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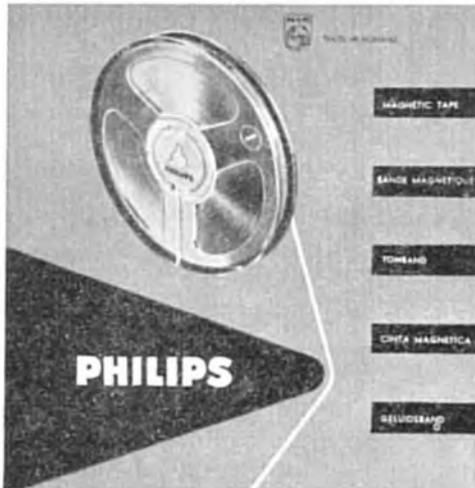
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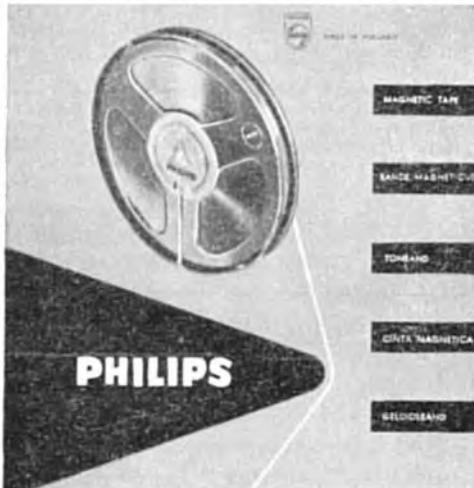
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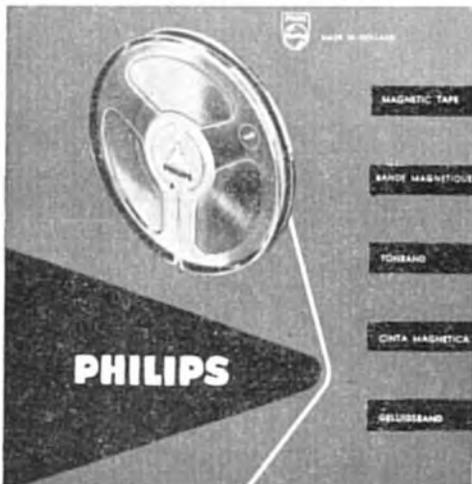
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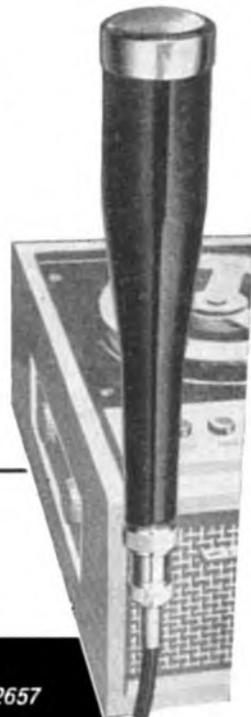
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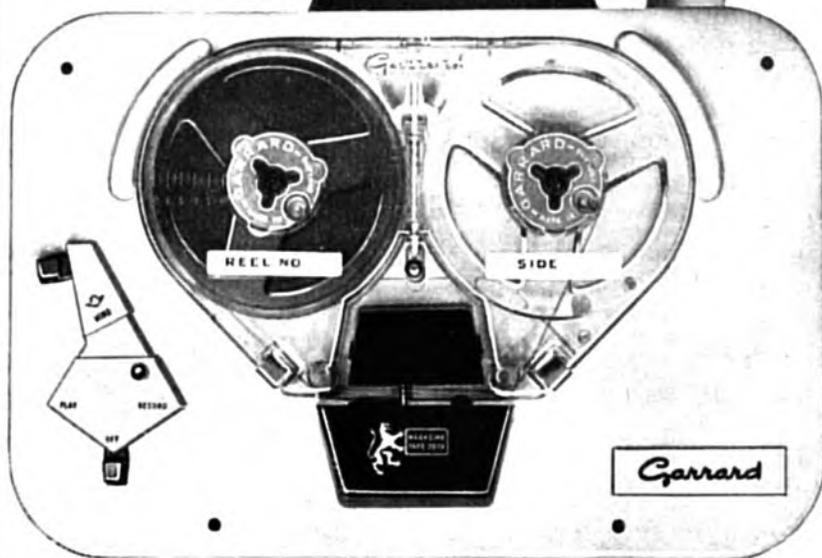
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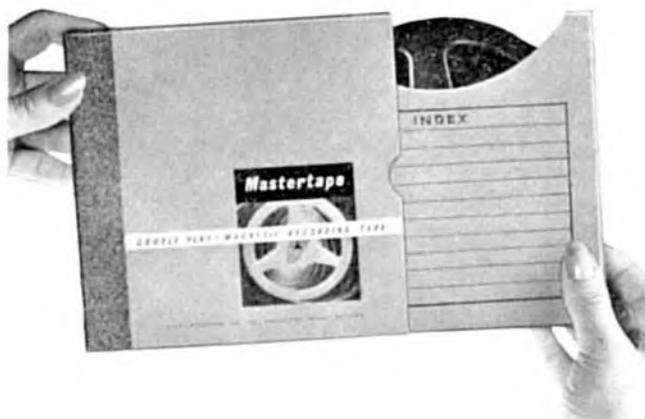
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TAPE

RECORDING
FORTNIGHTLY

Vol. 5 No. 12 14th June, 1961

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We take the view . . .

A DIGEST OF NEWS, COMMENT AND EDITORIAL OPINION

A **S**PLENDID article, full of sound common-sense, has been contributed to *Electronics Weekly* by Mr. G. E. Spark, the Sales Manager of Garrard. It is, in essence, a plea for a Magnetic Recording Industries Association in Britain.

This is essentially a problem for the manufacturers and dealers, of course, but it is of direct interest to the customers. Mr. Spark draws attention, for example, to the need to establish standards—a matter which we have frequently discussed in these columns.

Manufacturers, he says, should put their house in order by facing up to, and solving, such problems as the quarter-track dilemma, the recording characteristics of slower tape speeds, the question of colour coding, non-standard reel sizes and matters of copyright.

The whole industry, he declares bluntly, is bedevilled by problems and yet has no effective central forum capable of solving them.

Another responsibility of the trade association, Mr. Spark proposes, might be the establishment of retail selling schools, offering comprehensive

courses in all aspects of the trade, from customer relationship to servicing.

I know that the idea of a Magnetic Recording Industries Association has been canvassed here in the past; I know that some firms are keen on the idea, and that others are disinterested. Such an Association has proved its value in the United States and it can be taken for granted that amateurs who provide the informed buying public for the products of the industry would welcome the formation of a comparable body here.

This magazine receives a steady flow of letters from its readers commenting upon and often complaining about various aspects of current manufacturing and marketing policies. We hope that we are able to use this information in the way best likely to benefit customer and industry. But we would gladly see this information collected by—and acted upon—by a fully representative body of the industry.

It is impossible to exaggerate how great would be the psychological benefit if customers saw manufacturers get together to agree, for example, on such a simple thing as the colour coding of leader tapes. This is the sort of decision that could be reached quickly, without any serious sacrifice by anyone, and it would benefit the customer.

If a start could be made in this way, progress would be possible towards a situation in which a strong trade association could safeguard the public against unsatisfactory goods or services.

We congratulate Mr. Spark for having brought the subject back to the forefront of discussion.

Did you know ?

CHARTS showing the frequency ranges of different musical instruments are familiar to audio enthusiasts—but did you know that there are similar (if less pronounced) variations in the ranges of human speech in different languages?

A Frenchman uses a wide range of frequencies almost equally, but with a slight preponderance of notes in the 800 to 1,200 cps range. An Englishman uses more high-frequency notes, a Spaniard fewer.

If you are going to learn to speak a foreign language properly you must make the appropriate change in frequency!

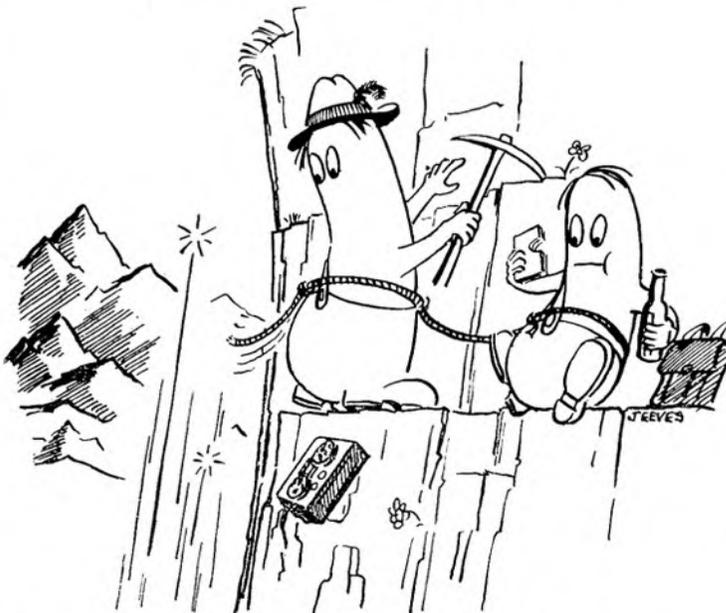
This discovery is claimed by Dr. A. Tomatis, of Paris, who has just been visiting Britain. He has been doing some fascinating research work with audio equipment.

He states that the way in which people talk is affected by the way in which they hear themselves. Using microphone, amplifier and earphones, he made his subjects listen to themselves indirectly. Then he introduced filters to distort the sounds they heard.

When he cut off the top frequencies in a voice, the subject modified the voice itself, using fewer high notes.

So, using the controls on his amplifier, Dr. Tomatis claims that he can give an Englishman a "Spanish voice" in about three weeks. Many audio amateurs may amuse themselves by pursuing this experiment.

LAUGH WITH JEEVES



"Just like Norman to sneak off and leave us to carry his recorder."

WITH A TAPE RECORDER AND CAMERA

IN AMERICA

A. C. WILSON concludes his travel series with this article on visits he made to schools and universities across the Atlantic.

AS a lecturer on international relations I am interested in education: the way that history is taught in a country's schools, for example, will influence the students' attitude to other nations even in adult life. Our plan in America, therefore, in our interviews with university lecturers, schoolmasters, directors of education, students and parents, was to build up a picture of the aims of American education, particularly where they concerned my own subject.

In one period of ten years, America admitted more than 8,000,000 immigrants, and it largely fell to American teachers to make the newcomers, and especially their children, into American citizens in less than a generation. To the difficult task of assimilating people from many different nations, has recently been added the problem of integrating coloured children into schools in areas where segregation has previously been practised.

We wanted to ask questions about these matters, some of them highly controversial, and to frame our questions in such a way that they did not even hint at the kind of answer we expected or would like.

Everyone we approached was willing to talk, and great kindness was shown to us everywhere we went: busy headmasters would give up an afternoon to a discussion in their homes, university lecturers would invite us to tea to go over the subject, a school board official took us on an extended tour of the schools in his area lasting nearly four hours.

Technical problems

We recorded classes in progress, seminars and lectures at universities, and informal discussions in canteens and corridors. Sometimes there were technical problems when, for example, we wanted to record both the lecturer's talk and the (highly relevant) question from the back of the hall with only the one microphone. Though we never tried to hide or disguise the equipment, almost everyone behaved entirely naturally when faced with the Grampian, even at close range, and human problems were few.

I would try to start the discussion some time before I expected to come to the key questions, and only when everyone was talking animatedly and interestedly about his or her work would I switch on the Fi-Cord; usually by this time no one noticed that they were being recorded because they had become too deeply involved in their subject—and this, of course, was what we wanted.

Ideally, for this sort of work the recorder should be as unobtrusive as possible—not only to the person being interviewed but to the operator also, who should not have to be thinking about the apparatus at all. The only way in which the Fi-Cord fell short of the ideal was in the need to reload it with fresh tape rather too frequently, because of the small size of the reels. Its portability was so useful, however, that we preferred to put up with this slight disadvantage

rather than carry anything bulkier about with us.

We also thought it was well worth while recording at 7½ ips all the time; we never used the slower speed, though it would have given us longer play, and merely warned the speaker that he would have to wait for a moment if he happened to be saying something important as the tape came to an end.

At the end of the day we wound off the used tape by hand on to a spare 7 in. reel, using a pencil as a spindle on which to turn it, and joining the short lengths of tape together.

We also bought some 7 in. reels of American mylar-based tape and wound off the appropriate lengths on to the Fi-Cord reels we had just emptied. The price of the American tape was a little

less than the cost of a similar length of longplay in this country, and we found it very good indeed.

Many Americans were fascinated by the Fi-Cord, never having seen anything like it before. At one university a musician, who spends a good deal of his time recording American folk-songs in isolated parts of the Appalachian Mountains, told us that he had been using a bulky American tape recorder, advertised as a portable, which had to be turned by hand.

He was tremendously impressed with the Fi-Cord, which had cost less than half the price of his instrument.

During our stay in New York, we saw a lot of British hi-fi equipment advertised and on sale in the shops, but we never saw a Fi-Cord.



The author films an interview with a school board officer in the grounds of Schaler Junior High School



STANDARD PLAY



EXTRA PLAY



DOUBLE PLAY



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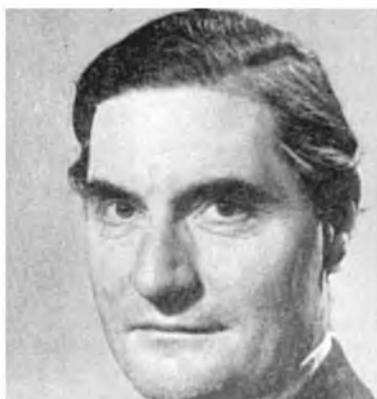
THE JUDGES

JO DOUGLAS, television star, producer and audio enthusiast, again sits on the panel of judges. She has been associated with the Contest since it was inaugurated in 1957.

TIMOTHY ECKERSLEY, Assistant Head of Programme Planning (Recording) at the BBC, joins the team. He is the organiser of all BBC Permanent Recording Libraries.

Miss MARY SOMERVILLE, OBE, the pioneer of BBC School Broadcasts in this country and later controller of the BBC Talks Division, is another new judge this year and will give special attention to entries from schools.

ALAN STABLEFORD, Secretary of the Federation of British Tape Recording Clubs, will represent the organised amateur enthusiasts in the clubs.



CLOSING date for the British and International Amateur Recording Contests is Friday, June 30. There is just over a fortnight left in which you can complete your tapes and submit them to the Contest at 7, Tudor Street, London, E.C.4.



The best tapes in the British Contest will automatically be entered on behalf of Britain in the International event.



Results of the British Contest will be announced on August 26. Results of the International will be known in Berlin on October 16.

THE CLASSES

Individual entries may be submitted in any or all of five classes:—

1. COMPOSITIONS (radio plays, drama, sketches, etc.), maximum duration 15 minutes.
2. DOCUMENTARIES AND "REPORTAGE," maximum duration 10 minutes.
3. MUSIC OR SPEECH (solo singer or player, orchestras, choruses, poems, imitations, monologues, etc.), maximum duration 4 minutes.
4. ACTUALITY (unusual voices, historic moments, etc.), maximum duration 4 minutes.
5. TECHNICAL EXPERIMENT (electronic music, musique concrete), maximum duration 4 minutes.

No individual may send more than one entry in each class.

There are two categories for group entries:—

1. FOR SCHOOLS—tapes presenting a "picture" in sound of some aspect of school activity, maximum duration 15 minutes.
2. FOR CLUBS—tapes of a dramatic, feature or documentary character on any subject, maximum duration 15 minutes.

POINTS TO REMEMBER

COPYRIGHT: No entry may contain any material taken from radio transmissions or commercial recordings. Any copyright material must be covered by an accompanying declaration by the copyright holder(s) authorising use.

RECORDING SPEEDS: Recordings must be made at either 7½ or 3½ ips. They must commence at the beginning of the tape, only one recording track may be used, and there must be no other recorded material on the tape than that which forms the entry. Stereo recordings must be made on "stacked-head" or "in-line" machines.

RETURN OF ENTRIES: All tapes submitted will be returned if adequate return postage is enclosed.

“... the isle is full of noises ...”

The second of three articles on the teacher and the tape recorder by JACK SINGLETON

Do your homework on the subject beforehand. Know what you want to know.

Arrange your questions logically, but be prepared to scrap them if the answers suggest a more interesting field. (But smell out any red herrings.)

You cannot do this if you are more concerned with asking your next arranged question than in listening to the answer to your current one.

Don't frame your questions so that the answers are only "Yes" or "No."

Don't keep on saying "I see" or repeating the answer given you.

Remember the interviewee is the important person. You are the catalyst agent, the midwife.

Put the interviewee at his ease and keep the microphone unobtrusive.

Get a good balance of voices. The tendency is for the interviewer to speak the louder.

Some interviewers discuss with the interviewee in detail beforehand what they are going to ask. This may make for tightness, but lack spontaneity. If you are a good editor it is better to sail straight in with the recording. You may have to repeat certain questions to reduce long-windedness or because after playback the balance has gone wrong somewhere, but you have a better chance of getting the genuine answer.

Make out a sheet for every reel you use. Then someone other than the interviewer can jot down names under Take 1, Take 2, etc., noting false starts and repeats and timings.

To return to Thaxted. We began with the verger who was polishing the brasses and proved an expert on Morris dancing; the manager of the sweet factory turned out to be a radio "ham"; at the "Theatre Workshop"



The author (standing) watches a tape engineer select and mark, prior to editing, an insert tape during a rehearsal of the BBC's "Thursday Roundabout"

in the British Legion Hut we recorded part of a children's play as well as interviewing the producer. Then the unexpected happened.

We bumped into some lads with a bogey piled high with wood and taped them. The set was switched on and off several times at the local cup-tie before we got the roar of a goal, but two girl spectators were fair game for interviewing. A police-sergeant made observations, a strolling guitar player sung for us, and the wife of the Centre Warden, complete with crying babe, recorded a few home truths. The coal-merchant-cum-parish-council-chairman, an authority on the Guildhall, and the leader of the youth club in the windmill had to be visited in the evening.

We listened to the tapes and timed and edited them, and then wrote the links and decided on our opening and closing. As well as speech links we recorded footsteps to suggest strolling from one place to another. We began with Church bells and ended with baby's yells fading into bells.

A subject can be so treated that no speech links are necessary, one phase fading into another, as in the film *This is the BBC* (which, however, has the "unity" of "a day in the life

of"), but this is more difficult, and there is an educational value in thinking and writing out links.

All kinds of facts emerged about Thaxted—why, for instance, the cutlery trade left the town, how myxomatosis killed poaching, that modern young people buy L.P.s instead of lollipops.

Other ideas for out-of-doors easily suggest themselves: A Day on a Farm; Night in the City (this for a select senior group—and permission from parents—with such items as the hospital, the night watchman, police, post office sorting, shunting, the last bus, casualty ward); Our Town (tape exchanges with another school in a different locality or country); Sports Day (interviews with favourites beforehand, groundsmen, commentaries on events, interviews with winners, presentation of prizes); All the Fun of the Fair; Saturday Night; Sunday Morning; a visit to . . . the gas works, the park, the zoo, the seaside, the airport the station, etc.

Another approach to outside recording is to take a subject, e.g., road safety, juvenile delinquency, or some burning local question and get different opinions on it, but that's another article.

SHAPING SOUND-4: NEW LAWS FOR MUSIC

Electronic music is a law unto itself. And not just because it sounds different. It really can be fundamentally different from conventional music: "impossible" scales and harmonics can be devised.

By Alec Nisbett

IN creating electronic music, the composer has complete control of his resources. He synthesises every first and last detail of the sound. With no performer to "get between" him and the final product, he has the whole responsibility for the work, and more freedom than any other composer—subject only to the limitations of time, patience, and, of course, his equipment.

But before we can examine the freedom he is allowed in this new medium, and in particular the freedom to create new harmonic structures and scales, we shall have to take a look at the concept of scale as we know it and the restrictions this imposes.

In conventional music, played on conventional instruments, everything derives from one fundamental relationship, that of the harmonic series in which the partials are all integral multiples of the fundamental. *Almost the whole body of musical composition as we know it is restricted to forms and scales derived from this harmonic structure.*

All stringed and wind instruments produce harmonic series of this sort quite naturally; and most percussion instruments are constructed or used in such a way as to fit in with this arrangement of

partials. For example, in the xylophone the fundamental is strongly emphasised and the overtones (which are not integral multiples) merely give "colour" to the sound. On the other hand, bells (true bells, that is) are "tuned" at the bell foundry: the metal is cut away from the inside of the bow until the principal partials are all related to the fundamental according to accepted harmonic practice.

All of the scales that have ever been devised for conventional music have one thing in common: the interval of an octave, in which the frequency of the upper note is exactly twice that of the lower. If the two notes are sounded together on orchestral instruments the combination sounds pleasant because of the concord between the fundamental of the higher note and the first harmonic of the lower; and there are also many other harmonics in common. If, however, one of the notes is shifted slightly off-pitch these various concords will be lost—they are present only when the frequency of the two fundamentals can be expressed as a ratio of small whole numbers.

But—and this is important—if there had been no harmonics present this sense of concord or discord would have been lost, unless the fundamentals had been themselves fairly close together.

If we start instead with two pure tones together at the same frequency and then increase the pitch of one of them the first effect that we hear will be a "beat" between them. As the difference becomes greater than 15 cps (twice or three times

this at high frequencies), this is replaced by the sensation we call dissonance, which increases to a maximum and then falls away again until as the frequency ratio approaches 5:6 it is no longer apparent. For pure tones dissonance occurs only within this rather narrow range. (There is just one proviso here: that the tones are not exceptionally loud. If they are, the ear begins to generate its own harmonics.)

Some experimenters with electronic music, noting all this, have concluded that our conventional concept of scale is merely a convenient special case, and that if only we could create harmonic structures which were not based on the conventional 1, 2, 3, 4 . . . series, completely new scales could be devised.

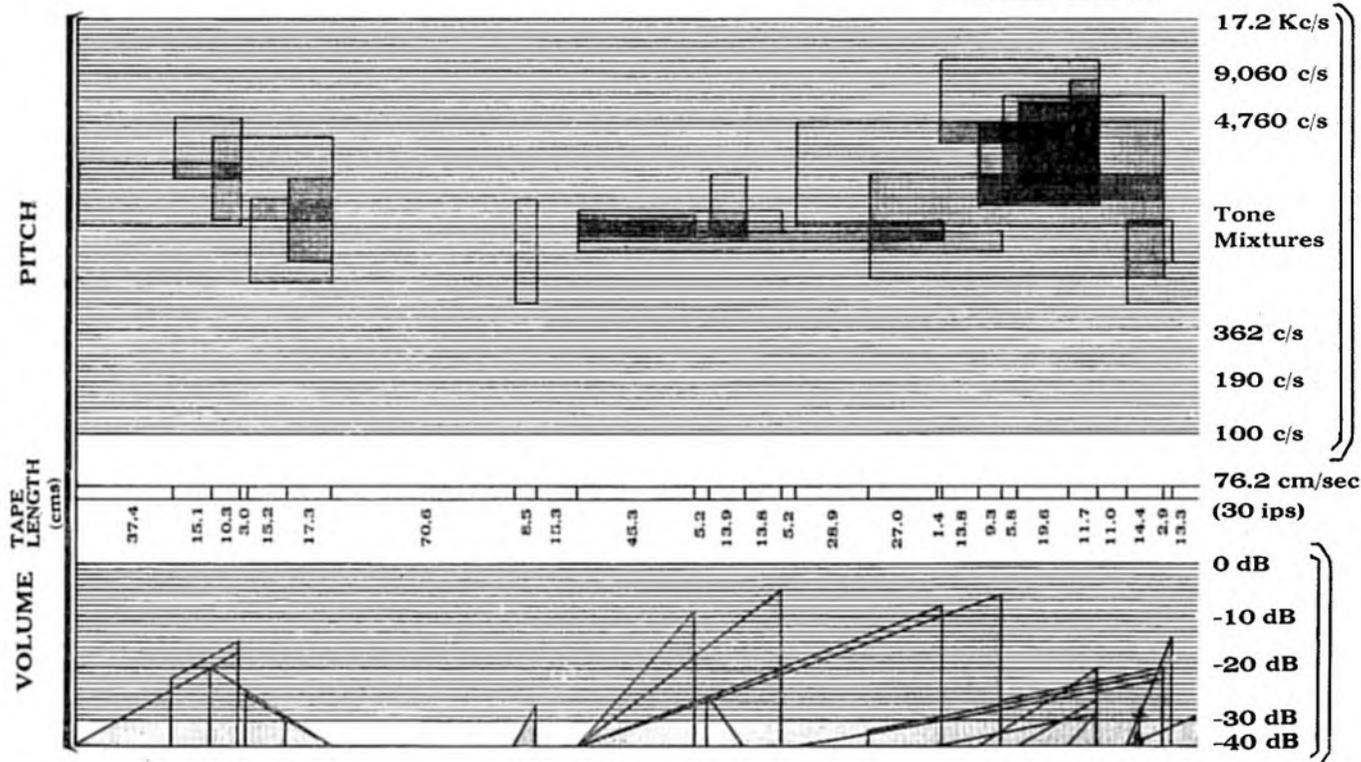
And, indeed they have been.

