

JULY
1958

1'6

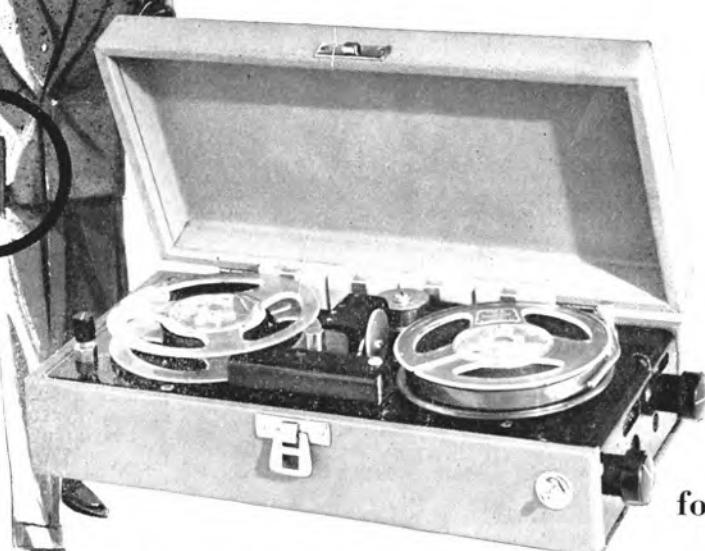
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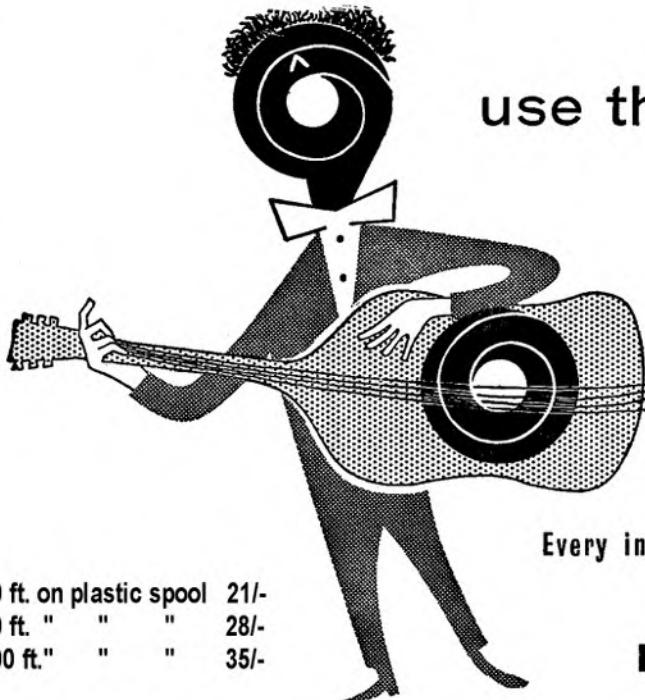
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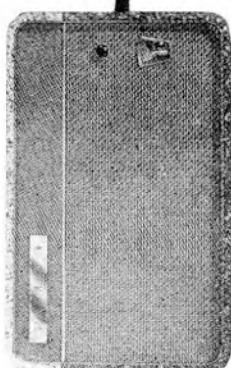
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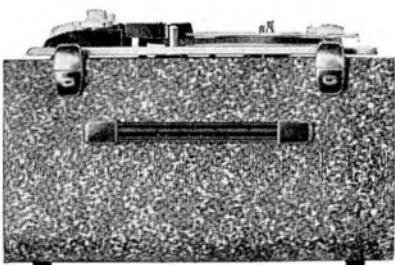
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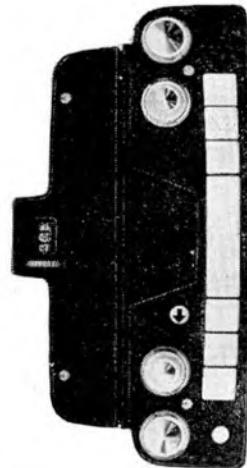
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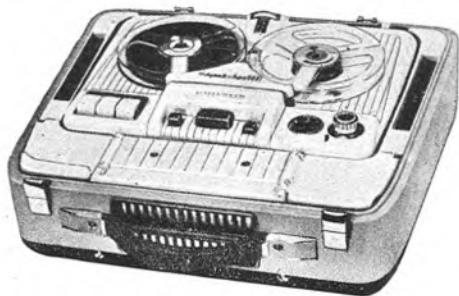
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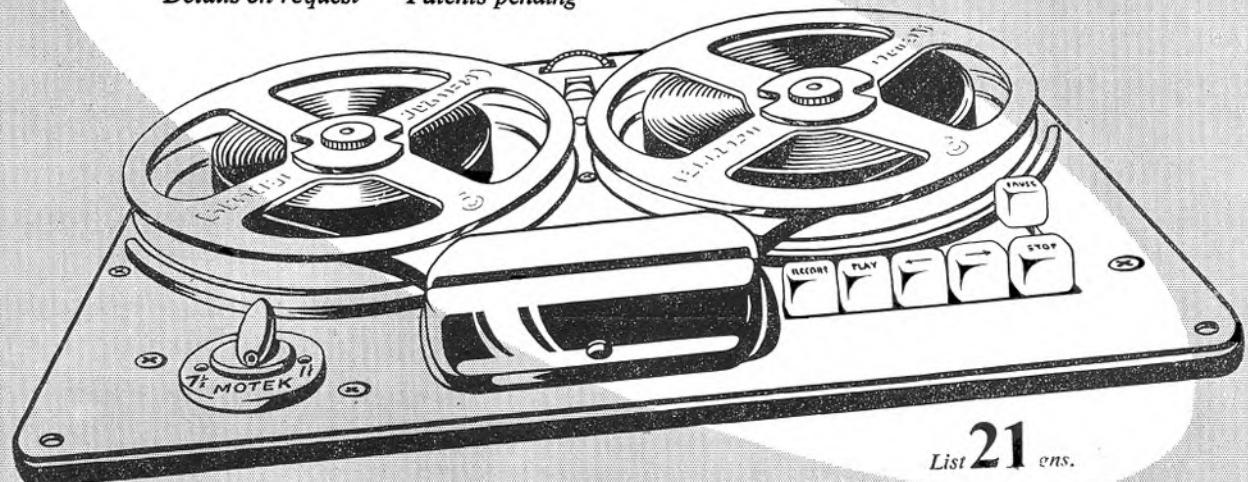
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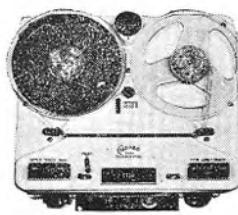


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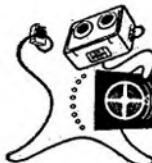
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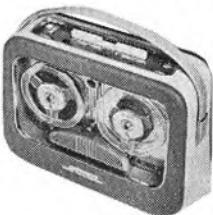
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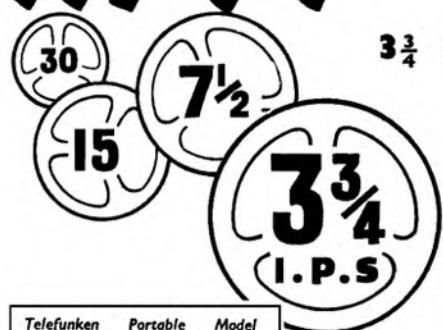
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ONLY 45 GNS

including 1800 ft. tape, microphone and all Accessories.

JULY 1958

Vol. 2, No. 7

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Use your recorder

THE TAPE RECORDER IS PROGRESSING rapidly beyond being a modern toy. No longer is the manufacturer content to assemble a tape deck, simple amplifier and small loudspeaker and sell such equipment on the novelty value of hearing one's voice for the first time.

Standards are improving all the time as an increasingly discerning public demands more advanced equipment; prices, too, are maintaining their balance.

It is up to the tape recording public—the small, keen minority who always pave the way for the majority—to use the equipment they are being offered in an increasing variety of ways.

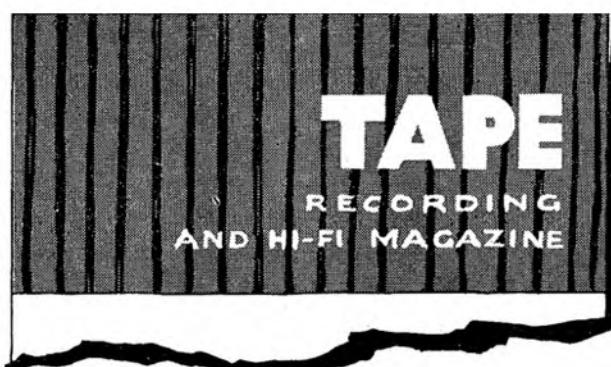
They can always build a better tape hi-fi set-up on the basis they have laid; their only problem here is the ever-present one of finance.

The tape recorder as a tool of original artistic or scientific research has far to go.

The work being done on occupational voices, recordings of different types of laughter, animal sounds, and the already well-known productions of the Experimental Theatre Club at Oxford University, are a few examples of the wide variety of work which can be undertaken in this field.

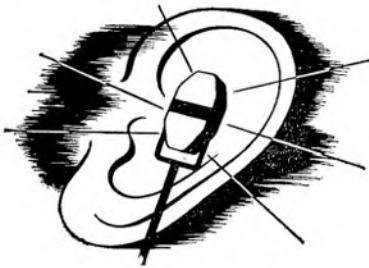
The keynote of summer is *activity*. That should be the enthusiasts' resolve all the year round.

For the enthusiast can probably find more to do amid the wonderful sound patterns of summer and autumn than any other season of the year. Winter is the time of playback.



Watch out for this bold new cover design on the bookstalls when purchasing next month's issue of "Tape Hi-Fi Magazine" — out on July 20th

STEREO OR BINAURAL?



Could we do better with headphones?

STEREO recording, particularly on tape, has lately been given a big build-up in America—and with good cause. It shows a considerable improvement over our present monaural reproducing systems. Yet many people who have heard stereo tapes have had a feeling of disappointment. The strange thing is that those who are most satisfied with stereo listening are the people who know most about it.

The ordinary stereo tapes most familiar to recording fans are essentially two-channel devices (if we ignore the complicated systems set up by some American recording companies whereby portions of a third, fourth, or even fifth microphone are used to feed the two basic channels). As such, they are reproduced through two amplifiers and two speaker systems.

The microphones used to record these two channels cannot differentiate between sounds in the same way as our ears. Here is one weakness of stereo recording. Another lies in the reproduction.

What is recorded on the tape is a fairly accurate electrical representation of what actually takes place, but it certainly cannot be true that what is reproduced is an accurate representation of what is on the tape.

Look at it this way. When we make our original recording, our main sound source may be contained within a small area directly in front of our microphones, but reverberations are coming from all around, from every angle. Thus, our original recording has a full 360-degree coverage, even though it is only represented by two channels. Therefore, if we want to try to reproduce that sound exactly our reproducing system should also have a 360-degree coverage. In other words, our speakers should be all around us when we listen. But all we have are two speakers in front of us, separated by an arbitrary distance and pointing in arbitrary directions. No wonder stereo doesn't always come up to expectations.

And not only must we contend with the reverberations set up in the recording studio; there are the acoustics of the room in which we listen to be taken into account.

This may suggest a gloomy picture of the future of stereo, but that would be unfair. The main problem lies, not in reproducing the sound waves put out by the original sound source itself, but in reproducing the sound waves produced by reverberation. Except in certain cases, the

original sound source is contained within a limited angle in front of our microphones and this angle can usually be adequately covered by the separation of our two speakers. So the main sound source is well looked after. This is what we should be listening for when we play stereo tapes, and if we keep it in mind, we find that stereo recordings are far more pleasant than monaural ones. Perhaps this is why people with knowledge of the limitations are more easily satisfied with stereo.

