that's going on around you. A great many of the sounds are so familiar that unless you're actually listening specially for them they won't be noticed.

The housewife, intent on her shopping for the family, may not be aware of the warning bell of an ambulance as it hurries to the scene of an accident. A group of young children may be so mesmerised by the display in the confectioner's window that they won't pay any heed to the cry of the newspaper man on the corner. And the young couple gazing longingly at the rings in the jeweller's would certainly hear nothing but the distant peal of wedding bells.

All these people are seeing life through their own eyes and listening to sounds through their own ears, yet their impressions of life in this High Street are likely to be highly individual and very different. In our search for sounds we have to be aware of these differences in outlook and be able to evaluate their relative importance so that we can present a truly balanced picture. Alternatively, if it's our intention to record, say, a child's impression of the High Street, then we must be able to get right inside the child's mind and introduce the correct degree of "unbalance" in the final tape.

There's a great temptation to make a great deal of one or two really good recordings, perhaps road drills at work or fire engine bells and other sounds that lend themselves readily to startlingly realistic reproduction. If this is overdone it will introduce an element of unbalance. Our High Street isn't really populated with hi-fi fiends who delight only in the raucous clang of bells, neither do the citizens wander, dazed and hopeless, through a ceaseless cacophony of nerve-shattering compressors and pneumatic hammers.

It's even easier to fall into another

error and return from a long and serious recording session only to find on playback that you've nothing more than miles and miles of endless background noise without a single feature in the foreground. Nothing intelligible, nothing to listen to; just jumbles of sound. One must have a certain amount of general background effects to serve as a link between the main recorded items. But, without a number of these clear, lucid recordings of people and events to join together, the final tape will tell no story and have no meaning.

It's primarily the people who make the life in the High Street that we want to record. Now this at once poses the old and contentious problem of whether or not to record with the subject's knowledge. Any kind of "secret" recording is abhorrent in principle to all right-minded enthusiasts. However, if the photographer, who shoots away in order to catch the spontaneity of the moment, had asked first, his photographs would have lost all their natural appeal. Similarly it may well be that if we were to ask permission to record, our subjects would become even more self-conscious than if they were posing for pictures, and the conversation would be so forced and artificial as to be useless.

The arbiter must be your own conscience. If either a picture or a recording is taken with malicious intent, and that includes the holding up of the subject to ridicule, then it is morally wrong and indefensible. Personally, I have never any scruples about recording "public utterances." If someone gets up on a soap box and addresses his words to the world in general then I believe, rightly or wrongly, that I am entitled to record them if I wish. But when taking such a recording it's not with the intention of spying, but merely of preserving in permanent form something which this individual has himself chosen to make public property.

When recording in shops you are on private premises and should ask permission of the manager, and he has every right to stop you. But even when you have permission, and it will nearly

(Continued on page 14)

Recording in the High Street

(continued from page 13)

always be readily granted, play safe by not attempting to hide your equipment; let it be obvious what you are doing. In a big, multiple store you are far more likely to come out with one of those vague, background noise tapes I mentioned earlier than with any intelligible voice recording, but by bringing the microphone close up to the till as the sales girl rings up the price of your purchase you can at least bring some presence and reality into the recording.

The finest lessons on technique in subjects of this kind can be learned by listening to similar feature programmes as broadcast by the BBC. Remember that the recording engineers were faced with exactly the same problems as you yourself, and if you analyse the broadcast material you'll find that very little, if any, could have been recorded without the subject's knowledge. It takes a little time and trouble to find a number of people who are able and willing to speak freely and naturally in front of your microphone, but to make a success of this tape you must find them.

The attendant at an all-night garage was able to see life from a different angle to most of us. He had many tales to tell of customers who come and go in the night, and my finished recordings also included the sounds of the petrol pumps and the cars. A sequence like this giving the contrast between this one man's biased, nocturnal point of view against the normal, day-time sounds of the

locality could make an excellent introduction to a documentary tape.

The greatest skill is required in piecing together the sounds to present the final picture. If your recording expeditions have been successful you may have a dozen or more tapes containing excerpts of varying merit and interest. Now comes the hard work of listening to those tapes over and over again. Note by reference to the position indicator, exactly where every important feature occurs and how long each item runs. If this job is done properly you should almost know your tapes off by heart, word for word and sound for sound. A glance at your list of headings will then remind you exactly of the recorded content of each sequence.

It is by considering the list of main items that the final decision is reached as to the structure of the programme. It may well be that following the general line of the recordings a scheme for the final tape suggests itself to you, possibly demanding the inclusion of other recordings not in the collection. If so, make every effort to go out and get them.

Whether the programme is built up on the framework of a commentary or narrative, or whether the sounds are left to tell their own story, it must be scripted. The spoken word is the easiest way of providing continuity but a collection of weak comments used to string together a number of brilliant recordings will only ruin the whole.

The commentator's remarks must be thought out critically and as carefully as the rest of the material. Properly prepared there would be at least four copies of the script, and it would indicate clearly the precise points at which recordings are cued in and their duration. It is the complete programme in words, tape references and dubbing instructions. Without it your final work would be as hopeless as it would be haphazard, and the time spent recording in the field would have been wasted.

By going about the job methodically as I have described you will come finally to your last recording session with the certain knowledge that all the thinking, creative problems have been overcome and all that remains is a piece of routine, straight-forward recording.

In practice it's very easy for members of properly constituted recording clubs to arrange to have the necessary skilled operators and equipment available to produce the end product. A minimum of two machines, a mixer and microphone will be required, together with their operators and script reader. The set-up used will depend upon the facilities available, but if possible have your live microphone in such a position that it won't pick up the sounds of the dubbing machine being turned on and off. Don't forget that your reader must be able to follow the recording on headphones otherwise he won't know when to come in. If this is not practicable for any reason he can be cued in by a signal lamp or some other simple means.

I do hope, Barry, that my remarks have been of some help to you. This is not such an easy subject to tackle as it might at first appear to be, but that's all the more reason for devoting time and energy to producing something really worthwhile.

BIG CHANCE FOR AMATEUR PERFORMERS

THE 1962 British Amateur Tape Recording Contest this year offers a big opportunity to amateur performers and artistes to make a name for themselves. It is a chance to get their names into the headlines and bright lights.

For the first time, the Contest includes a special section for performing talent. The recording itself will be of secondary importance—what will count will be the quality of the performance recorded. Musicians, vocalists, comedians, actors and actresses—all can compete.

The entries will be judged by a panel of experts from the world of show business. They will meet the winning performer and he or she will be auditioned by one of the leading record companies. An exciting future will open up for the winner.

Are you an amateur performer? Do you know someone with budding talent?

Entries in this section of the Contest will be judged separately from the remainder of the event. Different rules will apply. There will be a special entry form which will be published in the April issue of *TAPE Recording Magazine*.

Meanwhile you can start planning your entry. Tapes in this section must not exceed five minutes duration.

**CLOSING DATE FOR ALL SECTIONS
OF THE CONTEST IS FRIDAY, JUNE 29**

THE main part of the British Amateur Tape Recording Contest will follow the lines established in earlier years, with classes for Compositions, Documentaries and Reportage, Music or Speech items, Actuality, and Technical Experiment, and with special group classes for Schools and Clubs.



Full information was published in our last issue, and copies of the Rules and entry form can be obtained by sending a stamped addressed envelope to "Contest," *TAPE Recording Magazine*, 7, Tudor Street, London, E.C.4. This is a contest for those whose skill lies in recording technique, commentating or script-writing, production or electronic composition.



As usual the best British entries will be entered in the International Amateur Recording Contest (CIMES), where they will be eligible for more big prizes. There are no entry fees.



ALAN EDWARD BEEBY'S
TAPE TALK

CALLING ALL AMATEUR SCRIPT-WRITERS: I've just been listening to a tape recording sent to me by Mrs. Susie Peachment, a blind and partially crippled member of the Tape Recording Circle for the Blind.

Susie and her friend Maureen (also physically handicapped) are members of the "Happy Hearts" Club for the Physically-Disabled at Fakenham, in Norfolk, where they have formed an Entertainments Group for the purpose of providing variety shows for their own and other such clubs in the district.

But they're fast running out of fresh material, and they want sketches, plays, monologues, double-acts, comedy-scripts, and gags, etc. Can any readers help, I wonder? Because of the physical limitations of those taking part, items submitted should be of the kind which does not entail movement of any sort.

Manuscripts should be addressed to Mrs. Susie Peachment, 15, North Drive, Fakenham, Norfolk.

MY next note is for readers in the Northampton, Kettering, Bedford and Wellingborough areas. Any day now, you may answer the door to a pleasant young man carrying a Philips tape recorder. He will ask to be invited in for a few minutes to play you a recording of "vital importance." Don't bother; I can tell you what the recording consists of, if you're really interested—and it won't take me nearly an hour, either!

You will be informed (by a doom-ridden voice, subtly tinged with a hint of artificial-reverberation for dramatic effect) that you are a Sinner. Hell's Fire and Heaven's Wrath will rant and rave from the speaker in the best John Knox tradition till you feel like committing hara-kiri out of sheer hopelessness and desperation!

This, my friends, is the latest religion-pushing gimmick, and I, for one, am extremely sorry to see a tape recorder being dragged in as a vehicle for this type of tub-thumping nonsense.

THE Producers of the "Perry Mason" TV-series—winner of many small-screen awards in the past—are human, after all! They slipped up in "The Case of the Bedevilled Doctor" when a blackmailer was supposed to have made several dubbings of a tape recording. The criminal was seen busy at his nefarious task—using one tape recorder only! Or, could it be a case of "the scooper scooped"?

TAPES composed for hospital-broad-casting purposes have brought forth a veritable crop of budding news-readers. For the benefit of those wishing to im-

prove their style and achieve the state of full-bloom as quickly as possible, BBC-TV News-reader, Robert Dougall offers the following tips on the business:

"Vary your speech-pace, but don't rush or dawdle. Keep the tone conversational but clear. Speak naturally; in other words, don't try to adopt a so-called "cultured" accent if you haven't got one! It sounds false. If you trip up over a difficult word or passage, don't get flustered; simply make a brief apology and start the sentence again from the beginning. Remember, the great thing is to communicate interest, and to retain the listeners attention at all costs."

I've done a bit of news-reading myself. Shall never forget the time when, halfway through a bulletin, I came up against the word, "hæmatoporphyrinuria"!

Im Wheatter's

BATTERY RECORDER NOTEBOOK



ONE of the lesser publicised uses of a battery portable tape recorder is in the car driver instruction field. Although I do not suggest this use for the learner driver in the early stages, a battery model can be of great assistance once the control and steering lessons have been mastered.

The practice would be for the learner to speak a commentary of his actions during the run, subsequent replay providing ideal material for an analysis of the mistakes or misjudgements made.

Not every learner will be able to do this well, but as an exercise in "thinking aloud" whilst suiting action to words, I found it a most useful education. It is quite amazing how much planning ahead is needed in busy traffic conditions, and how often the mind is changed.

To try this out for yourself, it would be best to start with a quiet run to get used to the idea. First of all, establish how much gain your recorder needs for your voice when the engine is running at full speed. Secure the microphone to your lapel or drape it over your shoulder with the lead trailing back to the recorder which can be left on the back seat.

Now let us assume you are ready for the run with the recorder switched on,

REMEMBER my report, last April, of Walter Gilling's unsuccessful attempt to win £5,000 on the "Daily Mail's" "Get Ahead" Competition televised by the BBC? His idea was to establish a "talking newspaper" for the blind, on tape.

Remember what the judging-panel said about the idea? They said they felt that the BBC was already serving the interests of blind people quite adequately with national and regional news-programmes.

Now, roughly eleven months later, a radio programme called "In Touch" goes out regularly on Network Three. BBC-billing? "A monthly magazine . . . of special interest to blind listeners."

Wonder where the idea came from . . .

"WELL, I NEVER DID!" DEPARTMENT: Chap I know bought a tape recorder recently. Had an instruction booklet with it, part of which read: "If, upon operating the machine for the first time, you hear a loud humming sound, don't worry about it; this is simply the recorder's way of telling you that it is working."

S'fact! Made me feel that queer when I read it, I nearly ran out and bought a copy of "Which?"!

All you have to do is to speak your thoughts as you go through every operation and decision. For example: I am ready to start—switch on engine—check revving up—O.K.? Off-side trafficator operated—look through rear-view mirror—all clear. Now, clutch out—select first gear—revs up a little—let in clutch—forward slowly—steer out—increase speed a little—and so on.

Not only for learners is the recorder an asset. The experienced driver will find that the occasional commentary of progress and consideration of all the hazards of driving in town and at speed on the open highway may prove a salutary lesson when played back later. With an experienced friend to comment and/or criticise the driver's account of what he did or did not do, the recording should prove most instructive.

There are two points to be emphasised. First, forget the microphone and the recorder once it is switched on. The worst that can happen is that it runs out of tape or the battery runs down. The microphone position is not critical nor is high quality necessary. Tape speeds of 3½ or 1½ ips will be intelligible enough for the purpose.

Secondly, pay no attention to what someone else in the car says you should do. Speak the instructions to yourself, the microphone will pick them up. You are the driver and the interpreter of the conditions and actions to be taken.




SCOTCH

BRAND

MAGNETIC TAPE

A party by any other name is just as sweet, but there's only one 'name' for recording tape—SCOTCH. And that's where the most fun lies. Its clarity of reproduction alone invites celebration:

its reliability keeps alive the party-spirit hour after hour. Whenever you're in the party-throwing mood, lay in a reel or two of SCOTCH Magnetic Tape. Every party calls for it.

Made in Great Britain by MINNESOTA MINING & MANUFACTURING CO. LTD., 3M House, Wigmore St., London, W.1 

RECORDING FROM THE RADIO

Amplitude Modulation

THE main requirements for achieving high fidelity reproduction of radio programmes are: (1) the audio frequency modulation must include frequencies up to 10-15,000 cps; (2) noise must be at a very low level; and (3) the dynamic range must be reasonably wide.

AM Broadcasting has, of course, been with us since the inception of broadcast home entertainment. Broadcasting developed in this country using an amplitude modulation system, mainly concentrated in the medium wave band of frequencies. It is true that other frequency bands are used for broadcast purposes, but these have very little domestic entertainment value, apart from the long-wave channel of 1500 metres.

The AM system has many advantages and disadvantages and, on the credit side, we may list the following:—(a) It is possible to receive European stations, and also programmes from most parts of the world by the use of short-wave bands. (b) A tuner for use on local stations can be a very simple piece of equipment, and technical complications in use and design are relatively few.

The disadvantages of AM are many, and most of them are factors affecting quality such as: (a) The band-width occupied by the station is restricted, due to the band available for AM broadcasts being very congested. It is necessary to restrict the band-width in order to avoid interference with a station occupying an adjacent channel, and such a restriction deprives the transmitter of any possibility of maintaining a good high frequency response. (b) An AM receiver is extremely susceptible to any form of "noise" that may be received along with the required station, such as heterodyne whistles and electrical disturbances. Apart from the annoyance to the listener created by the noise, the dynamic range of the programme material is restricted, due to the necessity to raise the quieter passages above any noise level that might prevail at the receiver.