Happily, this aspect of electronic music is made easier to explain by the fact that one complete score has been published, showing everything that had gone into the making of a particular work: Karlheinz Stockhausen's "Study II." When the tape of this is played to a listener with perfect pitch, or even good relative pitch, it seems immediately that "something is wrong"—

Below:

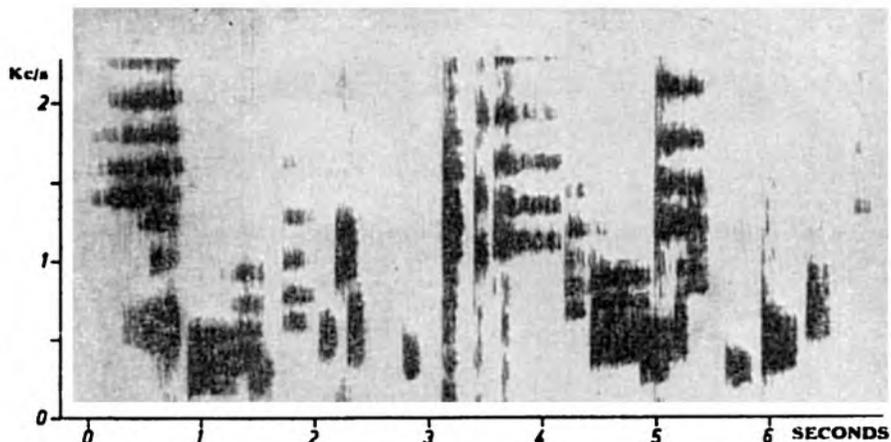
A page from the score of Stockhausen's Study II. Since there is little scope for the interpretation of electronic compositions (the work is usually completed in its entirety in the composer's laboratory) there is little practical use for a published score, except to show "how it was done." Notation is normally used only as a mnemonic by the composer or as a guide to his technical assistants. It has been said that there are as many systems of notation as there are electronic composers

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SHAPING SOUND-4:

By Alec Nisbett



Spectrogram of part of Stockhausen's Study II showing the effects of reverberation

or at the very least, that something is different. And indeed, by all conventional musical standards, something is; the arrangement of musical intervals is such as could never have been heard before the introduction of electronic sound synthesis.

Now, in order to accommodate as many small-whole-number relationships as possible, the conventional scale is based on a division of the octave into twelve equal (or roughly equal) parts. Each note in the chromatic scale is roughly 6 per cent higher in frequency than the one before, so that the product of a dozen of these ratios is two—the octave.

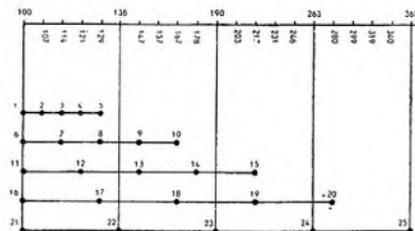
But Stockhausen, in his "Study II," dispenses with the octave completely, and takes instead a completely new scale based on an interval of two octaves and a third, i.e. the interval between a note and its "normal" fifth harmonic, or, to put it another way, the interval between any two notes whose frequency ratio is five.

This large interval he subdivided into 25 equal small intervals, which means that each successive note on his scale is about 7 per cent higher than its predecessor. So it is only to be expected that very few of the intervals based on this scale will correspond to anything in the previous musical experience of the listener.

Now, if music written to this scale were played on almost any conventional musical instrument (violins and trombones are examples of instruments which *could* be immediately adapted to playing in it; others, such as trumpets and woodwind instruments would have to be specially made), almost any combination of notes attempting either harmony or melody would be dissonant because of the harmonics present. The only feasible way of attacking the problem is to use completely synthesised sound derived from electronic sources. But the labour involved in this is bound to be immense.

Stockhausen, having devised his new scale, proceeded to construct new timbres in which the partials would all fit in with each other on the new scale. He limited

himself to five basic types of sounds, each composed of five tones. The most compact of these contains a group of five successive frequencies or "notes" from the new scale. The quality of this first group could be described as astringent, as it consists of a series of dissonant pairs. The next group contains members spaced two notes apart, and the internal dissonance has now almost gone; in the other groups, whose members are spaced at three, four and five note intervals, it has gone completely, and the difference in character between them depends solely on the width of their spectrum. (Before use each of the 193 basic groups were replayed through a reverberation chamber and re-recorded, in order to blend the sound.)



Five typical tone mixtures used in Stockhausen's Study II. 193 were used in all

Using these basic tones Stockhausen proceeded to experiment with different shapes, durations, combinations, sequences and so on—and the work lasts just long enough for the composer to explore and scout around a variety of the possibilities that have occurred to him.

However, when a composition like this is completed, what does it amount to? Since our enjoyment of music depends to a very considerable extent upon the way in which, emotionally or intellectually, it fits in with our previous experience; and since this particular sort of music is not likely to do this, its interest for us is going to be purely that of the excursion into unknown territory. To be intrigued by it is reasonable, but I would look with grave suspicion upon anyone who said at first hearing that he actually *liked* and enjoyed listening to it. What could such a person's past emotional and intellectual experience consist of?

Well, let's leave that question and turn to the matter of sound sources.

The most obvious source of electronic sound is the a.f. tone generator, of which there are now several inexpensive models on the market (these can even be bought in kit-form). But almost equally important is the white noise generator.

White and coloured noise is another type of source which is peculiar to electronic music (and radiophonic music, since this incorporates electronic techniques). It can be produced in several ways—for example, by amplifying the output from a noisy valve (if the noise is even enough. In fact, special valves can be bought for this purpose). A simpler way of obtaining a good even source is to record the amplified output from a VHF set, choosing a frequency and time at which no transmitters are on the air. A VHF receiver does not, of course, produce "noise" during normal operation when this is tuned to a transmitter—quite the reverse in fact, as one of the great advantages of VHF reception is its freedom from noise. Indeed if you listen to a VHF station just as it is going off the air, you will hear a very considerable jump in the noise level at the moment when the carrier wave is cut off. But when there are no broadcasts in progress the VHF band is a better source of clean white noise than longer bands, as the more erratic noise from distant thunderstorms, and so on, cannot bend round the earth's surface or be reflected from the ionosphere at very high frequencies.

White noise is in itself not particularly useful; but in combination with a versatile filter it can be used to produce "colours" which can be fairly indeterminate in pitch, or, alternatively, may be related to any desired musical scale by placing peaks at particular frequencies and troughs at others, or by using bands of particular widths. The frequency analogy between light and colour can, incidentally, be extended so far as to assign colour-names to particular bands. For example, white noise with bass tip up is "pink" noise.

In view of the difficulties involved in creating electronic music, the mountainous task of assembling a work, not merely note by note, but harmonic by harmonic, it is not surprising that methods of cutting down on the labour have been suggested—particularly for the cases where conventional harmonic structures are required. One line of attack is to use a sawtooth generator and filters. Another, and even simpler

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stereo

SPECIAL

SUPPLEMENT

JUNE 1961

ACOUSTIC FACTORS IN STEREO REPRODUCTION

IN sound recording and reproduction generally the acoustics of the halls or studios in which the recording takes place and also the acoustics of the room in which the recording is reproduced, will have a considerable effect on the sound actually heard by a listener. In this article it is hoped to show what particular effects these acoustic conditions have on the sound as it is eventually heard, and to show how such acoustic conditions can be best utilised to produce a desired effect.

What are the acoustics of a building? Most of us have said at some time or other that a hall has good or bad acoustics, and I wonder whether we have paused to analyse just what we mean by this statement.

It is quite possible that we may consider that a particular hall has good acoustics for one particular type of sound and bad for another. For example, if we are listening to people speaking on the stage in a particular hall, and assuming there is no sound reinforcing equipment, it is very necessary that we should be able to hear every word spoken in order to understand the discourse. It is most important that the clarity of the words shall not be blurred by excessive reverberation or discreet echoes. If all these conditions are fulfilled, we say the hall has good acoustics for speech.

Suppose now we go to the same

By H. Burrell-Hadden

hall to listen to an orchestral concert. The impression of the acoustics may now be very different. In much orchestral music, the composer uses an orchestra as a complete instrument, all the individual groups of strings and wind instruments merely serving to produce different tone colours, and it is necessary that the sound from these instruments should be well blended in order to achieve the musical effect intended by the composer. The works of Debussy and Ravel come into this category and those of the romantic composers such as Tchaikovsky.

Classical composers, Bach, Haydn and Mozart required correct reproduction of the detail of their music, every line being important of itself and not only serving as a part of a complex texture, and this is also true of some modern composers. Music of this type requires a different sort of acoustic again. Whereas the first type would need a fairly long reverberation time in order that the sounds shall be properly blended at the listener's ear, the classical works require the clarity of the orchestral detail to be conveyed to the listener's ear together with such reverberation as to produce a pleasing tonal quality. If there were no reverberation at all, a dull uninteresting

sound would result, with all the minute defects of every instrument clearly reproduced.

So much for "serious" orchestral music; but what happens when other types of music, light orchestral, and all the varieties of popular music have to be considered? All, or almost all of these are played in arrangements by various different arrangers, that is no "original score" in the sense that, say, Bach wrote a score, exists. Any one of these arrangements of the same tune may require quite different instrumentation and acoustic conditions from any other. Furthermore, many if not all of these arrangements are written for the microphone; that is, effects are expected which can only be achieved by the use of a multi-microphone balance technique. For example, a sub-tone clarinet might be written as the solo instrument, accompanied by full brass, a situation where without the microphones the clarinet would be completely inaudible.

It may be difficult to see where studio acoustics come into such a sound at all. However, a moment's reflection will show that if the sounds of the various instruments are not to appear in the outputs of microphones other than those close to those instruments, for example, the brass coming out of the string microphone or the woodwind out of the rhythm microphone, then there must not be too

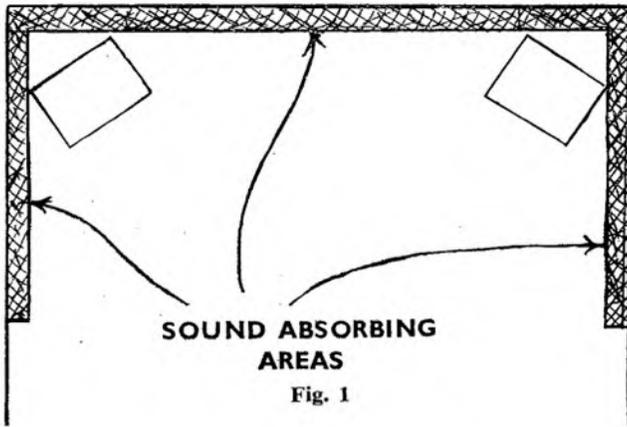


Fig. 1

many reflections from nearby surfaces such as walls and ceilings; in other words, the reverberation time must be low. On the other hand it must not be so low that the various instrumentalists cannot hear each other or the ensemble playing will suffer.

So far we have only considered acoustics in relation to the clarity of the sound in the studio or hall and the amount of blending of those sounds necessary in order to achieve a desired effect. In this particularly, the factor most affecting the issue is the reverberation time.

This is defined as the time taken for the sound left in the studio, after the original sound has ceased, to decay to one millionth of its original value. Reverberation time is dependent upon the cubic volume of the room and the amount of sound absorption present. It may vary between two and a half to three seconds for a large concert hall to less than half a second for the average domestic living room. Some cathedrals and churches can have even longer reverberation time—six seconds or more.

Reverberation time, however, varies with frequency in any given studio and it is the way in which it varies with frequency which gives characteristic colour to instruments or voices. Long reverberation time at low frequencies (usually one or more resonances at the low frequency end of the spectrum) will affect speech quality and tend to produce a "woolly" sound.

An increase in reverberation in the 1,000 cps region, provided it is not too great, may improve the "warmth" of string tone, whereas a similar increase in the 7,000 cps region might make strings sound harsh. On the other hand this latter increase could give pleasing brightness to brass instruments.

It can be seen then that not only does the mean reverberation time over the frequency band needs to be carefully controlled, but the way it varies at any frequency within the band must be controlled also, if a particular acoustic effect is to be achieved.

There are various ways of controlling reverberation time, all of them consisting of what is known as "acoustic treatment."

Basically, this is concerned with placing on the walls, ceiling and floor of the studio materials which either reflect or absorb sound, depending upon the effect required. Absorbers can be made to function at different frequencies in the sound spectrum and the use of these enables the reverberation time to be controlled within the limits required. Measurement of the reverberation time at different frequencies will give the information as to how much absorption or reflection is necessary.

So far all our discussion has been equally applicable to stereophonic or monophonic broadcasting or recording. Is there then no difference in the acoustic conditions required for the different media? Generally the answer is "No," but microphone technique may need to be revised for stereophonic work.

In addition to the effect of the directional information, the stereophonic microphones will pick up rather more reverberation than their monophonic counterparts, and so it is possible that they will need to be somewhat closer to the source of sound if a satisfactory direct to indirect sound ratio is to be achieved.

Domestic listening conditions, however, may need to be somewhat modified for best stereophonic effect. For monophonic listening, with the sound coming from one loudspeaker, it has frequently been found to be more

STEREO CONTENTS

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A special **STEREO SUPPLEMENT** to "Tape Recording Fortnightly" is published at regular intervals. Suggestions and correspondence on stereo matters will be welcomed.

pleasant to turn the loudspeaker into a corner and use the wall surfaces to reflect the sound into the room, thereby achieving a diffused sound source and breaking up to some extent the high frequency "beaming" effect due to the loudspeaker.

By the same token, a moderately "live" room might be considered better for the reproduction for some types of music than a "dead" one, provided the reverberation is not excessive at low frequencies. The reverberation must not be too long, however, or it will add significant coloration to the sound reproduced.

In the stereophonic case a rather different set of conditions applies. In order to achieve good stereophonic reproduction the listening room acoustic should be as "dead" as possible. Good stereophonic reproduction, means not only the spread of sound across the space between the loudspeakers, an effect which can undoubtedly be achieved with omnidirectional loudspeakers in a "lavish" room, but also accurate positioning of all the various component parts of the reproduced sound picture. This last can only be obtained if there are no reflections from nearby objects at all, in other words if the only sound reaching the ears is the direct sound from the loudspeakers. Anyone who has heard stereophonic sound under these conditions will have marvelled at the accuracy of location possible.

(Continued on page 29)

BUILDING A FOUR TRACK STEREO TAPE RECORDER



By
W. PATRICK COPINGER

THIS stereo tape recorder has been designed for easy transportation, tape economy and adaptability. It will require some additional equipment for playback, two amplifiers and speakers for stereo, and consists of a Brenell Mk. V deck with Brenell erase head, Brenell record/playback head, Bogen four-track head and Bogen four-track stereo head.

Two Mullard Type "C" tape pre-amps with their relevant power packs complete the system. The deck and pre-amps are enclosed in a portable case with the power packs in a separate case.

This recorder will record half-track mono and quarter-track stereo and mono, and will permit monitoring a mono signal off tape. This latter facility may also be used for echo effects etc. It is also possible to record one track and playback the other at the same time.

The quarter-track stereo recording enables you to use half the amount of tape you would require for half-track stereo for the same amount of recording time. With the Bogen quarter-track heads and the Mullard Type "C" pre-amps a remarkably good stereo signal is recorded. This type of head may be used for quarter-

EQUIPMENT REQUIRED

One Brenell Deck with erase and R/P heads.

One Bogen 1/4-track erase head Model UL 215.

One Bogen 1/4-track record/playback head Model UK 205.

One 4-pole two-way Yaxley type switch.

Two Mullard Type "C" tape pre-amps.

Two 5-way miniature screened plugs and sockets.

One 10-way plug and socket.

Two telephone jack sockets.

Two toggle switches.

An assortment of timber, glue screws, etc., for case.

track mono recordings, and existing half-track recordings can have two more tracks added to them without impairing the existing signal. These recordings would then, of course, have to be played back on a quarter-track machine.

For playback, output sockets are provided giving 250 Mv which may be used on high impedance phones for monitoring during record. With suitable jack plugs and "Patch Cords" this output may be connected to the radio inputs of a stereo amplifier or to two separate matched amplifiers and speakers.

This recorder is not intended to be used "on location" as a playback instrument. In the author's particular case he uses the Simon SP/4 tape recorder with stereo attachment which is a stereo playback only model.

If it be required to use the Brenell

model for playback it is suggested that a separate integrated stereo amplifier be used, thus retaining the portability for stereo recordings in concert halls, churches, theatres, etc.

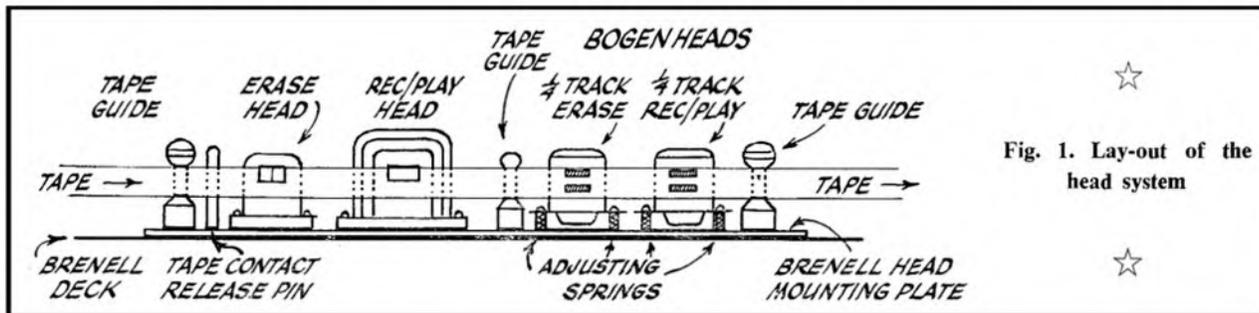
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Assembly—Mounting the heads

The four heads should be mounted on the head plate, which is removable from the Brenell deck in the order from left to right in direction of tape travel: 1. Erase head; 2. Brenell record/playback head; 3. Bogen 1/4-track erase head; 4. Bogen 1/4-track R/P head (See Fig. 1).

In order to fit the Bogen heads, the holes for the heads in the deck will have to be enlarged slightly with a small file to take the base of the Bogen heads. These heads are supplied with separate mounting plate, springs for head adjustment and screws for mounting.

The Brenell head mounting plate will have to be drilled and tapped and six B.A. screws purchased as it may be



BUILDING A FOUR TRACK STEREO TAPE RECORDER

difficult to obtain correct taps for the screws supplied.

In order to position the Bogen heads correctly, first mount the heads on the small plates supplied with each head and place in position so that the pressure pads on the Brenell deck plate are correctly lined up with the two heads when in the forward or play position. Ensure that the two heads are in a straight line with the existing two Brenell heads using a thin narrow piece of wood or pencil laid along the line the tape will run. Mark the Brenell head mounting plate at the points where the six holes (three for each head) are to be drilled and tapped.

Unsolder the existing head leads from the tag board under the deck and remove the head mounting plate which comes away complete with pressure pads and associated springs.

The Brenell instruction book tells you which screws to loosen to remove the plate. Drill and tap the six holes in the removed plate as marked. When mounting the Bogen heads the springs supplied should be inserted between the Bogen head plate and the Brenell head plate. These springs may have to be shortened slightly to give sufficient space to allow for vertical adjustment of the heads.

The felt pressure pads for the addi-

(Continued on page 25)

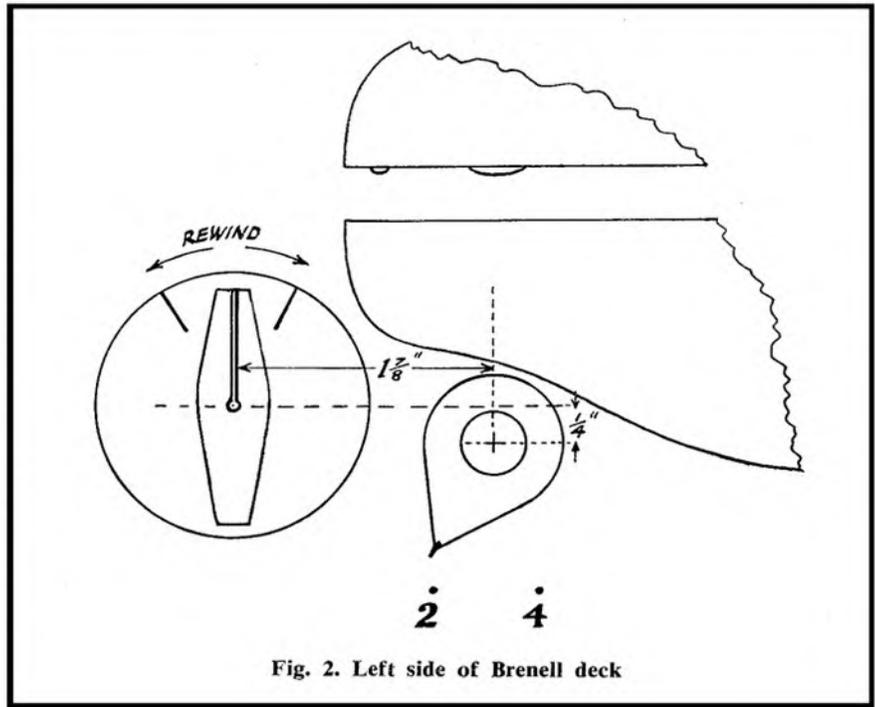


Fig. 2. Left side of Brenell deck

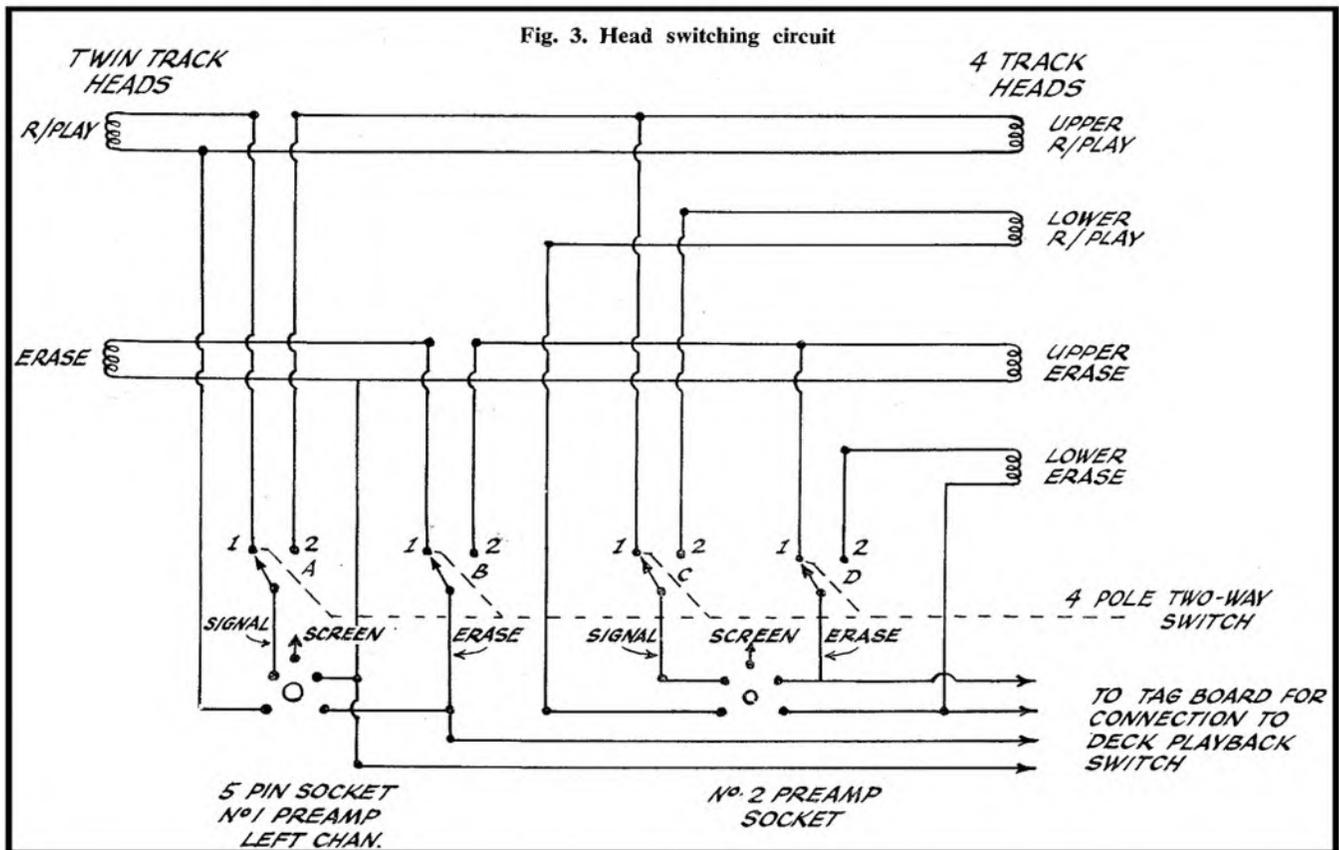


Fig. 3. Head switching circuit

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Combines for the first time the high performance of a transcription turntable with facility for changing records automatically.

Wow—less than 0.12 per cent r.m.s. Flutter—less than 0.05 per cent r.m.s.

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12" diameter loaded and balanced turntable suitable for use with all types of pickups including sensitive magnetic types.

Extremely sensitive automatic trip.

Easily adjustable clip-in spring suspensions from top of unit.

THE TRANSCRIPTION UNIT WITH AUTOCHANGE



by *

Garrard
of course



THE GARRARD ENGINEERING
AND MANUFACTURING CO LTD
SWINDON · WILTSHIRE

BUILDING A STEREO RECORDER

(Continued from page 23)

tional heads should be cut from their metal mounting with a sharp knife, and the pressure pad screens, supplied by Bogen, should be fastened to the pressure pad mounting with "Solderlene" (Woolworth's) and the felt pads glued to the inside of the screens. Make sure that these screens do not foul the head mounting plates when in the play position.

* * *

Mounting the track selector switch

This 4-pole 2-way rotary switch may be mounted on the deck or on the plywood panel which supports the two pre-amps.

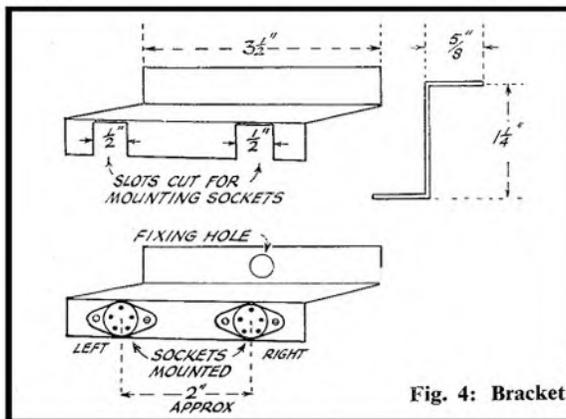


Fig. 4: Bracket for mounting sockets

For greatest efficiency it is necessary that the leads from the head be kept as short as possible to the pre-amps. It was therefore decided to mount the switch on the deck, taking the 12 leads from the heads direct to the switch.