Can we achieve 360-degree coverage in our reproductions?

There are two possible ways, and both produce an unexpected bonus.

The first is to disperse our speakers in a full coverage around us. I imagine myself using sixty separate microphones, each with a pickup pattern covering only three degrees, spread in a tight semi-circle. If each of these recorded one channel and each channel was played back through a separate speaker, also spread in a semi-circle, we would get pretty close to the discrimination practised by the human ear.

Obviously, the idea of 120 microphones is ridiculous, but supposing we used four on each side, each with its own channel and each reproduced through its own speaker, placed in the corresponding segment of the circle. We would be getting very much closer to the full-circle coverage.

This is actually done with some of the newer motion picture processes. Cinemascope uses only seven channels, but Cinerama and Todd-AO both use nine, the odd channel in each case being dead in front of the listener.

But, if only for financial reasons, multi-channel tapes and their associated equipment are impossible for anyone but a corporation. We must look for another way.

The second method of achieving 360 degree coverage is by using *binaural* sound, instead of stereo. *Binaural* means, quite literally, "hearing with two ears." *Stereo* means "possessing perspective." In other words, a binaural system bypasses all acoustic methods of coupling sound to the ear and applies the sound direct to the ear itself, and the only way this can be achieved is by using headphones. An element of confusion can arise here. While it is true that a binaural system possesses perspective and, by definition, becomes stereophonic, it is not true that

JOHN BERRIDGE contributes this thought-provoking article, which will, we hope, stimulate discussion of future developments in the tape hi-fi field. Some of the ideas may be controversial and we invite readers to send us their views.

the usual stereo systems are binaural. Since the two generally used methods of reproduction use either headphones or speakers, it has become general practice to refer to the headset system as "binaural" and the speaker system as "stereophonic" and I will follow that practice here.



Charles Langton—one of our technical advisers—writes:

"The idea of two transmitters and associated receivers is not, in principle, new. Would the Postmaster-General approve such miniature transmitters, and would he allocate frequency bands, issue licences, and so on? Such transmitters would need to be very carefully controlled to avoid creating interference."

"The author has not suggested a practical lead as to the circuitry. Although he states that the equipment could be reasonably priced, it is no simple matter to modulate even a miniature transmitter if the degree of distortion is to be kept low."

"The receivers are feasible but, if the transmitter output was limited to reduce the possibility of interference, then at least two and probably three transistors would be required in each headphone. The cost would not, therefore, be inexpensive."



THE present-day binaural headset is a great improvement over the old kind. They are light in weight and can be worn for long periods without causing discomfort. Some headsets have as good, if not better, frequency response as a good speaker system, down to the lowest audible frequencies.

In binaural reproduction, the two earpieces are connected separately to two channels. Listening to binaural sound has a number of advantages. The main one is that, since the sound is piped directly into the ear canals, it has that full 360-degree coverage. Another is that since there is no acoustic coupling, in the usual sense, the acoustics of the listening area make no difference whatever. In fact, not only are the acoustics of the room eliminated but, because the ears are covered by the headphones, all sorts of extraneous noises are reduced and it becomes perfectly possible to listen in comfort without disturbance in what might otherwise be quite noisy surroundings. It is also possible to listen to music played at concert hall level without disturbing other people.

Binaural sound has limitations. Though it achieves the full circle coverage we were after, and with only two channels, the microphones still cannot discriminate in the same manner as a single ear. They still receive all sounds equally. So, though two microphones can discriminate between different sound sources and also different degrees of coloration, they still cannot duplicate that faculty possessed by a single ear.

Many people may not like the idea of wearing headphones for a considerable length of time. They restrict movement and a dragging cable can be a menace to yourself and to others. I am now going to suggest an ingenious

solution. If you are willing to wear headphones, why not feed the output of each channel into two small transmitters, with a range of no more than a hundred feet? Two miniature receivers can be incorporated into the headset. Not only is it then possible to dispense with the cable, but it becomes possible to listen anywhere within a range of one hundred feet of the transmitters. This gives you complete freedom to move around the house as you wish.

This method may sound over-elaborate, futuristic and expensive, but such is not the case. Even FM receivers have now been transistorised. There are at least two available in America no larger than a cigarette package, and they are not too expensive. Since the transmitters remain in one place out of sight, their size and weight are unimportant. Consider, too, the fact that two amplifiers and two speaker enclosures can be pretty costly if you are interested in quality. Because of their low power demand, headphones can be run straight from a pre-amplifier, and a top-quality binaural headset costs less than one average quality speaker enclosure.

We should bear in mind that the techniques of recording binaural and recording stereo tapes are somewhat different. The spacing and number of microphones for stereo mastering has always been a matter of individual interpretation and almost every recording engineer has his own ideas on the subject. They would appear to be somewhat arbitrary, in view of the fact that almost every listener also has his own ideas on what constitutes good speaker placement. The chances of getting any measures of standardisation in either placement appear to be remote.

Binaural recordings, because of the intimacy of their reproduction, allow the engineer to state with certainty where his mikes should go. Since the average person's head is some nine inches between ears, obviously the same microphone spacing should produce the best results; and this is usually borne out by the results.

If you play a binaural tape over a stereo system, all you will get will be confusion, since the results will be very little different from a monaural tape played back over two speakers simultaneously. If, however, you listen to a stereo tape, with its wide mike spacing, through a binaural headset you get the feeling that your head is almost nine feet wide. It feels peculiar at first, but becomes quite pleasant once you get used to it. No doubt the purists will scoff, but aesthetic pleasure is what counts. It is perfectly possible to play stereo tapes over a binaural system with pleasing results, which probably accounts for the almost complete absence at present of binaural tapes. No one is likely to go to the expense of recording the same thing twice over, when one method serves both systems almost equally well.

Both stereo and binaural systems are much less of a strain to listen to than a monaural system, over long periods, but unless you know what to expect before you purchase, you can be disappointed. Give it a decent trial. It really is worth it.

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*REV. J. HEWITT's second article about
language tuition with a tape recorder*

FOLLOW THESE RULES TO BECOME A LINGUIST

To avoid the cumbersome use of two tape recorders, a recorder with two independent built-in recording systems has been specially designed for language study. Channel No. 2 is used at the time of recording the "master" voice, its track running on the upper portion of the tape. No eraser is provided for this and so, however often the tape is used, the "master" voice will remain. It can only be erased by turning the whole tape upside down and playing it backwards. After the initial recording of the "master" voice, this channel is never used again.

Channel No. 1 is used by the student. What is recorded on this channel will be erased when a later recording is made on it. The tape can, therefore, be used by a succession of students. By the use of headphones, which can be coupled to both channels, if so desired, the student can hear the "master" voice on channel 2 and record his own voice on channel 1.

He can then play the tape through again, hearing the "master" voice through one ear and his own voice through the other. He can thus compare his own voice with that of the "master." Linked with the method of constant repetition described in my previous article, the use of this type of tape recorder has proved most beneficial in the language school. The use of headphones is a definite aid to concentration. In half-an-hour the student has often achieved more than he could have done after several hours of more conventional language study.

Each recorded lesson contains about eight or ten sentences, and takes about 15 or 17 minutes to play right through. It is divided into three sections.

In the first section each sentence is read by the teacher twice at speed. A picture is supplied which gives the student a clue to the situation in which the sentence would be used, and so helps him to understand its meaning. Before each new sentence there is a slight pause, just long enough for the student to look at the new picture and understand the new situation. We try to grade the lessons or "dialogues" carefully, and build each dialogue round one particular situational—as well as upon one particular grammatical or structural—theme. During this section, the student just looks and listens, and tries to understand the conversation.

In the second section the sentences (and the pictures) are repeated in the same order and with the same expression as before. But this time there is a space after each sentence for the student to record his own efforts at imitating the "master" voice. Each sentence is repeated three times, and the student has three shots at it.

In the third section, each sentence is repeated once only. After the first, third and every odd sentence, there is a pause for the student to repeat the sentence (in most of the early lessons this is in the form of a question). Then there is a further pause for the student to look at the picture of the next sentence, and to attempt to say it. He then hears that sentence said by the "master" voice and is given a further pause as an opportunity to correct any mistake he might have made. In this way, the student is encouraged to take the initiative in speaking, instead of simply repeating parrot fashion.

By this time the student has heard each sentence said correctly six times and has made four or five attempts to say it correctly himself. He is probably as near perfection as he can be at that particular stage of language study. The last ten minutes of the lesson are spent in playing back the second and third sections, so as to compare one's own voice with the "master." It is useful occasionally to let the teacher listen to these sections and give his advice and criticism.

In recording sentences for the student to repeat constantly, the following points should be noted:

Sentences recorded in any one lesson should be restricted to one or two structural forms;

The material should be carefully graded;

The vocabulary should be limited—ten new words a day is good going;

The meaning should be simple enough to be conveyed by pictures and diagrams, not by written words;

The same sentence should always be recorded with the same expression, rhythm and intonation.

The teacher should speak each sentence aloud at speed, and then repeat it twice quietly under his breath before saying the next sentence aloud. The student will naturally stumble and falter in his attempts to repeat the sentence, and this method of recording gives him just that little extra time he needs. After a little experience one soon learns how long the interval should be.

When listening to the playback and recording his own voice, the student should follow these hints:

Listen to each sentence several times carefully, and note the phrasing, significant pauses and emphasis in the sentence, the rise and fall of the voice, and also, of course, the sequence of sounds;

(Continued on page twenty-five)

TAPE NEWS DIGEST

CHILDREN of Knowl Bank, County Primary School, Golcar, Yorkshire, scored a great success with a tape they prepared and sent "out into the blue" to the Mayor of Calgary, Alberta, for it was immediately broadcast over a Canadian radio network. Highlights were the singing of "Ilkley Moor Baht 'At" and "Yorkshire Tyke" by the children, all under twelve. A tape in reply is now awaited from a Calgary school, and similar contacts are planned with schools in Australia and New Zealand.

* * *

For Tessie O'Shea it is important that her weight should stay at about 13 stone—and it is inclined to run up to about 17 stone. How does she keep it under control? She has a tape recorder and a recording made for her by a hypnotist. His voice puts her into a light sleep and then proceeds: "You no longer want fried foods, sweets, pastries or potatoes . . . and when you are asleep tonight your subconscious mind will tell you that you are losing weight." This sounds like an example of negative-feedback.

* * *

"Record baby's first gurgles" is a familiar piece of tape recorder advertising copy. There may be more to it than one would think. Mrs. Barbara Strang, lecturer in English at King's College, Newcastle-on-Tyne, is recording her own offspring's glugs and gurgles in the belief that they may "yield something vital in the development of speech." She will study the recordings and may do a paper on her findings.

* * *

A Forest of Dean newsagent uses a tape recorder to help him organise his morning deliveries. Unlike the old order book, it leaves his hands and eyes free for sorting.

* * *

TAPE is helping out professional and amateur actors who are faced with problems of accent and dialect. One reading of their part on to a tape by a native gives them the complete example to study over and over again at leisure.

* * *

B.B.C. recording engineers will tape record budgerigars in an endeavour to find the country's most talented talking budgerigar. The recordings are being played to a panel of judges on July 27th to find the winner.

One thousand children were able to take an oral music examination simultaneously at a London school recently with the aid of tape. The questions were recorded and then broadcast to each class over the school's loudspeaker system.

* * *

No wedding or golden wedding is now complete without a tape recorder. Mr. Owen Oakley, aged 87, of Berriew, Montgomery, was unable to attend the wedding of his grandson so he sent his speech on a spool, which was duly replayed at the reception. When Mrs. Amy Bennett and her husband, of Netley, Hampshire, celebrated their golden wedding a surprise present was a taped message from their two sons, Gerald and Dennis, who are both teachers in New Zealand.