Frequency Modulation

The FM system also has advantages and disadvantages. It is a system that requires a very much wider band-width

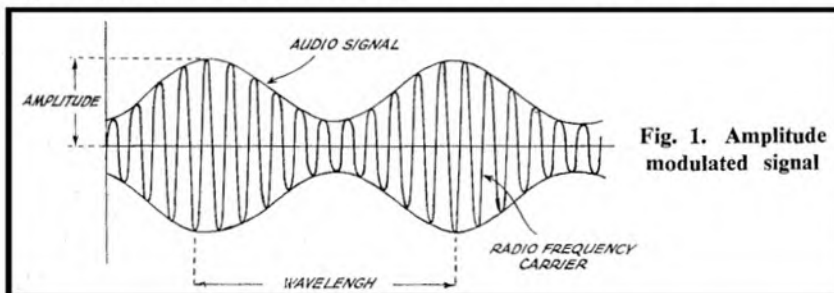


Fig. 1. Amplitude modulated signal

TAPE AND TUNERS

RECEPTION of radio programmes has some priority with amateur tape recording enthusiasts and with modern good quality tape recorders the use of a high-quality radio source is essential. With the advancing years and the introduction of LP records and tape recording, the old-established broadcasting systems have shown up their shortcomings.

With the introduction of VHF (very high frequency) broadcasting, radio now achieves the high standards expected from tape and discs. Tuner units for feeding a radio programme into an amplifier or tape recorder are available in three general types. A few manufacturers still produce a range of tuners for the reception of AM (amplitude modulation) transmissions only. In addition, a much larger range of units are available for receiving the new FM (frequency modulation) transmissions by the BBC on the VHF band and many manufacturers now offer a tuner for use on both AM and FM bands.

In this article DAVID ALLEN describes the three variations and their functions, and on pages 19-21 we provide an illustrated catalogue of the currently available units.

than an AM system, hence it must be used in a part of the radio frequency spectrum where wide channel spacings can be used. In Europe the VHF band (known as band 11 in this country) used for FM broadcasting occupies 88-100 Mc/s.

Use of VHF means that the service area of the transmitter will be limited, and the user of an FM tuner can expect to receive local transmissions only.

Tuners for operation on the FM band entail circuit complications that do not arise with AM and it is in the solution of some of these problems that one finds the main differences between one make of tuner and another.

The advantages of FM are many but, there are two main reasons why it is a superior system. Firstly, it discriminates heavily against noise. The reason for this is that noise is mainly AM in character, and a well designed FM receiver will not give an output from any form of AM signal input. Second, with no restriction on band-width, it is possible to use high modulating frequencies.

A third point is that with no modulation FM signal provides a very quiet background when compared to AM, hence it is possible to allow the quieter modulation passages to descend to a lower level than is possible with AM. This results in a greater dynamic range.

AM Tuners

The output of an AM transmitter remains at a constant level in the absence of modulation. This is known as the "carrier" and is used to transport the audio frequencies from the transmitter to the tuner. When modulation takes place due to speech or noise the trans-

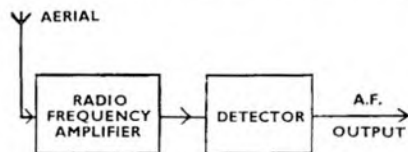


Fig. 2. Block diagram of simple tuned radio frequency tuner

mitter output rises and falls at the frequency of modulation. See Fig. 1.

The current in the receiving aerial will be a scaled-down replica of that in the transmitter aerial and the current will vary in a manner depicted in Fig. 1.

The receiver for quality reception of medium-tuned radio wave transmissions takes many forms, but there are three main classes, the tuned radio frequency (TRF), the superheterodyne, and the combined AM/FM. Fig. 2 shows a block diagram of a simple TRF receiver.

If a good signal-to-noise ratio is assured by living near the local transmitting station a simple tuner of this type is capable of excellent results. The selectivity requirements of the tuner are that it should be adequate to separate the local programmes, but broad enough to ensure good high frequency response. The detector is generally a diode, but other types of detector are often used.

Where the signal strength from the local station is relatively low and it is required to obtain more distant stations with the best possible quality, the super-

(Continued on page 18)

TAPE AND TUNERS

SPECIAL "TAPE" FEATURE

(Continued from page 17)

heterodyne receiver is more suitable. Fig. 3 shows a block diagram of a typical modern AM tuner.

The incoming signal is picked up by the aerial and passed to the mixer stage where it is made to beat with the local oscillator. This results in the received

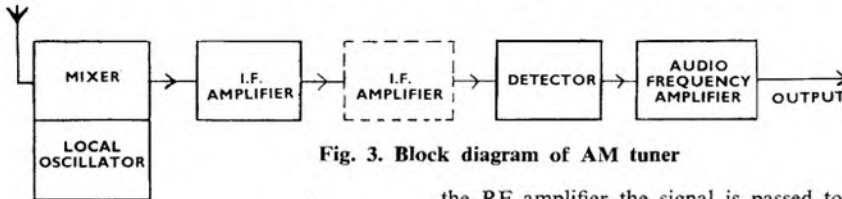


Fig. 3. Block diagram of AM tuner

signal being changed or converted into a fixed intermediate frequency (IF) which is fed to the IF amplifier stage.

It is important to realise that every signal to which the receiver is tuned is converted into a fixed intermediate frequency. The IF frequency varies in different makes of tuner from about 430,000 cps to 470,000 cps.

In some of the more expensive tuners more than one IF amplifier is used and provision is sometimes provided to enable the user to vary the IF band-width, so that, for best quality, the band-width may be as broad as conditions permit. This is known as variable selectivity. The signal from the IF amplifier is then passed to the detector stage which is usually a diode (two electrode) valve. This stage separates the audio frequencies from the radio frequency carrier and only passes on the required audio signal, the unwanted RF carrier being filtered out. The audio signal is then fed into an audio frequency amplifier stage or in some cases to what is known as a cathode follower stage.

This latter stage has the advantage that the connection between the tuner and amplifier or tape recorder may have a long screened lead, without detriment to the quality.

FM Tuners

Many designs of tuner are now available for feeding the local station programmes into a high-quality amplifier or tape recorder. The technique of VHF receiver design is relatively new, and as a consequence many different approaches to the problems are found. Fig. 4 shows a block diagram of a modern FM tuner.

The basic design is a superhet receiver with a radio frequency amplifier stage preceding the mixer, followed by one or two intermediate frequency amplifier stages. FM is unique in that a large number of possible detector systems exist, although the two most popular are the Ratio detector and the Foster Seeley. Both of these systems require two diode valves or Germanium diodes.

The output from the FM transmitter does not change during modulation like that shown in Fig. 1, as the amplitude is maintained constant, and the process of

modulation causes the radiated frequency to change as indicated in Fig. 5. At the receiver, this signal is fed to a radio frequency amplifier stage.

This is common practice with FM tuners and is an essential contribution to improving the signal-to-noise ratio. From

the RF amplifier the signal is passed to the mixer stage, which is generally a single triode valve (three electrodes) arranged to operate as a self-oscillating mixer. This stage, like the AM superhet tuners already described, converts all incoming signals into a fixed intermediate frequency. The IF is normally arranged to operate at 10.7 megacycles, although

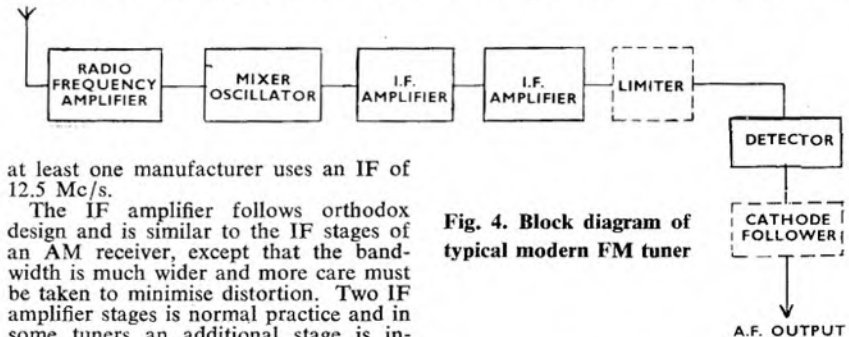


Fig. 4. Block diagram of typical modern FM tuner

at least one manufacturer uses an IF of 12.5 Mc/s.

The IF amplifier follows orthodox design and is similar to the IF stages of an AM receiver, except that the band-width is much wider and more care must be taken to minimise distortion. Two IF amplifier stages is normal practice and in some tuners an additional stage is included before certain types of detectors. Its function is to act as an amplitude limiter (a fuller description of this is beyond the scope of this article) as an FM receiver must, of course, give no output from any signal input that is amplitude modulated.

From the last IF amplifier or limiter stage the signal is passed to the detector. This stage for the FM receiver is completely different from its AM counterpart. The detector is required to provide an audio frequency output from a frequency

frequency amplifier. Any appreciable drift of oscillator frequency will result in distortion, and this calls for a very high order of frequency stability and care in tuning. Once the signal has been tuned it is essential that the oscillator frequency remains reasonably constant, otherwise, retuning will be necessary to "chase" the frequency drift of the oscillator. An initial drift may take place when first switching on, but this should be over after the first five minutes or so;

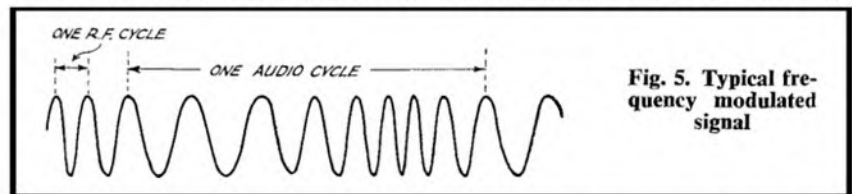


Fig. 5. Typical frequency modulated signal

change but no output from an amplitude change. As previously mentioned, the two most common types are the Ratio detector and the Foster Seeley.

The most popular of the two is the Ratio detector, its main advantage being that to a considerable extent it is self-limiting and a limiter stage is not absolutely essential. This, of course, helps to keep the cost down.

it is with the longer period of drift that we are mainly concerned.

Several methods of maintaining a constant oscillator frequency are in general use in FM tuning systems, the main system being temperature compensation, automatic frequency control and quartz crystal oscillators.

Temperature changes in the oscillator components are one of the main causes

of oscillator frequency drift and compensation for temperature effects is often carried out by the use of special capacitors, with positive or negative temperature co-efficient. By careful design a large measure of temperature compensation may be obtained in this manner, but such design requires not merely the choice of correct components, but also their correct positioning in the chassis so that compensating changes will occur at the correct time.

A number of tuners use Automatic Frequency Control (AFC) and has proved to be very satisfactory. In this system a valve is connected in such a manner that it behaves as a "reactance." The magnitude of the reactance is determined by a control voltage derived from the detector, and the reactance valve is connected across the oscillator circuit (shown dotted in Fig. 4). Any "off tune" in the oscillator produces a correction voltage at the detector which causes the reactance valve to balance in such a manner as to bring the oscillator back to its correct frequency.

One advantage of this system is that the "tuning" operation can become less critical than it might be without AFC.

The quartz crystal oscillator is well known for its frequency stability and at least one manufacturer has employed this method. Station selection or tuning is carried out by means of a three-position switch that selects the appropriate crystal for each channel.

Combined AM/FM Tuners

Many firms now manufacture tuners which offer the choice of the usual AM bands and the FM band. The design problems of such a tuner are usually concerned with using circuits that will ensure maximum economy of valves, by making the valves operate in both the AM and FM positions as far as possible. Fig. 6 shows a block diagram of one of the many possible arrangements. The tuning section or "front end" of the tuners are usually separate but the AM frequency changer plays a dual role by becoming an IF amplifier when switched to FM.

The IF amplifier stages are usually "common" and simply amplify the AM or FM signal presented to it. The output from the IF amplifier is presented to the appropriate detector and the a.f. amplifier input is switched accordingly.

Considerable circuit ingenuity exists in the various makes of combined tuner and the AM/FM switch which makes the appropriate circuit changes are very complex. In addition to the Medium, Long and FM bands several makes of tuner include one or more Short wavebands, plus added refinements such as variable selectivity for the AM bands and automatic frequency control for the FM band. This type of

tuner has to be very well designed in order that its performance will remain consistent throughout all its functions.

The Aerial

The importance of a good aerial cannot be over-emphasised. Whatever the tuner, whether AM or FM, it should be supplied with the best input signal that can be obtained. It is true that many manufacturers employ some excellent Ferrite aerials for use on the Medium and Long wave band, but whilst these are better than the "bit of wire," they can never be a substitute for a good aerial erected as high as possible.

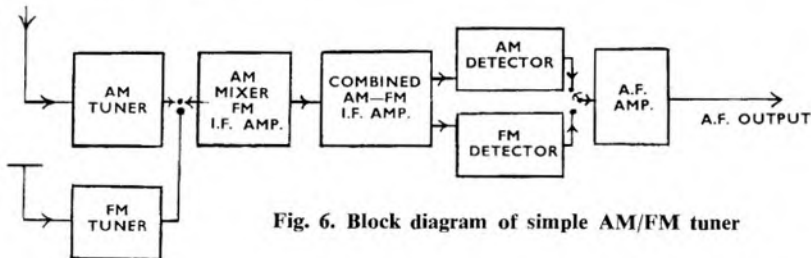


Fig. 6. Block diagram of simple AM/FM tuner

The FM tuner relies to a large extent on the use of a good aerial. The limiting action depends for its operation on receiving a strong signal and the stronger the signal the better is the AM suppression, with consequent improvement in the signal-to-noise ratio.

The guiding principle for obtaining the best performance should be to mount the aerial as high as possible in the open.

Power Supplies

It is important to realise that all the tuners so far described must have a power supply. At one time many manufacturers designed individual tuners to be used in conjunction with their own amplifiers or amplifiers of a similar type. In some cases a spare power socket was provided on the amplifier so that a small AM or FM tuner with modest power requirements could be used. This, of course, helped to reduce the size and weight of the tuners and also helped to ease installation problems. But with the larger type of tuner the trend has been towards including a built-in power supply.

For those people who already have an amplifier with adequate spare power the problem is comparatively simple. But many tape recorder enthusiasts do not have or need a large amplifier with a spare power socket, so, therefore, the tuner must be self-powered. Some manufacturers produce tuners with a separate power supply as an optional extra, in addition, there are a large number of power units available in kit form which are very simple to build.