The switch can be mounted on the deck in a position $1\frac{1}{2}$ -inch centre to line through centre of switch to the right (viewed from the front) of the tape rewind switch control (Fig. 2). It should be approximately $\frac{1}{4}$ -inch nearer the front of the deck. The position roughly corresponds to the position on the other side of the deck to that of the pause control. A bracket should be made to support the switch under the deck, this bracket being screwed to the existing bracket holding the rewind switch, using the existing bracket supporting screw.

* * *

Wiring the switch

The selector switch has two positions—

1. Connecting one pre-amp to the Brenell record/playback and erase heads and the other (No. 2) pre-amp to the upper track quarter-track head.

2. Connecting the two pre-amps to the four track heads. The circuit diagram is shown in Fig. 3.

The underside of the Brenell deck has a tag board fitted to which the leads from

the heads are taken and from which leads to the original connecting plugs are run. All these wires should be disconnected and the wires taken direct from the heads to the head selector switch.

It will be noted that some wires go from this tag board to the Brenell record-play deck switch. These wires are to prevent accidental erasure of tape by having the amplifier switched to "record" when the deck is on "play-back." These wires earth the erase heads when switched to playback thus making the erase inoperative. It is therefore important that the selector switch wiring

to the upper track for monitoring off tape or to the lower or right hand tracks.

* * *

Connections for sockets

A socket supporting bracket should be made and mounted on the underside of the deck. The author used part of an old mains transformer supporting bracket $3\frac{1}{2}$ inches long by $1\frac{1}{4}$ inches deep. Exact size is not important so long as it fits on the main motor holding plate under the deck. The bracket should be cut and drilled as shown in Fig. 4, and mounted on the motor holding plate using the existing bolt which supports this plate and the tag strip (Fig. 5).

The best sockets to use are the five pin sockets and screened matching plugs of the continental type which are obtainable

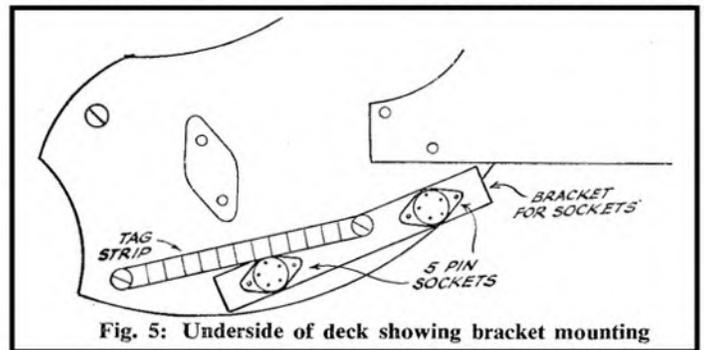


Fig. 5: Underside of deck showing bracket mounting

from Technical Suppliers Ltd., of 63, Goldhawk Road, London, W.2, mentioned in *Tape Recording Fortnightly* in September 7, 1960, issue. These cost 1s. 6d. for sockets and 5s. for the plugs.

These sockets should be wired as shown in the circuit diagram marking each socket "left" and "right" in order not to confuse one channel with the other.

This completes the deck and head wiring.

(To be concluded in next issue)

AMERICA TO BEGIN STEREO BROADCASTS

A STANDARD system for stereo broadcasting has been approved by the U.S. authorities and stations were licensed to operate it from June 1.

The Americans have thus stolen a march on the European broadcasting concerns, which have failed so far to agree on a system.

There would be obvious advantages in securing an international standard, but it is too early to assume that the American system will now be adopted here.

The approved U.S. system is a frequency modulation multiplex technique evolved by the Zenith Radio Corporation and the U.S. General Electric Company.

Fourteen different systems—including EMI's Percival system—were investigated before the U.S. Federal Communications Commission made its decision.

But the Mullard time multiplex system announced last year was not considered.

The American decision is stated to have been based on the simplicity of the adaptation of existing radio receivers to pick up stereo transmissions. The selected system is fully compatible, in the sense that listeners with mono equipment only will hear the combined left and right channel. It is admitted that some loss of quality may occur, however, with programmes using stereo records.

The fact that America has now committed itself to a standard system and that stereo broadcasting is certain now to extend rapidly throughout the States, is bound to bring a new sense of urgency to the protracted European discussions on stereo radio.

FERROGRAPH STEREO 808

HAVE you ever pondered, gentle reader, upon the snares and pitfalls which lie in wait for the reviewer, who innocently undertakes to have in his care, for all too short a time, some of the most outstanding products of the electronics industry?

Without a philosophy which enabled him to accept the world for the hard, cruel place that it is, he would become all bitter and twisted, frustrated by the knowledge that, unless he achieved a miracle with his pools coupon, he could never possess such gems of craftsmanship, which only succeed in emphasising the shortcomings of the equipment, "poor things but his own," with which he must be forever satisfied.

This tape recorder is one such mouth-watering, avarice-raising gem. It's a dilly, the end, the most, or whatever is the current phraseology for something to shout about—so let's get on with the shouting.

* * *

General description

The recorder assembly consists of a "Wearite" tape deck, control panel, two identical record/playback amplifiers and power supply bias oscillator unit, each on a separate chassis, interconnections being through plug/socket terminated cables. The units are contained in a strongly-made wooden case, with detachable lid, both finished in a grey-green imitation leatherette, with a strong carrying handle in green plastic and chrome fittings. The deck and control panel are in grey, with grey-green control knobs.

For valve replacement or general maintenance, two retaining screws at the front of the deck can be removed by hand, the deck hinging at the rear to give access to the interior. Layout is compact but uncluttered and assembly and finish are first class. The overall size of the recorder, with lid, is 17½ in. wide x 18½ in. deep x 9½ in. high and the weight is 51 lb.

Accessories provided comprise:—

6 ft., 3-core mains lead and plug (to fit the recorder); four screened jack plugs; four spare cartridge fuses; a small stiff brush for head cleaning; a roll of adhesive plastic tape, for splicing; and two 7 in. "lock-on" reels, incorporating spring clips in the hubs to grip the ends of the tape, (which allow the recorder to be used either horizontally or vertically).

Also supplied are the main operating instructions, on a stiff, glossy folder, for general reference, and a folder containing full operating instructions, parts list and circuit diagram.

Added to these is the complete "Ferrograph" manual, beautifully printed (with stiff binding), illustrated,

covering principles, operation and maintenance of the company's products generally. This manual may be purchased separately, price 12s.

The following equipment, not supplied with the recorder, is required to complete the installation:—

One or two microphones (or a dual stereo microphone), depending on the type of recording required.

Two power amplifiers, as the recorder outputs from the two channels are at a low level.

Two loudspeakers. (The recorder does not contain audio output stages or loudspeakers.)

Headphones, 500 and 5,000 ohms impedance, whilst not essential, are useful for monitoring during recording.

The recorder operates from mains supplies of 103 to 117 volts and 205 to 245 volts, 50 cycles per second, AC only, and consumes 110 watts. The mains voltage adjuster is on the rear panel.

* * *

"Tape deck" details

This produces simultaneous, twin-track recordings, for stereo reproduction, or standard, single channel half-track recordings, on the upper track only, so that the normal reel-inversion, two-track type recordings can be made. Three heads are used, viz., upper track erase/auto-stop, lower track erase and twin-track, in-line, record/playback.

Playing speeds used are 3¼ or 7½ ips, the total playing time depending on the size of the reels (max. 8½ in.) and type of tape used. A 1,750 ft. reel of standard tape giving the following times:—

Mono—1½ or 3 hours at 7½ or 3¼ ips.

Stereo—¾ or 1½ hours at 7½ or 3¼ ips.

A continuous loop cassette can be used instead of the standard reels.

Fast rewind, in either direction, takes less than one minute for a full reel and braking is positive and virtually instantaneous. An automatic stop switches off the motors if the end of the tape is allowed to pass the heads, and re-setting takes place when the tape is re-loaded, so that the motors will not run on an unloaded deck.

Cueing indication is provided by a "clock" type tape position indicator, which is shaft driven from the right-hand spool and can be reset by means of a knob at the centre of the dial.

There are five controls on the deck itself. These are: speed selector switch; main function switch, selecting record; fast rewind, fast forward and playback; Start button and stop button (controlling the operations selected by the main function switch); and press button pause control, on the hinged cover over the heads. This has a standard camera thread, so that a shutter release cable can be used for remote operation if required. (The speed selector and main function switch must only be operated when the tape is stationary.)

Tape loading is simple. After the hinged head cover is raised, either fast wind position is selected, moving the pressure pads away from the heads. The tape is dropped into place, connected to the take-up spool, and the hinged cover replaced. Zero the indicator and all is ready.

Adjustable guides control the height of the tape at the input and output of the head cover and the alignment of the R/P head can be adjusted by a screw under the cover.

Wow and flutter is specified as less than 0.2 per cent at 7½ ips.

* * *

Amplifier controls and connections

The amplifier controls are on a separate, sloping panel in front of the tape deck, and are duplicated to cover the two channels for upper and lower tracks. Each channel has two input jack sockets. No. 1 for low-level (microphone) signals of about 3.0 millivolts min., and No. 2 for high-level (radio/pick-up) signals of about 300 millivolts min. The gain controls adjacent to the sockets, are operative on both inputs, which have impedances of approximately 500 kilohms.

Microphones and pick-ups, etc., cannot be plugged into sockets 1 and 2 simultaneously, as a plug in socket 2 automatically isolates socket 1, and plugs in either socket disconnect the playback head, which uses the same amplifier, so that all input plugs must be removed for playback.

The amplifier output levels, on record only, are monitored by a peak-reading valve-voltmeter—connected so that the needle rises rapidly and falls off again slowly, to enable even the shortest peaks to be noted. A switch below the meter selects either channel and a small knob, to the right of the meter, adjusts zero (with the gain controls at minimum) for each track.

By

ALAN BEAUTEMENT

A switch selects the correct response equalisation for the tape speed in use and this is interlocked with the speed selector switch on the deck; if they are each set for a different speed, the motors will not operate.

Output jacks, for connection to external power amplifiers, are at the right-hand side, with the mains on/off switch above. The output impedance, in each case, is approximately 5,000 ohms, to match into amplifiers with input impedances of this amount or greater. The output level is 1.5 volts, approximately.

A neon indicator lamp, on the panel, shows when the recorder is ready for use; this operates from the high tension supply and therefore glows only after the rectifier valve is operative, about 15 seconds after switching on.

A further panel, on the rear of the case, carries the main input plug, mains voltage adjustment and mains fuse (1 amp, for 205/245 volts and 2 amps, for 103/117 volts). An octal socket (valve holder) provides outputs of 250/300 volts at 20 mA, and 6.3 volts at 1 amp. (LT centre-tap earthed internally) for ancillary equipment, such as radio tuners, etc., also connections for the Ferrograph Voice Operated Switching Unit, which switches the capstan motor supply and oscillator HT. To complete these circuits when the VOS unit is not in use, an octal shorting plug is provided, from which the spare HT and LT supplies can also be taken. The recorder will not operate with this plug removed.

This panel also carries the mono/stereo switch, which, in the mono position, cuts off the lower track circuit and controls and switches off the supplies to the lower track erase and record heads. (In spite of this, some weird effects are obtained if recording is accidentally attempted on the lower track. I know. I did it—and wondered why the recording was so bad!) A dummy load is switched in place of the erase head to maintain a constant bias voltage.

An erase link is provided, which, when removed, cuts off the erase oscillator output, thus ensuring that existing recordings cannot be accidentally erased if the main selector switch should be moved to the record position, and prevents such movement putting "clicks" on the tape. In addition, a suitable variable resistor can be connected in place of the link, to effect slow fade-out and fade-in of previously recorded material, so that spoken commentaries, etc., can be inserted at random on the tape without the sudden stops and starts associated with the normal erase function.

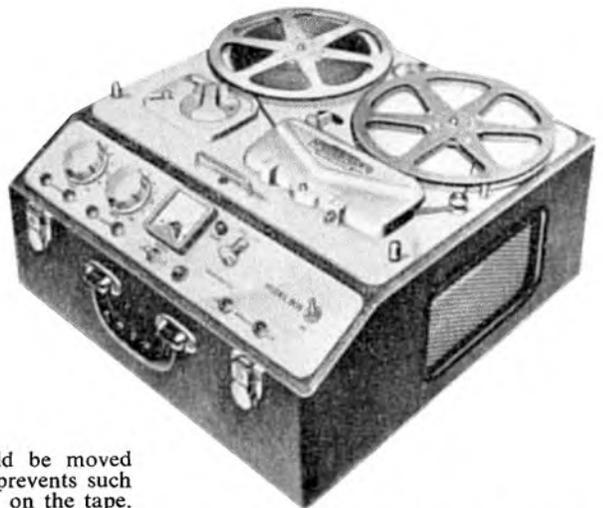
No tone controls are provided, the equipment having been designed to produce a flat playback response over the full audio range.

* * *

Amplifier circuits, etc.

Each playback head winding is transformer coupled to an EF86 pentode amplifier (not used on record), whose output is passed, *via* input jack 1 to a second EF86. The signal now passes, *via* input jack 2 and the gain control, to a twin-triode, type ECC81/12AT7, with the two sections in cascade, the amplified signal being fed to one half of a twin triode, type ECC82/12AU7. Output to the recording head is taken from the anode of this stage, through the equalising network, and external output, for the main amplifier, is taken from the cathode. Negative feedback is applied over the last three stages, to reduce distortion.

The recording level meter circuit consists of a rectifier ($\frac{1}{2}$ ECC82, diode connected), the circuit constants being chosen to give fast charge and slow discharge of



a capacitor across the diode load resistor. The capacitor voltage is then applied to the indicating meter *via* an amplifier stage ($\frac{1}{2}$ ECC82). The circuit has a rapid rise time and true peak indications result.

The frequency response of the overall recorder is 60 to 8,000 cps ± 3 dB at $3\frac{1}{2}$ ips and 60 to 14,000 cps ± 3 dB at $7\frac{1}{2}$ ips, signal-to-noise/hum ratio being greater than 50dB between 200 and 15,000 cps and not less than 45dB outside these limits. On mono operation, the lower track rejection is at least 60dB at 400 cps and on stereo, the track separation is approximately 40dB.

The line-up is completed by an EL84 bias/erase oscillator, operating at about 58 kc/s, and bias traps are included between the amplifiers and R/P heads, to prevent interaction between the amplifiers and the oscillator. A label under the deck gives the correct bias voltage to be used with the particular head fitted.

A full-wave rectifier power unit, using an EZ80, supplies HT for all circuits.

The amplifiers can, of course, be used as ordinary pre-amplifiers, for microphone or record reproduction, with the tape removed or stationary, and they are adjusted so that the same gain control setting on each amplifier produces the same output levels. If they are to be connected to the main amplifiers through leads exceeding 10 ft. in length, low-loss co-axial cable is recommended for this purpose in order to avoid loss of treble.

If sound-cell crystal microphones, having output impedances between 2 and 5 megohms, are used with this recorder, a slight loss of bass may result from the 0.5 megohm input impedances, but this can be corrected by means of the tone controls which will, no doubt, be available on the main amplifiers.

* * *

Operation and performance

Several mono recordings were made, using standard Zonatape, from microphone (Ronette soundcell crystal), from radio ("straight" feeder unit) and from records (Collaro 4T/200 transcription), and in all cases the results were excellent, reproduction *via* tape being indistinguishable from direct reproduction of the original.

(Continued on page 34)

MANUFACTURER'S SPECIFICATION

Price: 105 guineas.

Mains supplies: AC only. 103-117 V and 205-245 V, 50 cycles.

Power consumption: 110 watts.

Recording sense: Twin-track—either simultaneous or upper track only.

Track width: 0.085 in.

Playing time (standard tape): MONO— $1\frac{1}{2}$ hours at $7\frac{1}{2}$ ips; and 3 hours at $3\frac{1}{2}$ ips. STEREO—45 minutes at $7\frac{1}{2}$ ips; and $1\frac{1}{2}$ hours at $3\frac{1}{2}$ ips.

Frequency response: 60-8,000 cps ± 3 dB at $3\frac{1}{2}$ ips. 60-14,000 cps ± 3 dB at $7\frac{1}{2}$ ips.

Wow and flutter: Less than 0.2 per cent at $7\frac{1}{2}$ ips.

Input levels: 1-3.0 mV rms (min.) 2-300.0 mV rms (min.)

Input impedances: 1 and 2. 0.5 megohms (approx.). Output levels: 1 and 2. 1.5 V (min.) into 5,000 ohms or greater (cathode follower).

Signal-to-noise ratio: Better than 50dB from 200 to 15,000 cps (45dB min. overall).

Track separation (stereo): 40dB (approx.)

Lower track rejection (Mono): 60dB minimum at 400 cps.

Dimensions: $18\frac{1}{2}$ x $17\frac{1}{2}$ x $9\frac{3}{4}$ in. (with lid).

Weight: 51 lb.

Makers: The British Ferrograph Recorder Co. Ltd., 131, Sloane Street, London, S.W.1.

JAZZ

By **ROBERT GOWER**



The Soul of Ben Webster. HMV CSD 1355.

The veteran tenor saxist has never been better presented than in this modern jazz setting: forceful, relaxed and beautiful blowing.

The Count Basie Story. Columbia SCX 3372 & 3.

Re-orchestration of Basie jazz classics (1936-1944) comprise this 23-tune set of full-blast stereo performances by the contemporary Orchestra.

It's Right Here for You by Alex Welsh and his Band. Columbia SCX 3377.

It all happens in this happy, driving recital by one of Britain's leading Dixielanders. For added value there are some pretty guitar solos by the late Django's brother, Joseph Reinhardt.

STEREO DISCS STAR SELECTION

THE CLASSICS

By **EDWARD GREENFIELD**



Stravinsky: Rite of Spring. Philips SABL 174.

Stravinsky gives a fascinating introductory talk about his once revolutionary ballet, now an accepted classic, and reveals in the following performance the purely musical beauty of the work as well as its ferocity.

Britten: Spring Symphony. Decca SXL 2264.

This is one of Britten's anthology works showing his unrivalled powers of underlining the meaning of English words in music. The performance under the composer's direction is definitive and the recording of demonstration standard.

Tchaikovsky: Symphony No. 6 (Pathétique). Columbia SAX 2368.

Giulini and the Philharmonia make this sound a new work not by sensationalism and distortion but by devoted fidelity to the score. By far the most satisfying performance available.

ONE of the greatest needs today is for a hard core of enthusiasts to conduct a campaign on behalf of all that is best in tape recording, high fidelity and stereophonic sound. There are signs that the public as a whole is prepared to take sound more seriously—especially now that the novelty of television is beginning to wear off. But, for various reasons, it is not always the whole truth that is presented to them.

Often, for example, efforts to meet the public demand for economy are made at the expense of standards: as little as possible is said about the lower quality or reduced facilities and they become widely accepted as the norm. High quality machines remain on sale, but they tend to become obscured by the alluring barrier of cheaper models. In the same way, the more four-track recorders there are on the counters the less chance there is of a half-track machine getting proper attention.

Stereo Notes

By **D. W. Gardner**

Enthusiasts who know better, who know how much attention should be paid to the advantages of economy in various forms and how to weigh them against other more permanently satisfying features, may feel that they should mind their own business when it comes to the misconceptions of the rest of the world; but there are good reasons for playing an active part, wherever an opportunity presents itself, in keeping standards high. In the end we all gain from it.

The enthusiast can do a lot by way of education when friends and acquaintances are beginning to express a desire for a tape recorder, a stereo outfit or what have you. You can disabuse them of the notion that something cheap will give all the quality that the normal music-lover

needs ("I don't want to spend a fortune, old chap, just to hear a gnat in flight at 2,000 feet"), or the belief that some cheap, magic speaker cabinet they have read about will give them miracles of sound regardless of the rest of the equipment.

It would do a lot of good if every owner of high-quality tape equipment devised a programme to demonstrate to friends the difference between good and bad reproduction, using a cheap speaker to contrast with the good one (with a switch to supply quick-change comparison) and supplying other salutary contrasts on a carefully prepared tape.

Perhaps manufacturers of high-quality equipment could co-operate by preparing a suitable programme for sale at about the cost price of the tape.

The best way to drive home the fact that stereophonic sound is the ultimate best is to have ready some stereo examples of the type of music most liked by the listener concerned and to contrast this with the same example played monophonically.

ACOUSTICS IN STEREO

(Continued from page 21)

An extremely dead acoustic such as the one described, whilst it undoubtedly is the ideal for stereophonic reproductions, would unfortunately, not be very pleasant in a room which was used as a normal living room, the sort of room in which most of us do our stereophonic listening. Some form of compromise is obviously necessary.

The minimum requirement is that the space between the loudspeakers and immediately on the outside of each loudspeaker should be made as dead as possible. Sound absorbing materials should be placed in positions similar to that shown in Fig. 1. If it is possible, these sound absorbers should preferably be attached to the walls, and should be wide-band absorbers, designed to reduce the reverberation at middle and high frequency.

A suitable type of absorber would consist of the well known "Acoustic Tile" but if the appearance of this is not satisfactory for domestic use, other methods are possible. A 1 in. deep frame-work can be made and fitted to the wall. This frame-work could then be filled with rock wool, glass fibre or even cellulose wadding, the whole

being covered by some suitable soft curtain fabric to blend with the decor of the room.

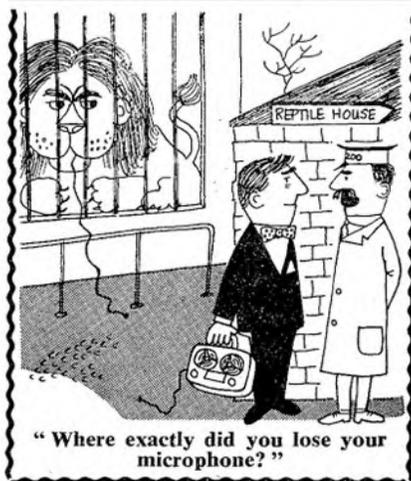
If acoustic tiles are used, care should be taken, if they are painted, to see that none of the pores are filled up, and in any case hard gloss paint should not be used. Neither of these treatments unfortunately, can be said to be cheap, and some other alternatives might have to be found.

A book-case full of books presents a fair sound absorbing surface, and so one solution would be to cover the necessary area with open-fronted book-cases; obviously the closed glass-fronted variety will not function in this way.

Another alternative would be simply to hang curtains over the offending walls. Any medium to heavy weight of curtain will be quite effective, especially if hung so that there is a 2 in. or more air space between the curtain and the wall.

Of course, the absorption will probably not be as great as with the first mentioned acoustic treatment. Failing any of these suggestions, suitable disposition of soft upholstered furniture can be used to achieve the desired

Hi-Fi HARRY by Rich



absorption, provided, of course, the furniture is not needed elsewhere for the seating of the listeners.

It is hoped that this article may have served as an introduction to this complex and not entirely understood subject of acoustic, and that it may have helped in some way to enable readers to achieve better stereophonic reproduction.

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G50TR.

Two from one by Alba

TWO new tape recorders from Alba have recently been announced. The first is the Model R14, a twin-track recorder incorporating the BSR Monardeck. The price is 24 guineas. For an additional three guineas, a four-track version—R15—is available.

Features common to both machines include a frequency response of 200-10,000 cps at the single speed of $3\frac{1}{2}$ ips. Wow and flutter is quoted as less than .4 per cent, and signal-to-noise ratio as 40dB. The loudspeaker is an 8 x 3 inch elliptical. Maximum spool size is $5\frac{1}{2}$ inches, providing $1\frac{1}{2}$ hours playing time per track using double-play tape.



The Alba R14

Among the facilities are high and low level mixing, an extension loud speaker socket with a cut-out switch for internal speaker, a magic eye recording-level indicator, and volume and safety erase lock controls.

The four-track version has push-button selection of tracks to simplify operation.

Storage compartment, adjacent to the main control panel, takes the microphone and jack plug which are supplied along with a reel of tape and empty spool.

The compact two-tone beige leatherette case measures $13\frac{1}{2}$ x 12 x $5\frac{1}{2}$ inches, and the front consists of a gilt metal fret covering the speaker.

Alba (Radio & Television) Ltd.,
Tabernacle Street, London, E.C.2.

New Products

FOUR NEW MODELS ANNOUNCED

Ferguson extend their range

TWO new tape recorders were announced recently by Ferguson.

The first is the Model 445TR, priced at only 24 guineas. This is a twin-track single-speed tape recorder ($3\frac{1}{2}$ ips) using a BSR Monardeck of the latest type. Spool diameter is $5\frac{1}{2}$ inches, giving a standard-tape playing time of $1\frac{1}{2}$ hours or 3 hours with double-play tape.

A generous audio output (2.5 watts) is quoted and the makers claim the 7 x $3\frac{1}{2}$ inch elliptical loudspeaker ensure excellent reproduction. A tone control and electronic recording level indicator are provided.

Rewind time is three minutes.

The strongly built wooden cabinet is attractively decorated with leathercloth in two colours, and there is a storage space for tapes and microphone. Dimensions are $13\frac{1}{4}$ x 13 x $6\frac{1}{2}$ inches.

The second machine is model 442TR, priced at 30 guineas. This is a four-track tape recorder with facilities for superimposition and "play through", and giving excellent reproduction from a 7 x $3\frac{1}{2}$ inch elliptical speaker.

Spool size is again $5\frac{1}{2}$ inches, with the BSR Monardeck providing a single speed of $3\frac{1}{2}$ ips.

