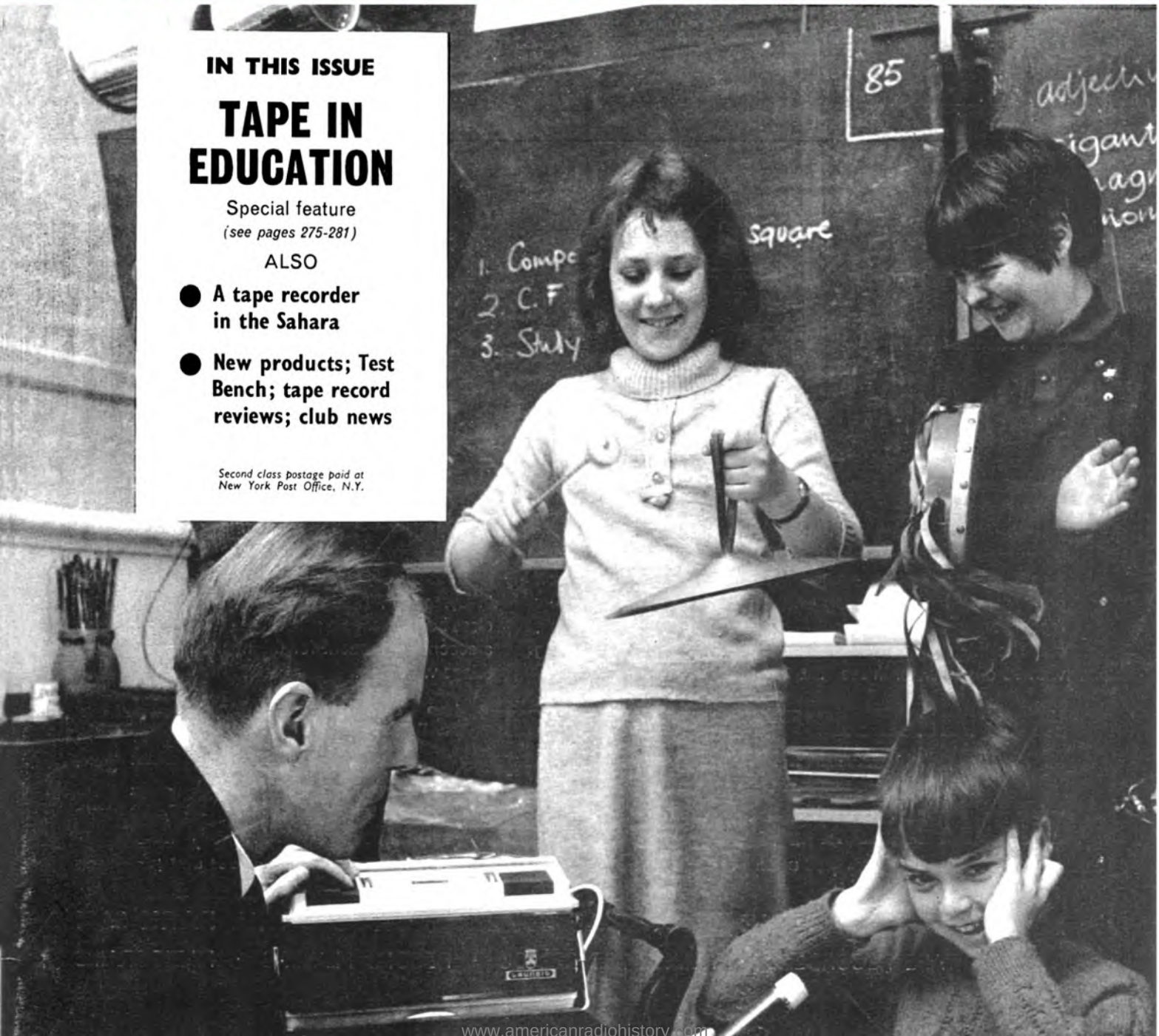
TAPE

RECORDING MAGAZINE

AUGUST 1966

2/-



IN THIS ISSUE

TAPE IN EDUCATION

Special feature

(see pages 275-281)

ALSO

- **A tape recorder in the Sahara**
- **New products; Test Bench; tape record reviews; club news**

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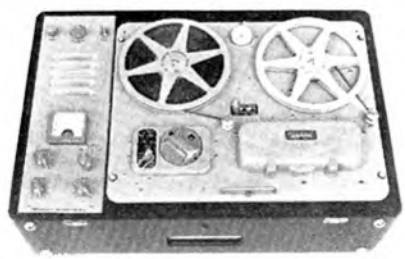

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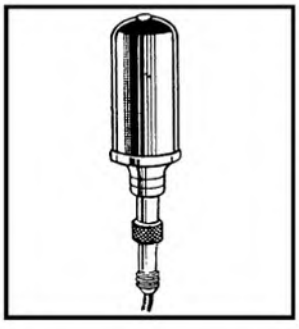