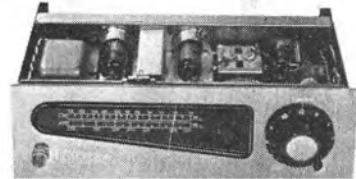
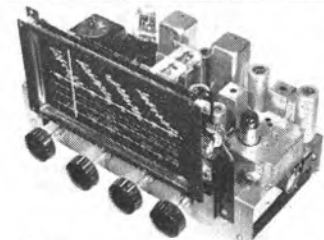
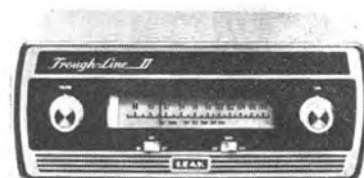
CATALOGUE OF TUNERS

Name and Type	Range	Level Indicator	P.S.N. or Self-Powered	Other Features	Size (inches)	Retail Price (including tax and surcharge)
ACOUSTICAL MANUFACTURING CO. LTD.						
QUAD FM	87.5—108 Mc/s.	Twin-Neon Tuning Indicator	6.3V 1.85A 330V 27m/A	AFC Permeability tuned RF, Mixer, OSC, IF, Limiter and Discriminator stages Output 100 mV at 100 KΩ	10½ × 3½ × 6	£29 13 3
QUAD AM II	European Model: 2.070—800 m. 588—185 m. 5.8—18.5 Mc/s. Overseas Model: 510—1,620 kc/s. 2.2—6.6 Mc/s. 5.8—18.5 Mc/s.	EM84 Tuning Indicator	330V 35m/A 6.3V 1.2A	Wide Band, Narrow Band and Filter Switch. Filter=9 kc/s. Europe; 10 kc/s. Overseas. Output 100 mV (for 30% modulation) at 15 KΩ RF, OSC/Mixer, Neutralised IF, Diode Detector, Delayed AGC.	10½ × 3½ × 6	£33 18 0
ARMSTRONG WIRELESS & TELEVISION CO. LTD.						
T4B FM Tuner	87—108 Mc/s.	None	Self-powered	Automatic frequency control. Cathode follower output. Pre-set output control. Shelf or cabinet mounting.	10½ × 4½ × 7½	£23 0 0

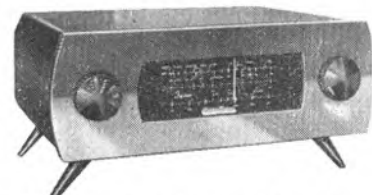
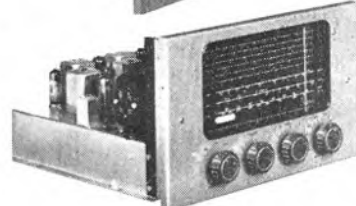
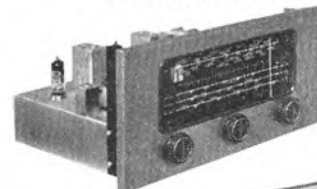
(Continued on page 20)

CATALOGUE OF TUNERS

Name and Type	Range	Level Indicator	P.S.N. or Self-Powered	Other Features	Size (inches)	Retail Price (including tax and surcharge)
ARMSTRONG WIRELESS & TELEVISION CO. LTD.						
ST3 Mk 2 AM/FM Tuner	87—108 Mc/s. 187—570 m. 1,053—2,000 m.	Yes	Self-powered	Automatic frequency control. Cathode follower output. Pre-set output control. Two IF stages on A.M. Ferrite aerial on A.M.	12 × 5½ × 7	£28 10 0
CHAPMAN ULTRASONICS LTD.						
SS: VHF/FM and AM, L, M and SW	FM: 87.5—100 Mc/s. A.M.: 16—50, 195—550 800—2000 m.	EM84 Bright Line	Alternative models	Variable selectivity and amplified delayed AVC.	13½ × 6½ × 9	S5/FM Powered: £38 19 9 Unpowered: £34 17 8
SSE: VHF/FM and AM, M and SW	FM: 87.5—100 Mc/s or 88—108 Mc/s A.M. 12.5—37, 35—100, 90—250 and 190—550 m.	EM84 Bright Line	Alternative models	Variable selectivity and amplified delayed AVC	13½ × 6½ × 9	SSE/FM Powered: £38 19 9 Unpowered: £34 17 8
S6BS: Six Stage AM	Bandspread: 11, 13, 16, 19, 25 and 31 m. 13—43, 43—140 and 157—570 m.	EM84 Bright Line	Alternative models	Variable selectivity and amplified delayed AVC.	13½ × 8½ × 11	S6BS Powered: £51 16 2 Unpowered: £45 13 1
S6BS/FM: Combined model S6BS and FM91	See S6BS and FM91 Specifications	EM84 Bright Line	Powered model only	Variable selectivity and amplified delayed AVC	13½ × 8½ × 13½	S6BS/FM Powered only. £72 14 3
FM90 Switched VHF/FM Chassis only	B.B.C., U.K.	None	From P Amplifier	Stable OSC, CCV and AFC	5 × 4½ × 6½	£20 0 0
FM91 turnable VHF/FM with or without cover	87.5—100 Mc/s.	EM84 Bright Line	Alternative models	75 ohms co-ax. or 300 ohms bal. Two stage limiting	12 × 4½ × 6½	FM91 Powered: £28 1 8 Unpowered: £24 0 0
FM95: VHF/FM and AM L & MW	FM: 87.5—100 Mc/s. AM: 195—550 and 800—2,000 m.	EM84 Bright Line	Alternative models	Self-powered model specially recommended for tape recording	12 × 4½ × 8½	FM95 Powered: £31 18 8 Unpowered: £27 16 7
GOODSELL LTD.						
FMT 706 FM (Manual tuning (permeability))	85—100 Mc/s.	Magic Eye	250V at 20m/A	—	4½ × 7½ × 5½	£14 5 1
GRAMPIAN REPRODUCERS LTD.						
FM571 Free tuned	85—98 Mc/s.	Magic Eye	300V at 35/40 m/A 6.3V at 2.5 amps	—	10½ × 5½ × 6½	£17 10 0
H. J. LEAK & CO. LTD.						
Trough-Line II FM	88—108 Mc/s.	EM84 Magic Eye	200—250V AC or alternative model 110—124V	AFC. Sensitivity 2 micro V at aerial for full limiting.	10½ × 7½ × 3½ with panel 11½ × 4½	£34 7 6
LEE PRODUCTS (GREAT BRITAIN) LTD.						
Dulcie FMT/2	88—100 Mc/s.	—	Self-powered	Provision for Stereo Adaptor (AFC)	12½ × 3½ × 9½	£25 4 0
Dulcie H4T/2	1100—1900 m. 187—540 m. 272—160 kc/s. 1,600—540 kc/s. 16—50 m. 19—6 Mc/s. 87—100 Mc/s.	Yes	Self-powered	Provision for Stereo Adaptor	12½ × 6½ × 10½	£26 7 8
Dulcie FMT/5	88—108 Mc/s.	—	Self-powered	Provision for Stereo Adaptor (AFC)	12½ × 3½ × 9½	£25 5 4
Dulcie H4T/5	AS H4T/2 87—108 Mc/s.	Yes	Self-powered	Provision for Stereo Adaptor	12½ × 6½ × 10½	£30 8 10

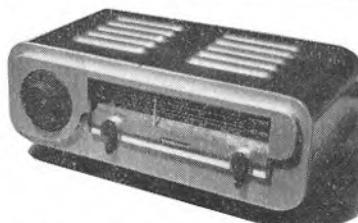
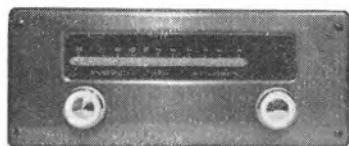
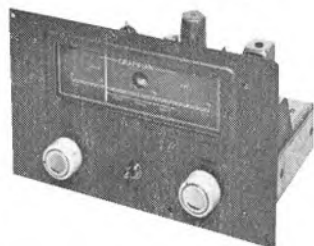
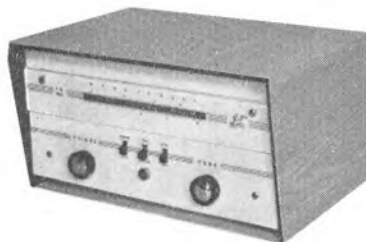


Above, top to bottom: Leak Trough-Line II; Symphonic AM/FM; Pye HFT 113; and TSL Universal FM

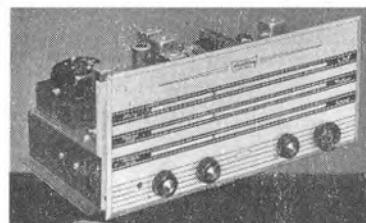
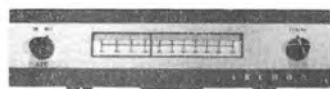


Above, top to bottom: Chapman S5E/FM, S6BS/FM, and FM 95

CATALOGUE OF TUNERS



Above, top to bottom: Lowther FM Mk 5; Grampian FM751; Sound Sales 108 Synchrolock; and Quad AM 11. Below: Tansley-Howard Archon; Armstrong ST3 Mk 2; and Pamphonic 546 FM.



Name and Type	Range	Level Indicator	P.S.N. or Self-Powered	Other Features	Size (inches)	Retail Price (including tax and surcharge)
LOWTHER MANUFACTURING CO.						
Mk. V, FM Variable tuning	87.5—108 Mc/s.	50 cps hum time check	250V at 30m/A 6.3V at 2 amps	AFC Cathode follow output	10½ × 4½ × 6	£22 10 0 Plus P.T.
Mk V, SP FM Variable tuning	87.5—108 Mc/s.	50 cps hum time check	Self-powered	AFC Cathode follow output	10½ × 4½ × 6	£24 10 0 Plus P.T.
Mk VI, FM Switched tuning	FM, Band 2	—	Self-powered	Crystal control AFC	10½ × 4½ × 6	To be announced
PAMPHONIC REPRODUCERS LTD.						
646 FM	88—108 Mc/s. FM/VHF	—	Self-powered	AFC	13 × 7 × 4½	£29 12 2
PYE LIMITED						
HFT 113 or HFT 113 M AM/FM Variable tuning	88—108 Mc/s. 190—550 m.	—	Self-powered dual voltage	AFC and AFC defeat	10½ × 5 × 3½	£29 8 0 (chassis) £31 10 0 (in metal case)
HFT 108 or HFT 108 M FM Variable tuning	88—108 Mc/s.	—	Self-powered dual voltage	AFC	10½ × 5 × 3½	£23 2 0 (chassis) £25 4 0 (in metal case)
RECORDING DEVICES LTD.						
Stuzzi AM	190—600 m. (medium wave) Pretuned to 1500 m. (200 kcs.)	—	Self-powered	Sensitivity control. Band- spread tuning	5½ × 4½ × 1½	£5 9 6
SHIRLEY LABORATORIES LTD.						
R6 FM Variable tuning	Standard Ltd.	EM84 Magic Eye	200—300V 30m/A; 6.3V 2.5 amps	—	—	£27 10 0
SOUND SALES						
A—Z FM 108 Synchro-lock unit (Mk IV)	87.5—108 Mc/s.	—	Self-powered	AFC	11½ × 4½ × 6½	£29 15 4
SYMPHONY AMPLIFIERS						
Symphony FM	87—100 Mc/s.	Magic Eye Optional £1 0 0	300V at 40m/A 6.3V at 1.5A	—	9 × 6 × 6	£15 1 0
Symphony AM and FM	16—50 m. 190—550 m. 1,000—2,000 m. 87—100 Mc/s.	Magic Eye Optional £1 0 0	Self-powered	—	13½ × 7½ × 8½	£24 0 0
TANSLEY—HOWARD LTD.						
Archon FM Type PF41	88—108 Mc/s.	—	Self-powered	Uniform with the ARCHON SP31 stereo control unit Switched AFC	12 × 6 × 2½ Panel size: 12½ × 3	£25 9 2
TECHNICAL SUPPLIERS LTD.						
T.S.L. Universal FM	87.5—108.5 Mc/s.	—	Self-powered	Sensitivity 0.6 of 1mV for full out- put. AF response 25—25,000 cps ± 0.5 dB. selectivity; 350 kcs bandwidth. AGC and AFC fitted	8 × 7½ × 2½	£25 14 6
TELETRON CO. LTD.						
Tapejak transistorised AM only	Any two B.B.C. programmes on medium wave, longwave light programme	—	Self-Powered	Self-contained aerial. High sen- sitivity. Twin- tuned circuits. Pre-setting for MW. Fix tuned on 1,500 metres. Switched pro- gramme selector	5 × 3½ × 1½	£5 11 8
WHITELEY ELECTRICAL RADIO CO. LTD.						
W.B. Stentorian Mk II, FM Variable perm- eability tuning	88—108 Mc/s.	—	200/240V at 45m/A 6.3V at 2 amps	—	11½ × 4 × 7½	£23 2 0

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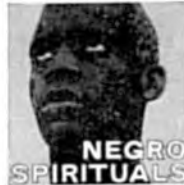


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43. Andy Cole, Barbara Leigh, Mike Sammes sing: High Society, Three Coins, Harry Lime, Gigi, 11 top film hits.
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50. David Hughes, Barbara Leigh, Andy Cole and chorus sing Indian Love Call, Rose Marie, many many more.
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51. They Can't Take That Away From Me, Baby Doll, It Only Happens When I Dance With You, 13 favourite songs from the great Fred Astaire.
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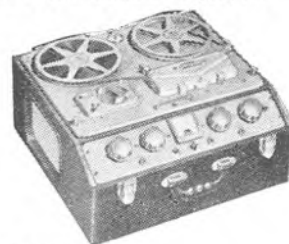
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TAPE RECORDS REVIEWED

By Don Wedge

WHEN, last November, I wrote in *Tape* that there was a crying need for more names of the current hit parade to be available on pre-recorded tape, it was without hope that some would be available as soon as this.

They come in a set of four "Star Parades" just made available by Music on Tape (TR723, TR823, TR923 and TR1023 can now be bought on tape. The disadvantage is that most of the performances are dated and none meant much in the hit parade.

Nevertheless there is a lot of material worth hearing. It would be a poor day if the only good material were the hits. There is also a certain nostalgic value. Remember Jackie Dennis, for instance?

The four "Star Parades" are ideal for a self-indulgent bout of "Juke Box Jury" service. They form a collection that rouses a lot of emotions in me—from being outraged to finding a good measure of satisfaction. In the four tapes, most artists appear twice, not always on the same one, never on the same track; some are represented with four numbers.



"Star Parade No. 1" begins with *Standing Around* by Russ Sainty, an unfortunate choice—the number seems to go on and on. The next—Curt Jurgens' *Live for Love* is quite awful, but Betty Miller makes the tape a pleasure for me with *Old Time Religion* a swinging, driving effort that might find success in today's trad boom. Vince Eager makes a very good job of *Why*.

The return track includes *Hey Baby* by Gary Mills and a very good *Greenfields* by the Brook Brothers—a little unrelaxed, but indicative of the success they were to get with later recordings.

The second tape has pianist Tony Hatch, pleasantly supported by an organ, on Russ Conway's *Side Saddle* hit, as well as the Brooks (sounding like the Everley's) singing a cute *How Will it End?* Betty Miller swings again with *Pearly Gates*—quite dateless, of course, this one.