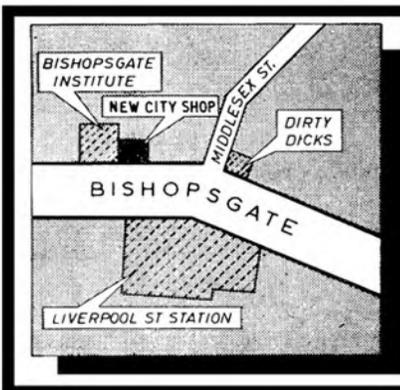
The preformed wooden cabinet, which measures $14\frac{1}{2}$ x $12\frac{1}{4}$ x $6\frac{1}{2}$ inches, is covered in durable leathercloth with a gilt loudspeaker grille and attractive gilt handle. A storage compartment is provided in the lid for microphone leads and spare spools.

A tone control and external extension speaker switch are fitted.

Thorn Electrical Industries Ltd.,
Thorn House, Upper St. Martin's
Lane, W.C.2.



Left: The Ferguson Model 442TR, and (right) the 445TR



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News from the Clubs

ONE of the greatest joys of belonging to a club is the sense of working together to achieve the desired object. In our field there is ample scope for this, and there are some outstanding examples of the goal being reached. In numerous issues we have urged the competitive spirit as being the most successful in establishing a "happy ship."

Our first report for this issue, once again proves that this point cannot be too strongly emphasised. It is not a difficult task—only an extension of the normal activities, but without a doubt it is the best method of making a success of your chosen hobby.

If your club has not explored the possibilities along these lines, why not raise the point at your next meeting. Don't leave it until the next but one meeting, demand a competition now. Ask some of the older clubs. They will agree.

The type of exercise suitable for any club, in any area, may be obtained from the latest report of the **WEST HERTS** club. At their April 19 meeting they organised another of their regular sound hunts.

Members divided into four groups, each with a battery portable recorder, and after some highly secret instruction envelopes were opened away from club HQ, the respective teams found themselves destined for four different railway stations along the local route.

Their instructions were to record arrivals and departures along with descriptions and interviews. These soon provided a great deal of amusement to the train drivers who found themselves set upon by a group at successive stations and asked to relate their destinations and something of their life on the railway.

Passengers were involved, too, and one, not able to stand the suspense any longer, came forth with a stream of questions of his own, about the unusual goings-on. His victim took the opportunity to record all his comments, with his permission, of course, and all ended happily with perhaps one of the most enlightening tirades ever recorded.

On returning to the club rooms, the recordings obtained were compared. Colin and Michael Coates and Arthur Mould, with a Stuzzi Magnette, were awarded most points.

Arthur Mould received further prizes at a following meeting when judging was completed for the inter-club competition for the Grainger-Holloway Cup.

This contest demanded a taped interview with local inhabitants who were able to describe the district at the turn of the century. The secretary of the local

Archaeological Society assisted Messrs. Grainger and Holloway in the judging and the cup, donated by Watford Supplies Ltd, was presented by Mr. Stan Freeman of that company, to Mr. Mould. In addition to the cup, he received a 5-guinea voucher, Dennis Millard (2nd) and Dennis Hill (3rd) received vouchers for 3 guineas and 35s. respectively.

The **CRAWLEY** members are well ahead with their arrangements for the 1961 "Courier" Talent Contest, the competition organised in conjunction with a local newspaper. The first entry coupons were published last month, with an encouraging note to begin recordings in May continuing through till July. Local "notabilities" will form a panel of judges in August and the "live" finals concert will be staged in September.

The contest is said to be of much wider interest than before, and will offer a great deal more scope for recording technique. Details of the competition may be obtained from the secretary, R. C. Watson of 32, Southgate Drive, Crawley, Sussex.

Other of their activities include the production of a documentary tape on "Old Crawley." Latest production centred on the introduction of electricity to the town, and members obtained an interview from an inhabitant who remembered this introduction in 1920.

Some measure of the capable assistance provided by members to neighbouring organisations may be gained by the news that this club recently received two voluntary contributions of 1 guinea each from the Headmaster of Southgate Junior School, and the local branch of the Electrical Association of Women.

The **RUGBY** club is now in its third year, and has recently issued the 45th edition of its monthly newsletter *Tape Life*.

Among recent activities described in this issue were the attempts made by members to record a "Dawn Chorus."

This unusual assignment came their way when Mr. J. Coleman, of the Rugby Natural History Museum, offered facilities to members who wished to accompany the ornithologists to their "usual spot" and record bird song. The idea was that the recordings obtained could be replayed at a later date and a member of the Ornithological Section would lecture the tape club members.

One Sunday morning Bill Tilcock led a team of stalwarts out at 1.30 a.m. to record. Their keenness was well rewarded, and they obtained some highly satisfactory results.

Impressed with their success, Dick Cotgrove and secretary Mike Brown set off at 3.30 a.m. on Whit Sunday to repeat the exercise. They used an Elizabethan recorder operated through a converter from a car battery, and a Magnette.

They also had a fair amount of success, and arrived back at Rugby at 6 a.m. When edited, a copy of the recording obtained will be sent to Mr. Cotgrove's

son in Australia who claims that one of the things he misses most is the sound of British birds.

The last meeting of their current year, their AGM was scheduled for June 1, was given over to a tape and disc stereo demonstration. This was presented by Mr. J. E. Capell and consisted largely of musical items. Later, members progressed to live recording, and recorded a scene from a play. Mr. Capell then answered questions, and demonstrated the recorder in use—a Grundig TK60.

Great progress has been made by the **SOUTH DEVON** club during its first seven months in existence, said the chairman G. Furneaux, during their AGM held on April 26.

Although not 100 per cent successful in their endeavours, he went on, the club was far from being a failure, and the initial handicaps would have been overcome by the start of the winter season. Increased membership and finance would lead to improved programmes and facilities, and the present financial state is promising.

Mr. Donald Aldous, Technical Editor of the *Gramophone Record Review*, and President of the club was thanked for his assistance behind the scenes, and the members proceeded to elect their officers. Mrs. D. Pletts replaced Mrs. G. Furneaux as secretary, and the remain-officers were re-elected. The new secretary's address is "Bridam," Kents Road, Torquay.

Members then discussed future plans for the club. These will include an extension of local advertising, increasing the number of practical evenings, pursuing the inter-club exchange scheme, and developing the club along more social lines.

Another club with a recent AGM was that in **DOVER**. Mr. E. Gilbert of 67, Old Dover Road, Capel-le-Ferne, replaced George Newey as secretary, as Mr. Newey became the chairman.

Membership has improved, and the club has now managed to organise a programme committee comprising six

(Continued on page 33)

B.B.C. "Sound" Programme

A magazine for radio and recording enthusiasts

Introduced by Douglas Brown

6.40 p.m. June 19

(A repeat of the programme broadcast on June 11)

TAPE IN SCHOOL: Joyce Williams, who teaches at St. Frideswides School, Didcot, and Graham Jones, of Temple Secondary School, Strood, Rochester, discuss the problems and advantages of using tape recording and broadcasting techniques in their teaching.

"Sound" is broadcast on alternate Sundays at 2.40 p.m. on Network Three

The next new programme is on June 25

Classified advertisements

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

MISCELLANEOUS

THE CHEAPEST IN BRITAIN. TRANSISTOR PORTABLE RECORDERS COMPLETE WITH MICROPHONES, EARPHONE AND TAPE, limited supply, 15 gns. complete. 3 SPEED STUDIO RECORDER, 7 in. REELS, SUPERIMPOSING, MAGIC EYE, our price 28 gns. COLLARO STUDIO TAPE DECK with BRAD-MATIC HEADS £11 10s. PROFESSIONAL GRADE TAPE, 7 in. spools, 1,200 ft. £1, 2,100 ft. 35s., 5½ in. spools, 850 ft. 17s. 6d., 1,200 ft. 20s. COLLARO 4-SPEED TURNTABLE and PICK-UP 3½ gns. LATEST COLLARO C60 AUTOCHANGER £7 15s. QUALITY CRYSTAL MICROPHONES 21s. 7 in. x 5 in. speakers 10s., postage extra. **SATISFACTION GUARANTEED.** **RADIO SERVICE CENTRE**, 10, Hatter Street, Bury St. Edmunds.

A BINDER is the ideal way of keeping your copies of *Tape Recording Fortnightly* clean and ready for easy reference. Available, price 14s. 6d. (post free), from 7, Tudor Street, London, E.C.4.

Do you use the telephone? If so you will find a Dektron Telecon the most useful of all your recording accessories. The Telecon is not just a novelty but a unit which you will use frequently for both family and business purposes. You will be surprised by its efficiency. Just stand it behind the phone (no connection is necessary) and both sides of the conversation can be recorded, or, if you wish, amplified and broadcast to listeners in the room. The price—only 27s. 6d. post free. To ensure delivery by return post write today to Dektron, 2, Westbourne Road, Weymouth.

WAL GAIN transistorised pre-amplifiers. Many applications, extra gain for Mics, Tape Heads, P-U's, etc. Mono version, £5. Stereo, £7 10s. **WAL BULK TAPE ERASER**, both tracks 8-in. reel erased 30 sec., £7 18s. 6d. **WAL TRAK** transistorised oscillator, 1,000 cps, indispensable for Service, £6 10s. Full technical literature sent, supplied through all leading dealers. Wellington Acoustic Laboratories Ltd., TRC Dept., Farnham, Surrey.

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

Something to sell?—equipment for exchange?—looking for a job in the hi-fi tape field?—seeking a tape contact abroad?—tape-to-disc services to offer?—expert staff needed? A classified advertisement in *Tape Recording Fortnightly* will bring you quick results—cheaply.

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

EASYSPLICE TAPE SPLICER—PATENTED & GUARANTEED makes tape splicing simple, easy and accurate. 5s. P. & P. 6d. Agents wanted, discounts to clubs. **EASYSPLICE**, 30, Lawrence Road, Ealing.

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

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SERVICES

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

TAPE-TO-DISC

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

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BRENELL MARK 5 Tape Deck 4 heads (2 stereo stacked). Two Mark 5 amplifiers, power packs, assembled special mounting rack, as new. Including accessories £95. Buckland, Sanderstead 3460 after 7.

FERROGRAPH Model 808 Stereo. Still under guarantee. As new. Cost new £110, asking £79. **A. S. Mackenzie-Low**, Millfield, Old Town, Bexhill-on-Sea, Sussex. Tel.: Bexhill 3922.

GRUNDIG STEREO TK60. Superb condition. Cost 128 gns, asking 98 gns. Telephone Salisbury 2146.

SIMON SP4. Completely overhauled by manufacturer. Perfect working order. Together with Cadenza ribbon microphone. Price new £110. Asking £85 or nearest. Box 420, *Tape Recording Fortnightly*, 1, Crane Court, Fleet Street, London, E.C.4.

Telefunken Microphone D11B nearly new, four guineas. **Elkan**, 6, Elizabeth Mews, London, N.W.3. PRI 5529.

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TAPE EXCHANGES

TAPE recorder owners who would like to make contact with others of similar interests to exchange news and views by tape are invited to send their name, address, sex, age and special hobby.

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

Hassell, Donald (27). Hazelwood Hotel, Belgrave Road, Torquay. General interests, home or abroad. All speeds. 7-in. spools.

May, I. B. (Male). 27, Beech Gardens, Hamble, Southampton. General interests. 3½ ips. 5½-in. spools.

Ollier, Reginald (40). 30, Crawley Avenue, Hebburn-on-Tyne, Co. Durham. General interests, home or abroad. 3½ ips. 5-in. spools.

Briant, Stuart (44). 1, Pring's Court, Brixham, Devon. General interests. 1½, 3½ and 7½ ips. 7-in. spools.

Warren, Frank (31). 7, Prince Street, Watford, Herts. Literary interests (short stories, poetry, writing). 5½-in. spools.

Williams, Roy (15½). 137a, Church Road, Hove, Sussex. Films, "pop" music. Female contacts of similar age wanted. 3½ and 7½ ips. 3-in. spools.

Yates, F. H. M. (45). 242, Brockhurst Road, Gosport, Hampshire. True life stories (personal). 7-in. spools.

News from the Clubs

(Continued from page 31)

members. There was some doubt as to the club's ability to continue, but enthusiasm amongst the present members outweighed the frustration felt at the lack of further enrolments, and those present decided to "press on."

Attempts to establish their old people's service have met with some resistance from the matron, but the members are confident that this will be established before long.

In HULL, however, the forty members of this city's club have received great encouragement for their hospital work. The Corporation's Telephone Department has given permission for the club to use their hospital's network for a three-month trial period.

They will use a network which is used to broadcast Hull City and Hull Rugby League Football Club matches to hospitals.

Over this system the members will transmit a half-hour programme of records and recorded messages to patients in nine hospitals.

At the April 27 meeting of the COVENTRY club, the members tried their hand at sound effects. It started when Peter Warden demonstrated some effects he had gleaned from Alan Edward Beeby's column in this magazine.

Using a Körting 157, and an Elizabethan, he first of all persuaded ten members to read aloud from newspapers. The desired crowd effect did not quite come off, and they then persevered with greater volume to simulate an angry crowd scene.

Cries of "shoot the chairman," clearly heard above the general rumpus, were taken to be only in fun.

Ron Walker then obliged with an imaginary telephone conversation using an alarm clock(!), and an upturned glass inside an ashtray. This turned out to be quite an authentic effect.

Keith Longmore's impression of a bomb falling almost started a general competition for the best effect. This effect was achieved by breathing into the microphone.

The idea behind the night's activity was the announcement of the proposed competition for the best play on tape achieved with sound effects. The contest was to be judged by members of the Walsall club who had promised to attend on May 25.

During a previous meeting, the club met a number of snags when testing recorder frequency responses. The promised square wave generator was not forthcoming, the replacement proved unreliable, and the testing finally commenced with Bill Tisdale using a Taylor 65B generator and a Heathkit oscilloscope. The meeting, as usual, was not without its lighter moments. When the chairman was demonstrating the 'scope, a wag was overheard remarking on the pleasing "appearance" of his voice.

The equipment that recently aroused a storm of comment in the technical press received attention at another recent meeting. Following lengthy discussion on the possibilities of the Jabey Gough loudspeaker, members decided to look for themselves, and arranged for construction of the item to be carried out as soon as possible for appraisal or other-

CLUB MEETING DIARY

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

ACTON: Alternate Fridays at the King's Head, Acton High Street. (June 23.)

BATH: Alternate Wednesdays at St. Mary's Church Hall, Grove Street. (June 14.)

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

BIRMINGHAM: Every Monday at the White Horse Cellars, Constitution Hill.

BIRMINGHAM (SOUTH): Alternate Mondays at Stinchley Institute, Hazelwell Street, Stinchley. (June 19.)

BLACKPOOL: Every Wednesday at "Habonim," Lonsdale Road, off Lytham Road.

BOURNEMOUTH: Alternate Tuesdays at the Civil Defence Centre, Holdenhurst Road. (June 27.)

BRIDGWATER: Alternate Tuesdays at Erio's Radio, West Street. (June 27.)

BRIGHTON: Every Wednesday at Fairlight School, Pevensey Road.

BRISTOL: Alternate Wednesdays at Redcliffe Church Hall, Guinea Street, Redcliffe. (June 21.)

BRIXTON: Every Tuesday at The White Horse, Brixton Hill, S.W.9.

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

CATFORD: Every Friday at St. Mary's C.E. School, Lewisham, S.E.13.

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

COTSWOLD: Fortnightly, alternating Monday and Thursday, at the Theatre and Arts Club, Cheltenham. (June 15.)

COVENTRY: Alternate Thursdays at Queens Hotel, Primrose Hill, Coventry. (June 15.)

wise.

Tom Bagley let himself in for an unusual experience at the same meeting. He professed a desire to record his experiences in a glider flight. Bill Tisdale made the necessary arrangements with a friend, and the trip is now on, although the first will be in a powered aircraft.

Patients in the Connaught hospital, who would otherwise have missed the event, were brought a sound picture of the Borough's Carnival procession, thanks to the endeavours of the **WALTHAMSTOW** club.

Secretary Ken Parks and "Vi" Burnett using two microphones for the commentary and another for sound effects kept up a lively descriptive narrative from points along the route. These comments were passed through a mixer to a recorder operated by Maurice Dudley who produced and directed the afternoon's recording session.

As soon as track one of a 3 in. spool was completed, it was rushed down to the hospital's basement for playback to the patients on their headphones.

After the commentary, the patients heard a tape recorded on a battery portable at the Town Hall earlier in the afternoon. The operator had obtained interviews with the Carnival Queen and her two Maids of Honour. The Mayor of Walthamstow, Alderman Baldwin, also passed his best wishes to the patients.

At a meeting following the exacting afternoon's experiences by members, the unedited tapes were played back for general criticism and discussion. An important point stressed during the talks concerned the exceptional organisation that went on before the recordings could be achieved.

A further expedition into the great outside was to have been made on June 10. For this occasion Bernard Wells had offered the use of his Dormobile van, which was intended to be used as a recording booth at the Midsummer Fayre.

CRAWLEY: 1st and 3rd Mondays in month at Southgate Community Centre

DARTFORD: 2nd and 4th Thursdays at 41, Windsor Drive, Dartford.

DOVER: Alternate Mondays at The Priory Hotel. (June 26.)

DUNDEE: Alternate Mondays at The Salvation Army Hotel, 31, Ward Road. (June 19.)

EASTBOURNE: Alternate Saturdays at Hartington Hall, Bolton Road. (June 24.)

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

ENFIELD: Alternate Wednesdays at Bush Hill Park School, Main Avenue, Enfield. (June 21.)

GRANTHAM: Weekly, 1st week in month, Wednesday; 2nd, Monday; 3rd, Thursday; 4th, Friday, at Grantham Technical College, Avenue Road.

GRIMSBY: Alternate Tuesdays at the RAFA Club, Abbey Drive West, Abbey Road. (June 20.)

HARROW: Alternate Thursdays at St. George's Hall, Pinner View, North Harrow. (June 15.)

HINCLEY: Alternate Wednesdays at The Wharf Inn, Coventry Road. (June 21.)

HUDDERSFIELD: Ring Huddersfield 5820 for details from S. Blackstone Esq.

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

IPSWICH: Alternate Thursdays at the Art Gallery, High Street. (June 22.)

KEIGHLEY: Alternate Wednesdays at the South Street Sunday School Rooms. (June 28.)

KETTERING: Alternate Wednesdays at the Rising Sun, Silver Street. (June 21.)

LEEDS: Alternate Fridays at 21, Wade Lane, Leeds 2. (June 23.)

LEICESTER: 1st and 3rd Friday at Bishop Street Reference Library.

LONDON: 2nd and 4th Thursdays at the Abbey Community Centre, Marsham Street, S.W.1.

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

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

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

MIDDLESBROUGH: Every Tuesday at 130, Newport Road.

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

NORWICH: 4th Tuesday at the Golden Lion, St. John's Maddermarket.

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

PLYMOUTH: Alternate Wednesdays at Virginia House, Plymouth. (June 14.)

RUGBY: Alternate Thursdays at the Red Lion, Sheep Street. (June 15.)

SOUTHAMPTON: 2nd and 4th Thursday at The Bay Tree Inn, New Road.

SOUTH DEVON: Alternate Wednesdays at the Man Friday Cafe, Torwood Street, Torquay. (June 14.)

SOUTH-WEST LONDON: Every Wednesday at Mayfield School, West Hill, S.W.18.

STAFFORD: Alternate Tuesdays at The Grapes, Bridge Street. (June 27.)

STEVENAGE: Alternate Tuesdays at the Tenant's Meeting Room, Marymead. (June 20.)

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

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

WALTHAMSTOW: Alternate Fridays at 22, Orford Road, E.7. (June 16.)

WARE: 2nd Tuesday at The Old Brewery Tap, High Street.

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

WEST HERTS: Fortnightly, alternating at the Cookery Nook, Watford (June 28) and Heath Park Hotel, Hemel Hempstead. (June 14.)

WEST MIDDLESEX: 2nd Thursday at the Railway Hotel, Station Road, Hampton, and 4th Thursday at St. George's Hall, Lancaster Road, Southall Broadway.

WALSALL: Every Wednesday at Bluecoats School, Springhill Road.

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

WEYMOUTH: Alternate Wednesdays at The Waverley Hotel, Abbotsbury Road. (June 14.)

WINDSOR: Every Thursday at The Royal Adelaide Hotel.

WINCHESTER: Every Friday at The Ship Inn.

WOOLWICH: Alternate Mondays at the North Kent Tavern, Spray Street, Woolwich. (June 19.)

YORK: Every Monday at 11, Southlands Road, off Bishopthorpe Road, York.

Unless otherwise stated, meetings start between 7 and 8 p.m.



YOUR LOCAL DEALER

In this feature you can check your nearest dealer who is a hi-fi specialist giving expert attention to tape equipment.

Ferrograph 808

(Continued from page 27)

A stereo recording was made, but although the results were satisfactory electrically, they were not so hot aesthetically as the sound sources available were rather limited! However, reproduction of an H.M.V. stereo tape ("Philharmonic Pops" by the Sinfonia of London), was most impressive and enjoyable. Unfortunately, the reproducers used were not identical assemblies and strong suspicions were aroused that the acoustic levels differed, so that these had to be adjusted by varying the electrical levels—not strictly according to Hoyle!

With the comprehensive instructions available, no difficulty was experienced in operating the recorder, but a couple of small snags did come to light. The standard plastic reels, supplied with the tapes used, do not sit quite so far down the spool spindles as do the Ferrograph reels, so a slight misalignment resulted, causing the tape to rub occasionally on the reel peripheries.

The other point was that operation of the main selector switch on the deck produces a loud "twang" from the springs in the mechanism, so that if recording from microphone in a quiet place, it is advisable to wait a moment after selecting "record." Alternatively, this may be overcome by keeping the microphone well away from the machine, before pressing the start button, otherwise the dying twang is recorded.

It may cross your mind that the claimed frequency response for this equipment is little or no better than that claimed for some of the much cheaper recorders, but remember that specifying response alone is pointless without the amount of deviation from the mean level being stated, and many manufacturers claim wide responses and give no levels—a misleading practice. "Response down to 30 cps" may mean with the accent on the "down"—by a large drop in level. The claimed frequency response for this recorder is confirmed on test and can be relied upon by the user.

Actually, a much wider useful response is available.

It is a recorder to satisfy the most critical amateur or professional and its choice by many of the most exacting users is recommendation enough.

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

SHAPING SOUND

(Continued from page 19)

method for organisations big enough to have such things is to use the colours provided by some sort of electronic organ.

There is now quite a variety of these available: the Monochord, the Melochord, the Spinetta, and so on, besides the more conventional Compton and Hammond organs—and if you do really want an electronic organ in your house there's a relatively inexpensive model on the market which you can buy yourself in kit-form.

In Germany there is a monster called the Trautonium—one of a group of instruments which can be used (and played, "live") to provide notes of any pitch, not just those corresponding to a keyboard.

Nevertheless, even with these aids (which can after all be used only in restricted circumstances) electronic composition is a mammoth undertaking—certainly if the composer proposes to take advantage of the extra freedoms offered to him.

Some of the references and ideas, which work on electronic music has presented to the composer, are equally valid in terms of conventional music. But not very many—until instruments are devised which will play Stockhausen's scales, colours and shapes. There's a vista of such musical systems stretching out into the infinite—of which conventional music uses only one particular special case which looms rather large in the foreground.

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TAPE

RECORDING
FORTNIGHTLY

Vol. 5 No. 13 28th June, 1961

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We take the view . . .

A DIGEST OF NEWS, COMMENT AND EDITORIAL OPINION

THE second annual Congress of British Tape Recording Clubs was again superbly organised this year and those responsible are to be congratulated on one of the most constructive jobs anyone has done to date to advance the hobby.

Unfortunately, the number of clubs which sent delegates was comparatively small. In fact, the Federation of British Tape Recording Clubs—which is responsible for this annual Congress—has grown during the past year, but it still has only about a fifth of the local clubs affiliated.

As I said in the address which I was invited to give at the Congress, tape recording has just emerged from a rather difficult year. There are still some uncertainties about its future development. There never was a time when it was more necessary that keen and informed amateurs should get together to discuss the problems and to work out a common policy.

Amateurs—who are the customers—can exert a considerable influence on developments; but only if they are organised and united.

This annual Congress of the clubs should be the principal get-together to let the world know what clubs are thinking.

I hope that next year we shall see a majority of the clubs affiliated and a turnout of several hundred enthusiasts at the Congress. Would it help, I wonder, if the event were held at the time of the Audio Festival, when many club members are coming to London anyway?

Dying dialects

TIMOTHY ECKERSLEY, of the BBC, gave those at this year's Congress a good deal to think about. The discs which he brought along as illustrations served better than any words to point the way forward to worth-while, creative tape recording activity.

He demonstrated how dramatic a simple voice recording can be—if you are recording a poet like Dylan Thomas or “characters” who can reminisce colourfully. He brought home to us the urgent duty of amateur enthusiasts to get on to tape adequate records of dying dialects and accents, and of disappearing social customs—before it is too late.

And he showed how easy it is to do a really worth-while piece of original research with a tape recorder. He played some of the 128 recordings taken during the first year of a baby

to illustrate the development of human speech—everything from the first “hunger calls” to the first pronunciation of the magic word: “dada.”

Many parents have made this type of recording. So far as is known none has previously treated it as a serious piece of research; keeping full documentation of the recordings.

Even in the straight-forward activity field there remain opportunities.

Mr. Eckersley re-issued a challenge to amateurs that he first made over a year ago. The B.B.C. still lacks a satisfactory recording of a tawny owl's hoot: “too-wit, too-woo.”

Sound magazines

I SHOULD like to see clubs make a new effort to produce sound magazines. Many attempts have been made, from the earliest days, and some clubs do turn out commendable tapes at regular intervals.

But I feel that no club should be considered to have exhibited a full and healthy club life until it is producing a first-class magazine-on-tape at least four times a year.