* * *

The advice Jack Payne gives to people who write to him asking how they can get into television, radio, records or show business is "make a tape recording of your voice and send it to the recording company (or radio or television producer) in question." In addition, however, he tells most of them not to try, because one needs, as well as a good voice, far more than the average degree of perseverance to get on in these spheres.

* * *

VISITORS to Churche's Mansion, Nantwich, can hear a tape recorded reconstruction of the history of this fine Elizabethan merchant's house as they walk around it. They can hear the welcoming "voices" of Richard and Margerye Churche, for whom the house was built in 1577. Mr. Richard Dimbleby speaks a prologue and sixteenth-century ballads are sung to the accompaniment of a spinet.

* * *

Old inhabitants of Hampstead, London, are recording some of their early memories of the locality. Excellent results are being achieved by Mr. Frank Celoria, secretary of Hampstead Local History Society, who interviews three or four old people at a time. The resulting tape is replayed to another group as a "priming" for further recollections. The recordings will finally be handed to the Hampstead Library.

* * *

Daily Mirror Editor, Mr. J. Nener, forecast the delivery of newspapers via the TV set at a recent public discussion. He thought that with the development of visual tape recording the day was coming closer when a roll of newsprint in each TV set would be printed electronically and delivered through the slot.

* * *

Danny Blanchflower, footballer of the year, tape recorded a speech for the recent dinner of the Football Writers' Association. Said his disembodied voice, "I am an Irishman playing for a London side in Barcelona. That's a better Irish situation than even the Irish could invent."

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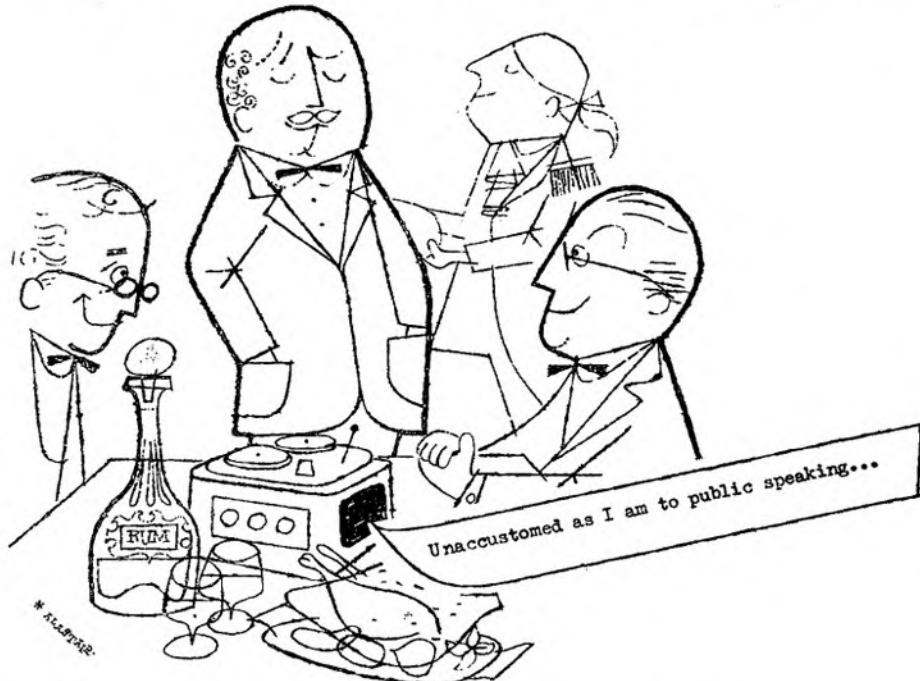
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TAPE TITTER By ALASTAIR



A TRIP down to the South of France as a car passenger has given me an opportunity to study the advantages of a tape recorder on a long run by road—especially for people like myself who usually feel cheated for years afterwards because so much is seen on such a journey and so little of it clearly remembered.

The machine I have with me happens to be a Fi-Cord, but for the basic job of recording the journey almost any recorder with a slow speed and a pause control, or a very simple stop and start mechanism, would do.

More can be accomplished, however, with a battery model than with one that depends on the car and a transformer, and I also found the hand microphone with built-in stop-start switch a great help.

The peculiarity of the situation is, of course, the rapid procession of impressions extended over two or three days and the consequent difficulty of retaining more than a confused recollection of what has been seen, and where.

In the past I have always resolved to make written notes and failed to do so. It is impossible to write in a car and at the end of the day the confusion has already set in.

In these circumstances the tape recorder comes entirely into its own, for one's impressions can be recorded absolutely first hand, in the more vivid present tense and at sufficient length to cope with the main details of a rapidly changing scene,

HOMO TAPIENS

by

Douglas Gardner

LESS tape is needed than might be imagined. I found that a very satisfactory account resulted from a running commentary recorded whilst we were passing through towns and other especially noteworthy places, supplemented by a regular series of "round-up" reports.

The latter might begin "We are just approaching the town of _____, the time is four-thirty, the sun is shining and the mileage is 436. During the past hour or so we have been running through the rich Burgundy country, with the Alps showing up mistily on the left . . ." and so on.

There is an extra advantage about taping such a journey. The necessity for putting your impressions into words at the time these things are happening sharpens your observation and encourages you to continue taking a lively interest in your surroundings when you might otherwise have relapsed into un-registering boredom.

The chief problem is that of making useful recordings without becoming anti-social—unless you are able to sit alone in the back seat.

It helps if your fellow-passengers can

be persuaded to play a constructive part with descriptive comments and factual notes.

The experiment certainly succeeded in its main object. After only a day or two, memory, unaided, was refusing to reproduce more than a vague and distorted impression of the journey; but a replay of the tape fitted the jig-saw together coherently and restored many missing pieces that might otherwise have disappeared for ever.

* * * * *
THE story of reader C. Butler, whose loss of a tape recorder was reported in a recent issue of *Tape Hi-Fi Magazine*, has taken an unexpectedly happy turn. The background is the fact that Mr. Butler works as a civilian with the U.S. Air Force at Bovingdon, and among the American friends he has made there are five tape recording enthusiasts with whom he has had many enjoyable recording sessions.

"When they heard of my loss," Mr. Butler writes, "they seemed even more downhearted than I was."

The surprise came a little later for, unknown to him, the American recordists made a collection and eventually presented him with a new Grundig TK5.

Mr. Butler tells me he was completely overwhelmed by this action, but however much he tried to thank them they simply replied: "Aw, forget it; we knew how much it meant to you."

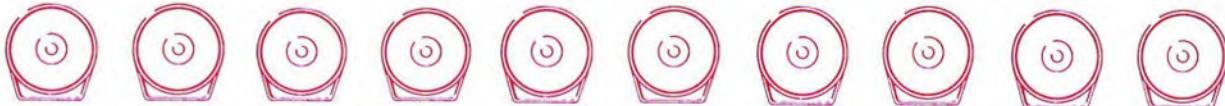
All I can say is that friendship of that kind means a lot to all of us.

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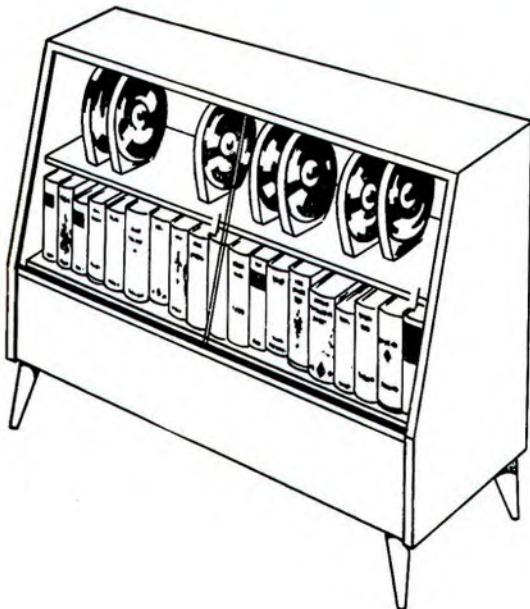
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SUGGESTIONS

RECORDING A WEDDING

MR. ALAN KNIGHT asks for hints on recording a wedding. A year or so back I did this with great success with the simplest possible equipment.

Having obtained the consent of the incumbent (an important note) I concealed myself in the pulpit (power supply from desk light calling for smallest size two-pin plug) with a Philips Recordergram junior. I tied the crystal microphone supplied with this little machine to the communion-rails.

The result was perfect: even the rustle of the bride's dress as she walked to the altar could be clearly heard. By the omission of some verses of the hymns and the shortening of some of the organ passages, the whole ceremony went on to one track of the 5 in. spool of tape; the other side being used for speeches, etc., at the reception. The complete tape was then housed in plastic case and presented to the bride.

PETER TURNER.

Stroud, Glos.

I AM happy to say to Alan Knight (June issue) that I recorded a forty-minute wedding service with one microphone and a TK5 recorder. It was an Anglican wedding service where the bridal couple moved up to the altar. To meet this I had a fifteen yard microphone extension cable. Since the choir pews were in front of the altar, a member of the choir very discreetly moved the mike to a position near the altar.

I placed the recorder in the vestry and did not see the service. I was pleased with the results although I picked up some hum. This was possibly due to the fact that I had more mains and mike leads than was necessary so that two leads were together in a corner.

I also found that the minister and bridal couple (the speakers) do not want

More and more readers are helping one another. If you have a problem, write to "The Ideas Pool" about it. And if you think you have an answer to any of the queries, let other readers share your knowledge and your own experiences.

THE IDEAS POOL

to be more than six feet from the mike as you need full volume and may pick up extraneous noises. Watch when the congregation are singing as they may send the magic-eye fluttering—and you'll be over-modulating.

My recording was made in a small church. For a larger building I would recommend a mixer unit.

We had a disc made from the tape—a 12 inch L.P. My friends were very pleased with it.

PETER I. STARIE,

Leicester.

MUSICAL COMPOSITION

I AM concerned with the problem of using tape recording as an aid to musical composition, and should be very interested to learn from others who have either been working on "musique concrete" or, as I have, on more legitimately based composing.

I append details of the methods I have used, as many musical people may be daunted by the mechanical aspects.

Two tape recorders were used, both with erase heads screened with copper foil to permit superimposition on the tapes. The different tape speeds available permitted frequency and tempo multiplication ($\times 2$), and subsequent superposition at final playing tape speed as required; also frequency division, though this was less successful because of dissonant beats which were noticeable at lower frequencies.

The piano, with its large frequency range was found to be the best means of producing a gamut of sounds, and is indeed made for the job. Our composition was sketched out beforehand using conventional musical notation, as far as possible, and graphic symbols.

By means of numbered references the score was related to a chart of five columns describing the recording method; this detailed what was to be happening on the instrument, recording speed or direction, playback speed, accompaniment to playback and the re-record speed of this latter.

We are still so uncertain of our medium that often it takes control and produce accidental effects far superior to our carefully planned ones.

AND QUERIES

I am anxious to hear from any readers interested in this new musical tool and its musico-philosophical aspects.

R. L. TAMS.

Preston.

A SUITABLE MOTOR?

I AM contemplating making a tape recorder about 8 in. \times 6 in. \times 3 in. or smaller. My main difficulty is to find a suitable motor for driving the capstan. I should therefore be pleased to hear of any small, constant-speed motors suitable for this purpose.

I have no preference for either clock-work or electric drive, and I would be interested to hear the pros and cons of the two methods of tape transport from anyone with experience of them.

B. R. STEPHENSON.

Sheffield.

BIRD RECORDING

MR. R. N. GREGOR has stated that obtaining a good recording of British bird song is more difficult than it would appear. While agreeing with him, I would suggest that it is by no means impossible for the amateur.

The main requirements are a small pre-amplifier for the microphone, some means of protecting the microphone from the wind, and a low impedance microphone to ease hum troubles in the long cable lengths involved.

I use equipment on these lines in conjunction with a microphone cable of approximately 200 yds. and the results are most satisfactory.