"Star Parade No. 3" pleased me most. It begins with an excellent modern big band backing Kenny Day on *My Love Doesn't Love Me at All*—an invigorating treatment of a sad theme. Rose Brennan is in excellent form for *Johnny Let Me Go*, a song worthy of her. Chas. McDevitt and Shirley Douglas, doing what Nina and Frederik do (recorded before we had heard of N & F), on *Dream Talk*, again a number well suited to their blend of dreamy harmony. Attractive piano features for Dick Katz (*Dream Rider*) and Tony Hatch (*Hey Chick!*) just add to the plus value of this one.

Katz is also in good form with an unusual treatment of *Surrey with the Fringe on Top* on "Star Parade No. 4." Betty Miller, now away from the religious-type song, still scores with *Jack of Diamonds* and gets my nomination as the best artist on the four records.

Kenneth Connor has a funny version of *Ramona*—a hilarious narrative of how he searches for Ramona (Smith) in the Canadian North-West. There is a multi-lingual *Mustapha* from the Don Carlos band, Russ Sainty does much better with *Happy Go Lucky Me* and the McDevitts are back with *Forever*.

Jackie Dennis contributes a too cute *Summer Snow* but is handicapped by an immature recording voice—probably the reason for him failing to maintain his bill-topping career despite his great talent on stage. Even more disappointing is the Wise Guys' *As Long as I Have You*, a terrible dirge.

Music on Tape has issued this set rather experimentally to discover the potential for pops. Frankly it is hard to see why some of the numbers were ever recorded. The reasons why several of them were not hits, on the other hand, is the story of Rank Records.

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FIXING THE FREQUENCY RANGE

THE purist will undoubtedly feel that the perfect hi-fi recording and reproducing system should transmit every sound produced by the orchestra in the studio, an ideal that raises a philosophical point. What is the designer's target to be; a sound system that gives a perfect re-creation of the studio performance, or one that gives the most pleasing results.

At first sight it may seem heresy even to suggest that a re-creation of the studio performance can be anything other than the most pleasing, but hard facts shake our confidence in this seemingly obvious conclusion.

Two American workers of international repute, Chimm and Eisenberg, put up a laboratory sound system in which the frequency range could be switched to any of the three standards of performance indicated by Fig. 1. Using programme material of various kinds they asked the test audience to vote for the particular response curve of Fig. 1 found to give the most pleasing reproduction. Opinion varied with the type of music but it is true to say that the majority opinion was almost always in favour of the medium fidelity or the low fidelity performance. The flat response curve found little favour, particularly from musicians.

Another facet of high fidelity explored by Somerville and Brownlees in this country produced a similarly disturbing result. There are few, if any, complaints from concert goers about the orchestra being over loud at a symphony concert, yet Somerville and Brownlees found that a typical audience preferred the loudness levels of reproduced music to be some 20 dB lower (this is roughly one-quarter as loud) than the levels experienced in the concert hall.

These are disturbing conclusions, for they are based on the carefully conducted tests of large numbers of people.

Interest was added when Olson checked the opinion of a large number of people using live music rather than a high fidelity system. He divided a large room by a partition consisting of a venetian blind structure that was in fact an acoustic filter passing all frequencies below 4,000 cps only. Under these conditions there was an almost unanimous preference for full frequency range.

It would be easy to interpret these results as showing that even the best laboratory reproducer system introduces distortions that are unacceptable to the average listener. Indeed, this is true, but the significant distortion is not the expected one. The reproducer system used both by Chimm and Eisenberg and Somerville and Brownlees were monophonic and not stereophonic. The signifi-

cant distortion was the failure to reproduce any indication of the size of the sound source, the really important attribute of a stereophonic system. However, this is a factor of such importance that it justifies a whole section to itself at a later date.

Your domestic hi-fi system is hardly likely to be as good as the professional equipment used in the experiments briefly described, so do not be unduly disturbed if it "sounds better" when the tone controls are in use. It is well established that the presence of harmonic distortion, hum, tape or record hiss, wow and flutter all lead to a preference for restricted frequency and loudness ranges. In addition there is evidence that the use of a domestic sized room leads to a similar reaction, a preference for a narrowed frequency range and a restricted loudness range.

This discussion rather suggests that your hi-fi system is a good one if your wife habitually plays it with the tone controls set to the "flat" position as she will set the controls to give the most pleasing result rather than the one that appears to you to be the technically correct position. Your preferences in this respect are less significant, for you are biased by knowing where they should be set.

The information given in the first two

wide range reproducer system in which there were filters to restrict the range when required. The microphone was set up at four feet from each of the instruments in turn and the player directed to play simple scales. The test crew, all young people with good hearing, were then asked to indicate whether they could detect a restriction in the frequency range when each of the filters were switched into circuit.

The resultant data is usually presented in the form of a bar chart, Fig. 2, in which the frequency range occupied by the music is shown as a solid line while the frequencies that carry only the incidental scraping, blowing and bowing noises are indicated by the dotted extensions to the solid lines. The oboe, snare drum and cymbals, hand clapping and key jingling are seen to have detectable components up to at least 15,000 cps while the double bass is seen to go down below 40 cps.

These are the results on solo instruments played loudly, but as we have previously noted that loud playing emphasises the high frequency components in music, it might be as well to see what results are obtained when the instruments play together in the ordinary way.

For this test a slightly different technique was used, the test crew being

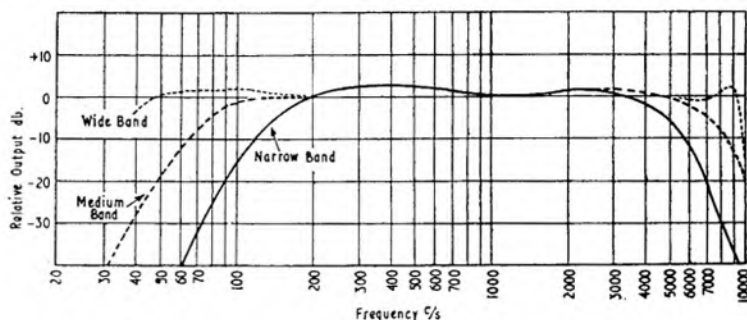


Fig. 1. Frequency characteristics of filters used in Chimm and Eisenberg tests

instalments was the result of objective, that is, instrumental tests, on the various instruments of the orchestra. This is vital information to the designers but in fact our ears and not our instruments are the final arbiters on sound quality. Thus we ought to have a look at the information available on what our ears think about the instruments of an orchestra.

There is a great deal of this sort of information available and we can only skim through the data. Our instruments have shown us that there are frequencies between about 20 and 20,000 cps in the sound output from a large orchestra. Do our ears agree?

Bell Telephone Laboratories set up a

asked to estimate the percentage loss in quality due to each restriction of the frequency range. This was done while the orchestra played some representative pieces. The results of this all-embracing test are illustrated in Fig. 3.

It will be seen that restricting the frequency range to 50 cps and 10,000 cps produced a quality loss estimated to be 5 per cent at each end of the range. If the test crew had been a little older, say between 35 and 45 years of age, instead of being between 20 and 30 years, the frequencies above 10,000 cps would have been even less significant. Some similar tests carried out by Gannet and Kearney in 1944 produced very similar results

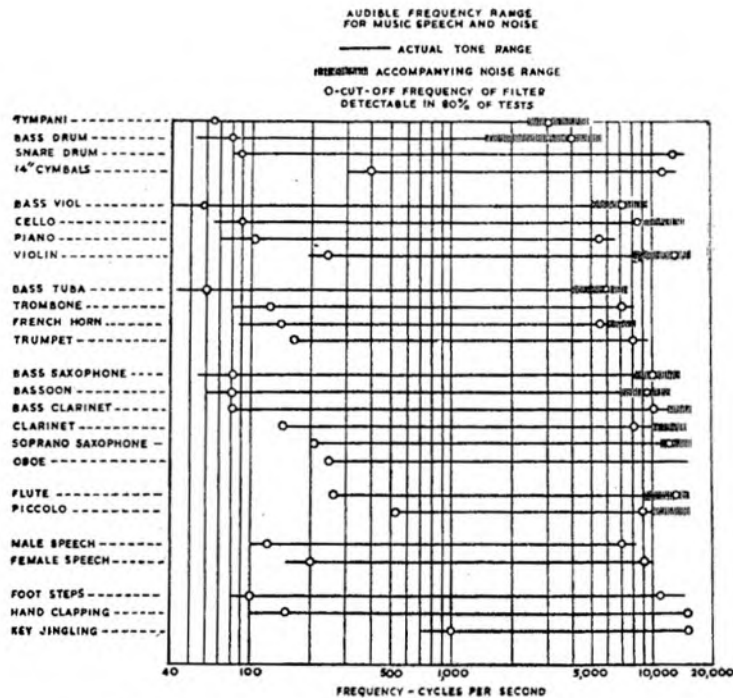


Fig. 2. Bar chart showing audible frequency range

and agreed in showing that the frequency range above 10,000 cps is of rapidly decreasing importance. An increase of range from 11,000 cps to 15,000 cps produces about the same change in quality as an increase in range from 3,600 cps to 4,000 cps.

Thus the data suggests that an equipment having a frequency range of 50 to 10,000 cps will meet most demands and that relatively little improvement is to be expected if the frequency range is extended above 10,000 cps. My own experience suggests that relatively few people have heard a system that was genuinely "flat" and smooth over the frequency range between 50 cps and 10,000 cps.

This is confirmed by the experience at a recent lecture where the audience were asked to write down their estimate of the frequency range of the reproducer system employed for the demonstration. The upper cut-off frequency was placed by the audience at various points between 3,000 cps and 14,000 cps, when, in fact, it was 4,000 cps.

There is an economic disadvantage in producing a sound reproducer system that has a wider frequency range, a lower distortion level or a higher power output than is necessary. A system having a good low frequency response extending to perhaps 30-40,000 cps will reproduce all the hum, rumble and wow introduced by other parts of the equipment. If the response extends to frequencies that are unnecessarily high the system will reproduce all the surface noise, tape hiss, adjacent channel chatter, etc., that are predominantly high frequency noises.

To eliminate these interferences while still retaining wide frequency response, requires that more money be spent on gramophone motors, tape decks and radio receivers in order to make their limitation less obvious. Wide frequency range

amplifiers require larger and more complicated output transformers, better smoothing systems and more careful layout and wiring. Loudspeakers with a wide and smooth frequency range are also larger and more complicated. Thus the economic objections to making equipment with a wider frequency range than necessary are quite formidable.

In fixing the frequency range to be employed it is much more important to obtain a balanced response than it is to obtain a wide frequency range. Thus a hi-fi equipment with a range 7,000 cps wide but extending from, say, 1,000 cps to 8,000 cps, would sound very thin and irritating, whereas a second system having the same bandwidth of 7,000 cps but extending from, say, 50 cps to 7,050 cps, would sound very good indeed.

Many criteria have been suggested to aid in balancing the frequency range. A very good guide is to make the product

This is the third article in a new series offering an authoritative but very readable explanation of audio—theory and practice.

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

of upper and lower cut-off frequencies 800,000. On this basis a system having an upper cut-off frequency of 8,000 cps should have a lower cut-off frequency of 100 cps. Alternatively, if the bottom end of the range is 50 cps then the upper cut-off should be at 16,000 cps. However, these simple guides do not have to be pressed too far or one gets a system having a range from 20 cps to 40,000 cps, almost as good as some of the advertisements.

In the next issue we will have a look at the sort of figures that should be obtained for wow and flutter, harmonic distortion, rumble, signal-to-noise ratio, etc., if a good performance is to be obtained. Provided your equipment has a frequency range exceeding a few thousand cycles per second, attention to these other factors produces a greater improvement than extending the frequency range to 15 or 20,000 cps. Just in case you are feeling that this is all theory and no practice, we will then look at the performance of a few actual reproducer systems and see how they meet the requirements.

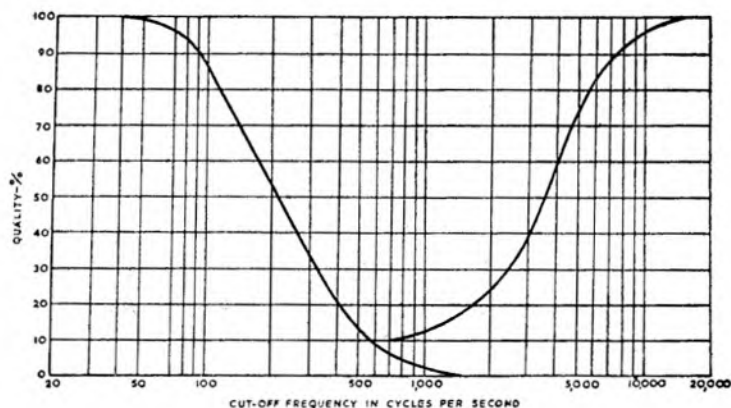


Fig. 3. Quality of orchestral music as a function of off-cut frequency

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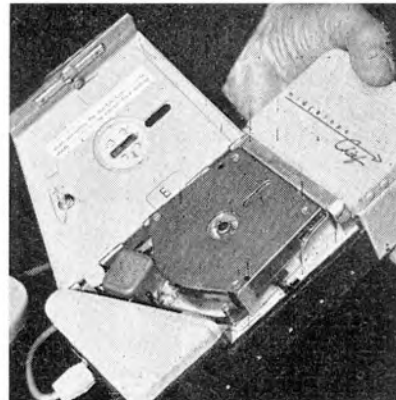
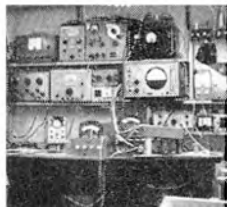
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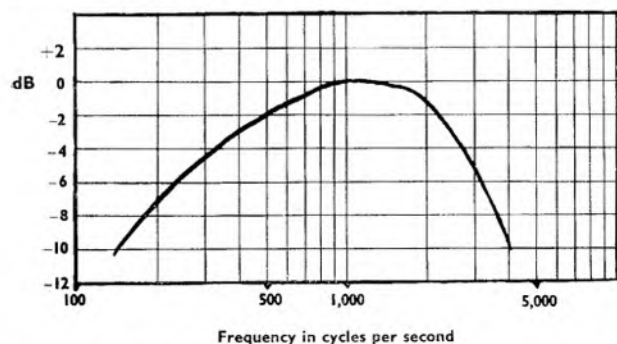


MOHAWK MIDGETAPE 400

THE Mohawk Midgetape "400" is an extremely small transistorised portable machine. Its dimensions are $8\frac{1}{2}$ by $3\frac{7}{8}$ by $1\frac{7}{8}$ inches, and it weighs less than 3 lb. A leather carrying case is available and the machine in its case looks much the same size as a folding camera of a few years ago. The carrying case includes a pocket mounted on the shoulder strap to contain the microphone which is a small moving coil unit, embodying a switch which controls the start and stop operation of the machine. The machine itself is contained in a metal case finished in grey crackle, giving it a business like professional appearance.