I recognise that material of the right quality is not in over-plentiful supply. For that reason, I think that the most common mistake has been to produce club magazines-on-tape on 5 in. spools (or larger). It would be sensible to aim at filling a 3 in. reel of tape with

four or five brief items and concentrating a little more on linking narration and effects.

This was my reaction after listening to the first sound magazine produced by a new organisation, the Tape Crusaders. The sponsors aim at a specialised audience—those who are actively involved in Christian activity and the contents of the first tape include such items as “The use of tape recordings in the Methodist Church,” “Evangelism in modern society” and “My experiences of mental nursing.”

The idea is excellent and, for a first effort, the magazine is very good. But it needs briefer contributions, more pace, the editing out of inessentials and hesitations. All this means hard work and I have no doubt that David Lazell (23, Wheatland Drive, Leicester Road, Loughborough) will be delighted to hear from anyone who is interested.

A different type of tape production reaches me from the West Middlesex Tape Recording Club. They have produced the first two of a series of “Technical Discussion Tapes.” The first has two enthusiasts informally discussing transistors and their uses; the second contains a practical demonstration, with the necessary explanations of the use of various types of microphone.

These tapes can be of great value to any average enthusiast. They can afford to be discursive and detailed for they are aimed at those who are diligently seeking precise information. I hope the West Middlesex Club will go on and make a complete set of these “Technical Discussion Tapes” and will make them available generally. Hon. Secretary is Mr. H. E. Saunders, 20 Nightingale Road, Hampton, Middlesex.

LAUGH WITH JEEVES



“I'm trying to get the sound of cocoanut shells being rattled.”

Should manufacturers establish closer contact?

THE PROPOSAL BY MR. G. E. SPARK, MANAGER OF THE TAPE DECK DIVISION OF MESSRS. GARRARD, FOR A BRITISH MAGNETIC RECORDING INDUSTRIES ASSOCIATION HAS CREATED WIDESPREAD INTEREST.

A NUMBER OF LEADING FIGURES IN THE WORLD OF TAPE RECORDING HAVE REACTED TO OUR EDITORIAL COMMENT ON THE PROPOSAL, PUBLISHED IN OUR LAST ISSUE.

FURTHER VIEWS FROM MANUFACTURERS WILL APPEAR IN OUR NEXT ISSUE AND DEALERS AND AMATEUR ENTHUSIASTS ARE INVITED TO JOIN IN THE DEBATE.

A CLUB VIEW

I WAS particularly pleased to read your Editorial of June 14. Mr. Spark's plea for a Magnetic Recording Industries Association deserves the support of the manufacturer, retailer and customer alike.

Apart from the problems of standardisation—how many types of plug are there?—training in sales and service for the retailer would be a great step forward. Sales staff who are thoroughly conversant with the equipment they are demonstrating are few and far between.

After-sales service is in an equally depressing state; hardly surprising when this sort of thing appears in the Situations Vacant column: "Radio and TV engineer required for servicing tape recorders."

The implication behind this advertisement (which actually appeared in the *Evening Standard* a few months ago) is that no specialist knowledge is required to repair a tape recorder!

Members of a Magnetic Recording Industries Association could well have a standard guarantee. It does not help the industry for the customer to be presented with a bill for labour charges arising out of a repair under guarantee.

Finally I would like to add that the Federation will give whatever help it can in setting up such an Association.

E. R. ASLIN.

**Secretary,
Federation of
British Tape Recording Clubs.**

THE GRUNDIG VIEW

MR. SPARK'S suggestion for a Magnetic Recording Industries Association in this country disturbs quite a few ghosts from the past. About five years ago Grundig took this view, and at its own expense called a meeting of various tape recorder manufacturers to explore the possibilities.

At that time it was not possible to discover a universally acceptable programme.

We still feel that there is merit in the idea, and would welcome more

collaboration with others in our field.

The regulation of trading policies would not appeal to us, for we have our own and we believe the trade is satisfied with it.

There are several other useful avenues of collaboration, however, and if the various manufacturers concerned are now of a different mind, we should be very pleased to take part in any new talks.

**G. S. TAYLOR,
Managing Director,
Grundig (Great Britain) Ltd.**

THE PHILIPS VIEW

I HAVE read with interest the article from Mr. G. E. Spark in a recent issue of *Electronics Weekly* dealing with the standardisation of magnetic recording equipment.

At the outset, let me make it quite clear that I, too, view standardisation as a worthy goal, always providing progress is not impaired for the sake of mere conformity.

But is Mr. Spark right in maintaining that machinery does not exist within the industry and independent professional organisations to cope with the problems that can arise?

I feel sure that many of us within the industry would not agree and, in my own opinion, such organisations as BSI, AMG, RECMF, IEC, CCIR, to name but a few, are capable—if used to the full—of producing any necessary recommendations for our industry as a whole.

To add to this list would surely only make for confusion and I would prefer to see an improvement in the liaison arrangements between the technical committees of these bodies rather than the establishment of additional groups to deal with sections of the wider electronic field.

However, how sincere is Mr. Spark in his quest for closer industry co-operation and standardisation? I cannot help but ask myself to what standard the tape cassette marketed by his own company conforms, or, to put it another way, when offering magnetic recording devices to a consumer market which has become used to certain established specifications with respect to spool sizes, speeds and pre-recorded tape facilities, how far does this particular cassette present built-in limitations?

Mr. Spark—your comments please!

**T. W. L. PERKINS,
Philips Electrical Limited.**

THE BRENELL VIEW

WE note with interest, in fact enthusiasm, that you are giving publicity to Mr. Spark's suggestions regarding the establishment of standards by which the performance of tape recording equipment may be assessed.

We, as manufacturers of high quality equipment, have agreed to support a Magnetic Recording Industries Association and our support has been promised to Mr. Spark. We feel that such an organisation is long overdue in this country, and we look forward to its inauguration.

We feel sure that British manufacturers have nothing to fear from such standards being incorporated; in fact, we feel that there is much to be gained.

A trade organisation of this kind, if it were functioning as we expect a British trade organisation to function, would prove invaluable to all manufacturers from other points of view than the production of a set of standards; for instance, consumer requirements and market trends in the very large export market for British-made tape recording equipment would be made available to all members, thus ensuring that the British-made tape recorders were always to the forefront in meeting the demands of our overseas customers.

We trust, therefore, that *Tape Recording Fortnightly*, having put its shoulder to the wheel, will not relinquish its efforts until such an Association is formed.

**P. GLASER,
Brenell Engineering Co. Ltd.**

Manufacturers and dealers urged to establish greater creative tape recording habits

FEDERATION CONGRESS REPORT

FIFTEEN clubs were represented at the second annual Congress of British Tape Recording Clubs at the Russell Hotel, London, on June 10. Delegates travelled from as far afield as Birmingham and Edinburgh, and of course, there was a predominant Home Counties representation.

Mr. Alan Stableford, who presided, said:—

“During the twelve months since our last Congress many thousands of people in Great Britain have bought tape recorders. Unfortunately, it is still true to say that of these thousands, a high percentage will quickly regret their purchase.

“They will learn that the widely advertised uses of a tape recorder—‘Record Baby’s First Screams!’; ‘Be The Life And Soul of The Party!’ and so on—would satisfy the most retarded teen-ager for only a few months.

“The alternative, to use the tape recorder as a photographer uses his camera, as an artist uses his brush, in order to *create* in sound—this alternative is rarely brought to the attention of the new owner by the manufacturer and even more rarely by the dealer.

“To enlist the support of these manufacturers and dealers in our efforts to establish tape recording as a popular, *creative* pastime should be our most urgent concern during the coming year.”

The Congress heard talks by Mr. Timothy Eckersley, Assistant Head of Central Programme Operations (Recording) at the BBC, and Mr. R. Douglas Brown, Editor of *Tape Recording Fortnightly*.

Mr. Eckersley discussed creative tape recording in all its forms and illustrated his talk with a series of discs from the BBC disc library. One of the items was a recorded description of Queen Victoria’s diamond jubilee in 1897—one of the first amateur recordings ever made.

Mr. Brown reviewed the progress of tape recording during the past year and considered the prospects for the year ahead.

London teachers produce plays for the classroom

“**L**ONDON TAPE” (short for London Teachers’ Audio Programmes for Education—an offshoot of the London Schools’ Drama Association) has now produced three programmes for use in the classroom.

“Stories for seven to eight-year-olds,” is being sent to a selected list of primary schools which are known to have used the tape recorder a lot. In this way the tape recorder will have little novelty value for the children, but be accepted as a familiar medium.

Each teacher using the tape will send in a report of the children’s reactions and a personal evaluation. In this way London Tape hopes to obtain an accurate assessment of the scheme.

The other two programmes are being revised slightly before issue to London schools. If the scheme is successful further tapes will be produced in the Autumn.

* * *

JACK SINGLETON has been recommended to be the Radio Personality for 1961—unfortunately so far only by a listener writing in the “Radio Times.” The writer thinks that the “Two of a Kind” programme does a great service in bringing the people in that series to our notice.

His recent articles, “Keeping an Eye on the Saints” and “The Isle is full of Noises”, have been highly praised by many teachers.

Look out for his next article which will tell you about giving shape and texture to magazine programmes.

* * *

THIS week the Tape in Education Working Party of the National Committee for Audio-Visual Aids in Education is meeting in London. An account will appear on this page next month.

They will be considering an interim report based on just over 320 completed questionnaires which have been received by May 26. J. Embling, the chairman of the Working Party, will be using this report to lead a discussion on tape in education at the Annual Conference of the NCAVAE at Whitelands College, London, on Friday, July 14.

The Secretary of the National Committee says that returns are very representative, both of the various types of educational establishments and their geographical location. She is surprised, though, at the low number of returns from Primary Schools—approximately 17 per cent only.

TV CHIEF TO JUDGE CONTEST



Mr. Stephen McCormack (above) Programme Controller of Anglia Television, has agreed to join the panel of judges for the British Amateur Tape Recording Contest.

He joins Josephine Douglas, Timothy Eckersley, Miss Mary Somerville and Alan Stableford, the judges announced in our last issue.

There are only two days to go before the closing date—**JUNE 30**. If you wish to enter this contest, tapes **MUST** be posted immediately to **B.A.T.R.C., 7, Tudor Street, London, E.C.4.**

SPECIAL TEAM TO RECORD FOLK LORE

TEAMS with tape recorders should be sent out into Nigerian villages to record folk tales, stories and histories recommended fifteen Nigerian teachers in Oxford recently. They were advising Pergamon Press on the textbooks Nigeria needs. Subsequent conferences will examine the needs of Ghana, Malaya and India.

TAPE IN THE SCHOOLS

GEOFFREY HODSON

SCHOOL TAPE CLUB

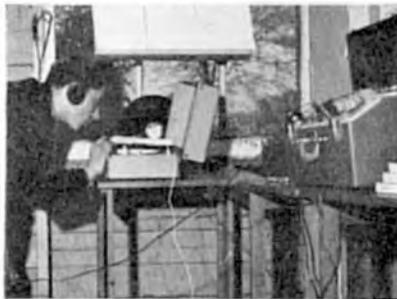
1: The Microphone Society (Moseley Hall Grammar School)

edits the latest news
— and comments

The aim of this new series is to encourage schools interested in tape recording to form their own clubs through reading accounts of existing ones. Please let us know what you are doing.

HAROLD ROTTESMAN made a considerable reputation for himself as a tape producer when he was up at Oxford in the late nineteen-fifties. BBC producers Archie Campbell and Trevor Hill were among the many to sing his praises. Now he is an occasional week-end actor for the BBC in Manchester.

It is not surprising therefore, that he founded "The Microphone Society" when he was appointed to Moseley Hall Grammar School in Cheadle, Cheshire.



Sound effects

NEXT MONTH

"This is a Temple School production" will describe this Kent school's tape progress from a studio in the school boiler-room to an acoustically-treated room.

This school moved into new buildings after Whitsun, and they contain what we believe to be the first studio-control room set-up to be built as an integral part of a British school.

The Society is fortunate in that it has a more-or-less permanent base. A small room running the width of an old Scout Hut is the control room. Here the apparatus is built round an adaptation of a Ferrograph, a system which dates back to Mr. Rottesman's Oxford days. Play-in grams, tape, and several microphone points lead to the tape recorder via a home-made mixer unit.

The whole set-up is highly mobile, and it has been used recently in a variety of locations to make poetry recordings for a well-known publisher.

The studio is also used as a classroom and drama workshop. This leads to the great disadvantage that it must be dismantled after each recording session. But the studio engineers of the Society can quickly set up the microphones, cue lights, talk-back loudspeaker, and monitoring headphones for narrator. They also erect various tents with stage drapes to give varied acoustic conditions.

So far their recording activities have chiefly been drama scripts—on the whole written by Mr. Rottesman. However, they have let their fantasy loose on the visit of Macbeth to the witches' cauldron, with startling results!

The Microphone Society is aiming for the best in all senses, and to this end they have visited the BBC sound studios in Manchester to learn as much as they can. They are also arranging a programme of visiting speakers.

Unfortunately the Society is having an enforced rest this term because Mr. Rottesman has had to go into hospital. We wish him a speedy recovery, and long life to the Society.



Drama Scripts

TAPE FOR TEACHERS—BBC DISCUSSION

TAPE in School was featured in the BBC "Sound" programme on Network Three on June 11, when two teachers discussed the problems and advantages of using tape recording and broadcasting techniques in their teaching.

One of the teachers speaking in this programme was Miss Joyce Williams who teaches at Frideswides School, Didcot, Berkshire. She explained that her principal use of tape has been with puppet plays and with small discussion groups.

The second teacher was Graham Jones of Temple Secondary School, Strood, Kent. He described his approach as being chiefly from the performance and programme construction view. This included fantasy, documentary, adaption of prose material, and original plays.

After a short description of these various uses, the two speakers disagreed about the value of recording for speech training—Miss Williams being very much in their favour.

Apart from broadcasting last year's winning schools entry in the British Amateur Tape Recording Contest, we believe this to be the only time the BBC has given air-space to tape in schools.

They are assured of keen listeners if they decide to improve on this in the next "Sound" series. Let's hope they will.

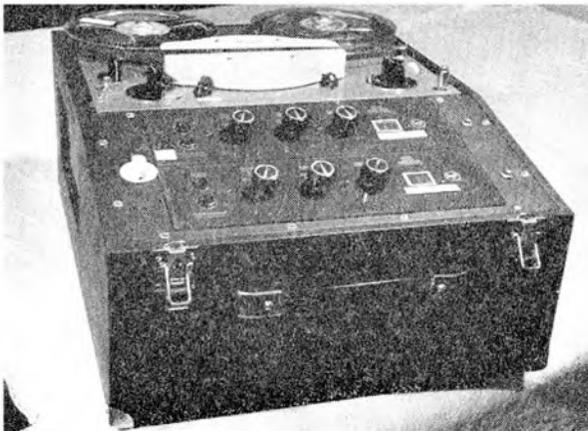


Graham Jones, seen at the controls in a recording studio during the Fourth Tape Course at The Rose Bruford Training College

BUILDING A FOUR TRACK STEREO TAPE RECORDER

**The concluding article
in a special
do-it-yourself feature**

By **W. PATRICK COPINGER**



☆
Left: The completed Brenell 4-track stereo tape recorder
☆

Pre-amps and Power Packs

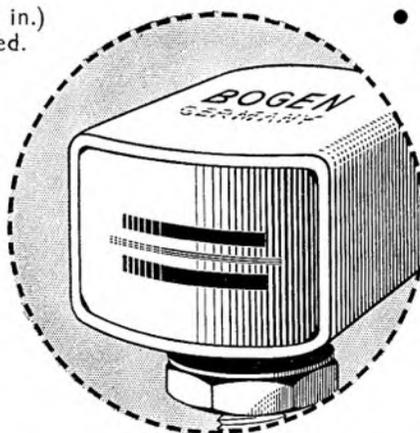
Messrs. Stern Radio Ltd., of Fleet Street, London, are able to supply two Mullard Type "C" tape pre-amps specially adapted to work as a pair for stereo record/playback. They will also supply two power packs to provide the correct voltages to run the pre-amps.

In order to reduce the size and weight of this tape recorder, the power packs are enclosed in a separate case with carrying handle and two switches, one for each channel. The case should be well ventilated and a ten-way (or two five-way) sockets mounted on the side for the outlet to the tape recorder. Detailed instructions for wiring the

BOGEN

THE WORLD'S BEST FOR 2- AND 4-TRACK STEREO AND MONO TAPE HEADS

- Gap—3.5 microns (0.0001375 in.) per channel, ground and lapped.
- **FREQUENCY RESPONSE:** 30-16,000 c/s at 3 $\frac{3}{8}$ ips; 30-10,000 c/s at 1 $\frac{7}{8}$ ips. using high quality tapes and amplifiers.
- Magnets — special laminated steel.
- Working life—10,000 working hours; about 10 years' normal use.



- Price — set comprising 4-track record/replay head and erase head —15 gns.
- Bogen heads are easily fitted. They are characterised by the same standards of manufacture as Bogen heads costing over £100 each.
- As used in building the Stereo Tape Recorder described in this issue.

Convert to 4-Track with genuine **BOGEN** HEADS

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GOPALCO LIMITED 66 BOLSOVER ST., LONDON, W.1 EUSton 4264/5/6

BUILDING A FOUR TRACK STEREO TAPE RECORDER

power packs to the pre-amps are enclosed with the equipment when purchasing.

The ten-way plug and socket are to accommodate the HT pair, LT pair for each pre-amp and a switched mains pair for running the motors on the tape deck.

It is suggested that the switch controlling the upper or left hand channel (No. 1) be a double pole on/off switch so that it can also switch the mains to the deck. A ten line length of cable should be made up from flex or bought ready made (ensure that each wire can be identified at each end of the length to facilitate correct connections) and taken to a ten-way strip connector mounted on the inside of the tape recorder case. This cable should be about four or five feet long so that the power pack can rest on the floor or be kept well away from the tape recorder to reduce the risk of any induced hum.

Connecting pre-amps

These are supplied with screened record/playback leads, separate erase pairs, screened output leads and four-wire power cables. The four erase and record pairs from each pre-amp should be soldered to the five-pin plugs, the screening being connected to the earth pin of each plug. The four power leads from each pre-amp should be taken to the ten-way connector mounted on the inside of the case.

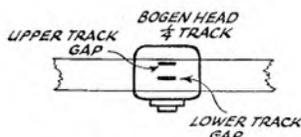


Fig. 6. Lining up 1/4-track head

Portable case

It is not proposed to detail the construction of the case at this stage except to mention one or two points.

There should be a gap of about 1/8-inch round the sides of the deck between the deck and case to facilitate ventilation. It is suggested that the control panel be a sloping one as this enables the magic-eyes to be seen while seated at a table with the tape recorder. Plenty of ventilation ports should be provided in the case at the bottom and sides, and the case should stand on rubber stops keeping free air flow underneath.

Lining up the quarter-track heads

Obtain a length of transparent 1/4-inch wide tape or remove the oxide from an old piece of recording tape so that it becomes transparent. (Some of the earlier spools of tape used to have a length of un-oxide clear tape on the

inside of the spool.) Remove the pressure pads in front of the 3 quarter-track heads and put the transparent tape from spool to spool in front of the heads in the normal tape run position. On the Bogen heads it is possible to see where the two magnet gaps are positioned, so that by getting the eyes on a level with the deck and looking through the transparent tape the gaps may be seen.

With a screw driver (non-magnetic preferably) start adjusting the three spring-loaded screws on the replay head so that the upper gap is a fraction below the top of the tape and the lower gap just below the centre line of the tape (Fig. 6). Ensure that the head is parallel with the run of the tape. This may be done by holding a straight-edge along the top of the head (heads) and checking for parallel by eye.

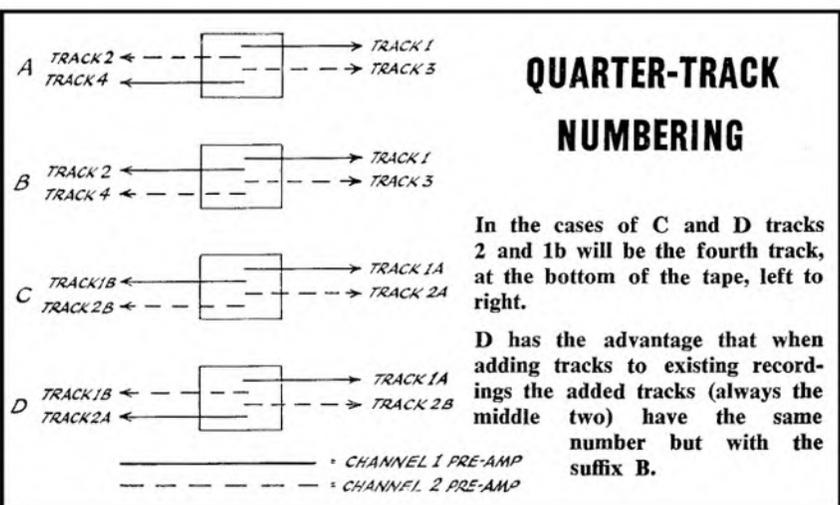
Next, with the screw at the back of the head plate, make sure that the head is vertical by checking against the tape, which should be held taut across the front of the heads. The correct position of the tape should be checked against the three tape guides.

Testing

Having roughly lined up the playback head and replaced the pressure pads, playback at ordinary dual track recording and listen to the result. Compare the quality of the playback with that from the Brenell replay head by switching during playback from one position to the other with the head selector switch. There should be a slight drop in signal strength but the frequency response should sound as good if not better.

Make sure that the pressure pads are in contact with the tape and pressing it against the head. If necessary adjust the back screw for vertical alignment to see if this improves the response. If no signal is obtained from the quarter-track head with the half-track head working satisfactorily, lower the quarter-track head a fraction as the gap may be just off the signal on the tape. Try a playback on Channel Two. Here you should only hear track two of the recording played backwards. If you hear any of track one the head is too high. Lowering it a fraction will improve playback on

(Continued on page 30)



In the cases of C and D tracks 2 and 1b will be the fourth track, at the bottom of the tape, left to right.

D has the advantage that when adding tracks to existing recordings the added tracks (always the middle two) have the same number but with the suffix B.

Teaching tape

to tiny tots

By

ALAN EDWARD BEEBY

HELLO, kiddies! On your own, this evening? Mummy and Daddy gone round to the boozier? . . . And somebody's been hammering on the front door. The rent man? Never mind, I expect you kept ever so still and quiet, didn't you, just like Daddy! Read all your comics? . . . And that book there? What's that, then, ducky, let's see. . . ? Oh, you mustn't have that one, that's Daddy's! M'mm? No, well, he wasn't a very nice game-keeper! Now, put it back where you found it, there's a good boy.

Been playing with the pussy, have you? Where's the pussy gone now, then? Eh? Where is the p . . . oh dear what's the matter with it? Did you? Well now, that was rather silly, wasn't it? Pussies can't swim, can they? It didn't! No, well, you leave it where it is and Daddy'll, er . . . see to it when he comes home!

Now, what shall we do next, eh? Tell you what, let's have a jolly little game with Daddy's tape recorder, shall we? Yes, you go and fetch it. Careful. . . ! Can you manage to lift it down? Whoops-a-daisy! Pick it up, ducky, don't leave it lying in the coal-scuttle like that—it'll get all dirty, won't it! The lid's bent? Oh, I see, the hinge has broken, has it? All right, we'll tell Daddy about it when he comes in, won't we, eh? I bet he'll say: "Hello, hello! What's my little man been up to this time?" And then he'll pat you on the head and start running his fingers through your insurance policies! What? Oh, nothing, just Uncle Alan's little joke, that's all (Phew!)



Have you got the microphone? Good! Now, let's find out where your power p . . . here, you mustn't hit your toy drum with Daddy's microphone like that! It isn't a drum-stick, is it? Don't want to spoil your nice, new drum, do you?

There's the power-point, over there by the sideboard. Go and plug the mains lead in. . . . Yes, in there, that's right. Don't roll all over the floor like that, ducky, what are you doing? What went up your arm? Now, now, that's naughty! (What a revolting expression for such a young child!) Come along, now, plug the nice lead in, like a good boy. That's right! Now, do you see that little switch that says, "On/Off"? Yes, that's the one—press it down. . . .

Oh, dear! The naughty tape recorder

went off "Bangity-Pop!" did it? I wonder why it did that? Did you see all those pretty little blue sparks come out of the side? That's called a "short-circuit." Did you know that? Eh? There, there, now! Dry those tears and be a big, brave man! (250 volts . . . probably shook the little horror's nerves up a bit!)

Let's see how you've got the mains lead plugged in, shall we? I bet you've stuck it into the tape recorder upside-down, haven't you, you silly billy! Daddy says what? It can only be plugged in one way? Well, you've proved Daddy wrong then, haven't you? (You little nit, you.) Try it again. Push it right in . . . That's the way!



There we are! The little yellow light's come on now—see? Can you see the . . . look, leave the pussy-cat alone! Yes, it's . . . gone to sleep, now put it down! Oh, don't pummel the poor pussy about like that—what are you doing? Giving it what? Artificial reverberation? Look, I should take it and lay it outside the back door, if I were you . . . that's right. (Don't suppose the fresh air'll do it much good, but still. . . !)

Done it? Shut the door, then. Now, do you know where Daddy keeps his spare tapes? In the cupboard? Yes, you go and fetch one. No, not all of them, that large one will do. It is a big spool, isn't it! Whoops! There, now it's gone rolling right over to the other side of the room, hasn't it? Naughty tape! You've what? You've still got hold of one end of it, have you? (Yes, you would have, you pint-sized idiot!)

Let's roll it up again, shall we? What's that you say? What are those little pieces of white paper stuck all along the tape? They're splices, ducky. SPLICES! Yes, you see, each section of brown tape in between those white pieces is a separate sound, and Daddy has stuck them all together to make one long sound. Where. . . . Where do *which* two pieces go? Oh dear, now you've pulled it apart!

Never mind, Daddy will sort them out, won't he? What have you done with the two loose pieces? You've draped them . . . over the "pot" on that big loud-speaker in the corner! What? No, it doesn't matter . . . now!