Should any reader be interested I should be only too pleased to supply circuits and details if they will write to me at Treween, Altarnun, Launceston, Cornwall.

K. L. DEAN,
Launceston,

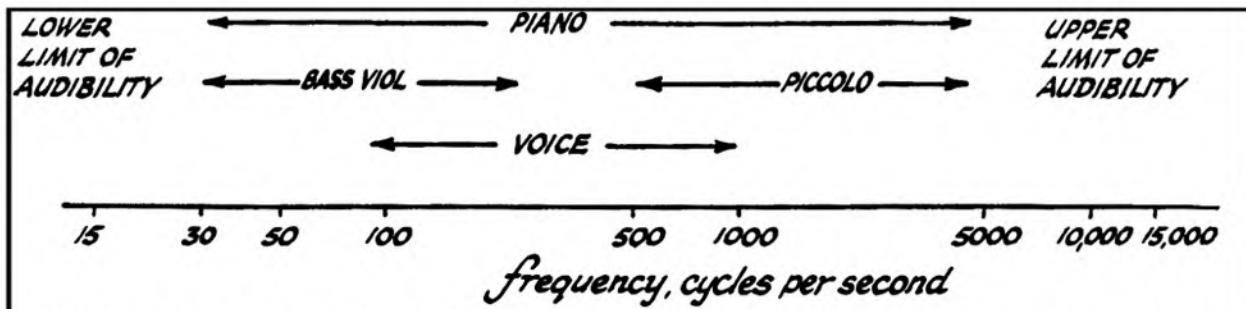


FIG 1. AUDIO FREQUENCY SPECTRUM. Musical Overtones, and noises such as squealing brakes, extend up to and beyond, the upper limit of audibility

THE A·B·C OF AMPLIFIERS

**CHARLES LANGTON, A.M.Brit.I.R.E., continues his series
on Tape in a Hi-Fi System, designed for newcomers**

WHEN we talk about an amplifier, we mean a device for magnifying or enlarging a small electrical signal, such as the tiny voltage obtained from a microphone when spoken into. Amplifiers fall into two basic types: voltage amplifiers, which, as we may expect, deliver a voltage which is an enlarged replica of the input; and power amplifiers, which have to be used to drive a loudspeaker, for example. In most practical cases, the complete amplifier is made up out of both types.

If there were such a thing as a perfect amplifier, it would give an output which was a pure, magnified replica of the input signal. All amplifiers, however, like everything else in the world, are somewhat imperfect, some more so than others. This imperfection results in the output not being an exact replica of the input, and therefore the output is said to be distorted. In a well designed amplifier, however, the distortion produced is very small, and it is the desire of every designer to reduce the distortion as much as possible.

DISTORTION

There are two forms of distortion found in amplifiers: harmonic distortion, and frequency distortion.

Harmonic distortion is due to the amplifier actually producing harmonics or overtones which were not present in the input signal. These unwanted harmonics are usually the second or third. Thus, if a pure tone at a frequency of

400 cps is to be amplified, the output from the amplifier would consist not only of an amplified 400 cps tone, but a small amount of second harmonic (800 cps) and third harmonic (1200 cps) as well. Therefore, the output signal will not sound quite the same as the input, and so is distorted.

The degree of distortion depends upon the amount of unwanted harmonic present and is expressed as a percentage, being the ratio between the rms value of the unwanted harmonics and the rms value of the total output.

TOLERANCE

The ear is far more tolerant towards second harmonic distortion than third harmonic, a small proportion of the latter causing more irritation than a larger amount of second.

As a guide, the total harmonic distortion in a good amplifier should be less than .5 per cent. The aural effect of this kind of distortion is a rough, jarring sound accompanying each note; it is very noticeable when listening to piano music.

Harmonic distortion may be caused by over-modulation when recording, volume control too high on playback, or the use of a loudspeaker which does not match the output stage. Internally, the fault could be due to a "soft" valve, or the wrong grid bias voltage, or other more obscure faults.

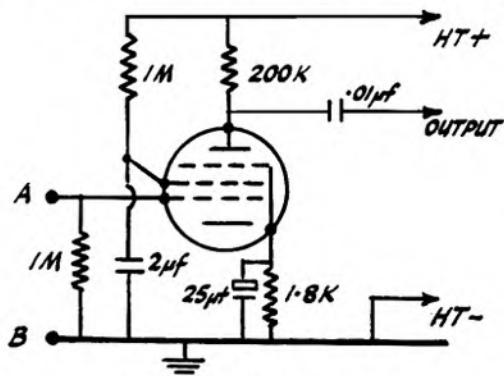


FIG 2. VOLTAGE AMPLIFIER

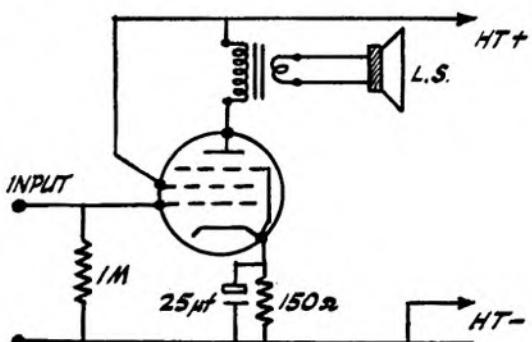


FIG 3. POWER AMPLIFIER or OUTPUT STAGE



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The JC20 Plus . . .

AS REVIEWED IN MAY ISSUE

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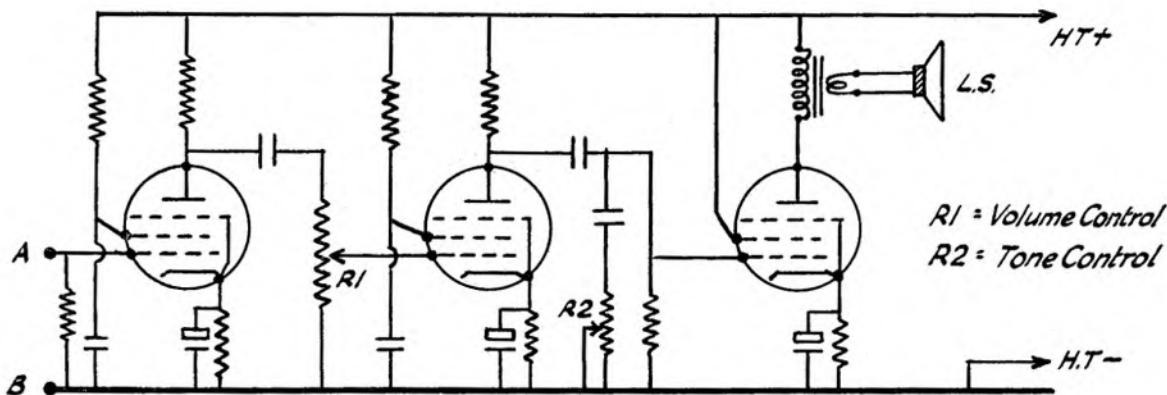


FIG 4. THREE STAGE AMPLIFIER. BASIC CIRCUIT

Frequency distortion occurs in amplifiers which are unable to amplify all musical frequencies equally. The human ear is capable of responding to musical notes from about 15 cps up to 15,000 cps, the upper frequency limit depending largely upon the age of the subject.

Now, a full orchestra produces musical notes and overtones on all frequencies within this range, and if the amplifier did not respond to any of the frequencies, those musical notes would not be reproduced, and would be lost.

This occurs most commonly to the frequencies at the extreme ends of the scale, the bass and treble. Thus when listening to music on a poor quality amplifier having poor bass and treble response, it will be impossible to hear, say, the double bass and percussion instruments, and so the music loses its naturalness.

Furthermore, because each musical instrument is characterised by the range of overtones it produces, and because the overtones are on a higher frequency than the fundamental note, it is quite possible that a poor quality amplifier will fail to respond to the overtones, and so even the medium pitched instruments will lose their naturalness.

ESSENTIALS

In the light of the above, we can now begin to see the essentials of a high-fidelity amplifier. The word fidelity means faithfulness, and for an amplifier to give faithful reproduction it must be free from harmonic distortion, and possess an adequate frequency response.

The gain is a measure of the amplification of an amplifier. Thus, if the gain of a voltage amplifier is 1000, then the output voltage will be 1000 times as great as the input. Similarly, in the case of a power amplifier, the gain is equal to the power output divided by the power input.

In a complete amplifier, say a playback amplifier, the first stages amplify the tiny voltage from the playback head, until it is large enough to feed a power amplifier, which in turn drives the loudspeaker (fig. 4). In this case, it is usual to refer to the overall gain as "so many millivolts input to produce maximum undistorted power output."

The power required to drive the loudspeaker is measured in watts or milliwatts (thousandths of a watt), and this depends upon the size of the room or hall, furnishings, and number of people present. Soft furnishings and many people readily absorb sound waves, and more power is required in these cases. When playing back a recording in the average home, an average output of about 50 milliwatts will suffice in a fairly quiet room.

It must be realised, however, that this is only the average power, and as the range of volume of an orchestra is tre-

mendous the amplifier should be capable of handling a peak power of several watts, without distorting, on the loud peaks of music. The power produced by a full orchestra when at its loudest is over 1000 times the power produced by, say, a triangle.

Fig. 2 shows a circuit of a basic voltage amplifier. The microphone or playback head is connected between points A and B, and the amplified output is taken from the anode circuit at point C. The valve used in this case is a pentode, although a triode is often used.

This may be followed by a similar amplifier to give further voltage amplification, and then finally fed into the grid of a power amplifier (fig. 3). The output from this drives the loudspeaker on playback, and could also drive the recording head when recording. The complete basic circuit is shown in fig. 4.

LANGUAGE TUITION ON TAPE

(Continued from page seventeen)

Try to imitate all this as closely as possible when you speak;

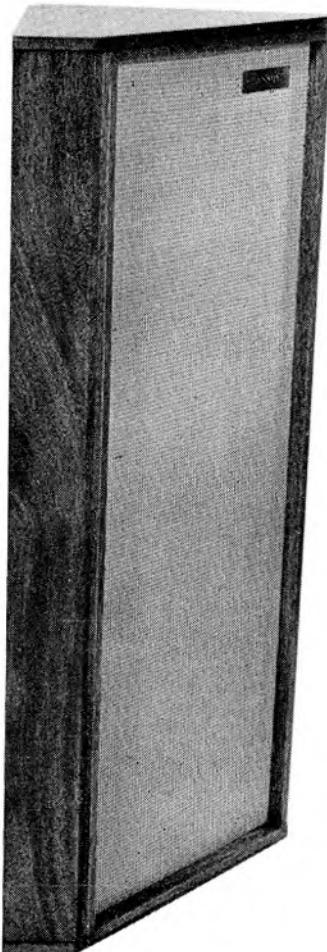
Do not be shy of the mike. Speak with confidence, even if you make mistakes. You can correct yourself the next time;

When listening to the playback or recording your own efforts at imitation, never read a script. Such reading is only legitimate in recording (not listening to) long sustained passages, never in repeating these short sentences. The reason for this is obvious; when you find yourself in a new country you cannot ask shopkeepers and friends to translate each sentence or write it out for you. And so in your lessons you must train yourself to listen, understand and speak without any aids of translation or writing. The use of pictures to convey meaning (and of acting out the situation if you have a live teacher) is permissible, because they help to break down the artificial atmosphere of the language lesson and transport us into an imaginary situation in which it would be natural to hear and say the sentences which we are practising.

There is no guarantee that everyone will be able to master a language quickly. Motivation plays an important part in this.

Mechanical aids have their limitations, but tape recorders can be used to good advantage, particularly if their use is approached methodically and imaginatively. You will find the whole process most interesting, and great fun too.