An unusual feature of this tiny machine is that the tape is contained in a metal cartridge or cassette. Tape threading consists simply of inserting the cartridge in the case, and an access door is provided for the purpose. Each cartridge contains sufficient tape for one hour's recording at $1\frac{1}{2}$ ips; a half hour being recorded on one track, the cartridge then being turned over in order to record the second half hour. No power operated rewind is available, a handle being pro-

vided to do this manually. The tape indicator is a series of figures engraved on the case, showing the time left on the reel.



vided to do this manually. The tape indicator is a series of figures engraved on the case, showing the time left on the reel.

The Midgetape has very few operating controls: an "on/off" switch incorporating the mechanical linkage operating the pinch wheel; a "record/playback" switch and a volume control. No record level indicator in the accepted sense is provided but coloured marks on the volume control give suitable levels for various situations described in the instruction manual. No safeguard is provided to prevent accidental erasure of the tape if

the record/play switch is inadvertently left in the record position, but erasure on rewind is unlikely since the mechanism and amplifier has to be switched off before the manual rewind can be operated. Two sockets are provided on the machine, one for the microphone or other input and the other for a miniature ear piece. An unusual feature is that the machine can either play back through the microphone, using this as a miniature loudspeaker, or through a small transistorised amplifier and loudspeaker, which can either be purchased with the machine or as a later addition. Space is provided in the case for this and fitting is a matter of only a few moments.

The power supply for the Midgetape 400 is from a special mercury battery which gives a life in excess of fifty hours. This battery is situated in a compartment at the end of the machine and can be very easily replaced. As with most transistorised recorders, battery life can be conserved by keeping the playback volume to a low value.

The internal construction of the machine is very good, the standard of workmanship is commensurate with the high price of the machine. In this respect the compactness and rigidity would suggest that this machine can withstand a fair amount of rough handling and still work successfully.

Mohawk Midgetape 400 Record/replay characteristics

Frequency response tests were made and the overall record/replay response is shown in Fig. 1. The makers specification claims a response of 150-5,000 cps but does not state any limits. As can be seen, the response is well down at these limits, and one might have hoped for better things. Wow and flutter were fair but this machine could scarcely be recommended for the recording of music. As with most portable machines, the wow varied considerably if the machine itself was moved whilst in action.

It is only fair to say that in order to complete this review, two machines were supplied by the British agents. The first machine apparently had a defect in the tape transport system and would not therefore record at all successfully. The second machine, the one whose response

is shown, was completely free from this defect and the reviewer can only assume that the first machine was an unlucky one. However, the microphone supplied with the second machine functioned only intermittently, and whilst this also was probably an unfortunate specimen, the reviewer feels that these things should not happen in any machine, particularly a machine at this very high price.

Turning to the price, the Midgetape 400 complete with its transistorised speaker and amplifier, microphone and battery costs £129 10s. It can be obtained without the built-in loudspeaker unit for £115. The cartridge of tape lasting one hour costs £4 19s. 6d. and the leather carrying case £4 17s. 6d. A new battery is £2 14s.

The above prices may seem very high, when one considers that a portable transistorised machine, albeit somewhat larger, with a maker's specification almost identical to this one, but including power rewind and a recording level meter, can be bought in this country for less than £30.

One must consider, however, that this is an American machine, presumably designed for the business tycoon to do his dictation whilst travelling in his car, or aeroplane, and there will probably always be a market for high priced equipment of this type.

H. BURRELL HADDEN.

MANUFACTURER'S SPECIFICATION

Speed: $1\frac{1}{2}$ ips, half track operation in a cartridge.

Frequency response: 150-5,000 cps.

Wow and flutter: Less than 0.7 per cent.

Signal-to-noise ratio: 42 dB.

Playing time: Thirty minutes per track.

Rewind speed: Manual.

Inputs: 2,000 ohms, 1mV min.

Output: 10 mW at 2,000 ohms.

Sockets: Microphone, and earphone/amplifier.

Controls: On-off, Play-record, and Volume.

Recording level indicator: Coloured marks on volume control.

Motor amplifier life indicator: Incandescent lamp.

Transistor complement, Four.

British Agents: Thomas A. Edison Limited, Victoria House, Southampton Row, London, W.C.1.

SPECIAL SURVEY: THE CLUBS IN LANCASHIRE

Lancashire and the North-West

IN the first of a special series of articles with a local flavour, *TAPE* takes a look at the Lancashire and North-West area.

On the facing page is an article on a broadcasting studio built on the lines of the BBC operations rooms in one of the Lancashire cotton mills. This is just one example of the enthusiasm for tape in these quarters.

At present there are eleven clubs known to be in operation within this section of the UK. Their formation and activities follow much the same pattern of clubs throughout the country, and the three described below are offered as a cross-section.

One of the greatest problems facing the formation of a club, once enough members have been found, is the selection of a suitable venue for meetings. Many of the clubs now in formation meet at the same headquarters that they did when first formed, in some cases three years ago.

This is rarity, and one of the best examples is shown by the history of one of the Liverpool clubs. This particular membership was first visualised in December 1960. Mr. A. Burnett was the instigator, and following a few weeks' hard searching for other enthusiasts, he finally managed to call a preliminary meeting in the following January.

Five prospective members attended the first official meeting at the founder's home. A constitution was drawn up and their activities for the future discussed. A church hall was selected as their meeting place, and the club's first demonstrator was welcomed along.

Their first set-back occurred in March when the club found it necessary to move to other premises. Established in the Brookman Hall, they welcomed a representative of local dealers Coghlan & Robinson who lectured on recording techniques. But their pleasure was short-lived, and April brought yet another venue change. By this time they had affiliated to the now defunct British Recording Club, and their membership stood at thirteen. It was at this time that the secretary, Mr. A.

Evans, stood down in favour of the present secretary, Mr. E. Durkin, and the club moved back to Brookman Hall.

Their meetings continued apace with demonstrations continuing and everything in the garden being fine. However, in January this year yet another move had to be made, and the club are now at home at the Common Hall, situated right in the centre of the city.

Despite the setbacks, and their attendant upheavals with the extra secretarial work involved, the members persevered. They now hope that their location in the city will encourage new members, who may in the past have been discouraged or found it impossible to locate the club.

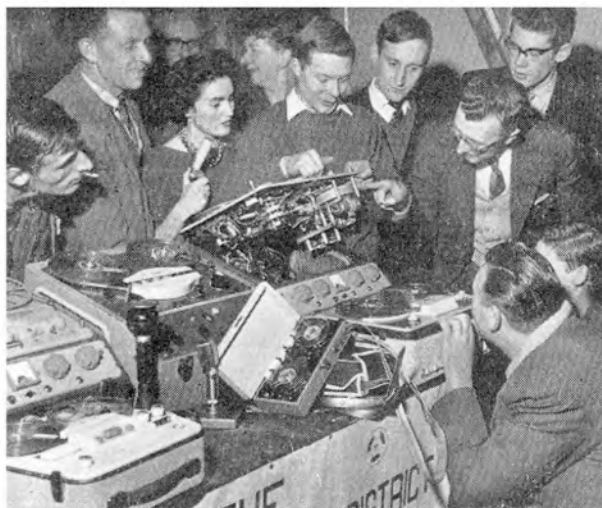
Among the recorders owned are Telefunksens, Philips, Grundigs and a Ferrograph. These are put to most use during their outside recording activities, a speciality of the club—the latest of which was recording a service and the bells of Liverpool Parish Church. As recently as February they visited the Spinners Folk Club to record a 2½-hours' programme of entertainment.

* * *

A rise and fall of another nature is the key-note of the formation of the Urmston club. In October 1959 three members of a "Hifi Club" decided that a tape club was a much more practical proposition. Accordingly they set to work to advertise their intentions, and placed small placards in dealers' windows, and in the public library.

Keith Alker, the present secretary, and his wife, enrolled in this way, and from then on membership rose to the highest membership they record, some twenty members. The difficulty this membership experiences is not in finding a regular venue, but with maintaining membership once established. Their members seem to favour the cosier atmosphere of each others' homes.

In the event, the members dropped to a hard core of twelve, whose activities are varied and many. Each Christmas they have recorded the local carol service



Secretary of the Urmston club, Keith Alker, holds the deck of a Ferrograph for technical adviser Sid Wignall. Treasurer Barbara Alker looks on with an Acos microphone

for the Old People's Homes, and they also enjoy recording wedding services.

Their activities are not confined to religious occasions however; they have also recorded brass bands in Manchester and Crosby, and compiled sound effects for a play produced by a Stevenage drama group. The most recent exercise was a session recording the complete Gilbert and Sullivan's *Princess Ida* for the performers, the South Manchester Amateur Operatic Society.

They modestly admit they have not tackled any constructional work as a club, but several members have built their own equipment. Inter-club tape exchanges are being planned, and following a recent agreement they now await a

(Continued on page 37)

THE LOCAL CLUBS

Dave Birtwistle, 11, Pilkington Street, **Blackburn**, Lancashire.

J. Bootle, 34, Racks Parade, **Blackpool**, Lancashire.

Dave Wolstenholme, 73, Darley Street, **Bolton**, Lancashire.

J. H. Graham, 186, Greenmount Lane, **Bolton**, Lancashire.

S. J. Powell, 11, Cressingham Gardens, **Ellesmere Port**, Cheshire.

J. Davies, 36, Thornley Street, **Hyde**, Cheshire.

E. Durkin, 103, Ritson Street, Lodge Lane, **Liverpool**, Lancashire.

K. A. Wilson, 21, Elm Road, **Seaforth**, Liverpool 21, Lancashire.

T. Moorhouse, Grange Villa, 39, Warren Road, **Rhyl**, Flintshire.

D. Woolfenden, 551, Bury Road, **Rochdale**, Lancashire.

Keith Alker, 26, Hayeswater Road, **Urmston**, Lancashire.

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Lancashire and the North-West WORKER'S TAPE-TIME

By
G. A. THEAKSTON

"THE only mill in the country to own its own broadcasting studio"—that's the proud boast of Mr. Anthony John Hoyle, one of the directors of a cotton mill in Radcliffe, Lancashire.

Twenty-two-years-old Mr. Hoyle, a keen audio enthusiast, has every reason to boast. In the course of the last 18 months a disused office on the top floor of the mill has been converted into a fully equipped studio and control room from where programmes of interest to the mill's eighty em-

ployees are sent out every day.

Originally it was decided to equip the mill to receive standard radio programmes, but Mr. Hoyle drew up plans to take the project one step further. He called in Westrex to provide expert advice and equipment and he himself designed the compact 20 ft. by 12 ft. studio and control room.

Now all is fully operational and the studio is "on the air" every week day from 11.0 a.m. until 5.0 p.m., blending BBC programmes with locally produced material.

Most of the home grown programmes are pre-recorded at weekends by a small group of local enthusiasts for transmission during week.

A number of amateur recordists from as far afield as Harrogate in Yorkshire send in tapes they have produced themselves for playback. For instance, a young actor on tour with a Theatre for Youth Company, Adrian Talbot, sends in regular contributions recorded on his Gramdeck.

Record request and disc-jockey items are most popular and, with the help of a Clarion Transitaape, local news items and interviews are included.

The equipment in the studio is a sound enthusiast's dream come true. Inside the control room everything



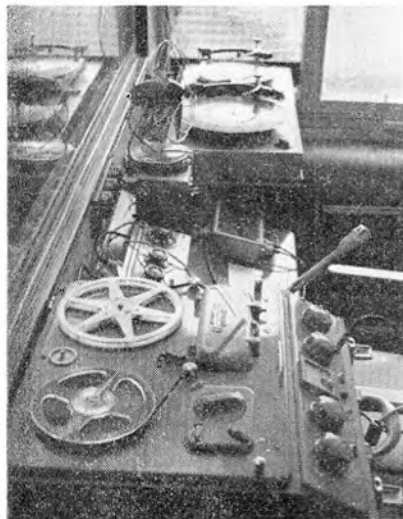
"Johnny and the Jays," a rhythm group from Bury, provide a musical programme for the studio

with the exception of the Ferrograph recorder has been manufactured by Westrex. This includes a five-way mixer, echo unit, twin turn-tables and tuner. A fifty watt amplifier carries the sound to the forty seven-inch loud speakers positioned throughout the mill. A talk back system and cueing arrangements complete the picture.

Inside the cream-painted studio, cut off from the control room by a sound-proof, glass-fronted panel, are five microphones—Acos, Lustraphone and S.T.C. Sockets for monitoring headphones for broadcasters are positioned along the walls.

Mr. Hoyle supervises the running of the day's programmes and gives local producers and personalities full scope. As the station is non-commercial, no one gets paid for their work. Being able to use such equipment is reward enough.

Mr. Hoyle and his co-directors feel the project is money well spent and goes a long way to relieve some of the boredom associated with the more monotonous of jobs in the mill and that, as Mr. Hoyle points out, can not be bad for productivity.



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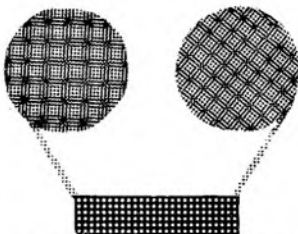
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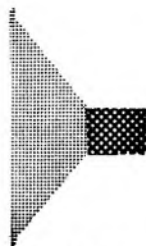
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NEW PRODUCTS



MORE TELEFUNKEN MODELS

THREE additions to their present range are announced by Welmec Corporation Ltd., who handle the Telefunken tape recorders.

The first is a two-track model, Magnetophon 95, (illustrated right), at 59 guineas. Three speeds are incorporated, $1\frac{1}{2}$, $3\frac{1}{2}$ and $7\frac{1}{2}$ ips, and it features an entirely new design deck. The quoted frequency response is 30-18,000 cps at the top speed, with restrictions at 16,000 cps and 9,000 cps, respectively, for the two slower speeds. Wow and flutter figures are given as better than ± 0.15 per cent, ± 0.2 per cent, and ± 0.3 per cent, respectively, and signal-to-noise ratio is rated at better than 40 dB.

Maximum spool size is seven inches, allowing a playing time of four hours per track at $1\frac{1}{2}$ ips using double-play tape.

Inputs are provided for microphone (2 mV at 2 M ohms) and radio/pick-up (2 mV at 50 K ohms). Playback outputs are 1.5 v at 18 K ohms (radio), and 2.5 watts loaded with 4.5 ohms (loudspeaker). Facilities for earphone monitoring are also provided.

Among other features are automatic tape end stop, sensitive braking and tape tension control system, separate controls for recording and playback, tone control, three-digit rev. counter, tape splicing groove, and neon recording level indicator. The 95 also has provision for straight-through amplification, an extension loudspeaker socket, and a 10 x 3 inch oval loudspeaker with cut-out switch.

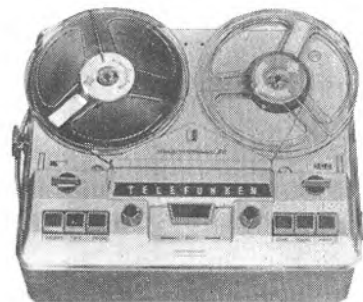
Mains supply is 110/200/220/240 v, AC, 50 cycles, and power consumption is approximately 60 watts. It measures 16 x $11\frac{1}{2}$ x $7\frac{1}{2}$ inches, and weighs 24 lb. Included in the price is a $5\frac{1}{4}$ -inch reel of tape and a spare spool.