Shall we thread the rest of the tape on to the recorder, then? All right, you can do it if you want to. There's a clever little man! Now, which is the "play-back" button? That one? Right, ready. . . ? GO! Oh dear, now you'll have to thread the tape back on again, won't you? That was the "fast-rewind" button, wasn't it! (Look at the idiot, laughing all over his face!)

There, that's done it! You've found the right button, have you? Ah, that's the one. Oh, look, another little light's just come on—do you see it? Now, you listen. . . . Listen. . . . L. . . . !

Yes, the music is a long time coming on, isn't it? 'Pardon? What's that little needle flickering for? Well, that's the recording meter. You see, every time you speak . . . look, watch it . . . that means we're rec—TURN IT OFF!! Press the "stop" button! Ooops! Yes, the tape is going round fast now, isn't it! No, I don't know why it's all going underneath the spool. . . ! All right, so the spool's climbing higher up the spindle. . . ! There! Now it's jumped right off, hasn't it!



SH-H-H-H!! Here's Mummy and Daddy coming back! Quick, put the magazine away before Daddy sees it! Why? Well, we don't want to upset Daddy, do we? I mean, if Daddy was in one of his funny moods, he might start writing letter to the Editor about our little bit of fun, and then poor Uncle Alan would lose his job, wouldn't he! Now, listen. If Daddy asks where you read it, you tell him that you saw it in Vivienne Gooding's column. Yes, that's right, Vivienne Gooding. O.K.? Bye-bye, kiddies!

Make way for the

LADIES

Personality of
the month—6
LILLY

A new regular
monthly feature

Edited by
Vivienne Gooding



"POOR Lilly!" I can hear them mutter. "Poor Lilly, she's always getting herself into such frightful scrapes."

Poor Lilly; troubles cling to her more quickly and more easily than strawberry jam to my youngsters' washed and hopeful tea-time faces. Isn't it strange how some people seem to go through life attracting trouble, whilst others never have to suffer the merest rippling in the sea of calm on which they ride serenely from the cradle to the grave? But Lilly's troubles aren't the desperate catastrophes that spell major ruin or disaster, they're just—troubles!

I can't think of anything more ordinary and normally trouble-free than going to bed; after all, it's a thing that most of us do with pretty monotonous regularity. For a person like Lilly the

dullest of daily routines rarely remains dull for long, so I asked her to go through the motions of retiring for the night in front of the microphone specially for me.

Some people might think it rather odd if I told them I wanted to record what happened when they went to bed; some might even think it very rude. Not so Lilly. Neither surprised nor perturbed

she agreed at once and immediately began to search out all the little bits and pieces so dear to our women's hearts at bed-time.

We decided to start the recording from the pyjama stage onwards, and no one could fail to admit what an attractive pyjama girl she made. But as soon as we began the purely feminine part of the business Lilly found herself in trouble. Little things like hair nets and curlers were subdued with a struggle, but the face cleansing cream was the end! Poor Lilly! Not only did her face begin to look like a well-larded chicken just before it's popped into the oven, but somehow her hand must have slipped into the jar and the white, greasy stuff began to ooze up between her fingers. Poor Lilly!

The whole time she was describing what she was doing, and please don't think that she was intentionally "putting it on" for the sake of the recording—far from it. These things just happen naturally to Lilly without any outside help at all!

Lilly had done this kind of thing for me before, and so she knew just how to handle the subject descriptively, and in fact the recording we took was not bad. If you have an idea that this sort of recording is easy, just have a go and see how difficult it really is. Success depends entirely on the ability and co-operation of your "victim". This kind of "getting into trouble" is essentially humour of the visual, slap-stick variety and it's terribly difficult to convey by sound alone, although the effects are only too obviously funny to the eye.

I was lucky with Lilly because not only does she have a wonderful sense of humour which positively sparkles when she's making fun of herself, but she's able to express herself in such a way that the listener instinctively knows what's going on and can identify herself personally with the action.

Several times I've tried to persuade Lilly that her talents might prove worthy of a highly-paid professional career. She's not interested. To earn her bread and butter she manages the cosmetics counter in one of the big multiple chemist's stores. The work is hard, the hours long and the pay modest. She uses a tape recorder at home, but only for recording popular music of which she's very fond. With a sigh she admits that things often go wrong when she tries to use it on her own. Poor Lilly. In trouble again!

When a succession of little things go wrong, and heaven knows they do often enough, I try to think of Lilly. Always in trouble, but always ready to laugh it off. I wish I could do the same.



My Diary

WHEN did you last have a hair-do? No, I don't mean a home perm with the help of the girl next door, but a real, honest-to-goodness session at the salon. Try to remember, then read on.

Early in May the hairdressing trade held its bi-annual trade fair at the Alexandra Palace, and I went along on your behalf to see if I could wheedle any top secrets out of their real experts. I spoke to the champion stylists, the international prizewinners; I spoke to the manufacturers of the most exclusive preparations and I spoke to the even more exclusive and dazzling glamorous models whose gorgeous gowns and practiced poise carried some of the most exotic and fabulous hair styles I have ever seen.

Is their hair more than human or is mine less? That was the question. Why can I never do a thing with mine, and why when at its best is it still utterly hopeless compared to what I saw at the Alexandra Palace?

I was using a Fi-Cord battery machine for my interview, and all the people I spoke to were not only very co-operative and courteous but many of them showed a lively interest in tape recording and *Tape Recording Fortnightly*. They were very impressed with the machine, too. I think a battery recorder is essential for working under exhibition conditions. Trailing mains cables would have been a nightmare!

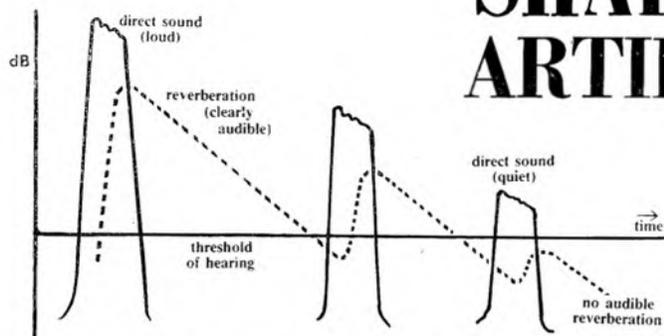
Funny how things always happen to me, though. The very first person I in-

terviewed looked somewhat blankly at me when I spoke to her, and then when I waved the microphone under her nose nothing happened. She looked at me even more blankly and just a little frightened. It was later that I discovered she only spoke French . . .

Did I learn the secret of how to manage a mop of unmanageable hair? Indeed I did. Without exception all the experts were agreed. There is no need for irritation and lost temper every time you go out because you "can't do a thing with it". The remedy is very simple. *Just make a point of regularly visiting a properly qualified ladies' hairdresser and stop trying to fool around with it yourself to save a few shillings.* I was not told this once, but every single time I asked for advice to pass on to my readers it was the same. A hairdresser serves a seven-year apprenticeship; at the end of that time he knows *something* about his job. He will probably go on learning for the rest of his working life. However helpful the girl-next-door might be she's no substitute for the real thing.

I wonder why I've never established a regular monthly appointment to the hairdressers—heaven only knows my mop needs it. I think I'd better get on with the washing-up before my husband tells me . . .!

SHAPING SOUND-5: ARTIFICIAL ECHO



Direct and reverberant sound. If only a touch of "echo" is being added, then for loud sounds the reverberation time will appear to be longer than for quiet sounds; and for very quiet sounds the "echo" may be imperceptible

AMONG the various techniques for changing the quality of a sound, "echo" is by far the firmest established. "Echo" may be added to music to blend the elements of a too-dry sound, or it may be used dramatically to provide a "bright" acoustic or cavernous quality. Then again, it may be used as a gimmick, as in "pop" music, and so on.

The term "echo," by the way, has become a piece of technical jargon; and when discussing the subject we should really use the term "reverberation" for the process whereby sounds created in a confined space are reinforced by multiple reflections from nearby surfaces.

Before going on to describe some of the techniques for creating echo effects, perhaps I had better say something about the nature of reverberation itself.

Reverberation time is a measure of the most important single quality of any room which is to be used for recording in. It is calculated as the time it takes for a sound to die away to one millionth part of its original intensity (60 dBs).

If the decay process were continuous the sound intensity could be expected to fall at an even rate of dB/sec. However, the process is discontinuous, there being a large number of small losses at successive reflections. In addition to this, the various different surfaces will have different absorption co-efficients, and these in turn will be frequency-dependent. As a result, the decay will have many small irregularities; but unless these are excessive, this is beneficial rather than otherwise, in that they add a certain amount of character or vitality to the reverberation.

The overall rate of absorption will not generally be the same for all frequencies, and there may be resonances causing marked coloration. And it is also worth noting that different spaces of a large hall may have different absorption rates. In such cases the more heavily damped part of the

hall (e.g. underneath a balcony) may have a complex decay curve; after mopping up its own ambient sound it will continue to be fed from the space or dimension with the longer reverberation time.

Most recordists will remember the first lesson they were taught about dubbing tapes or recording from a radio or gramophone: that an electrical connection should be made, rather than an acoustic pick-up with a microphone in front of the loudspeaker. And the main reason for this is the coloration, the change of quality that the sound would suffer. This would be due to the frequency characteristics of the loudspeaker and microphone themselves as well as the acoustics of the room and the standing wave pattern in which the microphone will be situated.

But there is a second reason why the acoustic method of dubbing is not recommended, and this is the change in quality which will occur due to the increase in the actual proportion of indirect sound. This increase may at times be very marked. Indeed, in some cases (for speech particularly) the reverberation time of the room that is used for re-recording may be greater than that of the original studio. In the case of straightforward copying, such changes must

clearly be avoided. But if, on the other hand, such an effect is actually wanted, the very same layout—or an extension of it—can be used as an echo chamber.

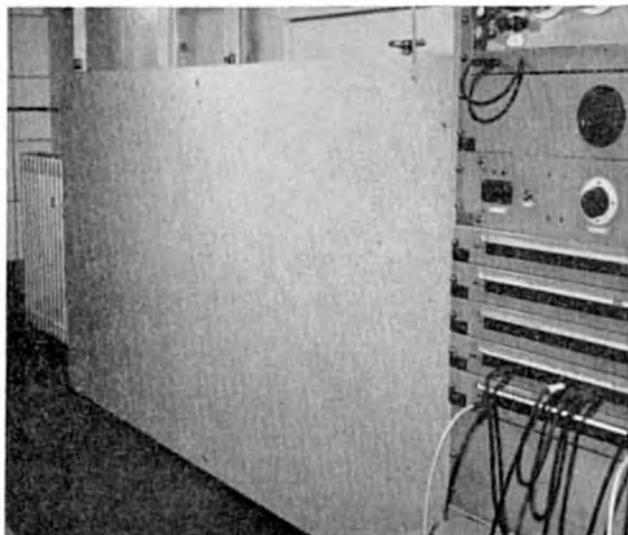
Obviously in the case of the echo chamber, deficiencies of loudspeaker and microphone can still be troublesome—but provided the room itself does not have excessively unpleasant colorations (not a simple proviso if a smallish room is being used) the linearity of the microphone and speaker need not be much better than the room. In other words; provided that the response of the equipment is moderately flat, quality need not be up to extreme hi-fi standards. Some fall away in bass response may be no disadvantage and will often compensate for boominess of the echo chamber.

In the case of concert halls it is not usual to monkey with the acoustics by adding this sort of reverberation—though before the war the Broadcasting House Concert Hall was used as an outsize echo chamber for some transmissions from Covent Garden. But in general an echo room is small and has reverberation characteristics which would rarely improve even a bad concert hall.

Artificial echo assumes more importance when one is dealing with smaller instrumental groups—particularly where these are not internally balanced in the way that a symphony orchestra is.

A simple case is where a small orchestra appears a little thin on woodwind. To compensate for this a special woodwind microphone may be slung; and then, in order to restore the proper perspective, a touch of echo can be added to its output.

In many complex dance band balances a



SHAPING SOUND—5: ARTIFICIAL ECHO

ALEC NISBETT describes some of the equipment and techniques used by the BBC and record companies for adding reverberation artificially.

separate microphone is used for each section, and each has its own individual echo control.

The extreme case is that of the commercial studios built specially for recording "pop" gramophone records. Nowadays these studios may be designed to be acoustically fairly dead, close balance and individual echo being used throughout. It is felt that this gives a more versatile form of control over reverberation (once you've placed your microphone you can add reverberation, but you can't take it away); it reduces spill from one section to another and of course it also saves space, much smaller studios being possible. (Incidentally, if by any chance you feel your "pop" records are too dead, there is now on the market a record player which has built-in echo—the mechanism is a system of springs.)

Let's take a look at the echo chain as it has been developed by the BBC. This is the sort of layout that is used for all but the smallest talks studios:—

After pre-amplification the output from each of the sources (microphones and grams) is split by a hybrid coil, one feed being taken direct to the gain control for that source, and the other joining the feed to the loudspeaker in the echo chamber. For each source there is also an echo mixture switch, which is used to control the proportion of the two feeds. In its central position both are fed at full volume: turning one way the echo feed is reduced to zero; turning the other, the "direct" is cut down instead (a two-pole, nine-position switch is used). The output from the echo chamber microphone is returned to the control desk

as an additional source with its own individual fader.

The advantages of this system are obvious: the ratio of direct to reverberant sound can be varied well beyond the normal range permitted by varying the microphone balance; the results are much more predictable (balance is something of an art) and the whole operation is simpler.

A disadvantage is that once the echo chamber is laid out, its reverberation time is fixed. If this is about two seconds it may be suitable for music but less satisfactory for drama—a little echo goes a long way when used on monophonic speech. If, however, only a touch of echo is used, it will be noticeable only on the louder sounds; a situation which corresponds well with what we observe in real life. In this case the rather overlong reverberation time will be apparently reduced. (Another way of dealing with this would be to replay a tape through the echo chamber and re-record, with both machines running at half speed—or at double speed for doubling the apparent reverberation time. But I don't recall any occasion on which this expedient has been used, as there would inevitably be losses in copying and replaying at "incorrect" speeds.)

It should be noted that for any changes or contrasts of perspective rather more sophisticated techniques will be needed. For example, as an actor moves in close to the microphone the signal will tend to increase—and so will the echo, unless it is faded down. This leads us to consideration of a set-up which affords a more realistic picture and which involves the use of a second bi-directional microphone with a strong echo feed, suspended above the main working microphone. Then, as the actor moves in close to the lower instrument he moves out of the field of pick-up of the upper one. In this way perspectives can be emphasised without constant resort to the echo fader.

The echo chamber itself may be a room with "bright" reflecting walls, perhaps with "junk" littered about at random, in order to break up the reflections and mop up excess mid-range reverberation. Or it may have a wall most of the way down the middle, so that sound has to follow a U-shaped path. At the RCA studios in Hammersmith (where sound is dubbed for many CinemaScope pictures) a disused stone staircase has been turned to effective use.

Another device—more versatile than the echo chamber because its reverberation



The author demonstrates an acoustic pick-up from grams or tape. Generally speaking, this is the way not to mix in effects—but just occasionally, it is advantageous to route a sound through the studio, as when an effect recorded in the open air requires an indoor acoustic adding to it. An additional advantage is that the actors (who normally cannot hear recorded effects while their own microphone is live) have something to work against

BBC photographs



A BBC studio manager adjusting the decay time on a motorised reverberation plate during a dance band rehearsal. The plate itself is sealed in a box and tucked away in a corner—taking up little space compared with an echo-chamber

time may be varied—is the reverberation plate. In principle this plate is rather like a thunder sheet, except that instead of being hand operated, and delivering its energy directly to the air, it has two transducers. One of these vibrates the plate, rather as the coil vibrates the paper cone in a moving coil loudspeaker; and the other, acting as a contact microphone, picks up the "sound" and its many reflections. (It is, in fact, possible to make an electronic thunder sheet by using a suspended metal plate and a contact microphone or adapted gramophone pick-up.)

The reverberation plate is a steel sheet held under tension, and it has a basic reverberation time of over five seconds. This can be gradually reduced to well under a second by increasing the pressure of a damping blanket which is held alongside the plate. In one BBC studio, the damping element is motorised and control given to the studio manager at the control desk; the reverberation time can even be changed while the plate is in use, if necessary.

With the plate, as with an echo-room

(Continued on page 18)

STC and the Royal Wedding

TUCKED away in a little room between the choir and the astronomical clock in York Minster, the scene of the recent Royal Wedding, was the STC sound reinforcement equipment used during the ceremony.

Our photograph shows Mr. R. Booth of STC checking the performance of a microphone pre-amplifier in readiness for the event.

The Minster's permanent sound installation was completed by STC in 1955. There are nine microphone channels for the choir area, and another nine for the nave. A 45 watt power amplifier feeds eleven loudspeakers throughout the Minster. The system normally uses STC 4035 microphones.



MISS BRENDA NORMAN of 50, Roslin Way, Bromley, Kent, receiving from Mr. Peter Dimmock the Stuzzi Mannequin tape recorder which she won in the Sportsman's Night Raffle held recently in London. The recorder was donated by Recording Devices Ltd. and Mr. Dimmock drew the tickets for this annual sportsman's get-together organised to collect funds for the Sunshine Homes for Blind Babies and Children.

BBC CONTRACT

The BBC has placed a contract with EMI Electronics Ltd. for thirty TR90 professional tape recorders and 42 TR90 replay machines. This equipment will be used in BBC broadcasting studios throughout the various Regions.

Most of the equipment will be trolley-mounted for easy movement between studios, but four of the tape recorders will be fitted into transportable cases in mobile recordings.

SHAPING SOUND

(Continued from page 17)

(and for that matter, any other room) reverberation will be discontinuous and there is likely to be some colouration. As I have already indicated, within limits this may not be undesirable; but it is very easy for these limits to be exceeded and for the colouration to assert itself unpleasantly. (This would depend on the positioning of the two transducers on the plate as well as the tension under which it was kept.) Incidentally, there will be quite a significant signal taking the direct path between the two transducers, a condition which may be avoided in the chamber; this means that there is a limit to the proportion of echo that can be mixed with a sound if the plate is being used. But this is a restriction which is very rarely of importance—and far outweighed by the convenience of being able to vary the reverberation time.

To the amateur these techniques will probably sound highly sophisticated—indeed at times almost excessively so. For the amateur has, for dramatic work, techniques available which the professional cannot conveniently use—he can, in fact, go “on location.” Not necessarily the actual location required by the script—one amateur tape I've heard gave me a highly convincing picture of a journey into a crypt; and it turned out later that after opening the creaking door (ironing board) the scene had been played to an omni-directional microphone underneath the kitchen sink.

The amateur has time on his side; for dramatic work he can experiment to find the right acoustic for each successive scene, and there is no reason why he should not achieve results which are, from this point of view right up to professional standards.

continues his series explaining the fundamentals of sound and electro-acoustics

AT the beginning of this article I should apologise to those readers who might think that their school-days have returned. Basic units have a habit of interlocking with each other and this Branch is no exception, hence the quote used as a heading for this article.

In Part One we considered a small piston set in a wall, producing alternate compressions and rarefactions of the air surrounding it. The magnitude of these variations determines the intensity of the sound, whilst the rate of the variations determines its pitch.

The amount of deviation from the mean value is termed the *excess pressure*, and since this is an alternating quantity, its RMS value is the one normally used. Pressure is force applied over unit area and in the CGS system, sound pressure is given in dynes per square centimetre.

The *dyne* is defined as the force required to produce an acceleration of one centimetre per second when acting on a mass of one gram. The sensitivity of microphones is given in terms of these units, i.e., volts per dyne per square centimetre.

As the air is compressed, it acquires potential energy and in this way pressure can be considered to be analogous to voltage. By reference to a standard pressure, the second pressure level (SPL) may be specified in decibels. 0 dB is taken as .0002 dynes per sq. cm.

The intensity of the sound is a measure of the power delivered to the air by the piston. Since the pressure is analogous to voltage in an electrical circuit, it follows that there is also an acoustical equivalent to resistance. The Specific Acoustical Resistance is obtained by multiplying the density of the medium by the velocity of sound in it. The unit of sound intensity is the erg per second per square centimetre. (1 erg=1 dyne-cm.) Alternatively, watts per sq. cm. may be used.

THE NATURE OF SOUND

Part Four—More definitions

“Begin at the beginning, and go on till you come to the end: then stop”

—The King, “Alice in Wonderland”

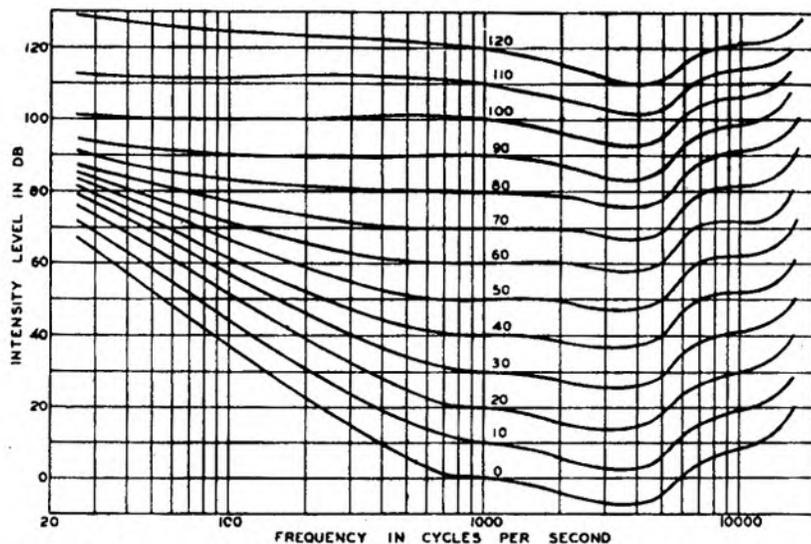


Fig. 1. Contour lines of equal loudness for normal ears. Numbers on curves indicate loudness level in phons. $0\text{dB}=16^{-16}$ watts per square centimetre. $0\text{dB}=0.000204$ dyne per square centimetre. (After Fletcher and Munson).

Reproduced from "The Journal of the Acoustical Society of America"

In a science which is closely linked to the behaviour of the senses, it is desirable to use units which can be obtained subjectively. It is a well-known fact that the ear has a non-linear frequency response. Two sounds of differing frequencies which appear to have the same intensity will not necessarily have the same SPL. Moreover the difference will not remain constant when the general level is changed.

Much work in this field was done by Fletcher and Munson in the Twenties, and they published curves showing the frequency response at various sound levels of the ear in 1933.

The minimum audible sound pressures over the audio range were established for a large number of observers and also the pressures which ceased to be perceived as sound but gave a "tickling" sensation. These two boundaries are known as the thresholds of audibility and feeling respectively. Within these boundaries, contours of equal loudness were then

determined. The observers were placed in an echoic chamber and a reference tone was compared with a tone of varying frequency. Curves were then obtained of sound pressure versus frequency for tones which give the same impression of loudness. Fig. 1. The threshold of audibility at 1,000

TABLE OF NOISES

Source and description of noise	Loudness in Phons
Hi-Fi addict's equipment	140
Threshold of pain	130
Pneumatic drill, express train (12 ft.)	90
Busy city street or factory	80-90
Cinema music	—
Noisy office	70
Normal speech	60
Quiet restaurant	50
Quiet garden and normal domestic noise	30
Rustle of leaves in slight breeze	10
Threshold of audibility ..	0

cps is 10^{-16} watts per square centimetre. The loudness level in *Phons* is numerically equal to the SPL of a pure tone of 1,000 cps which is judged to have the same intensity.

Thus a tone having a level of say, 20 phons, would have a SPL of 20 dB at 1,000 cps but 40 dB at 200 cps.

The table at the foot of this page gives a scale of ordinary noises, selected from various sources, to enable the reader to form an idea of the phon.

The non-linearity of the ear is the reason why misleading results are often obtained when the performance of two sets of reproducing equipment are compared at differing levels. Some otherwise very fine but low efficiency loudspeakers have been passed over because they have appeared to lack bass when they have been judged on an incorrectly set up comparator.

In order to preserve the original balance when reproducing music at a low level, compensated volume controls have been devised which boost the bass in such a way that when playing at say 50 phons, an 80 phon characteristic may be obtained. Since this idea is primarily intended to prevent annoyance to the neighbours, it does seem to have an important drawback. The reduction of 30 phons only results in a reduction of 8 phons at 30 cps. It is the lower register which is transmitted through the walls. Where are our good intentions then?

There is a strong argument for the adoption of a system of measuring sound in *Loudness Units*. This is based on the principle that when the units are doubled, the auditory sensation is doubled, when they are trebled, the sensation is trebled, and so on.

Taking the zero level as 10^{-16} watts sq. cm. as before, it has been found that an increase of 2.1 dB gives the impression that the loudness has doubled. This is equivalent to increasing the loudness from 1 to 2 Loudness Units. Similarly an increase of 3.9 dB above threshold results in an impression of three times the loudness, i.e., 3 LU. Proceeding in this way, it was found that a loudness level of 40 phons gave an increase of 1,000 LU. A level of 1,000 LU is called *1 Sone*.

In the subsequent articles we shall be dealing more specifically with loudspeaker topics, and in the next issue we will discuss the basic requirements of a loudspeaker.

Tape for Stereo

For those whose interest in sound is wide and flexible

NOW that more tape records are becoming available the subject of tape versus disc for stereo will become a very lively one for discussion where audio enthusiasts meet. I hope that it will be dominated by the question of the superiority of one or the other from the point of view of all-round, sustained quality rather than of handling convenience and similar questions.

By all-round quality I mean quality that includes the best possible spatial fidelity in addition to pure fidelity of sound—although it deserves to be stressed that the latter is impossible without the former except in the case of a solo instrument or solo voice.

Congenital monophonists will protest at this, but there can be no doubt that monophonic reproduction of an orchestra, or a piano-violin sonata, is a form of distortion. We love to hear a number of instruments or voices in action at the same time, but we love the mixture less and not more if the sound waves are completely integrated, thereby reducing our chances of distinguishing the individual components.