ACCENT ON SLIMMING



STEREO developments have intensified efforts to produce smaller speaker housings of high efficiency, and one of the results is the **Tannoy Chatsworth Aperiodic Enclosure**. It is 39 ins. high and has a maximum width of 19 ins. With these modest dimensions and a 12 in. Tannoy dual concentric speaker, a frequency response is claimed of 50 to 20,000 cps plus or minus 3dB with the bass response falling away below 50 cps at only 12dB per octave.

The enclosure can be wall-mounted or placed on the floor when it occupies only three-quarters of a square foot. The power handling capacity is 15 watts. Complete with loudspeaker unit and crossover unit, the price of the Chatsworth is £49 15s.

A novel tubular design

THE **TSL-Geruphon Omni-D Resonator** is a loudspeaker of novel tubular design weighing only 1 lb. 12½ ozs.

The rest of hi-fi

Many tape enthusiasts have decided that the first priority if they are to get hi-fi reproduction is a good external speaker, and the prospect of many new tape records in the near future will give a boost to this trend.

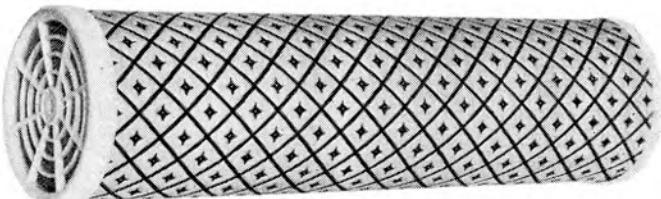
A large number of modern tape recorders have amplifiers that are capable of giving an even better response than the built-in speaker can deal with, and the advantages of having a separate hi-fi speaker are therefore obvious.

At the last Audio Fair there were a significant number of new speakers and enclosures on view, and they received close attention.

On these two pages we publish photographs and basic details of a few of the recently introduced models that are suitable for use with a good quality recorder.

This feature is the first of a number in which we shall report on new items of associated equipment suitable for use with tape. Next month we hope to deal with amplifiers.

Right: The unique TSL-Geruphon speaker, which can be hung from the ceiling. Left: The new Tannoy Chatsworth



It employs a small speaker unit mounted asymmetrically in a tube of acoustically inert material 15½ in x 4½ in. diameter, and it is intended to be suspended horizontally so that the sound is radiated in the two opposite directions, using the sound pressure from both sides of the diaphragm.

One does not expect a miracle with a speaker costing only £5 10s. 9d., and with a 4 in. cone, but the results were distinctly better than the performance of a slightly larger unit mounted in a 9 in. x 9 in. baffle, used as a comparison. The claimed frequency range of 80-10,000 cps indicates the extent of bass response, but music can still be very effective within the stated range, and the distribution of sound produced by the resonator is a pleasing feature.

The cylinder is in washable PVC in various colours.

Pye announce two new models

THE **Pye Mozart Companion**, Model HF10BS, is a new 10-watt speaker housing one 8 in. and one 4 in. speaker, the tweeter being acoustically isolated. A smooth response is claimed from 45 to 17,000 cps. The crossover is at 7,000 cps.

The cabinet, measuring 25 x 11½ x 10½ ins., can be placed vertically or horizontally, and matching 18 in. legs are an optional extra.

This speaker, serving as a natural companion to the Mozart Lowboy equipment cabinet, is priced at 21 guineas, the matching legs costing an extra 2 guineas.

Another new Pye product of which advance information has been issued, is the **De Luxe 3-speaker system**, a 25-watt unit in a heavily braced and acoustically resistance-controlled cabinet. There is a 15 in. bass unit, an elliptical mid-range unit and a 4-in. tweeter, giving a claimed frequency range of 20 to over 20,000 cps. The cabinet is of the corner type, 37 in. high and 26 in. across the front. The price is about 58 guineas.

NEW SPEAKERS OFFER BETTER LISTENING

AUDIO FAIR 1957 saw the launching by G.E.C. of the periphonic loudspeaker system; and at the 1958 Fair a smaller version was introduced—the Baby Periphonic, intended for the average-sized living room.

G.E.C. claim that it achieves standards of response, smoothness and bass distortion cancellation strictly comparable with the Periphonic unit demonstrated in 1957, but uses a much smaller cabinet.

For the bass performance, at frequencies below 1,500 cps, the system uses two G.E.C. metal cone loudspeakers mounted one behind the other in a totally enclosed cabinet.

The cabinet (22 x 21 x 14½ ins.), costs £13. The metal cone speakers are £9 5s. each, and the presence units, complete with coupling condenser, £3 19s. 6d. each. Components for a suitable crossover system are available.

Axiom 15/4 has four units

EXCEPTIONAL smoothness and freedom from distortion is claimed for the new 15-watt Axiom 15/4 high fidelity loudspeaker system which handles, in an attractive cabinet (36½ x 19 x 13½ ins., on 7 in. legs), a claimed frequency response of 30 to 16,000 cps in the following way:

For the bass (30 to 950 cps), a direct radiator unit, with 14,000 gauss magnet assembly. For the mid-range (950 to 5,000 cps), a pressure-driven unit loaded by precision diecast horn with low frequency cut-off of 650 cps. For the high frequencies (5,000 to 16,000 cps), two pressure-driven horn-loaded units, with low frequency cut-off of 2,500 cps, positioned to give wide angle coverage.

The multiple crossover network comprises four half section filters. Bass loading is by Acoustical Resistance Unit A.R.U. 172.

B.J. use special V spreader

BURNE-JONES new R-2 is a corner speaker containing a professional 12 in. drive unit with high flux magnet. Around this is designed the large capacity reflex sub-cabinet of quadrilateral prism form, a patented "V" spreader directing the sound forward through bilateral vents.

The cabinet is 39 in. high and 35½ in. wide. A smooth response is claimed down to 20 cps and the new BJ Top C tweeter is recommended for giving additional presence. With walnut veneer finish the R-2 is priced at £30 9s.

The CQ home construction speaker kit

CQ AUDIO LTD. have produced the Q-Flex speaker to an interesting and unusual design.

The main departure is the deliberate use of flexing walls to increase the effective radiation at low frequencies and give greater loading on the speaker diaphragm, with lower cone distortion as a consequence.

The Q-Flex employs three speakers, a 9 in. x 5 in. elliptical and two matched 4 in. tweeters, individually treated for optimum efficiency. The claimed frequency response is from below 40 cps to above 17,000 cps.

A curved and hinged deflector panel permits variation of the sound pattern.

A feature of the Q-Flex is that it is designed for home-construction and the complete kit costs 14 guineas. It will also be available fully assembled at an extra charge.

Other recent innovations

DYNATRON have added the CLS15 and CLS20 to their range, following the success of the CLS10, using the same acoustic cabinet as the latter. The CLS15 (£35 10s.) uses the Goodmans Orlin 111 plus a single high note driver, and the CLS20 (£46 15s.), uses the Goodmans Axiom 150 Mark II plus the Goodmans Trebax high frequency pressure unit and filter.

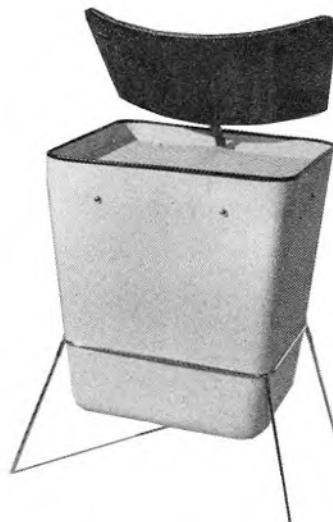
Altobass Ltd. introduced a new 12 in. loudspeaker at the Audio Fair, the 1210, designed to handle up to 10 watts of audio power. Their new Saltzburg Suite, in Sapele mahogany, comprises an equipment console and loudspeaker enclosure, the latter combining a bass reflex cabinet with a horn loaded port. Recommended speakers are the Altobass 2000 or 1210.

The Avantic Loudspeaker enclosure Mark IV is a forward-facing reflex corner enclosure. It incorporates a three-speaker system, a Beam-Echo 12 in. Type BEA12, plus a middle and a high frequency unit.

The new Whiteley T.359 cone tweeter unit is designed for use with Stentorian 10 or 12 in. units. It has a 9,000 gauss magnet and the claimed frequency response is 3,000 to 17,000 cps. The price is 35s.

New designs
bold and clean

Top, the "build-it-yourself" Q-Flex. Centre, the G.E.C. Baby Periphonic. Bottom, the Pye Mozart Companion.



A Console from Veritone

FURTHER evidence of the trend towards console models is provided by the latest product from Veritone. This is the Veritone Venus.

The machine is in black veneered mahogany of cabinet design with removable legs. It incorporates a deck of entirely new design giving speeds of $3\frac{1}{2}$ and $7\frac{1}{2}$ ips, a revolution counter, three heads and solenoid braking.

There are two amplifiers, one for recording and one for playback. Immediate playback while recording is possible. Superimposition and echo effects can be obtained as desired. There are two speakers, a 10 in. x 6 in. elliptical and a 4 in. tweeter. The response claimed is 40 to 12,000 cps at ± 3 dBs.



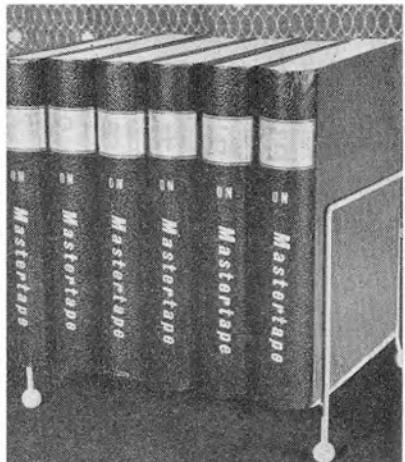
Provision is made on either side of the deck for the installation of the F.M. radio and an additional 10 watt high fidelity amplifier. Veritone will be marketing these as well.

Kurland Contemporary

COMPACTNESS is one of the notable features of the Kurland "Contemporary" TR7 tape recorder, made by Kurland Recording Systems Ltd., Tilly's Lane, High Street, Staines, Middlesex. The overall dimensions are $15\frac{1}{4}$ in. x $15\frac{1}{4}$ in. x $7\frac{1}{4}$ in., and the weight is approximately 34 lbs.

The Collaro deck is employed. The amplifier output is approximately 6 watts and the frequency response claimed is 50-9,000 cps at $3\frac{1}{2}$ ips, 50-12,000 cps at $7\frac{1}{2}$ ips, and 40-15,000 at 15 ips.

The price of the Contemporary is 56 gns. including tape and microphone, and extras include a lightweight earphone, three guineas, and a foot control, three guineas.



"TAPE BOOKS"

Each "book" shown above will hold two reels of tape. These are being marketed by M.S.S. at 7s. 6d. per book. The stand to hold six books costs 17s. 6d.

An exciting new portable

RECORDING enthusiasts with high standards as one of their aims will see from the design and specification of the British-made Fi-Cord that a serious attempt is being made to provide a battery portable that will give them the quality and facilities they need.

The Fi-Cord, made in Yorkshire under licence from Quellet-Stellavox, Switzerland, measures approximately $9\frac{1}{2}$ in. x 5 in. x $2\frac{1}{2}$ in. and weighs 4½ lbs. It takes 3 in. spools and operates at $7\frac{1}{2}$ ips (9 minutes per track), or $1\frac{1}{2}$ ips (36 minutes per track), so that one has the choice of a really long session with speech or a shorter session with high quality in mind.