Their second new model, Magnetophon 96, is a four-track version of the 95. Additional facilities include double the available playing time, provision for playing back two tracks together, and reproduction of stereo tapes using a stereo amplifier or radio. A pause control and mixing facilities are also included, and provision for monitoring one track whilst recording another is made by means of the Teleset 85 earphone which is available as an extra.

The price of this model is 69 guineas.

The third model is the Magnetophon 97 (bottom right), a four-track stereo recorder incorporating the same three speeds, and with identical frequency response, wow and flutter and signal-to-noise figures.

The seven-inch maximum spool size provides 16 hours monaural or eight hours stereo operation at $1\frac{1}{2}$ ips using double-play tape.



In addition to the features on the other new models, it has a stereo balance control, and two 10 x 3 inch loudspeakers, one in the recorder, another in the lid.

It measures 16 x $11\frac{1}{2}$ x 9 inches, and weighs 29 lb. The price, including $5\frac{1}{4}$ -inch reel of tape, is 95 guineas.

Welmec Corporation Limited, 147/8, Strand, London, W.C.2.

NAME CHANGE

THE name of E.M.I. Sales and Services Ltd. has been changed to E.M.I. TAPE LIMITED. The Emitape Division will now trade under the new name, and all orders and communications should be addressed to E.M.I. Tape Limited, Blyth Road, Hayes, Middlesex.

COSSOR INTRODUCE NEW MODEL

THE third in the Cossor range of tape recorders, the CR1603 is announced. The new model is a single speed four-track recorder selling at 28 guineas, and accommodating a 5½-inch spool.

Maximum playing time per track using double-play tape at 3½ ips, is 91 minutes, and rewind time is given as three minutes for 900 ft. of tape.



The Cossor CR1603

New Emiguide

THE fourth in the Emiguide series of instructional pre-recorded tapes has now been released by E.M.I. Tape Ltd.

Dealing with *Outdoor Recording*, it is full of useful and practical information on this form of recording, and is accompanied by a small instructional booklet. Information is provided on how to fit mains recorders with extension leads to give greater mobility; on the use of battery models; and on microphone technique out of doors.

It is available from dealers, and direct from the manufacturers, price 8s. 6d.

E.M.I. Tape Limited, Hayes, Middx.

THREE MODELS FROM JAPAN

THREE Japanese transistorised tape recorders are now being distributed by Finex (Overseas) Ltd. The first, the Lumier Model LTP-200, has a variable speed system, incorporates four transistors and one thermister, a 3½ x 2½ inch loudspeaker, and operates on a 9 v PP3 battery. It measures 9 x 7½ x 3 inches and weighs 3½ lb. The price is 15 guineas. Their second model, the 26-guinea Comet 400, operates at 3½ ips, and houses a 2½-inch P.M. loudspeaker providing an output of 180 mW. Five transistors are included in the circuitry, and it measures 9 x 5 x 2½ inches. Accessories include a crystal microphone, leather carrying case, and crystal earphone.

The Comet 600, 29 guineas, has a similar specification to the 400 with the exception of an additional tape speed of 1½ ips.

Finex (Overseas) Limited, 7, West End Lane, Kilburn Bridge, London, N.W.6.

Quoted frequency response is 80-13,000 cps and the signal-to-noise ratio is given as better than -36dB. Housed in a two-tone green polystyrene cabinet it measures 12 x 10½ x 6 inches, and weighs 11 lb.

Among features are inputs for microphone (0.4mV 1.5K ohms 3-pole DIN); pick-up (100mV 680K ohms IEC); and radio (diode: 2mV 20K ohms 5-pole DIN); and output sockets for extension loudspeaker (3-7 ohms) and radio (diode—approx. 1.5V 20K ohms). A moving coil meter indicates the recording level which can be adjusted while the tape is stationary. Also incorporated is a transistor amplifier on a printed wiring panel.

A four-inch high efficiency loudspeaker is fitted, providing an output of one watt.

Voltage ranges are 110, 127, 200-250 volts AC 50 cycles (easily adaptable for 60 cycles), and the power consumption is rated at approx. 25 watts.

Cossor Radio & Television Limited, 71, Endell Street, London, W.C.2.

Argyll increase range

TWO new recorders have been announced by Fidelity Radio. They are the Argyll Major and Major-4, two and four-track models respectively.

A BSR Monardeck is incorporated providing a single playing speed of 3½ ips, and a maximum spool size of 5½ inches. This allows a total playing time of 91 minutes per track using double-play tape. Rewind time is stated to be three minutes for 850 feet of tape.

Features include an 8 x 3 inch elliptical loudspeaker, magic eye recording level indicator, automatic locking device to prevent accidental erasure and playback tone control. Inputs are fitted for microphone and radio/pick-up, and a socket is also available for an extension speaker (3-5 ohms).

The price complete with crystal microphone, tape and spare lead is £29 8s.

Quoted frequency response is 60-8,000 cps, with signal-to-noise ratio given as 50dB down, and wow and flutter rated as better than 0.4 per cent.

The second model is a four-track version of the Major. With an additional amplifier it can be used for stereo reproduction. The price is £30 19s. 6d.

Fidelity Radio Limited, 11-13, Blechyn-den Street, London, W.11.

Address changes

LEE PRODUCTS (Great Britain) Limited, the electronic manufacturers and distributors of the Elpico range of tape recorders and Dulci amplifiers and loudspeakers, announce a move from the offices in Longford Street, N.W.1.

Their new offices are situated at 10-18, Clifton Street, London, E.C.2. The telephone number is now Bishopsgate 6711.

Pamphonic Reproducers Limited have also announced a recent move from their former offices at 17, Stratton Street, W.1. They are now situated at Westmoreland Road, Colindale, London, N.W.9. (Colindale 7131.)

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TAPE IN THE SCHOOL

TEACHERS RUN RADIO SOHO

WHEN Radio Soho goes on the air at noon on Monday, April 30, it will be manned by London teachers. Perhaps anticipating the Pilkington Committee's recommendations on local broadcasting, Radio Soho will find its news and inspiration in the locality it serves.

But like the many local broadcasting experiments being conducted by the BBC at the present time, Radio Soho will be transmitted on closed circuit only.

The programmes on Radio Soho—some live, some pre-recorded—will be the culminating exercises of a seven-day tape recording course organised for LCC teachers. A group of teachers experienced in tape recording will have the opportunity to take charge of programmes.

The less experienced will have a day and a half of instruction and practice in the basic techniques of tape recording before joining their colleagues as producers, actors, technicians, interviewers and announcers in the programme exercises. The staff will include Graham Jones and John Weston.

Frank Gillard, Controller Western Region of the BBC, who is in charge of the BBC experiments, will open the Soho course by talking about local broadcasting and playing recorded examples.

Opening the first eleven-day course for prospective BBC Station Managers at Poole on January 22 he said: "It is not too early to begin training key men."

If the BBC is given the job of establishing local broadcasting stations, it will be ready to go ahead immediately. For the future, the Corporation is thinking in terms of 80 to 100 local stations, with a total staff of over 1,000.

EDITED BY GEOFFREY HODSON

A NATIONAL network of schools' tape recording contests each year leading to the British Amateur Tape Recording Contest—that could be the pattern of events in 1963. At least that was a mental picture I had when I recently received a news item from Aberdeen.

Enthusiasm for tape recording in Aberdeen schools has grown up fast. Now the energetic Superintendent of Speech, Catherine Hollingworth, announces their first tape recording contest, closing date May 3.

It is being organised in five sections to cover the whole gamut of school life—5-18.

Each tape has to represent the work of an entire class with all participating. Secondary schools are to send in tapes lasting 20-30 minutes, and the Primaries 15-20 minutes.

A compere or announcer and a signature tune are suggested for all tapes, but otherwise a free choice of content is allowed. A very helpful list of suggestions has been sent to all Aberdeen schools, and evaluations will be given on each tape entered in the competition.

Certificates will be awarded to the winning entries in each grade, and BBC production staff in Aberdeen have agreed to assist with this project.

It is perhaps a little late for this year, but in 1963 it should be possible to have several of these local competitions running. Aberdeen has set the lead. London has plans in hand. There is strong evidence that Kent, Yorkshire, Hampshire and parts of the Midlands have many schools doing good tape recording work.

If each area organised its own competition, ideas could be exchanged very quickly and overall standards are bound to rise. I am not suggesting that only the winners of the various local competitions are entered for the National Contest. But the local competitions would provide a good stamping ground.

Northern Tape Course

ALTHOUGH there will be no National Tape Recording Course this Easter at the Rose Bruford Training College in Sidcup, Kent, there will be a similar course in Manchester—the North of England Tape Recording Course. This is being organised by Manchester University from Friday, April 13 to Thursday, April 19.

The Course will be non-residential with student-accommodation available. The daily hours will be approximately 9.45 to 5 p.m. Tutors will include practising teachers, and BBC North of England staff including Alfred Bradley and Geoffrey Wheeler.

Full details from the Organising Tutor, W. G. A. Rudd, School of Education, The University, Manchester 13 (Ardwick 3333, Ext. 350).

WEEK-END COURSES

Short week-end courses announced include: Williton Secondary School, Taunton, Somerset (March 10); Bristol University (May 18-19); and Winchester, Hampshire (May 26).

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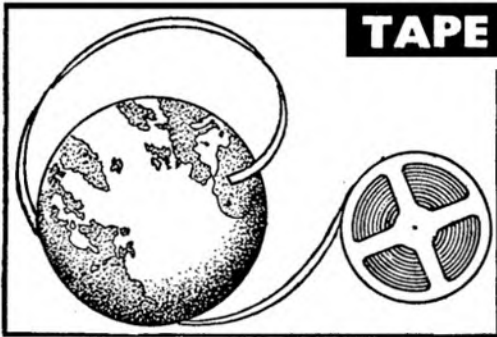
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TAPE EXCHANGES



Tape goes round the world! There is no comparable means—except costly travel—to form friendships with men and women in other countries and continents. Every month, in this feature, we list enthusiasts who are seeking tape contacts.

local government, 7½, 3½, 1½ ips, 8½-inch spools. Ferrograph, Stuzzi Magnette. Europe, New Zealand.

FAMILY EXCHANGES

Chopping, P. F. (32) and wife. 141, Malyns Road, Lewisham, London, S.E.13. Music, 35mm photography, railways. 1½ ips, 3-inch spools. Philips. Canada, U.S.A., New Zealand.

Crew, Eric, W. 26, St. David's Drive, Broxbourne, Hertfordshire. 7½, 3½, 1½ ips, Family exchanges with Eire desired.

Flinders, Jean (Mrs). 25, St. Thomas Street, Bolton, Lancashire. Home and family. 15, 7½, 3½ ips, 8½-inch spools. Brenell Mk. V. Housewives anywhere.

Fricker, E. C. (38). The Lodge, Knoll House, Corfe Mullen, Near Winbourne, Dorset. 3½ ips, 5-inch spools, Philips EL3527. Family contacts anywhere.

Jenkins, Keith, F. J. (34) and wife (29). 12, Withleigh Road, Knowle, Bristol 4. Photography, piano, current affairs, short-wave radio, classical and some "pop" music. 7½, 3½, 1½ ips, 7-inch spools. Repts R10. Wish to contact individuals and families in Europe, Scandinavia, and families in U.K., U.S.A. and New Zealand.

TEENAGE EXCHANGES

Alper, Harvey, Martin (15). 4435, King's Highway, Brooklyn 34, New York, U.S.A. World politics and history. Commonwealth subjects. 7½, 3½, 1½ ips, U.K., same age, male or female.

Bassett, Leslie (17). 56, Southroyd Park, Pudsey, Yorkshire. Photography, all music. 3½ ips, 7-inch spools.

Devitt, D. A. (15). Flat 1, Redlynch Court, 70, Addison Road, London, W.14, or Waye's Radley College, Abingdon, Berkshire, in term time. Psychology, parapsychology, hypnosis, philosophy, gymnastics. 3½ ips, 3-inch spools. Grundig TK1.

Ellis, Terry (16). 30, Corporation Road, Peverill, Plymouth, Devon. Records, motoring, television. 3½ ips, 5½-inch spools, Sobell.

Estlick, Raymond (16). 22, Laburnum Road, Fareham, Hampshire. "Pop" music, general interests. 7½, 3½, 1½ ips, 7-inch spools. Philips 2-track.

Evans, D. R. (15). 10, Brookvale Road, West Cross, Swansea, Glamorgan. Cine photography. 3½ ips, 7-inch spools. Philips EL3541 (4-track stereo replay). Wishes to contact youths (15-17) in U.K.

Haselwood, Michael, J. (19). 4, Brookside Close, Dunchurch Road, Rugby, Warwickshire. Skindiving, motoring, "pop" music. 3½ ips, 5-inch spools. Philips, Stella. Beverley Hills area, California, U.S.A.

Lamplough, Clifford (16). 29, Ferndale Crescent, Cowley, Uxbridge, Middlesex. Sound effects, aero modelling. 3½ ips, 5½-inch spools, Westminster. Particularly Channel Islands.

Lindsey, Robin (16). 110, Cock Bank, Whittlesey, Peterborough. Aquaria, radio. 3½ ips, 4-track, 5½-inch spools. U.S.A., Germany, U.K.

Parkins, Michael Leonard (17). 74, Crookston Road, Eltham Park, London, S.E.9. Trad jazz, cars, show and piano music. 7½, 3½, 1½ ips, 7-inch spools. Brenell, Canada preferred.

Aitchison, T. (43). 58, Longhouse Road, Mixenden, Halifax, Yorkshire. Motoring, photography. 3½ ips, 5½-inch spools. Grundig TK14.

Argent, G. W. (39). 74, Woodlands Road, East Grimstead, Sussex. Cinema and cinema organs. 7½, 3½ ips, 8½-inch spools. Ferrograph 4A/N. U.K., New York and San Francisco.

Armstrong, Stan N. (32). 282, Station Road, Kings Heath, Birmingham 14. Folk music, all jazz, country and western. 7½, 3½ ips, 8½-inch spools. Ferrograph 4A/N.

Bagley, Thomas (41). 16, Hallam Road, Holbrooks, Coventry, Warwickshire. Books, travel, music, general. 7½, 3½, 1½ ips, 7-inch spools. Philips.

Barrington, Ron (46). 9, Pickford Hill, Harpenden, Herts. Motoring, hi-fi, Latin American, modern jazz, instrumentals and vocals. 7½, 3½ ips, 7-inch spools. Collaro Studio and hi-fi unit, Spectone 161.

Bass, Sam (31). 98, Orme Road, Newcastle, Staffs. Ukelele, Lanza-Formby-Jolson shows. 7½, 3½, 1½ ips, 7-inch spools. Philips, Grundig, Elizabethan, 2- and 4-track.

Bateman, L. (Male 24). Royal Air Force, Coningsby, Lincolnshire. Cars, music, philately. All speeds, 7-inch spools. Grundig. Female contacts preferred.