And those who reach for a grain of salt to aid the digestion of what might seem to be, at best, a refinement too small to be important, should remember that the eye is fully capable of perceiving and enjoying, in an instant, a complex pattern of many individual shapes and colours—and, what is significant, perceiving and resenting any accidental overlapping and confusion.

As well as being high, it is equally important that the quality should be sustained in every particular, including the particular separation. In the case of disc, it helps if the equipment is first class, and kept in first-class condition, but if the standards are not so high then it is

quite certain that the stereo effect will progressively disappear as the record is played a number of times.

Discussion is likely to take place, too, on the problem of standards. On the question of tape standards I do not see why it should not be possible for the recording companies to give us, if necessary, the same performances at alternative speeds and on alternative track widths—just as we now have the same subject matter on 45's as on 33 $\frac{1}{3}$ rpm discs when the occasion calls for it. This would not be simple, I know, and the shops would not be able to carry immediately stocks of all versions; but it would help stereo forward and after a time the process of natural selection would bring us back to a commonly accepted standard.

Tape is not alone in having its problems of standards, however. In the case of disc, the acceptance of the 45/45 system has not solved all the difficulties by any means. It seems that we still have to resolve, internationally, the matter of the cutting angle of the recording tool, the avoidance of distortion depending on correspondence between the angle of the cutting tool and the angle of the playing stylus.

Relevant to the tape-or-disc question is the news that a standard system has now been selected for stereo broadcasting in the United States. It serves as a reminder that stereo broadcasting is sure to come here, too, although nobody seems to be in a hurry about it. When it does arrive I am quite sure that people who have come down on the side of stereo on tape will be glad that they have done so; for there will be a great deal of attractive broadcast material that will be worth hearing more than once, apart from musical performances.

Undoubtedly the future is with stereo rather than mono; and because that is so I am inclined to think that the future is for tape rather than disc—especially for people whose interest in sound is wide and flexible.



B.R.E.M.A. COMMITTEE ELECTED

AT the second annual general meeting of the Audio Manufacturers' Group of the British Radio Equipment Manufacturers' Association, at the Hotel Russell, London, on May 17, the following firms were elected members of the management committee:—

Associated Electrical Industries Ltd.; Clarke & Smith Manufacturing Co. Ltd.; Decca Record Co. Ltd.; Easco Electrical (Holdings) Ltd.; Electric Audio Reproducers Ltd.; Gramophone Co. Ltd.; Grampian Reproducers Ltd.; Jason Motor & Electronic Co.; Lowther Manufacturing Co.; Philips Electrical Ltd.; Standard Telephone & Cables Ltd.; and Trix Electrical Ltd.

After the annual meeting the new management committee elected D. M. Chave (Lowther Manufacturing Co.) and Major J. F. E. Clarke (Clarke & Smith Manufacturing Co. Ltd.) to be chairman and vice-chairman respectively.

During the meeting it was stated that the Hall of Sound, proposed as a new feature of this year's Radio Show at Earls Court, has not so far received the support expected, even from AMG member firms.

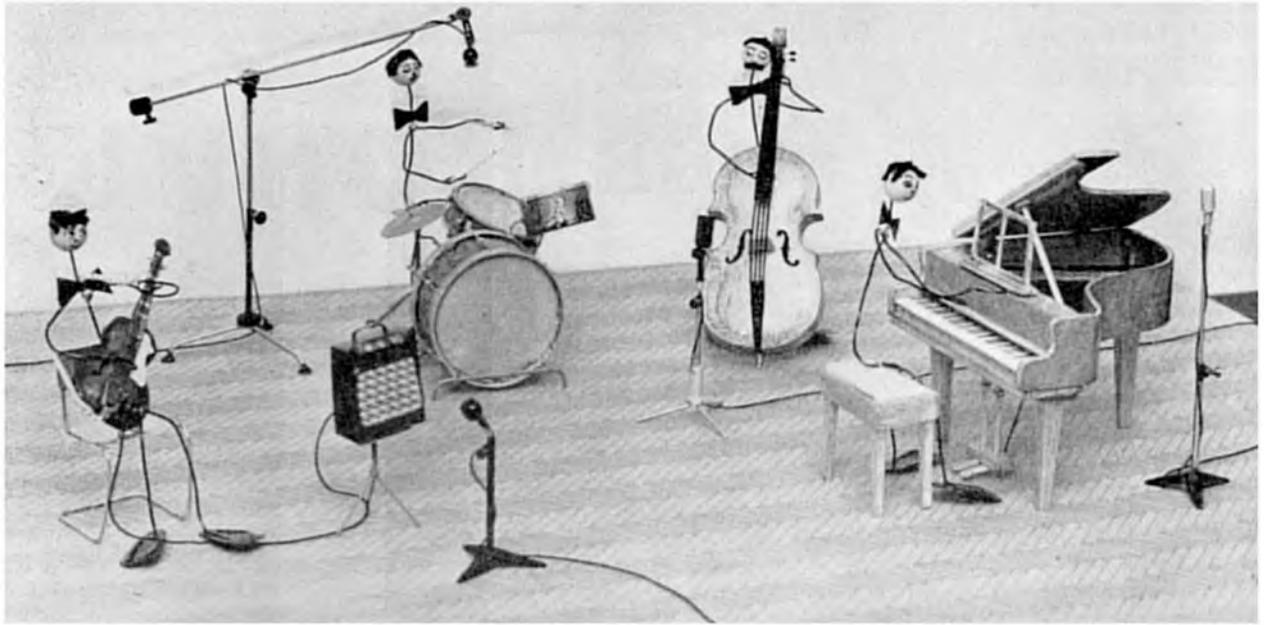
The committee asked members to consider urgently if they will exhibit. Firms in the audio field who are interested in the project should get in touch with the A.M.G. at B.R.E.M.A.'s offices at 49, Russell Square, London, W.C.1, without delay.

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Where does the sound radiate from?

How much space is needed for full tonal appreciation?

Does the room or acoustic environment enhance the sound?

THESE are three basic questions for which we ought to have the answers before we can expect successful applications of microphone skill.

The first consideration will give us the direction, that is, for the microphone to face the true sound source. Your personal preference will determine the proximity in question number two. The answer to the third question will provide you with information on the types and quantity of microphones required.

A good deal of training and experience is obviously behind the recording engineer who is proficient in quickly evaluating a recording requirement, but perhaps a more encouraging note would be to consider a small number of individual sounds, before attempting to size-up the grander orchestral ensembles.

The photograph of the model quartet arrangement may well represent a cabaret musical show group or a small jazz band. This kind of entertainment is to be found in hotels and restaurants.

So far the tendency has been to pick-up with the microphone a higher proportion of direct to indirect sound and, therefore, one of the problems in this case is should the microphone be aimed at the piano strings or the facing surface of the open piano lid?

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

We may well argue that we hear more reflected than direct sound in the auditorium of the concert hall, but this is all part of the environment and may not necessarily satisfy the listener who is seated at the loud-speaker end of the chain—especially a high quality outfit!

As well as the application of science and various techniques, there is always the personal preference factor—possibly the reason for so much variety in present-day recordings under one title. At first, it might be as well to endeavour to satisfy your own taste in balance and presentation and if there should be criticism then inevitably a change of taste will come about with experience.

As a precaution for the musically unqualified recordist, why not have the guidance of a good musician friend—who could more readily suggest that an alteration is necessary. It is then up to you to interpret the remarks and take action. The arrangement is not uncommon in some studios where so much depends on good balance and musical expression, to name but two aspects.

The illustration also shows the close-microphone method in use, where each instrument is catered for individually. Naturally if the microphone is placed too close to instruments

which respond more to the lower frequencies, then the harmonics will become quite audible and the resultant effect jarring. However, proximity to the higher tuned instruments is such as to pick up as much “attack” or “top” as is necessary for wide-range results.

Ideally, one microphone could be aimed at the piano strings as shown, in order to pick up as much direct sound as possible. Once the original note is captured, then in varying degrees can be added the reflection or reverberation; thus an additional microphone can pick up from reflecting surfaces, such as walls, pillars, floor, according to the amount of colour desired.

It has been said by some keen concert goers and music-lovers that the recorded music has far superseded the original performance; perhaps because of the physical impossibility of being present in a number of favourite places in the auditorium at once. Nevertheless, this is where the carefully placed microphones can win.

Despite much controversy on this point, a good recording artist is not deterred from constantly striving for optimum results alongside personal preference, whether it takes a few minutes or hours to reach a happy compromise.

Equipment Under Test

THE Robuk RK3 tape recorder is the result of over ten years experience in the manufacture of recording equipment. It combines many of the facilities and standard of performance found only on some more expensive machines, with a simplicity of operation that will enable any member of the family to achieve satisfactory recordings.

It is supplied complete with microphone, seven-inch reel of tape, spare spool, instruction book and a lead for connecting to a gramophone or radio. The RK3 costs £37 16s., at which price it is very good value indeed.

It is very attractively styled and the case is one of the best I have seen for some time. Strongly made of wood, it is plastic covered and may be washed with warm soapy water or cleaned with any good brand of furniture polish. A strong handle is provided, and as the total weight is only 23 lb. it is quite portable. A maximum reel size of seven inches

can be used with the lid closed, but the lid may be removed if required.

The styling of the tape deck is a breakaway from the type of thing one normally expects a tape deck to look like, as can be seen in the photograph above. Five push-buttons are incorporated. These are mounted flush with the moulding and (except for the red stop button) are of the same colour. Only a very slight pressure is needed to operate any of these, the various functions being: stop, wind on, wind back, play, and record. The record button is interlocked with

a small press switch to guard against erasing a previous recording by mistake. A pause control is also fitted.

On the right hand side of the deck is the speed selector, recording level indicator and super-impose button. The correct amplifier function is selected when the appropriate button or switch is adjusted. For example, speed equalising is ganged with the speed selector switch.

The following facilities are also incorporated: radio or gram inputs can be mixed with the microphone as each has its own gain con-

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TAPE RECORDERS

218 HIGH ST. BROMLEY, KENT. RA.V. 4477

By
E. A. RULE



control; monitoring can be carried out on the internal speaker as a recording is being made; and the monitor volume can be controlled independently of the recording being made. A top-cut tone control is provided on replay and there are outputs for either an external loudspeaker or hi-fi

Tape Recording Fortnightly and therefore is a standard production model.

The full manufacturer's specification added below should be compared with **Table 1** which shows the results of the tests made.

The percentage distortion at various power outputs is also given and includes the distortion in both the record and replay amplifiers as well as any distortion due to biasing, etc., it is therefore the distortion under normal working conditions.

The frequency response of the model tested was not as good as the claimed response, but I feel that this was due to the sample of tape supplied with the recorder and not due to any fault. When re-tested with a change of tape the claimed response was obtained. However, as the maker recommends the tape supplied the results obtained on the first test must stand.

A printed circuit is used and is of good quality, the general workmanship being very good.

Recordings made from a VHF tuner were completely free of wow or flutter at $7\frac{1}{2}$ ips. Erasure was full and even a tape that was over modulated could be wiped clean. The crystal microphone supplied gave pleasing

quality on speech but a higher quality microphone may be needed for music.

Summing up; although on a few points the recorder did not quite meet the claims made, I feel that it is very good value for money, it has more features (useful ones) than many recorders costing much more and is well constructed so that years of trouble-free operation should be obtained. The results when feeding into a hi-fi external speaker system were excellent and would put many other so-called hi-fi systems to shame.

If you want a recorder that is pleasing to look at, simple to use, and gives good results with the minimum of trouble, then this is the one to get. I can fully recommend it as value for money.

TABLE 1

Distortion per cent	Watts output
5.7	0.5
5.6	1.0
6.0	2.0
10.0	2.5

total harmonic, measured at 900 cps.
Signal to noise ratio -35dB fully modulated tape to erased tape ratio. 1 kcs tone.
Microphone input 1.5 milli-volts.
Radio/gram input ... 100 milli-volts.
(See graph for frequency response measured at -26dB below tape saturation and 1 watt output across dummy load in place of loudspeaker.)

amplifier system. All the controls are neatly set into the left-hand side of the cabinet. The recorder amplifiers can also be used as a radio or gramophone amplifier, and, by using a tuner, can be converted into a first-class radio. It is fitted with a tape counter.

The tape recorder obtained for review was picked out from a normal production run by the Editor of the

MANUFACTURER'S SPECIFICATION

Speeds: $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{5}{8}$ ips. Automatic amplifier correction at all speeds.

Rewind speed: 1,200 ft. in less than one minute.

Frequency response: $7\frac{1}{2}$ ips: 60-14,000 -3dB; $3\frac{3}{4}$ ips: 60-7,000 cps -3dB; and $7\frac{1}{8}$ ips: 60-3,500 cps.

Signal-to-noise ratio: Better than 40dB.

Wow and flutter: Better than 2 per cent at $7\frac{1}{2}$ ips. Better than 3 per cent at $3\frac{3}{4}$ ips.

Input sockets: Microphone, radio, pick-up.

Outputs: External amplifier and ext. loudspeaker.

Output: $2\frac{1}{2}$ watts.

Loudspeaker: 7 x 4 inch elliptical.

Consumption: Approx. 95 watts.

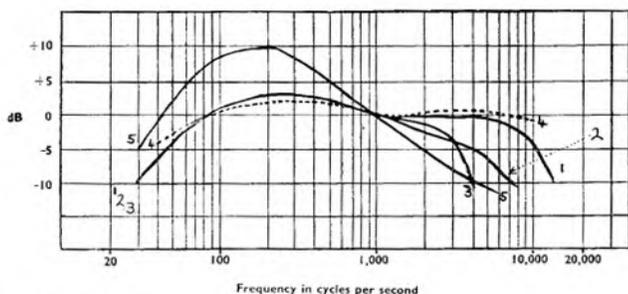
Valves: ECC83, ECL82, EL84, EZ80 and EM84.

Size: 16 x 11 $\frac{1}{2}$ x 7 $\frac{1}{4}$ inches.

Weight: 23 lb. complete.

Other facilities: Three motor deck mechanism with patented brakes, automatic interlock to avoid tape spillage, tape counter, superimposition, mixing, pause control, separate tone control, safety erase lock.

Makers: Robuk Electrical Industries Ltd., 559/561 Holloway Road, London, N.19.



The Frequency responses of the Robuk RK3 showing variations achieved at the three speeds

1: Record/replay at $7\frac{1}{2}$ ips. 2: Record/replay at $3\frac{3}{4}$ ips. 3: Record/replay at $1\frac{5}{8}$ ips.
4: E.M.I. Test tape at $7\frac{1}{2}$ ips. 5: Effect of top cut at $7\frac{1}{2}$ ips

Copyright—Legal action is no idle threat

IT is evident, from their letter published in the May 17 issue of *Tape Recording Fortnightly*, that Mr. P. Tucker and Mr. D. J. Garrett have made a careful study of the Copyright Act 1956. There are, however, certain points on which an incomplete or inaccurate interpretation has, we feel, been given.

As Mr. Tucker and Mr. Garrett rightly point out, Section 6(1) of the Act states that no fair dealing with a literary, dramatic or musical work for purposes of research or private study shall constitute an infringement of the copyright in the work.

It should, however, be understood that the research or private study must relate directly to the copyright work concerned and not, for example, to the science of tape recording. It is also relevant to note that on the basis of the existing case law it seems clear that the term "private study" only covers the case of a student copying a work for his own use, but not for circulation among others. The exception provided by Section 6(1) is, therefore, a good deal narrower than it at first sight appears.

We are glad to note that your correspondents agree that an author or composer must be paid for the use of his work; but we are surprised to see them go on to state that, having bought a book, one is not required by law to pay a further royalty to the author if one copies out a page. By copying out, without permission, so substantial a portion as a page, one would, of course, be committing an infringement under Section 2(5)(a) of the Act. There is very little difference in the general law of copyright relating to literary and musical works.

We cannot let your correspondents' reference to "idle threats of legal action" go without comment. The first point to remember is that a case of breach of copyright is frequently so clear-cut that the defendant agrees to settle the matter before it comes to court; there are, therefore, breach of copyright actions about which the public never hears. If, however, your correspondents wish to read a case which is currently being reported, we refer them to the May 4 issues of *The Times* and the *Daily Express*.

In reply to your correspondents' complaint about the fee charged in one particular instance, we wish to point out that it is surely easy enough to understand that there is, for economic reasons, a minimum below which it is simply not worth while to go.

Your correspondents states that the reason for the controversy is the absolute prohibition on the reproduction of a sound recording. We hope that they have not missed the point that a copyright musical work may not, without permission, be recorded from any source at all, even for private and domestic use.

We cannot agree with your correspondents' suggestion that the law should, perhaps, be altered so as to allow a person to tape his own records for his private use. We do not see why he should be allowed to take advantage, for nothing, of the skill and labour of both the composers and the record manufacturers; in any case there would, we feel, be a risk that for the purposes of recording many would fail to distinguish between their own records and those borrowed from friends or from public libraries.

Your correspondent Mr. Comper has been accused of over-simplification. Although it is clear that Mr. Tucker and Mr. Garrett hold their views in all sincerity, and have gone to considerable trouble to present them, we fail to see anything in their arguments which refutes the points made by Mr. Comper in his letter published in the April 19 issue of *Tape Recording Fortnightly*.

B. DINNING.

*Mechanical-Copyright Protection
Society Ltd.*

Letters to the Editor

TAPE CIRCLES— Allow more time to pass on tapes

AS a newcomer to tape recording I would like to say how much I enjoy reading your magazine, which I now take regularly.

Referring to a letter from Frank Warren concerning the Tape Writers' Circle (*May 31 issue*), may I offer one reason, perhaps, why his membership is so low.

He stipulates that the tapes circulated shall not be retained for more than four days. This is a reasonable request, I agree, but perhaps there are others like myself who might be interested in joining such a circle except that they work away from home from Monday to Friday. In such cases it is very difficult to keep to the conditions laid down. A tape received on a Monday would be held eight days before being passed on to the next member.

Wishing *Tape Recording Fortnightly* every success.

E. BINNION,
Wrexham, N. Wales.

A reader airs his dislikes . . .

I HAVE one criticism to make about *Tape Recording Fortnightly* and that is the number of articles that have appeared on the subject of tape editing and cutting.

I think this subject has been done to death and it is a subject that surely is only carried out to the extent mentioned in "Creative Tape Editing" (*May 17 issue*) by the professionals. The majority of amateurs have no need to edit to such an extent and indeed the cost of recording tapes as it is, who wants to mutilate it with endless joins.

Musique concrete? Well, this is a gimmick that requires hours of experimenting, and in my opinion the end product is not justified. Anyway, who the heck wants to listen to this garble. Give me real music any day.

But then, if you want to cut and splice go ahead. But remember the most important point which was not mentioned in this article anywhere, the speed of recording. This must be at least $7\frac{1}{2}$ ips. At $3\frac{1}{2}$ ips it becomes a fine art, and at $1\frac{1}{2}$ ips impossible.

Let's leave editing and cutting alone for a while and try something else.

How about tape transport systems? There are several methods. How different types of recording heads are made, and more reviews of recorders. These latter I enjoy thoroughly.

Thank you for an excellent magazine which has given me endless pleasure.

G. C. PHILLIPS.

Castle Bromwich, Warks.

EDITOR'S NOTE: Mr. Phillips' points have been noted. We hope to give him the articles he suggests. Other readers' likes and dislikes are invited.

. . . another asks for assistance

I AM about to buy a new recorder (or possibly deck, amplifiers and loud-speaker system) after two years of heart-breaking frustration with a well-known expensive model which has spent as much time under repair as I have had use out of it.

Would any fellow enthusiast care to write me if he has given his equipment some really good use for a period of, say, 18 months to two years and feels fully satisfied with the way it has stood up to the test.

In return I shall be happy to supply him with the name of the manufacturer of my recorder so that he may avoid their products when buying.

JARED WILLIAMS.
*10, Nab Wood Road,
Shipley, Yorkshire.*

Letters to the Editor

NOT SO NEW!

THE note *Along the Grape-Vine* appearing in heavy print in the May 17 issue, deserves some comments, in spite of the rather limited information given.

In particular, your Lady Editor has been gravely misled if she was made to believe that the salient feature of the announced SUPER-Microphone is based on completely new and revolutionary principles. The fact is that extremely detailed treatment of the subject was published exactly one quarter of a century ago and is also available in standard textbooks.

I have no doubt that this microphone may be as excellent as stated, but I personally shall have no difficulty in disentangling my beard from my slide-rule (I am clean-shaven as a rule).

In all seriousness, I feel that, unwittingly and unwillingly, this is an instance of unfair publicity, where advantage has been taken of the fact that the Editor of a Technical Journal cannot possibly be aware of every detail of a highly specialised product with exceptionally numerous variations.

G. R. PONTZEN.

*Lustraphone Ltd.,
London, N.W.1.*

Correction

MY recent letter "A mystifying and annoying phenomenon" (*May 31 issue*) referred to "Hi-fi recorder circuits" becoming a receiver of radio signals. This should have read "Hi-z recorder circuits."

D. C. COMPER.

London, S.W.15.

Our apologies for a printing error.

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

Commonwealth schools look for tape exchanges

New Zealand . . .

MANY thanks for an interesting and informative magazine. In our outpost of the Commonwealth beset by problems of overseas exchange and resulting import restrictions, we see only a very few of the models described in your magazine and this makes it more interesting than ever for us. At least we can read what is happening in the tape recording field. Little ever reaches us otherwise. I have just seen my first four-track recorder, and over the last few months, two portables described in *Tape Recording Fortnightly*.

As a school teacher I use a tape recorder in my primary school classroom. I cannot agree with Gordon Pemberton, Waterloo School, Pudey, who wrote in your February 8 issue. I prefer a number of short 20-25 minute recordings to one long marathon recording for any class exchange. In this way, the recording material can be to the point and will not cause too much interruption to any other work in a school programme when preparation and recording are being done.

The object, of course, is to integrate it into the class programme as much as possible. I feel that with a seven-inch tape or even a long-play five-inch reel, interest will wane especially with younger children, and with some older children too, and so much effort is required trying to fill out the long recording.

I have not found it hard with a class of higher intelligence children, but not all of us are so fortunate to have such a class. I would advise any teacher to have a class exchange or two. The oral expression, written expression, reading, social studies, etc., that can come from the preparation of work for recording is really worthwhile, and every pupil can have his place on a tape at some time.

With an overseas exchange, especially between my country and England or America, only about two or possibly

three can be carried out in a school year due to differences in vacation times and school year times. Our school year commences in February.

My class of 9-11-year-olds are interested in exchanging tapes. We have 150 pupils from 5 to 11 years old. Another colleague of mine, Miss P. Robins, has a class of 12-13-year-olds who are extremely keen to hear of the life of children in other lands. They attend Bohally Intermediate School which has a total of 500 pupils—from 11 to 13 years old.

We both use twin track recorders with tape speeds of $3\frac{1}{4}$ and $7\frac{1}{2}$ ips.

JOHN E. HYNDMAN.

*Mayfield School,
Blenheim, New Zealand.*

. . . and Australia

I WRITE to ask if there is a school in England willing to exchange a tape.

Quite a number of the pupils in this class, whose ages range from 13-18 years, are very keen to compile a tape dealing with their school activities, interests, etc., and to exchange with schools on similar lines.

The school in question is the Toowoomba State High School and Technical College. Pupils receiving secondary education number 685 with 1,000 attending the technical education section.

Toowoomba is the second largest city in Queensland, situated some 80 miles west of Brisbane on the crest of the Great Dividing Range. To the west is the well-known Darling Downs, a large agricultural area better known as the "Granary of Queensland".

Our tape speeds are $3\frac{1}{4}$ and $7\frac{1}{2}$ ips, on a half track recorder.

MRS. D. FANNING.

*6 Cory Street,
Toowoomba,
Queensland, Australia.*



irish



Minimum head wear

WILMEX (DISTRIBUTORS) LIMITED

151-153 Clapham High St., London, S.W.4

TAPE RECORDING HANDBOOKS ADVICE ON BUYING A TAPE RECORDER

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

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

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

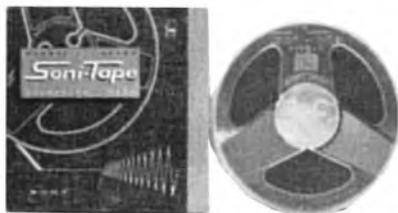
New Products

TELLUX TO MARKET JAPANESE TAPE

TELLUX LTD., importers of the Japanese Sony tape recorders which first appeared at the recent Audio Festival, have now announced the introduction of a range of Japanese tapes.

The new Sony Tapes will be available in four sizes. The smallest, a 3-inch message spool SY3, holding 200 ft. of tape will sell at 6s. Other sizes are as follows: SY5—a five inch spool holding 600 ft. will cost 16s.; SY6—5½-inch spool, 850 ft., will cost 22s.; and SY7—7-inch spool, 1,200 ft., will cost 28s.

Packed in polythene envelopes, the reels are presented in attractive display boxes. At present only the standard



thickness tapes are available. This selection, including long and double-play tapes, will be increased in the near future.

Tellux Ltd., 44 Brunel Road, London, W.3.

METROPOLITAN

IN our March 8 issue we published a full-scale technical report of the Walter "Metropolitan" mains/battery recorder. Since we initially had this machine for review, the manufacturers have ceased to produce tape recorders, and have now disappeared from the market altogether.

A number of these instruments are still available, however, and at a much reduced price. Originally retailing at 55 guineas, the Metropolitan may now be purchased for only £35, although of course, it is not now covered by a manufacturers guarantee.

J. E. Sexton Ltd., 162, Grays Inn Road, London, W.C.1.

TRIPLETONE ANNOUNCE TWO AMPLIFIERS

TRIPLETONE have produced a new integrated amplifier named the Gemini, which is intended for both the mono user and the stereo enthusiast. A total of 8 watts is available, this being



The Tripletone Gemini

split into two identical channels of 4 watts each. The front panel selector switch enables the user to select stereo, mono, radio or an auxiliary which could come from a tape recorder.