On the faster speed a frequency response is claimed of 50 to 12,000 cps ± 3 dB. For high-fidelity results, how-

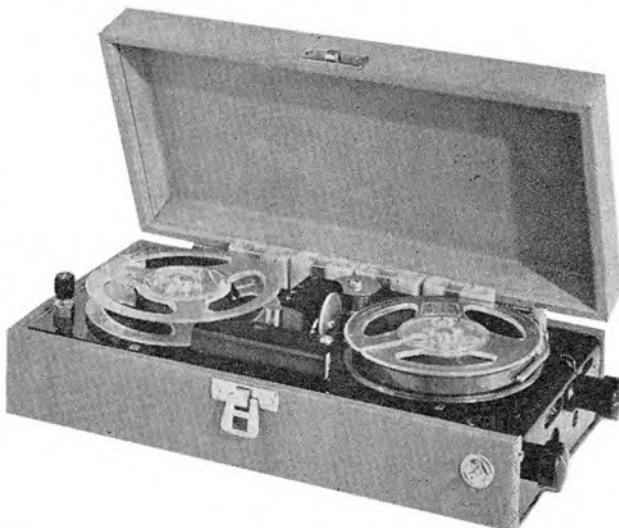
ever, it is necessary to use a studio microphone; and the Fi-Cord has an output socket to provide a feed into a high-fidelity amplifier and associated loudspeaker for top quality playback.

There is a built-in loudspeaker for monitoring; and an acoustic earphone, or stethophones, can be plugged into the main panel. The dynamic microphone provided has a stop/start switch, useful both for dictating and for recording interviews and so forth.

The Fi-Cord is transistorised and power is supplied by four small rechargeable batteries. It costs £79 10s., with microphone, tape and batteries; and the Fi-Cord charger operating off A.C. mains, costs £10 10s.

There is variety among these three new machines announced this month.

Top, the Veritone Console; left, the Kurland Contemporary; and right, the miniature transistorised Fi-Cord

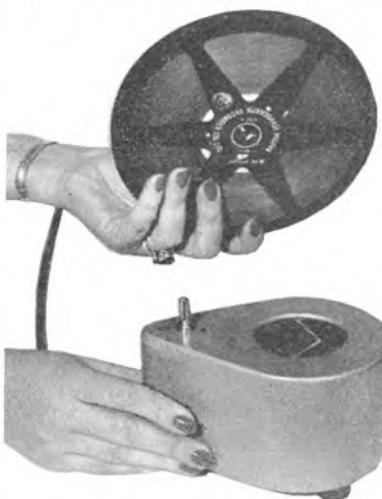


Instantaneous monitoring on new Verdik



THE new recorder from Verdik Sales Ltd., referred to in our May issue. It incorporates a new deck with provision of three half-track heads and separate record and playback amplifiers enabling instantaneous monitoring from the tape. Speeds are 3½ and 7½ ips; claimed frequency response from 40 to 12,000 cps. Three motor drive, magic eye, twin speakers and output for external speaker. An output is also provided with CCIR correction for feeding into a high-quality amplifier.

A TAPE ERASER



A TAPE eraser not only saves time when clean tapes are needed but it can ensure the elimination of residual background noise from over-modulation during previous recordings, which normal erasing on the machine does not always remove completely.

The WAL Tape Eraser, designed and produced by Wellington Acoustic Laboratories Ltd., is intended for professional and serious amateur users. It is mains operated, and the position of the mounting spindle can be varied to give optimum results for spools of all sizes. There are various finishes and the price is £7 18s. 6d.

PRE-RECORDED MUSIC ON TAPE

A new firm enters the field

AN important development in the field of recorded music is the announcement of a library of pre-recorded tapes by Saga Films Ltd. Some of them will sell for as little as 35s.

The first release of twenty tapes has already begun and all are expected to be issued by September.

600 ft. on 5-inch spools playing for 32 minutes will cost 35s. This selection includes a concert by the Royal Danish Orchestra; The ballet suite "Swan Lake" played by the Bolshoi Theatre Orchestra and a Pouishnoff piano recital.

850 to 900 feet on 7-inch spool playing at 44 minutes will cost 50s. They include two volumes of Beethoven's violin sonatas played by Alan Loveday, violinist, and Leonard Cassini, pianist; the Nurnberg Opera Orchestra and Chorus in Wagner's Die Meistersingers; Tchaikovsky's Symphony No. 6 in B Minor

played by the Bolshoi Theatre Orchestra and Brahms' Symphony No. 1 in C Minor played by the Royal Danish Orchestra conducted by John Frandsen.

1,200 feet on 7-inch spools playing for 64 minutes will cost 55s. These will include the Liszt Sonata in B Minor and a Schumann piano recital by Sergio Fiorentino.

Saga Films Ltd. are a comparatively new company of documentary and cultural film makers. The recordings, with the exception of those with the Bolshoi Theatre Orchestra have been made by their own recording units in Europe.

The quality of these tapes and library of stereophonic tapes that they are going to issue was demonstrated at a recent gathering at the International Broadcasting Company. *Tape Recording Magazine* hopes to include some reviews in an early issue.

Manufacturers news round-up

CAMP BIRD INDUSTRIAL LTD. have acquired a controlling interest in A. Prince Industrial Products Ltd. Dr. A. Prince continues as managing director. He informs us that they will continue the exclusive distribution of Uher tape recorders, Blue Spot radios and radio-grams, Dual record players and Changer Units, Ilse Cabinets and Akkord portable radios.

An exhibition of high fidelity equipment is being held at Imhoffs, 112 New Oxford Street, W.C.1 from June 16th to 28th. Stereo demonstrations will be a feature.

* * *

I have been inspecting the new waterproof cover supplied by A. Brown & Son Ltd. of Hull for protecting tape recorders, writes Douglas Gardner. This is made of sturdy waterproof material and is available in navy blue, brown, grey and maroon with white piping. A cover suitable for the Grundig TK5 complete with microphone pocket costs 36s. and a TK8 39s. Special covers can be made to order and trade inquiries are invited.

* * *

Mr. P. Collings-Wells, Goodmans Technical Manager, gave the inaugural lecture of a series on "High Fidelity Quality Sound Reproduction" at the Wembley works recently. These lectures are continuing through June and July. Sales staff of dealers and stores interested are invited to write to Messrs. Goodmans for details concerning time and date of the next lecture.

Thieves who gained access to the premises of Messrs. Howard Photographic, Bromley recently, had passed out thirty-two machines before their presence was noted. They had been placed in an adjacent graveyard before being loaded on to a lorry. £300 worth of machines were stolen although £2,000 worth were stacked among the graves. No arrests have been made.

* * *

The price of the Winston Thoroughbred tape recorder has increased from 65 to 69 guineas. The firm state that this is solely due to the cost of materials. The Thoroughbred now uses the Collaro Mark IV deck. It has heavier, quieter running motors which cut out via a "micro-switch" when the instrument is neither recording nor playing back. A brake on the flywheel enables the tape to be reversed almost instantaneously. The firm have improved the amplifier and they claim complete redesigning of the deck reduces wow and flutter to a new low level.

* * *

Elizabethan announce the following price revisions: The Essex is now sixty-five guineas (including 1,800 feet of tape) with Cadenza ribbon microphone ten guineas extra and a high quality crystal microphone five guineas.

The Mayfair console model is seventy-two guineas (including 1,800 feet of tape) with additional microphones as quoted above.

The Escort is forty-five guineas (including 1,800 feet of tape, high quality crystal microphone and all accessories).



Nancy Spain to present prizes

TAPE CONTEST NEARS ITS CLIMAX

THE second British Amateur Tape Recording Contest is gathering momentum as it moves to its climax. Entries and requests for entry forms are arriving daily at the offices of *Tape Recording Magazine*.

The programme for an exciting day on Saturday, August 30th, is being finalised.

There are two main sections of the Contest. One for individuals (with four individual sections) and one for schools.



The contest is linked with the International Amateur Recording Contest in which seven other countries take part. Already the panel of judges and the finals of the international event to be held in Berne, Switzerland, in October are taking shape.

Between July 31st (closing date for entries) and August 30th, TV, radio and journalistic personalities, Josephine Douglas, Tony Gibson, Charles Mason and Douglas Gardner will be busy choosing the winners from the great many entries which it is now certain are going to be received.

There is an impressive prize list and programme for the winners in both sections.

In the individual section prizes will include the Emi-tape Challenge Cup; a tape recorder presented by Messrs. E.A.P. Tape Recorders Ltd.; a tape recorder presented by Messrs Fi-Cord Ltd. (for the winner of the documentary section); a ribbon microphone presented by Messrs. Film Industries Ltd.; a ribbon microphone for the winner of the music and speech section presented by Simon Sound Service Ltd., five radio jacks presented by Messrs. Truvox Ltd. and a supply of magnetic tape presented by Messrs. Olympia Sound.

In the schools section the winners will receive the Grundig Challenge Cup and a supply of tape presented by Messrs. Philips Electrical Ltd. The prize list is grow-

ing rapidly and until it is complete it is not possible for us to allocate particular items to the individual sections.

It is already clear that the winners of each of the four categories as well as the **Tape of the Year** entry will carry away a very exciting bag of prizes.

* * *

On Saturday, August 30, the winners will arrive in London and will be entertained as the guests of Electric and Musical Industries Ltd., who will take them to lunch at the Savoy.

After the prize-winning luncheon the guests will enjoy an afternoon at the Radio Show and will be invited to a reception to be given in their honour later in the afternoon by Messrs. Lustraphone. It is hoped that many tape recorder manufacturers and personalities will be represented on this occasion and meet the winners.

At 7.30 on the same evening *Tape Recording Magazine* will promote the playback of winning tapes and presentation of prizes at an important function in the South Restaurant of the Earls Court Radio Show.



Miss Nancy Spain, the eminent broadcaster and writer, has kindly consented to present the prizes to the winners. Their tapes will automatically qualify for entry in the International Recording Contest. If successful they will receive prizes from the international list including sums of 100,000 French francs, 10,000 Belgian and 1,000 Swiss.

If you have not already written for your entry form, do not delay, write today.

In the schools section a special function will be arranged by Messrs. Grundig either in London or in the area in which the school is situated to which the winners will be invited as soon as possible after the Contest. The Cup and prizes will be presented at this event.

KNOW YOUR RECODER

No. 6

THE Sonomag portable tape recorder is designed to be used on A.C. mains, 200/250 volts, 50 c/s. The primary of the mains transformer is centre-tapped for 110/115 volt supply.

At the rear centre of the deck is the red speed change knob. In the centre is a three-digit revolution counter. Nearer the front of the deck will be seen the play, record and fast rewind buttons.

In the centre of these is the stop bar, which must be used to stop the tape drive mechanism if any button is in use and before using any other button. It must also be used before switching off at the mains, or by the switch knob on the amplifier panel.

On the amplifier panel are two input jack sockets marked "Mic" and "Radio/gram" which are used in recording. There is a combined mains switch and volume control. Turned fully anti-clockwise it switches off the mains.

There is a bass-cut control of tone. Turned anti-clockwise, the control is inoperative, but turning the knob clockwise reduces the bass content, enabling the tone to be adjusted to suit the recording.

There are two output jack-sockets,

Another in our regular series of information for readers who are able to service their equipment; these pages can be cut and pasted on card for easy reference.

SONOMAG PORTABLE AND THE ADAPTATAPE

marked "amplifier" and "speaker." A high-fidelity amplifier may be plugged into the first socket, and a high-quality external speaker can be connected into the other.

A crystal type microphone is supplied with each recorder, and should be plugged into the socket marked "Mic." To prevent interaction and "howl" the microphone should be used as far from the machine as possible, but the lead should never exceed 30 ft. with a crystal microphone.

The "Elac" speaker is capable of giving very good results. It is obvious, however, that owing to the limited space, and the mechanism inside, a proper acoustical chamber cannot be formed. For regular replay at home, if a high-quality external speaker is available, very fine results can be obtained. The external speaker should have an impedance of 2 to 4 ohms.

The socket marked "amplifier" may be used to plug in a high-fidelity pre-amplifier, main amplifier and external speaker to the system, giving excellent results at even greater volume. Care must be used here, or interaction and

hum may be caused. The earthing should be inspected, earth "loops" avoided, and the mains connections reversed till the most hum-free position is found.