Batter Brian C. (31). 59, Castlehaven Road, London, N.W.1. Sports, good music, people. 3½ ips, 5½-inch spools. Grundig TK24.

Burr, Peter, N. (22). 205, High Street, Elstow, Bedfordshire. Youth club organisation, stereo, photography. 7½, 3½ ips, 8½-inch spools. Ferrograph stereo 422. U.K., Continental, U.S.A.

Bush, Bob (20). 222 Squadron, RAF Woodhall Spa, Lincolnshire. Stereo, electronic music, travel, photography. 7½, 3½ ips, 8½-inch spools. Reflectograph 570 stereo 2-track.

Carter, B. (27). 13, Greenfields, Upton, Chester, Cheshire. Fishing, jazz records, 7½, 3½ ips, 3-inch spools. Stellaphone. Overseas contacts required.

Carey, Brian, G. (33). 5, Montague Road, Hanwell, London, W.7. Opera. 3½, 1½, 15/16 ips, 5½-inch spools. Stuzzi Tricorder.

Collier, Richard (30). 44, Crondace Road, Fulham, London, S.W.6. All music, humour, general interests. 3½, 1½ ips, 5½-inch spools. Telefunken 76K, 4-track, U.S.A. Female contacts preferred.

Cooper, Barrie, G. 27, Hollybank Crescent, Sheffield 12, Yorkshire. Outdoor recording, instrumental "pops," jazz, electronics. 7½, 3½, 1½ ips, 7-inch spools, Collaro Studio deck and home-built amplifier, Stuzzi Magnette. Letters not needed.

Cronin, Ben (20). 6, Norfolk Terrace, Brighton, Sussex. Fire-fighting, motorcycling, reading, general interests. 3½ ips, 5½-inch spools. Peto Scott 4-track. South-East England, females, same age, preferred.

Dengate, Ronald (32). 77, Marine Parade, Tankerton, Kent. 8mm cine, 35mm colour photography. 7½, 3½, 1½ ips, 7-inch spools, Robuk RK3.

Eden, Jonathan (22). 25, Alpha Road, Cambridge. Electronic music, foreign radio plays. 3½ ips, 5½-inch spools. Grundig TK24. Speaks Spanish, German and French.

Guiney, Robert (30). 23, Englis Avenue, Port Seaton, East Lothian, Scotland. Jazz, rock 'n' roll, modern dancing. 3½ ips, 5-inch spools. Stellaphone 451. Female contacts desired.

Hannah, A. A. (50). 17, Blundell Street, Blackpool, Lancashire. 8mm slides, woodwork, decorating. 7½, 3½, 1½ ips, 2-track, 7-inch spools. Elizabethan Major, Truvox, Philips. Overseas only.

Holland, John, A. (42). 18, Fitzjohns Road, Lewes, Sussex. Pipe and electronic organ, 3½ ips, 7-inch spools. Stellaphone.

Hunt, Alan, R. (35). "Winton," Palmers Road, Wootton, Ryde, Isle of Wight. Photography, ships, general topics. 3½ ips, 7-inch spools. Grundig TK1. No need to write first.

Iredale, John Derek (34). 9, Ingfield Avenue, Dalton, Yorkshire. Motoring, reading, travel. 7½, 3½, 1½ ips, 8½-inch spools. Ferrograph Series 4, Telefunken 76K 4-track, Travler battery recorder, Commonwealth, Continent and U.K.

Jones, Elizabeth (Miss). 1, Earley Hill Road, Reading, Berkshire. Folk and show music, travel. 3½ ips, 5½-inch spools, R.G.D. 104. Malta, Norway, U.S.A., France, China, Lebanon.

King, Derek, A. (31). 42, Banyard Road, London, S.E.16. 8mm cine, printing, theatre, cinema, pipe bands, light classical, show music. 7½, 3½ ips, 8½-inch spools. Grundig Cub, Grundig TK5, Ferrograph.

Leah, Eric (39). Ty-Rhos, Nevern, Near Newport, Pembrokeshire. Oriental philosophy, the land, classical and light music. 3½ ips, 4-track, 7-inch spools.

Leslie, Tony (34). 24, Mount Street, Levenshulme, Manchester 19. West Coast modern jazz, modern humour. 7½, 3½ ips. U.S. contacts preferred.

Matthews, Eric (34). 16, High Fords, Icklesham, Winchelsea, Sussex. Jehovah's Witness. 3½ ips, 3-inch spools. Corsor 4-track.

Moore, Gerald (28). Yew Tree Cottage, Cockleford, Cheltenham, Gloucestershire. Bible, history, archaeology. 3½ ips, 5½-inch spools. Grundig TK14.

Mostyn, Douglas Robins (33). "St. Crispin," 28, Fellows Avenue, Dawley Brook, Kingswinford, Staffordshire. 8mm cine, photography, chess, brass band music. 7½, 3½, 1½ ips, 8½-inch spools. Grundig TK35, Ferrograph 4A/N. No need for letters.

Runton, Kenneth (27). 154, Raffles Avenue, Carlisle, Cumberland. Photography, most music, books. 3½ ips, 7-inch spools. Philips EL3541, 4-track.

Schofield, Jack (51). Room 1, 201, Camden Road, London, N.W.1. Philately, records, hi-fi. 3½ ips, 7-inch spools.

Storzini, Claudio (25). Via P. de Bianchi 15, Milano, Italy. Theatre, languages, "pop" music. 3½ ips, 5½-inch spools. English or Italian female contacts in U.K. wanted.

Shakesby, Mary, E. (Miss) (22). 13, Schofield Road, Loughborough, Leicestershire. Languages, all music, photography. 3½ ips, 7-inch spools. Philips EL3541, 4-track. Germany, Holland, Portugal, U.K.

Soman, Maurice (34). 8, Cranley Mews, London, S.W.7. Motor sport, music, photography, philately. 7½, 3½, 1½ ips, 7-inch spools. Grundig TK35, Stuzzi, Near or Far East, females preferred.

Stevenson, Richard (37). 45, Whitehall Road, Crayford, Kent. 8mm cine, cinema, all music. 3½ ips, 5½-inch spools. Fidelity Argyll. Particularly America.

Tomlinson, W. J. (Male 49). 62, Beacontree Avenue, London, E.17. Audio in general, motoring. 3½ ips, 5½-inch spools, prefer 3-inch. Grundig TK14. Commonwealth and areas of Scotland and Ireland.

Watson, R. C. (Male 50). 32, Southgate Drive, Crawley, Sussex. Politics, writing, organisation, music. 15, 7½, 3½, 1½ ips, 8½-inch spools. Elizabethan Major, Philips EL3585.

Watts, John (27). 6, Osbour House, St. Mary's Terrace, London, W.2. Colour photography, cars, travelling, electronics. 7½, 3½ ips, 7-inch spools. Royale Tutor, West Germany, Italy, Malaya (English speaking only).

Wilkinson, Peter (20). 36, Heathwaite Crescent, West Derby, Liverpool 11. Unusual sounds, "pop," country and western music, general interests. 15, 7½, 3½ ips, 7-inch spools, Scotland, female contacts desired.

Wright, Norman, J. (50). The Bungalow, Landdulas, Abergele, Denbighshire. Youth work,

Tape recorder owners wishing to make contact with others of similar interests are invited to complete and return this form.

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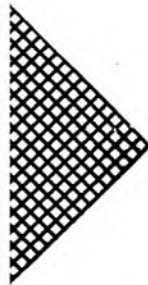
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News from the Clubs

EDITED BY FRED CHANDLER

BATH

A change of address for the secretary and a different venue is announced by the Bath club members. The new address of Mr. K. W. J. Gingell is "Fistral," 45, Fairfield Avenue, Fairfield Park, and the members now hold meetings every Wednesday at 24, Green Park. Much work has gone into making the new headquarters operational. Their new room has been partially redecorated and sound-proofed, and completely re-wired.

Great success is claimed for the message scheme organised for the Somerset and Cornwall Light Infantry serving in Tobruk. Already twelve tapes have made the 3,000-mile journey arranged by the Company C.O., Major C. D. Frith, himself a keen tape enthusiast. He records the messages on his machine and sends the tapes complete with instructions for delivery back to this country for despatch to clubs situated near the soldiers' families.

GLASGOW

A change of meeting place is announced by the Glasgow club members. For their first meeting in the New Year they moved to the Highlands Institute, Berkeley Street, Glasgow, C.3, and will be holding meetings there until further notice fortnightly on alternate Tuesdays and Thursdays.

Several groups were out recording during the seasonal revels in George Square collecting effects for a proposed programme, and also recording interviews with visitors to the Kelvin Hall Carnival.

HUDDERSFIELD

The members of this club are co-operating with the Huddersfield Hospitals' Broadcasting Association to compile programmes for the local hospitals. To date they have achieved recordings of the Fenton Ladies' Choir, and a local choir, providing enough material to produce two 15-minute broadcasts, and have also obtained permission to record the Black Dyke Mills Band, and the Colne Valley Male Choir.

Other activities have included recording interviews carried out by the H.B.H.A. with popular singers Billy Fury, Eden Kane, Johnny Leyton, and the Allison. An interview with Cliff Richard was proposed for January.

Further hospital services are being provided for patients along the usual lines of passing messages to and from relatives. The lecture meetings at the Public Library continue, with good attendances being recorded to date.

NORTHAMPTON

A special "at home" was arranged by the Northampton members on January 9. The occasion was the opening of the new headquarters at the Peacock Room, Grand Hotel, Gold Street. Almost 180 persons attended from all parts of the Midlands, including representatives of the Bedford, Coventry, Nottingham and Rugby clubs.

The programme included a stereo demonstration on tape and disc, raffles, and a quiz. An old *March of Time* series film entitled *Disc Review* provided a contrast to hi-fi stereo.

The evening concluded with two local bands playing a selection of music giving the visitors and members a chance to show their prowess with their recorders. The Nottingham members were non-starters, having failed to pack a microphone, and frantic efforts to equip their tape recorder failed.

NORTH LONDON

Ambitious plans necessitating a change-over from fortnightly to weekly meetings were announced by chairman Don Hughes at the December AGM of this club. The full programme for the year will include five meetings devoted to assembling an electronic mixer and practice in using it, and following this, further equipment construction sessions.

Regular competitions carrying an annual "Tape of the Year" trophy, a quarterly newsletter for circulation to other clubs, brains trusts and debates would also be included.

Referring back to the previous activities, the re-elected secretary Richard Collinson praised the entries for competitions held within the club. He listed a number of their exercises, including recording sound effects for a soldier in Belgium, compiling a programme about the Enfield Show for local blind people, and recording hymns and Christmas carols for a hospital service. Meetings subjects varied from impedance matching and recorder maintenance, to dubbing and mixing.

Following a recent visit to a meeting by Messrs. Teletape, the members paid a return visit to the Marble Arch dealers. Mr. G. N. Tughan and Service Manager Mr. W. Thomas demonstrated a number of machines, played a variety of their stock of tape records, and presented the members with ample refreshments.

SOUTH BIRMINGHAM

A change of venue also for the members of the South Birmingham club. They moved into new club-rooms at the beginning of the year and now meet on alternate Mondays at The People's Hall, Oak Tree Lane, Selly Oak, Birmingham 29.

WALTHAMSTOW

*Little Jack Horner sat in a corner
Travelling to Walthamstow,
When he got there his tape was quite bare,
He'd forgotten the train's dynamo.*

This little poem was attached to this society's January newsletter as a warning to tape enthusiasts to "Beware of the electric trains." Commenting ruefully on his personal experience, secretary Ken Perks said: "If the tape is not shielded by household tin-foil or similar material, there is a chance that a stray magnetic field may affect the recording." His warning received publicity in the local newspapers.

Experiences swapped at a later meeting all had a common factor—the ruined tapes had either been transported or carried on the person of somebody travelling on the recently electrified local line. Experiments since carried out by the members have confirmed the suspicions, and it has been found the worst position is just above the motors.

Apart from this set-back, and now careful guarding every tape produced, the members' arrangements for the running commentary on the Whitsun Carnival procession are well in hand.

A great deal of work and time is devoted to helping the patients at Connaught Hospital. In the New Year, the members recorded special greetings from Lonnie Donegan, a one-time resident of the Borough, and the Mayor of Walthamstow. These messages, recorded in the Mayor's Parlour, and in Lonnie's dressing-room at the Birmingham Hippodrome, where he appeared in *Cinderella*, were included in an extra long special edition of the regular fortnightly request programmes for the patients.

Announcers Tony Norton and Graham Ford introduced the programme with a recording made just before Christmas of a carol service practice session in St. Saviour's Church.

WEST HERTS

Among the latest meetings of this society was an amusing evening spent experimenting with microphones. A throat microphone received most of the attention being strapped round a glass full of water containing a floating balloon, which was later burst to produce a "beautiful bubbling of liquid" sound. Breaking glass in a polythene bag containing a crystal microphone, and later, strapping the microphone to a slat of wood into which nails were driven, were other of their experiments.

A fortnight later at Watford on December 20, Jack Hill had arranged an editing exercise. The purpose was to re-assemble a jumbled-up "well-known

phrase or saying"—an easy task compared to re-arranging commercials into their correct sequence, one of their earlier exercises.

Newest and youngest member, Martin Baker, finished his tape first with only two errors to collect the prize. The evening saw the largest array of tape recorders, and provided an opportunity to inspect the Elizabethan Major.

Their January 3 meeting included more puzzles, this time requiring members to compile six sounds to baffle the judges. At Watford on January 10, Mr. Varrell of Simon Equipment Ltd. paid a return visit to demonstrate the Simon equipment, and on January 24 members gathered to start work for the British Amateur Tape Recording Contest.

Other of their activities have included a visit to the Watford Cine Society by John Grainger, who spoke about tape recording and played some of the tapes produced by the club during the past year. Peter Holloway, Colin and Michael Coates, and Dennis Hill were at a meeting of the R.A.F.A. at Watford a week later for the same reason.

LANCASHIRE CLUBS

(Continued from page 30)

tape from the members of the Walsall club.

Brenell and Ferrograph recorders are among the most popular models, and the Grampian DP/4 microphone can be seen in most of their homes. These latter items are of most importance for the club's battery portables, which are both Fi-Cords.

* * *

The establishment of regular meeting rooms was also an initial problem for the members of the Rhyl club first formed in February 1961 with eight members. The problem has long been solved, and they now meet fortnightly at Studio A in Bedford Street.

Twenty "full-paid-up" members are boasted, but average attendance around the dozen mark is admitted.

The committee headed by secretary Tom Moorhouse, try hard, and successfully, to make their meetings interesting and instructional. Among their most recent endeavours have been lectures on

how a tape recorder works, and on such specialised subjects as splicing, editing, and dubbing. Care of machines, talks on electronics, hi-fi, mixers, microphones, and similar ancillary equipment, plus tape/slide shows and a practical demonstration of the use of FM tuners have also featured.

The highlight of most club meetings is location recordings. To date they have collected a library of tapes which include organ recitals at local churches, choral music, plays, the local fire-station in action, and a stereophonic recording of the pantomime *Goody Two-Shoes*. Their activities in this direction have multiplied since the introduction of battery portables among members.