The use of dual concentric controls allows accurate balance to be obtained between channels for not only can the volume be balanced, but also the tone controls.

The case is finished in black hammer, and the fascia plate is a "coffee and cream" colour combination with cream and gold Continental-type knobs and a neon indicator.

Rubber feet are supplied for shelf mounting, so that the amplifier can be

GARRARD BOOKLET

A BOOKLET providing details of the various accessories available with the Garrard Magazine Tape Deck has recently been issued by Garrard Engineering.

Available free on request, the booklet also deals with the operation of the deck, and describes the advantages of its design.

Garrard Engineering and Manufacturing Co. Ltd., Newcastle Street, Swindon, Wiltshire.

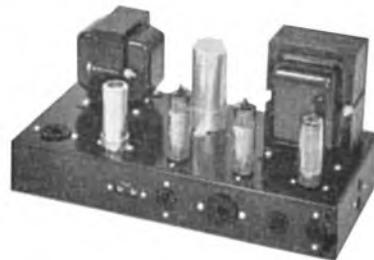
The Japanese Sony Model 521, the two and four-track stereo recorder now being marketed in this country by Tellux Limited. Two speeds, 7½ and 3½ ips, are incorporated, and the quoted frequency response at 7½ ips is 30-18,000 cps. The price is 124 gns



used as a free-standing unit or mounted in a cabinet. Valve line-up is two 6BW6, two 12AX7, and an EZ80.

Dimensions are 11 x 6½ x 3 inches, and the price is 15 guineas.

Another recent addition to their range is the DP12, a 12 watt (15 watt max.) power amplifier. Used with a stereo pre-amp, the DP12 will make a complete monaural system, with the advantage that subsequent conversion to stereo is achieved by adding another identical unit.



The Tripletone DP12

In addition to provision for a pre-amp, the DP12 has a second octal socket from which auxiliary equipment such as an AM or FM tuner can be powered.

Valve line-up is two EL84s, a 12AX7, and an EZ81. The 12 watt output is matched for 15 or 2-3 ohms.

Its dimensions are 12x6x5½ inches and the price is £12 6s.

Switched mains are available so that all equipment can be turned on or off from the one switch.

Tripletone Manufacturing Co. Limited, 241a, The Broadway, Wimbledon, S.W.19.

Continental plugs by T.S.L.

A WIDE range of Continental plugs and sockets from 2-pin to 6-pin, both male and female, as illustrated right, are being marketed by Technical Suppliers Limited, who can supply descriptive leaflets and who state that manufacturing techniques have allowed a considerable reduction in price.

Technical Suppliers Limited, 63 Goldhawk Road, Shepherds Bush, London W.12.



News from the Clubs

ANOTHER Congress of the **Federation of British Tape Recording Clubs** has passed, and the suggestions and points raised at this annual meeting are now being further discussed by those who attended. A number of these points are described in "We take the view."

This was the second such congress, and the third AGM of the Federation. It seems a pity therefore, that a number of clubs still do not send a representative along to the meeting.

The Federation is an entirely voluntary movement of amateurs composed of members drawn from the local clubs in the UK. They are affiliated to FICS, International Federation of Sound Hunters, who organise the International Tape Recording Contest. As such they are kept constantly in touch with all aspects of recording, and are able to provide a strong petition for the rights of tape enthusiasts should the occasion demand. The new secretary of the Federation is E. Roger Aslin of "Fairlea," Boar's Head, Crowborough, Sussex.

A "small world" story comes from Jeff Langley, secretary of the **ILFORD** club, who was recently operating a battery recorder on an underground train. Approached by one of this fellow passengers, the secretary became involved in a general tape talk.

The newcomer soon admitted to ownership of a newly purchased Fi-Cord, and Mr. Langley asked if he had thought of joining a tape club. The affirmative reply was qualified with the news that the Ilford club had been considered but that details had still to be applied for.

Introductions followed, and now another enthusiast has joined their ranks.

A proposal that members should record a news tape for the blind was agreed to at a recent meeting of the **LUTON** society. Their idea is to record a fortnightly news bulletin compiled from articles in their local newspaper. The first edition is to be issued this month.

Their third AGM was held on May 23, when James Conway, of 12, Whipperley Ring, Farley Hill Estate, was elected secretary. The whole of the proceedings were recorded using a Reflectograph recorder, two Reslo's and a Simon Cadenza microphone and a Vortexion mixer.

Judging of the club's competition tapes was arranged for the June 13 meeting.

The **NORTHAMPTON** club members have also undertaken to supply a news tape for the blind. Designated the *Northampton Town and Country News*

Tape, this fortnightly production is to be increased to a weekly issue as soon as more readers can be obtained.

The trouble seems to be that most members are usually engaged during the evenings on other club activities.

Since their formation some sixteen months ago, the club has forged ahead. Recording concert bands and steam engine organs for playback to various other local organisations, plus a regular habit of interviewing visiting personalities keeps the members busy. They also claim a considerable amount of outside recording is carried out for sound effects.

These latter projects are carried out at the request of local clubs who use the effects for play productions. For the second year running the members are to supply effects for the Masque Theatre for their play in Abington Park.

The club must certainly be one of the busiest on record. They meet on every Tuesday and Thursday, and even this does not seem to give them enough recording time.

A successful year also for the members of the **BRISTOL** club. Highlights of their past twelve months have included the purchase of a Fi-Cord and Grampian DP4 for the use of members, and the construction of mixer units. Technical expert Mr. Hollier supervised the construction work.

Several programmes have been taped, and more are planned for the future, although no indication of the subjects were provided. Their meetings have been described as very friendly, and their past programme has proved of such great interest that they now keep all visitors as members.

The AGM of the **COTSWOLD** Society was held on May 29. First item on the agenda was the election of their officers. These include a joint secretaryship shared by Peter Duddridge and Peter Turner. The latter of Cave Cottage, Oakridge Lynch, Stroud, Gloucestershire.

The elections were followed by a demonstration of stereo recordings. This was provided by Colin Woods using an E.M.I. professional recorder and A.K.G. headphones.

The demonstration provided the first opportunity of many members to hear stereo through headphones and all found it deeply impressive. The difficulty of loudspeaker positioning and possible annoyance to neighbours being just two of the points in the system's favour.

At the previous meeting on May 18, the members welcomed Mr. Spark, Manager of the Tape Deck Division, and Mr. Mortimer, Chief Development Engineer of Garrard Engineering. These two gentlemen gave a demonstration of tape and disc reproduction using equipment manufactured by their firm.

The Magazine-loading deck was the first to be shown, and what was described as convincing reproduction of stereo and

mono tapes was provided using a Jason stereo amplifier and Goodman's speakers. The Garrard clock-type indicator, first shown at last year's Audio Fair, also achieved marked appreciation for its precise operation.

Mr. Mortimer then demonstrated disc-stereo, using a new type ceramic cartridge.

A talk on the manufacture of magnetic tape was given to the members of the **WARWICK AND LEAMINGTON** club at their May 13 meeting. The speaker was Mr. Alan Clifton of E.M.I., who followed his stimulating lecture with a question time during which he was verbally bombarded by the members.

This meeting was followed on May 17 with a special programme of members' six-minute tapes.

Each member contributed, and Brian Race's comedy item was selected as the best production. The tapes were to have been chosen for their reminiscent qualities, and Mr. Race's included a rendering of *Air on a G string*, which he claimed reminded him of a holiday in the Swiss Alps.

Blind member Peter Joy had recorded sounds of everyday life to gain second prize in the competition. His tape included the tinkle of a bicycle bell as his wife returned home, the chime of a clock that had belonged to his grandparents, and the whirring of a lawnmower.

During forthcoming club meetings, members are planning to produce a number of replies to tape contacts.

Also forecast for the near future is a tape/slide show to be produced by secretary Eileen Jones. This will re-live her coach-touring holiday to the Continent, with extracts of the Oberammergau Passion Play, and the sounds of Venice, and the French and Italian Riviera.

An attempt to record a nightingale's song led to a thorough soaking for one of the members of the **MAIDSTONE** club. Hiding him under a cloak of secrecy, the club secretary reports that this

(Continued on page 29)

B.B.C. "Sound" Programme

A magazine for radio and recording enthusiasts

Introduced by Douglas Brown

6.40 p.m. July 3rd

(A repeat of the programme broadcast on June 25)

SOUND UNDERWATER: S. M. Wheatley and John Ford talk of the development of underwater recording techniques drawing on their experiences as pioneers and practitioners.

HOLIDAY RECORDING: Douglas Brown considers taking a tape recorder away on holiday—precautions and suggestions.

This is the final broadcast in the present series

"Sound" will return to the air in the Autumn

Classified advertisements

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

MISCELLANEOUS

WAL PRODUCTS. The new D-Mag Head Demagnetiser, nylon bushed probes, £2 10s. The new Hi-Gain Pre-amp, with tape equalisation, ideal for Ferrograph, Philips, etc. For monitoring, dubbing, playback, etc., £7 16s.

WAL BULK ERASER (for tape and film), £7 18s. 6d. MONO WAL GAIN £5, STEREO £7 10s. Professionally designed, professionally built, for professionals. WELLINGTON ACOUSTIC LABORATORIES LTD., Farnham, Surrey (6461).

Tape splicing is easy and accurate with an **Easysplice Tape Splicer**. Patented and guaranteed. 5s. Sent by return. Easy-splice Co., 30 Lawrence Road, Ealing.

A **BINDER** is the ideal way of keeping your copies of *Tape Recording Fortnightly* clean and ready for easy reference. Available, price 14s. 6d. (post free), from 7, Tudor Street, London, E.C.4.

Do you use the telephone? If so you will find a Dektron Telecon the most useful of all your recording accessories. The Telecon is not just a novelty but a unit which you will use frequently for both family and business purposes. You will be surprised by its efficiency. Just stand it behind the phone (no connection is necessary) and both sides of the conversation can be recorded, or, if you wish, amplified and broadcast to listeners in the room. The price—only 27s. 6d. post free. To ensure delivery by return post write today to Dektron, 2, Westbourne Road, Weymouth.

WAL GAIN transistorised pre-amplifiers. Many applications, extra gain for Mics, Tape Heads, P-U's, etc. Mono version, £5. Stereo, £7 10s. WAL BULK TAPE ERASER, both tracks 8-in. reel erased 30 sec., £7 18s. 6d. WAL TRAK transistorised oscillator, 1,000 cps, indispensable for Service, £6 10s. Full technical literature sent, supplied through all leading dealers. Wellington Acoustic Laboratories Ltd., TRC Dept., Farnham, Surrey.

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

Something to sell?—equipment for exchange?—looking for a job in the hi-fi tape field?—seeking a tape contact abroad?—tape-to-disc services to offer?—expert staff needed? A classified advertisement in *Tape Recording Fortnightly* will bring you quick results—cheaply.

MISCELLANEOUS

DUODE SOUND UNITS give most NATURAL results from tape, disc or radio—because their famous, unique dual drive, built-in crossover and feedback, linen cone with graded compliance, produce 20-15,000 cps with smooth non-resonant, dead-beat crystal clarity. Buy DUODE for your lasting pleasure and finest long-term, good, sound investment. Duode Ltd., 16 Brunswick Road, SUTTON, Surrey.

BARGAINS IN TAPE RECORDERS slightly used for demonstration only:—Ferrograph 4AN, 72 gns.; Telefunken 75K-15, 39½ gns.; Grundig TK1, 25 gns.; Stella ST454 - Cossor 1602, 32 gns. Collaro latest Studio Decks, 10 gns. each. All fully guaranteed by us. Carriage paid England. N.R.S., 11 King's College Road, London, N.W.3. PRImrose 3314.

"**BRAND FIVE**" American Tape. Long Play 5 in. (900 feet) 18s. 6d.; 5½ in. (1,200 feet), 23s. 6d.; 7 in. (1,800 feet), 35s. Sent by return. Post Free! Watts Radio, 54, Church Street, Weybridge, Surrey.

LAPEL MICROPHONES, good quality, ideal for interviewing, match all portable recorders, only 17s. 6d. N.R.S., 11, King's College Road, Swiss Cottage, London, N.W.3.

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

PRE-RECORDED TAPES

Unique 40-page catalogue listing all makes, Mono, Stereo, 7½ and 3½ ips. Send 2s. 6d., refundable on first tape record purchased. Dept. 6, Teletape Ltd., 33, Edgware Road, W.2. PAD 1942.

New Saga and every pre-recorded tape available supplied post free. Send large S.A.E. for free catalogues. W.S.L. (Tape Dept.) 106, Greyhound Lane, S.W.16.

FOR SALE

HARTING H.M.8 for sale. Six-month guarantee. £55 o.n.o. Ring: Fletcher, BEL 4915, after 6.30.

MINIVOX "C" Battery - operated portable tape recorder, twin speed and magic-eye indicator, 1½ hours playing time. 25 gns. or near offer. Box 421, *Tape Recording Fortnightly*, 1, Crane Court, Fleet Street, London, E.C.4.

SERVICES

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

TAPE-TO-DISC

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

48-HOUR POSTAL SERVICE S.a.e. for leaflet to Deroy Sound Service, 52, Hest Bank Lane, Hest Bank, Lancaster. Tel.: H.B. 2444.

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

WANTED

WANTED—Reasonably cheap Telefunken 85. Phone; LAR 2595 after 7 p.m.

WANTED—Copies of *Tape Recording Magazine* dated January, February, 1958. Box 422, *Tape Recording Fortnightly*, 1, Crane Court, Fleet Street, London, E.C.4.

SITUATIONS VACANT

SITUATION available in Central London Area for young man with some knowledge of tape recorders. Apply Box 419, *Tape Recording Fortnightly*, 1, Crane Court, Fleet Street, London, E.C.4.

Sales Representatives

The Robuk RK3 is reviewed in this issue. It is sold on a direct-to-dealer basis by our sales team which we wish to bring up to its full strength of 29.

If you have a knowledge of tape recording, and a connection with the radio retail trade, we may have an area vacant which would suit you. Car supplied, expenses, salary, commission and bonus. It's worth a brief letter to:—

**SALES MANAGER
ROBUK ELECTRICAL INDUSTRIES
LIMITED**

559/561, Holloway Road, London, N.19

News from the Clubs

(Continued from page 27)

unfortunate member departed for the North Downs late one night with a portable recorder, and despite a soaking, managed to obtain a first-class recording complete with rain pattering on to his parabolic reflector.

Other interesting experiences related to members at recent meetings, included the attempts made by John Periam and Alan Winn to record in a Supermarket whilst attending the recent Rose Bruford Tape Course.

A new clubroom has been obtained, and to mark the opening on May 25, Graham Jones gave a lecture on "How to get the best out of your tape recorder."

Since they changed to weekly meetings, the club membership has increased, and topics discussed have included frequency response, editing, and magazine and drama production. It is hoped in the near future facilities will be available for members to visit firms concerned with the production of recording equipment.

Arrangements have been made for Mr. Richard Purwood of the BBC to give a lecture on magazine production and battery portable recording.

Yet another club with a recent AGM was that in **NOTTINGHAM**. Held on May 1, their number one meeting of the year began with the election of officers. Mr. B. L. Harris was chosen as secretary. His address is 40, Chetwin Road, Bilborough Estate, Nottingham.

Following the election of other officers, Keith Fricker played his recently completed production *Around the World in 80 Days*.

Later in the month members had arranged a general discussion meeting on all forms of tape recording. This was to be followed by one or two examples of tape exchange tape promised by George Jones, who was also to introduce the competition for the following meeting.

For this, members were invited to produce an original tape, serious or otherwise, to provide ten minutes entertainment.

The money-making film *This is the BBC*, had been promised a showing at their June 15 meeting, when members of the staff of B.A.S.F. (Chemicals) Ltd. were to attend to provide a demonstration. A talk on head-demagnetising and on sound in the theatre are promised for the June 29 and July 13 meetings.

Roger Aslin, again came to the rescue of the **LONDON** club when Alan Pearce was unable to attend and organise the evening's programme for the April 27 meeting.

This great stalwart of the club, always ready to fill in a gap, worked his marvels once again and produced a concise lecture on circuit reading. Members present were showered with leaflets giving electrical symbol meanings and a well-drawn, simple, descriptive electrical diagram. The drawings were further explained by Roger who had available a complete valve, and another dismantled for greater examination.

All did not go as well as expected, and a minor setback was met when a demonstration of soldering had to be missed due to the iron being mis-placed.

At the close of the meeting Terry Devereux played a section of the club's

CLUB MEETING DIARY

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

ACTON: Alternate Fridays at the King's Head, Acton High Street. (July 7.)

BATH: Alternate Wednesdays at St. Mary's Church Hall, Grove Street. (June 28.)

BEIHAL GREEN: Every Friday at Shoreditch Tabernacle, Hackney Road.

BIRMINGHAM: Every Monday at the White Horse Cellars, Constitution Hill.

BIRMINGHAM (SOUTH): Alternate Mondays at Starchley Institute, Hazelwell Street, Starchley. (July 3.)

BLACKPOOL: Every Wednesday at "Habonim," Lonsdale Road, off Lytham Road.

BOURNEMOUTH: Alternate Tuesdays at the Civil Defence Centre, Holdenhurst Road. (July 11.)

BRIDGWATER: Alternate Tuesdays at Erio's Radio, West Street. (July 11.)

BRIGHTON: The Brunswick Arms, 38, Ditchling Road. (July 5.)

BRISTOL: Alternate Wednesdays at Redcliffe Church Hall, Guinea Street, Redcliffe. (July 5.)

BRITTON: Every Tuesday at The White Horse, Britton Hill, S.W.9.

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

CATFORD: Every Friday at St. Mary's C.E. School, Lewisham, S.E.13.

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

COTSWOLD: Fortnightly, alternating Monday and Thursday, at the Theatre and Arts Club, Cheltenham. (July 6.)

COVENTRY: Alternate Thursdays at Queens Hotel, Primrose Hill, Coventry. (June 29.)

CRAWLEY: 1st and 3rd Mondays in month at Southgate Community Centre.

DARTFORD: 2nd and 4th Thursdays at 41, Windsor Drive, Dartford.

DOVER: Alternate Mondays at The Priory Hotel. (July 10.)

DUNDEE: Alternate Mondays at The Salvation Army Hotel, 31, Ward Road. (July 3.)

EASTBOURNE: Alternate Saturdays at Hartington Hall, Bolton Road. (July 8.)

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

ENFIELD: Alternate Wednesdays at Bush Hill Park School, Main Avenue, Enfield. (July 5.)

GRANTHAM: Weekly, 1st week in month, Wednesday; 2nd, Monday; 3rd, Thursday; 4th, Friday, at Grantham Technical College, Avenue Road.

GRIMSBY: Alternate Tuesdays at the RAFA Club, Abbey Drive West, Abbey Road. (July 4.)

HARROW: Alternate Thursdays at St. George's Hall, Pinner View, North Harrow. (June 29.)

HINCKLEY: Alternate Wednesdays at The Wharf Inn, Coventry Road. (July 5.)

HUDDERSFIELD: Ring Huddersfield 5820 for details from S. Blackstone Esq.

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

IPSWICH: Alternate Thursdays at the Art Gallery, High Street. (July 6.)

KEIGHLEY: Alternate Wednesdays at the South Street Sunday School Rooms. (July 12.)

KETTERING: Alternate Wednesdays at the Rising Sun, Silver Street. (July 5.)

LEEDS: Alternate Fridays at 21, Wade Lane, Leeds 2. (July 7.)

LEICESTER: Alternate Fridays at the Newark Girls' School, Imperial Avenue. (June 30.)

LONDON: 2nd and 4th Thursdays at the Abbey Community Centre, Marsham Street, S.W.1.

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

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

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

MIDDLESBROUGH: Every Tuesday at 130, Newport Road.

NOTTINGHAM: Alternate Thursdays at the Co-operative Educational Centre, Heathcote Street. (June 29.)

NORWICH: 4th Tuesday at the Golden Lion, St. John's Maddermarket.

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

PLYMOUTH: Alternate Wednesdays at Virginia House, Plymouth. (June 28.)

RUGBY: Alternate Thursdays at the Red Lion, Sheep Street. (June 29.)

SOUTHAMPTON: 2nd and 4th Thursday at The Bay Tree Inn, New Road.

SOUTH DEVON: Alternate Wednesdays at the Man Friday Cafe, Torwood Street, Torquay. (June 28.)

SOUTH-WEST LONDON: Every Wednesday at Mayfield School, West Hill, S.W.18.

STAFFORD: Alternate Tuesdays at The Grapes, Bridge Street. (July 11.)

STEVENAGE: Alternate Tuesdays at the Tenants' Meeting Room, Marymead. (July 4.)

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

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

WALTHAMSTOW: Alternate Fridays at 22, Orford Road, E.7. (July 7.)

WARE: 2nd Tuesday at The Old Brewery Tap, High Street.

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

WEST HERTS: Fortnightly, alternating at the Cookery Nook, Watford (June 28) and Heath Park Hotel, Hemel Hempstead. (July 12.)

WEST MIDDLESEX: 2nd Thursday at the Railway Hotel, Station Road, Hampton, and 4th Thursday at St. George's Hall, Lancaster Road, Southall Broadway.

WALSALL: Every Wednesday at Bluecoats School, Springhill Road.

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

WEYMOUTH: Alternate Wednesdays at The Waverley Hotel, Abbotsbury Road. (June 28.)

WINDSOR: Every Thursday at The Royal Adelaide Hotel.

WINCHESTER: Every Friday at The Ship Inn.

WOOLWICH: Alternate Mondays at the North Kent Tavern, Spray Street, Woolwich. (July 3.)

YORK: Every Thursday at 62, Micklegate.

Unless otherwise stated, meetings start between 7 and 8 p.m.

Contest entry. The extract was well received, although discussion took place about some of its "home-made" sound effects contained therein.

Roger was again in the chair at the following meeting on May 11, when the subject was maintenance. The club tape recorder was completely dismantled, and apart from dropping the pinch wheel spindle into the recorder's interior, everything went as planned. Head cleaning and alignment was followed by lubrication, and the output was checked with a meter and a C.C.I.R. test tape.

The remainder of the evening was in the capable hands of Ken Blake who kept members enthralled by a tape editing demonstration. I believe secretary Terry Devereux was only having fun when he described the members editing attempts as "wading through piles of scrap tape flourishing razor blades before a successful edit was made."

The **SOUTHAMPTON** club combined two hobbies at one of their recent meetings. Member D. Briggs, who is also interested in orchid growing, provided a taped narration when he displayed some of his choice blooms for the entertainment of his fellows.

Other activities have included a stereo recording session. This was achieved with the aid of a Grundig TK60 and a local rhythm group headed by one of the club members. With a little patient experimenting, the club claimed excellent results.

Their present projects include the production of a play on tape, and the organisation of a sound hunt for the "portable kings and queens."

Two new clubs are in formation. The first at **Bromley**, is being organised by David A. Cornet of 110, Princes Plain, Bromley, Kent.

In the same county, but along the coast at **Whitstable**, Mr. T. Robinson of "Crepello," 17a, St. Anne's Road, is also working to form a club.

BUILDING A STEREO RECORDER

(Continued from page 13)

Channel One. Try rocking the head in azimuth by adjusting one of the side screws very slightly and listening carefully for any difference.

Lining up the erase head

Proceed as for the playback head visually. The test procedure is by trial and error. Record a signal on half track using Channel One on the half-track head. A good signal would be full orchestra with plenty of strings and bass.

Switch to position two on track selector switch and erase part of this recording using quarter-track erase head. Play this back on quarter-track and there should be no audible signal. If there is some recording audible, raise or lower the erase head and repeat the process until no signal is heard on playback. A further check can be made by changing tape over so that track one is at the bottom of the tape instead of the top.

A final check is to get a friend with a quarter-track recorder to make a recording for you on all four tracks and play this back to ensure that you have got all the tracks properly separated. You can then make a recording and ask him to check your recording on his machine.

Track numbering

With this quarter-track head it is possible to double the playing time for any given length of tape by adding two more tracks to your existing recorded tapes.

The tracks may be numbered in various different ways (Fig. 7), i.e., as they lie numerically on the tape, or in the order in which the tracks may be recorded. It is possible to record on the tracks in various different orders, for example:—

- Track 1, Channel One left to right;
- Track 2, Channel Two right to left;
- Track 3, Channel Two left to right;
- Track 4, Channel One right to left.

This means at the end of the track one, turn the tape over, switch to Channel Two (putting Channel One to playback) and record track two. At the end turn over again, remain on Channel Two and record the third time. At the end, turn over tape again, switch to Channel One (Channel Two to playback) and record track four.

All this sounds very complicated, but there are no hard and fast rules laid down and it is entirely up to the user to record the four tracks in the order which suits him best. It would be a good plan to stick to a first decision if you intend to retain the four track recordings, as a later change would somewhat confuse the finding of a particular recording on a particular track.

If you exchange quarter-track recording with other people, make sure they know which track is where.

Some correspondence took place in the pages of *Tape Recording Fortnightly* on numbering of quarter-track recordings from September 21, 1960, issue onwards, and some ideas may be gained from these letters.



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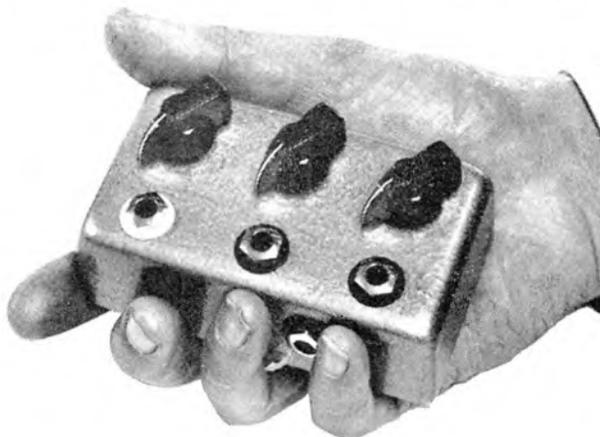
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