If regular recording and replaying is to be made via high-fidelity equipment, the Sonomag "Adaptatape" is specially designed for a specialist job. This is a high-quality pre-amplifier directly coupled to the Collaro 3-speed tape transcriptor deck. It provides all oscillator, bias and erase voltages, and passes the signal to any standard pre-amplifier and amplifier system in a suitable form for highest quality reproduction.

No tone control is fitted, as this will be better handled by the succeeding amplifier system. The right-hand knob is a mains on/off switch. The left-hand knob is the volume control. A pilot bulb lights when the mains are switched on.

The rear panel carries the octal base socket for connecting to the power pack. There are also two co-axial sockets, one marked "input" for plugging in a radio-tuner, pick-up, etc., and the other "output," to feed the following high-fidelity system.

(Circuit Diagrams on page 33)

Something new! ...a tape library!

A Q.M. service that opens up a new world of entertainment for the tape enthusiast—you can now hire all available monaural and stereo pre-recorded tapes through the post! Cost? Only 52s. 6d. for a single reel—which you can change up to 12 times within a six-month period! Or you can have two tapes for 82s. 6d. and you can exchange those 12 times within six months—making 24 different tapes! For 112s. 6d. you get three tapes—over six months, that's 36 different tapes!



HARTING

The Harting Portable tape recorder is a two speed model—7½/3½ i.p.s. It gives exceptionally good quality and is very simple to operate. Its handsome appearance and magnificent performance make it one of the finest recorders available.
Price 82 gns.

STUZZI MAGNETTE

A fully transistorised battery operated recorder combining a first class performance with genuine portability. Running cost is about 1d. an hour!
Price 69 gns.

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FIRST TIME EVER . . .

A fully monitored Hi-Fi Tape Recorder at a price all can afford. Hitherto these features were obtainable only in equipment costing double the price of the Verdik SI. This star-studded Tape Recorder is made to very high standards with particular emphasis on trouble-free long-term stability.

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SEPARATE RECORD AND PLAYBACK AMPLIFIERS AND 3 HEAD SYSTEM ALLOWS PLAYBACK OF TAPE AS YOU RECORD. NO MORE RUINED RECORDINGS—YOU HEAR IT AS YOU RECORD IT.



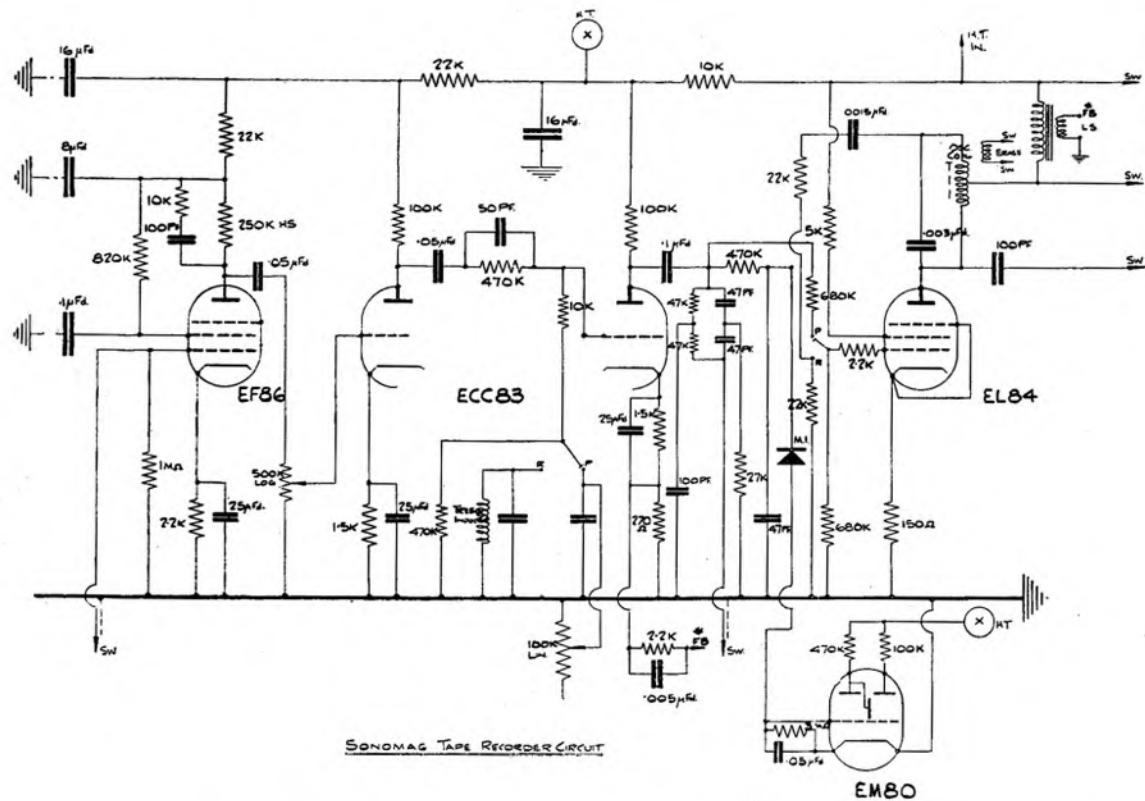
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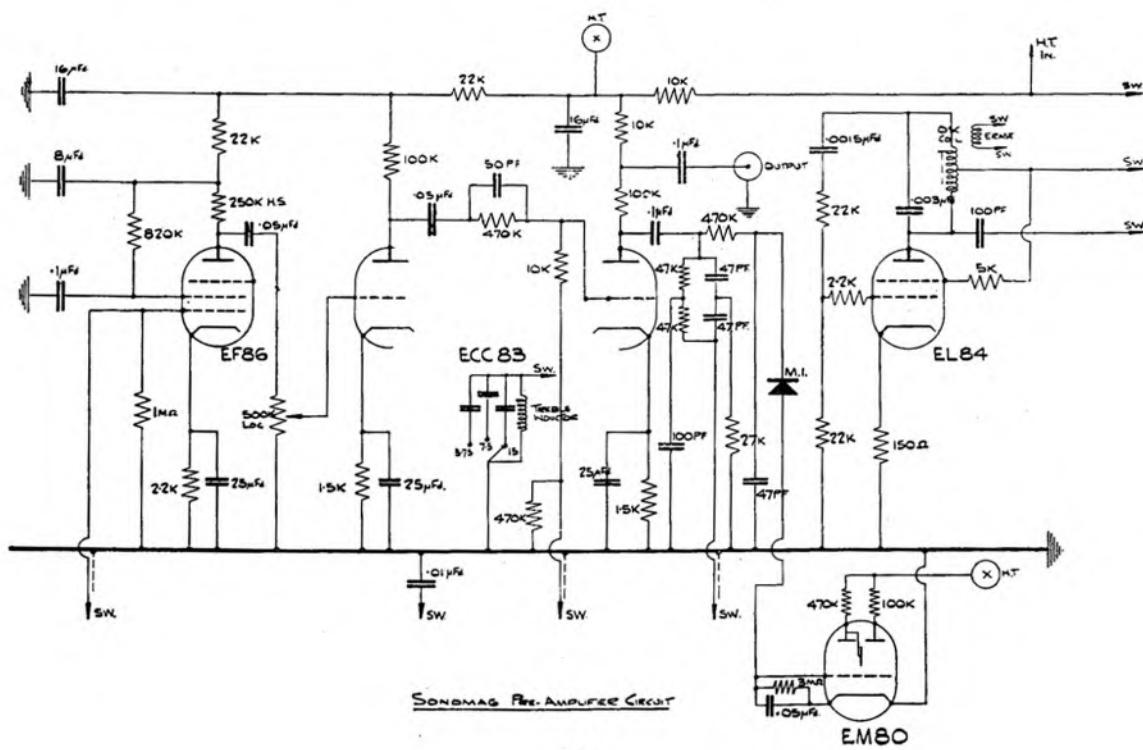
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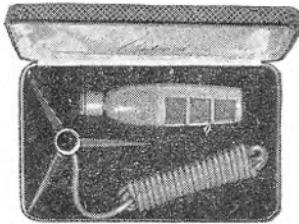
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The diagram above shows the basic circuit of the Sonomag Portable Tape Recorder, while that below is of the special high-fidelity Sonomag "Adaptatape" pre-amplifier coupling system. The right is reserved of making detail modifications from time to time as may seem expedient.





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Microphone (dual impedance head) and tripod desk stand, with 11 ft. of cable, 10 gns.



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BBC STEREO BROADCASTS

THE interest shown in the second series of B.B.C. experimental stereo broadcasts is expected to encourage those responsible to more ambitious efforts during the coming winter. The era of regular stereo radio is coming perceptibly nearer, even though the B.B.C., in its public pronouncements, still sounds a cautious note.

Probably the next step will be to broadcast a promenade concert in stereophonic form.

Following the first experiments last January, the B.B.C. put out two half-hour programmes on May 11 and 17, as part of its special "Record Week."

The right-hand channel was transmitted on the Third Programme and TV sound wavelengths; the left-hand channel on the Home Service wavelength on the first date, and on the Light Programme wavelength on the second.

An explanation of the broadcasts and advice on adjusting the speakers and volume controls was provided.

The programme began with the favourite gimmicks—the table tennis game and the passing train. Then an excerpt from *The Beggar's Opera*, a car race, a harmonica item, a song from *My Fair Lady*, and passages from *Falstaff*, Tchaikovsky's Fourth Symphony, and the *Ride of the Valkyries*.

Mr. J. W. RAINES, chief engineer of the Brenell Engineering Co., writes:—

"A fleeting broadcast of this importance had to be recorded—if only for its historical value. We, therefore, set up two FM tuners and the necessary recording equipment, in this case the Brenell Mark 5 deck, with four heads, and two Brenell Mark 5 amplifiers.

"This enabled the recording to be made by the 'staggered' stereo system—that is, the two recording heads spaced, and not 'in line' or 'stacked'—designed to eliminate 'cross talk.'

"No difficulty was experienced in obtaining a good quality recording; the operator felt a little apprehensive, but the equipment worked normally. As independent recording amplifiers were used, the balancing of the signals was easily accomplished without the need for adjustments to the FM tuners.

"As might be expected, the recording has been replayed many times already; in small rooms, large rooms, long rooms, short rooms, and many interesting features have been noted. There is not the space available to go into all the details but a few observations may be of interest:—

Small rooms: Surprisingly effective. Better than expected. Best position for speakers was on either side of the bay window.

Long rooms: Quite good results, especially with speakers at the narrowest end of room, approx. 9 ft. apart.

Large hall: Disappointing results—in this case due to room's acoustics—too much echo. More experiments required in this direction.

Volume levels: Matter of personal choice, but one can simulate moving towards orchestra, etc. as volume level is increased. Eventually, one is virtually on the Conductor's rostrum. Low level of volume on 'effects,' i.e. car racing and trains gave impression that they were at a distance and below one's own level. Increasing volume level brought one to the edge of the car track and railway platform.

"Many folk have heard the recordings and although a few have decided that stereo is not for them, the vast majority are really impressed with it, especially when, immediately afterwards, a monaural replay is heard."