The secretary welcomes tape contacts with other clubs in an attempt to widen their technical and general know-how, and to exchange news and opinions.

Nearly every type of recorder, including two- and four-track, mono and stereo, and of course battery portables, are represented at the club. They have one grievance—the delay in seeing the day when magnetic tape drops in price.

ABERDARE: Alternate Wednesdays at Cwmanan Institute, Cwmanan, (Feb. 21.)

ABERDEEN: 1st Tuesday in every month at 8 Deer Road, Woodside.

ACTON: Alternate Fridays at the King's Head, Acton High Street, (March 2.)

AYLESBURY: Monthly at Hazell's Club, Britannia Street, (March 15.)

BARNESLEY: Every Tuesday at YMCA, Eldon Street.

BATH: Every Wednesday at 24, Green Park.

BATH (2): Alternate Wednesdays at 41, Herbert Road, O'field Park, (Feb. 21.)

BEDFORD: Final Tuesday in month at 131, London Road.

BELFAST: Every Thursday at 44, Dublin Road, Belfast 2.

BETHNAL GREEN: Every Friday at Shoreditch Tabernacle, Hackney Road, E.2.

BIRMINGHAM: Every Monday at the Chapel Tavern, Ludgate Hill.

BIRMINGHAM (SOUTH): Alternate Mondays at The People's Hall, Oak Tree Lane, Selly Oak, Birmingham 29, (Feb. 26.)

BLACKBURN: 1st and 3rd Tuesdays at Blackburn YMCA.

BLACKPOOL: Alternate Wednesdays at the Albert Hotel, Lytham Road, (Feb. 28.)

BOURNEMOUTH: Alternate Tuesdays at the Queen's Hotel, Queen's Road, Bournemouth West, (March 6.)

BRIDGWATER: Every Tuesday at Evis' Radio Shop, West Street.

BRIGHTON: Every Wednesday at The Brunswick Arms, 38, Ditchling Road.

BRISTOL: Alternate Wednesdays at 6, Royal York Crescent, Clifton, (Feb. 21.)

BRIXTON: Every Tuesday at The White Horse, 94, Brixton Hill, S.W.2.

BROMLEY: 2nd and 4th Thursdays at St. Mary's Church Hall, College Road.

CAMBRIDGE: Every Wednesday at the Mitre Hotel, Bridge Street.

CARDIFF: 1st and 3rd Tuesdays at 46, Caroline Street.

CATFORD: Every Thursday at the Black Horse, Rushey Green, Catford, S.E.6.

CHESTERFIELD: Every 3rd Monday at the Yellow Lion Inn, Saltergate, (March 12.)

CLACTON: Every Monday at Ebor Lodge Hotel.

COTSWOLD: Fortnightly, alternating Monday and Thursday at Bayshill Hall, Royal Well Lane, Cheltenham, (Feb. 22.)

COVENTRY: Alternate Wednesdays at Holy-Park Hotel, (Feb. 28.)

COVENTRY (audio and cine): Alternate Tuesdays at the Liberal Club, Union Street, (Feb. 27.)

CRAWLEY: 1st and 3rd Mondays at Southgate Community Hut.

DARTFORD: Every Thursday at 41, Winsor Drive.

DERBY: Alternate Wednesdays at Osmaston Park Hotel, (Feb. 28.)

DONCASTER: Alternate Thursdays at Lancaster House, Westlith Gate, (March 1.)

DOVER: Alternate Mondays at the Priory Hotel, Dover, (Feb. 19.)

DUBLIN: 1st Monday at "Hardy House," 6, Capel Street.

DUNDEE: Alternate Mondays at The Salvation Army Hostel, 31, Ward Road, (Feb. 26.)

CLUB MEETING DIARY

EASTBOURNE: Alternate Saturdays at Hartington Hall, Bolton Road, (March 3.)

EAST HERTS: Alternate Mondays at 3, Chadwell, Ware, (Feb. 26.)

EDINBURGH: 1st and 3rd Fridays at 22, Forth Street, Edinburgh 1.

FRIERN BARNET: 2nd Friday at 7, Harmsworth Way, N.20, and 4th Thursday at 146, Friern Barnet Lane, N.20.

GLASGOW: Fortnightly, alternating Tuesday and Thursday at the Highlands Institute, Berkeley Street, Glasgow, (March 2.)

GRIMSBY: 1st Monday at 21, Langton Drive, Nunthorpe, Grimsby.

HARROGATE: Every Wednesday at 4, Belford Road.

HARROW: 1st and 3rd Thursdays at St. George's Hall, Pinner View, North Harrow.

HASTINGS: Every Tuesday at the Citizens' Advice Bureau, Cambridge Gardens.

HINCKLEY: Alternate Wednesdays at The Wharf Inn, Coventry Road, (Feb. 28.)

HOVE: Every Thursday at 44, Hogarth Road, Hove.

HUDDERSFIELD: 1st and 3rd Wednesday and last Monday at the Public Library, Ramsden Street.

HULL: Alternate Tuesdays at 281, Hessle Road, (Feb. 27.)

ILFORD: Every Tuesday at the RAFA Rooms, Cranbrook Road.

IPSWICH: Alternate Thursdays at the Art Gallery, High Street, (March 1.)

JARROW: Alternate Mondays at Jarrow Central School, (Feb. 26.)

JERSEY: 1st and 3rd Mondays at "Santa Barbaba" Maufant, St. Saviour.

KEIGHLEY: Alternate Wednesdays at the Spencer Street School Rooms, (Feb. 21.)

KETTERING: 2nd and 4th Wednesdays at the Rising Sun, Silver Street.

KIDDERMINSTER: Alternate Wednesdays at the Town Hall, (Feb. 28.)

LEEDS: Alternate Fridays at 21, Wade Lane, Leeds 1, (March 2.)

LEICESTER: Alternate Thursdays at the Leicester Museum, (Feb. 22.)

LEYTONSTONE: Alternate Wednesdays at Harrow Green Library, London, E.11, (Feb. 21.)

LONDON: 2nd Thursday at the Marquis of Granby, Chandos Place, Charing Cross, W.C.2.

LUTON: 2nd and 4th Tuesdays at Flowers Recreation Club, Park Street West, Luton.

MAIDSTONE: Every Wednesday at the Ex-Services Club, King Street.

MANCHESTER: Every Saturday, 6 p.m., at 20, Naylor Street, Hulme, Manchester 15.

MEDWAY: Every Monday at 23, Edward's Close, Wigmore, Gillingham.

MIDDLESBROUGH: Every Wednesday and Friday at 130, Newport Road.

MILLOM: Every Wednesday at Millom Centre.

NORTH LONDON: Every Wednesday at Bush Hill Park School, Main Avenue, Enfield.

NORTHAMPTON: Every Tuesday at the Peacock Room, Grand Hotel.

NOTTINGHAM: Alternate Thursdays at the Co-operative Educational Centre, Heathcote Street, (Feb. 22.)

NORWICH: 4th Tuesday at "Lady Chamberlin Hall," 38a, St. Giles' Street.

PETERBOROUGH: Alternate Thursdays at The Youth Centre.

PONTYPOOL: Every Monday at the Hospitality Inn, Crumlin Road.

PLYMOUTH: Alternate Wednesdays at Virginia House, Plymouth, (Feb. 21.)

READING: Every Monday at Abbey Gateway.

REDDITCH: 4th Thursday at The White Hart Hotel, Headless Cross.

RHYL: Alternate Tuesdays at Studio A, Bedford Street, (Feb. 27.)

ROTHERHAM: Alternate Thursdays at St. John's Church Hall, Masbro', (Feb. 22.)

RUGBY: Alternate Thursdays at the Red Lion, Sheep Street, (Feb. 22.)

SHEERNESS: Alternate Fridays at Arthur Gisby's, 136, High Street, (March 2.)

SOUTHALL: Every Monday at Southall Community Centre.

SOUTHAMPTON: Alternate Thursdays at Southampton University, (Feb. 22.)

SOUTH DEVON: Alternate Wednesdays at the YMCA, Castle Circus, Torquay, (Feb. 28.)

SOUTH-WEST LONDON: Every Wednesday at Mayfield School, West Hill, S.W.15.

STAFFORD: Alternate Tuesdays at The Grapes, Bridge Street, (March 6.)

STEVENAGE: 1st and 3rd Tuesdays at the Tenants' Meeting Room, Marymead.

STOCKPORT: 1st Friday at the Unity Hall, Greek Street.

STOKE NEWINGTON: Every Wednesday at 53, Londesborough Road, N.16.

SWANSEA: Every Thursday at the YMCA Buildings, St. Helen's Road.

URMSTON: Alternate Thursdays at Davyhulme Scout Hut, Barton Road, (March 1.)

WALSALL: Every Wednesday at the New Inn, John Street.

WALTHAMSTOW: Alternate Fridays at 22, Orford Road, E.17, (March 2.)

WARWICK & LEAMINGTON: 1st and 3rd Wednesdays in Room 18 of the Royal Leamington Spa, Town Hall.

WEST HERTS: Fortnightly alternating at the Cookery Nook, High Street, Watford (March 7) and Heath Park Hotel, Hemel Hempstead, (Feb. 21.)

WEST MIDDLESEX: 2nd and 4th Thursdays at Dormers Wells Primary School, Dormers Wells Lane, Southall.

WEST WALES: 1st and 3rd Fridays at The Meeting House, New Street, Aberystwyth.

WEYMOUTH: Alternate Wednesdays at The Waverley Hotel, Abbotsbury Road, (Feb. 21.)

WHITSTABLE: Alternate Mondays at The Granary, 1, Borstal Hill, (Feb. 26.)

WINCHESTER: Every Friday at 45a, St. Swithen's Street.

WINDSOR: Every Thursday at The Guildhall.

WOOLWICH: Alternate Mondays at the North Kent Tavern, Spray Street, Woolwich, (Feb. 26.)

YORK: Every Thursday at 62, Micklegate.

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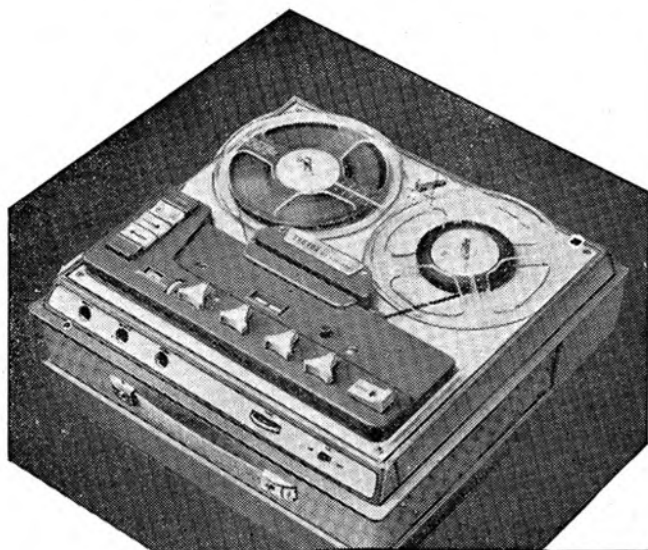


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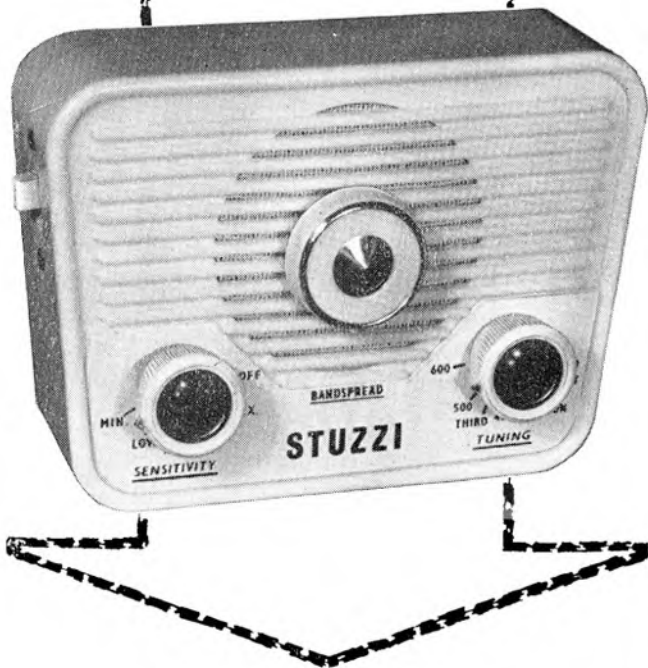
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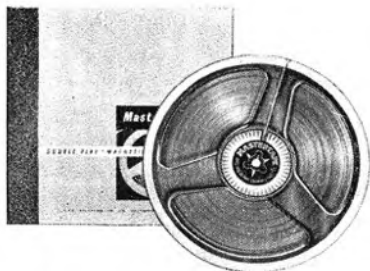
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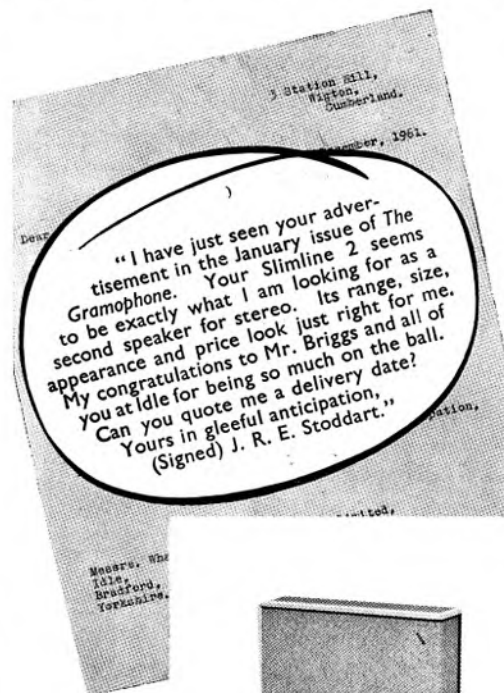
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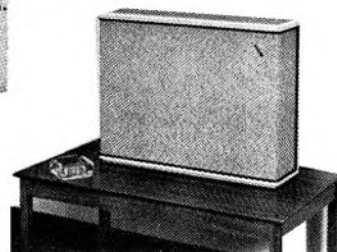
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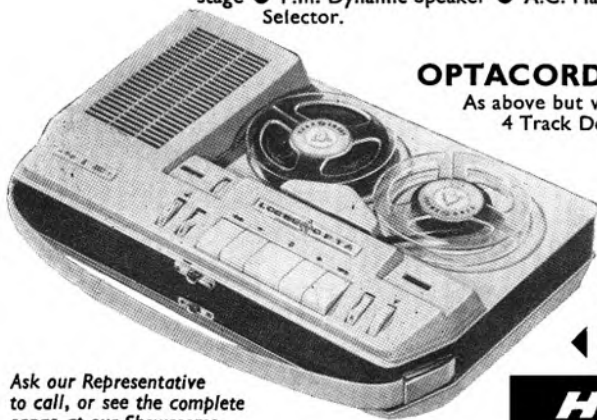
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