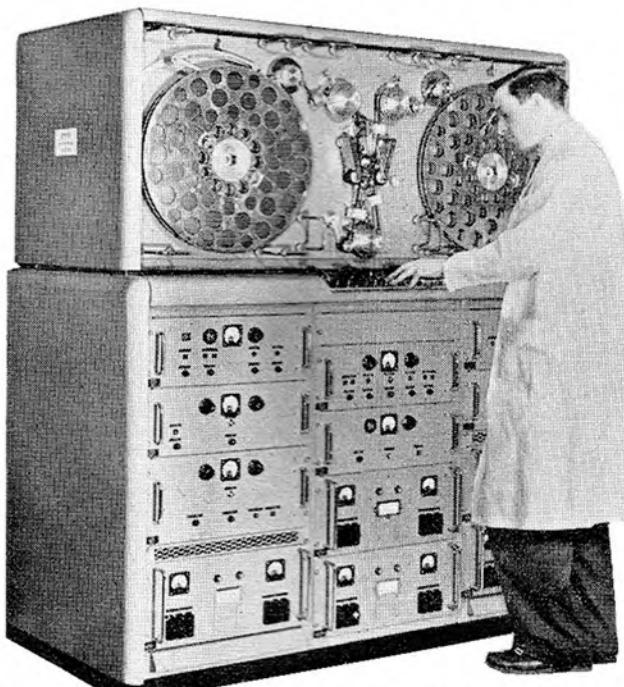
TAPE RECORD RELEASES

NEW tape records issued during the past month are: HMV single channel HTA 36 *Suor Angelica* (Puccini); HMV Stereo SCT 1524 *Russian pieces* (conducted by Charles Mackerras); Columbia single channel CAT 294 *Irresistible Strauss* (conducted by Herbert von Karajan); Columbia stereo BTA 126-9 *Der Rosenkavalier* (conducted by Herbert von Karajan).

We shall be publishing reviews of these records in our next issue.

B306-7

Here is Vera



THE B.B.C. has released this photograph of VERA (Vision Electronic Recording Apparatus), the distinctive British equipment for recording TV pictures on magnetic tape.

It uses a half-inch tape of normal commercial quality and information is recorded on three channels; one for the lower part of the frequency band, another for the higher frequencies, and the third for the accompanying FM sound.

Separate fixed recording and reproducing heads are used, so that continuous monitoring of the picture is possible while recording is in progress.

The tape speed is 200 feet per second and special methods have had to be devised to control speed and tension.

But the method has the tremendous advantage that recordings can be edited by cutting and jointing in the ordinary way, and can be replayed immediately.

Readers will appreciate the merits of this British system by comparing it with information about the American machines printed in our January issue.

CORRESPONDENCE

HAVING been a regular reader of *Tape Recording* for some considerable time, I would like to commend your series "Know your recorder."

Being engaged on electronics—but not a "service engineer" as E. A. Giddens, who criticises this series—it is a relief to have a circuit diagram to go by when tracing faults in friends' recorders, instead of wasting hours chasing out the circuit.

Mr. Giddens would prefer—as some dealers would—to be the sole possessor of the elusive diagram so that the "uninitiated" would only have one option when, say, they have a "broken mains lead."

No, keep this series going and cover all of the recorder range.

E. JONES.

Cheltenham, Glos.

CONGRATULATIONS on the Audio Fair number of the *Tape Recording Magazine*. To one who could not get along to the Fair this was a very fine second best.

I also like the new style of the magazine and very much welcome your completely independent policy as regards Tape Clubs. You will have the very earnest support of all tape recording enthusiasts.

ROBERT ELLIS.

Schoolhouse, Whitsome, By Duns, Berkshire.



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NEWS FROM THE CLUBS

The National Federation

THE Lord Mayor of Coventry has kindly agreed to open the inaugural meeting of the National Federation of Tape Recording Clubs.

A change of venue has been made and the meeting will now be held in The Conference Room, Hotel Leofric, Coventry. Date as previously announced is Saturday, July 5th, at 2 p.m. If any delegates who are attending have any last-minute enquiries they should contact Mr. J. Amphlett, 12 Stanhope Gardens, Highgate, London, N.6.

London

LONDON Tape Recording Club reports increased activity and membership. There are now more than forty members. The Club has indicated its support for the National Federation of Tape Recording Clubs. It is no longer affiliated to the British Tape Recording Society.

The Club received a tape message from the Master of the South Goodwin Lightship in answer to their Christmas Greetings. At a recent meeting they welcomed a visitor, Mr. Turney of the ETESSA Tape Recording Club. Secretary of the Club is Roger Aslin, Flat 1, 269, Green Lanes, London, N.4.

West Middlesex

THIRTEEN is obviously going to be the lucky number of the newly formed West Middlesex Tape Recording club for it was on the 13th day of the month that the first meeting was held. Thirteen members attended and elected a committee of the following officers: Chairman, W. P. Copinger; Secretary, H. E. Saunders; Treasurer, F. Gazeley. A constitution and rules were drawn up and subscription fixed at 15s. for individual and family members with juniors under 21 paying half. Aims and objects are in line with other clubs. A tape prepared by Mr. and Mrs. Copinger depicted the incidents leading up to the inaugural meeting. A prize of a year's subscription for identifying the incidental music included on the tape was won by Mr. George Waterford of Ruislip.

Glasgow

MEMBERS who were unable to be present at a recent meeting of the Glasgow and District Tape Society will be sent a three-inch tape of the proceedings on which track two will be reserved for their comments.

Howard Lockhart, M.A., a broadcaster and producer has consented to become honorary President. The Society is planning to introduce a tape service to record historic events in the Glasgow district. Secretary D. Craig, 55, Ledaig Street, Glasgow, E.1.

Aberdeen

ABERDEEN CLUB held its inaugural meeting on May 12th. A constitution was agreed and the following officers elected: Chairman, R. C. Miller; Secretary, A. G. Carnie and Treasurer, R. Simpson.

Meetings will be held on the first Tuesday of each month and a new session is to commence in September.

All interested are invited to contact Mr. Carnie at 181, Hilton Avenue, Aberdeen.

Dundee

EXPERIMENTS with sound effects are a current pre-occupation. It began with a tape by Mr. Charles W. Aitken of such sounds as passing trains, sawing through wood, heavy rain, a gale, and the noise in a Dundee jute factory—all made at home with the aid of a hair dryer, an egg beater, a jar of lentils and a cardboard cartoon. A tape-talk on microphones from the Bournemouth Tape Club has also been played, as well as a recording of a Gaelic concert held in Dundee recently.

World Tape Pals

LEN WATKINS of World Tape Pals informs us that they have just received a copy of a tape programme entitled "Abilities Incorporated." This has been sent by the Committee for the Handicapped of the American People-to-People programme. It is recorded at 3½ ips. dual track on a 3 in. spool. Mr. Watkins will make it available to any reader on receipt of a 6d. stamp, together with a suitable length of tape recording instructions and return postage. The address is 40, Ravenslea Road, London, S.W.12.

Midland Counties

THE most popular of the tapes circulated by the Midland Counties Tape Society is proving to be the newest Opinion Tape. Secretary John R. Walters reports that no two members seem to have the same opinion on anything. The Committee is meeting regularly in Birmingham. A new service provided by the Society is the arrangement of tape recorder insurance for members. The minimum charge is 15s.

The election of the new committee is in progress and should be completed this month.

Coventry

EIGHTEEN members attended the recent meeting of Coventry Tape Club. The Selectophon was demonstrated by a new member. Mr. L. Skingley interviewed Chairman Roy Penfold. The club were visiting the Coventry Over 30 Club earlier this month.

Future activities of the club include an annual dinner and it is hoped a visit to the B.B.C. recording studios.

Peter Warden had prepared a tape of household noises for a recent meeting. A competition to guess them was won by Mr. Malcolm Simmons. His prize?—a three-inch tape.

Rugby

RUGBY Amateur Tape Recording Society is hoping to commence activities this month. Colleagues at Warwick and Leamington Club will lend support. Secretary is Mike Brown, 219 Clifton Road, Rugby, Warwicks.

Halifax

CONSIDERABLE interest in recording activities in Halifax is shown by the attendance of forty-five people at the inaugural meeting of the Halifax Tape Recording Society. A temporary committee has been appointed. Meetings are to be held on the second Tuesday in every month.

Millom

MILLOM and District Tape Recording Society has held a thriving meeting attended by fourteen members. Officials elected are Chairman, Mr. H. Newton; Secretary, Mr. K. Thompson and Treasurer, The Rev J. Stobart. Future activities include recording church services, programmes for the blind, a library of the town's musical activities. Innovation is a quarterly tape magazine for local people living abroad, including tape messages for them. Meetings are being held monthly. Support for National Federation of Tape Recording Clubs has been indicated.

Worthing

SILSEX Miniature Theatre Society, Worthing, would be pleased to welcome new members from the Worthing area. They have a total membership of more than sixty, fairly extensive premises with a record library and several tape recorders. They have a miniature theatre using three-inch high puppets. The club is open every night from 6 p.m. and throughout the weekends. There are several other cultural clubs connected with it.

Forming

STEPS are being taken to form a tape recording club in Jarrow, to meet at the local community centre. Those interested should get in touch with Mr. John Rippington, 30, Breamish Street, Jarrow, Co. Durham.

Oldham, Lancashire, should also have a club soon. Those interested should contact Mr. Beverley Stuart Craig, 126, Main Road, Oldham, Lancs.



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JOHN HASSELL RECORDINGS. Tape/Disc. All Speeds. C.C.I.R. Studio, 21, Nassau Road, London, S.W.13. RIVerside 7150.

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Maestrovox with Guarantee Mk. IV Collaro Deck, £50. 20, Denecroft Crescent, Hillingdon, Middlesex. Uxbridge 5425.

One-third off List! 1958 model Wyndson Regent. (Office) SPEEdwell 9647.

Spectone, sixteen months old, excellent condition, £50. Sharrocks, 36 Mellor Lane, Mellor, Blackburn, Lancs.

1957 Ferrograph 66, fitted new valves, factory overhauled. Complete with splicer and original tape. In perfect condition, £65. Phone: Gillard, Boxmoor 3636.

An original Reflectograph RR 102. Variable speeds. Almost unused, list £115, will take £80. Phone GRO. 5940, or Box No. 242, Tape Recording Magazine, 1, Crane Court, Fleet Street, London, E.C.4.

EMIGRATING. Selling month-old Sound 777, £47. Lacey, 1, Netherhall Gardens, London, N.W.3.

WANTED.—Pocket Recorder. Particulars and price to Bain, 19, North Parade, Whitley Bay.

EMIL2.—Professional battery-operated recorder. Highest offer secures. Box No. 243, Tape Recording Magazine, 1, Crane Court, Fleet Street, London, E.C.4.

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NEWS IN BRIEF

Jason have formed an associate company "Jason (France)" 19, Boulevard des Capucines, Paris 2e. The company will manufacture high fidelity equipment in France. First products are the Jason J10 amplifier and the C.Q. speaker made under licence from C.Q. Audio Ltd.

* * *

Recording Devices Ltd., a new company, are not yet included in the telephone directory. They are marketing the Stuzzi Magnette and ask us to point out that their address is 95 Villiers Road, London, N.W.2. Telephone: WIL 6678.

* * *

Bill Farquhar, American correspondent of *Tape Recording Magazine* is in Europe on a short business visit. He can be contacted via our office.

* * *

We regret that owing to considerable pressure on space this month we have had to hold over reviews of the Zeiss Moviphone recorder, a new recorder from Regentone and the RD junior stereo control unit.



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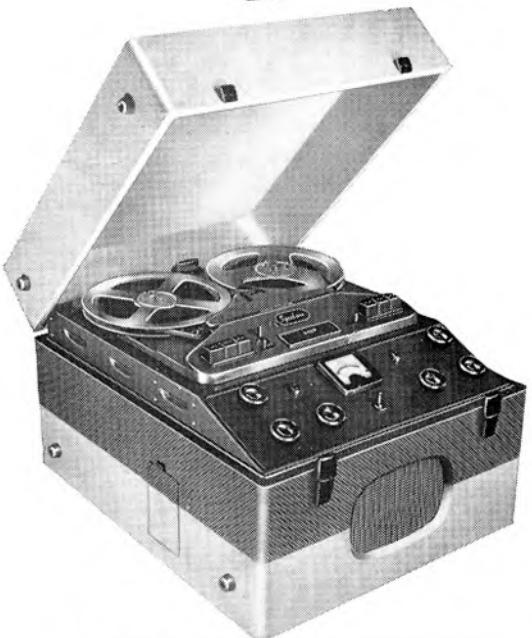
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