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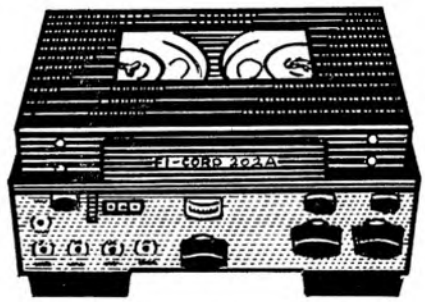

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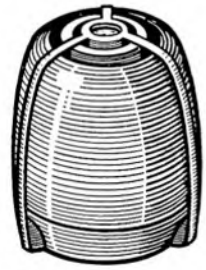

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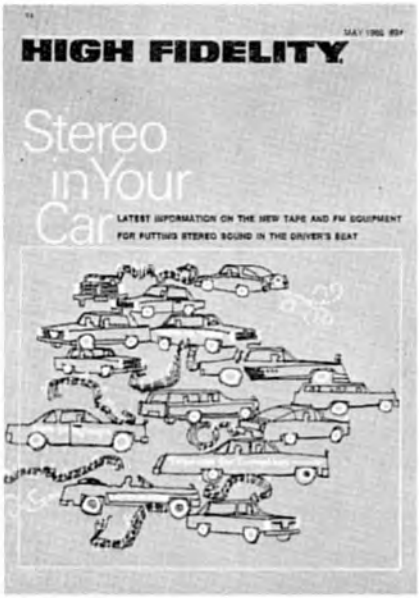

Keeps You Abreast of TAPE Trends in the U.S.A.

Mind you, every issue does not feature tape as did the one pictured here. But time and again we examine the present potentialities of tape and consider its prospects for the immediate future.

Every issue of this widely hailed monthly offers The Tape Deck, where R. D. Darrell reviews in depth important new pre-recorded tapes—4-track, 7.5 i.p.s. stereo tape in normal reel form.

And in several issues a year our technical experts discuss new and important tape trends and products, based on laboratory measurements presented by the independent C.B.S. Laboratories.

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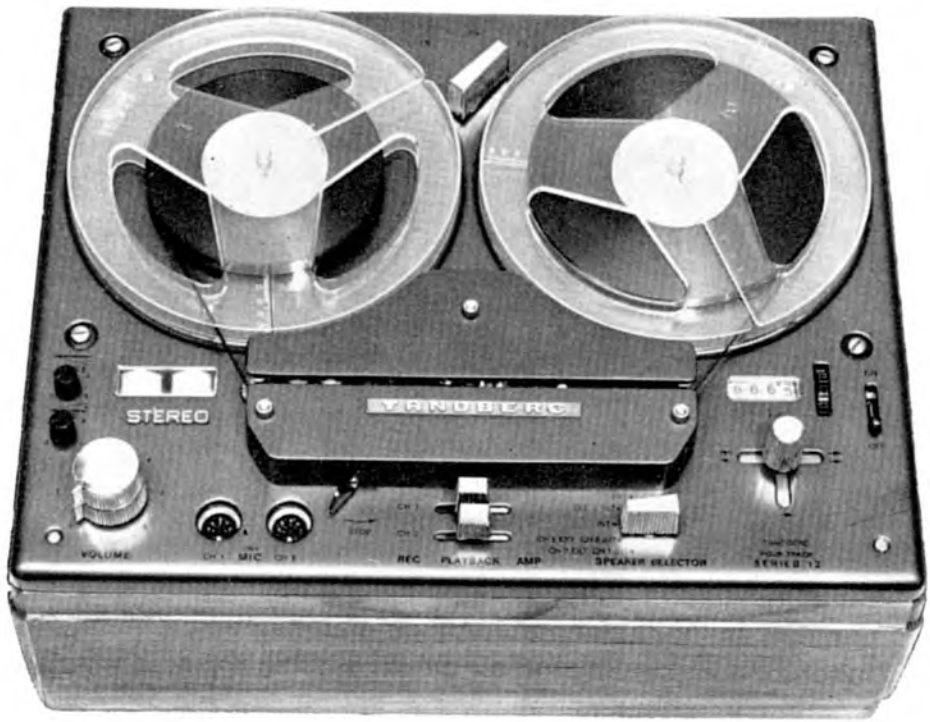

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Tape speed	7½" and 3¾" per sec
Reel size	7" or smaller
Recording system	4-track stereophonic and monophonic
Frequency response	30-18,000 cps at 7½ ips (50-15,000 cps at 7½ ips±3db) 30-13,000 cps at 3¾ ips
Signal-to-noise ratio	Better than 50 db (at peak recording level)
Flutter and wow	Less than 0.19% at 7½ ips Less than 0.25% at 3¾ ips
Erase head	In-line (stacked) quarter track, EF18-2902H
Record/Playback head	In-line (stacked) quarter track, PP30-4202
Level indication	Two VU meters (calibrated to 0 VU at 12 db below saturation of tape)
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Output	Low impedance line outputs (2) Output level 0 db (0.775 v) External Speaker jacks (8 ohms) (2) Integrated Record/Playback Connector (1) Binaural monitor output (1) Output level 0 db (0.775 v)
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RESEARCH MAKES THE DIFFERENCE

TAPE
RECORDING
MAGAZINE

Vol. 10 **No. 8** **August 1966**

IN THIS ISSUE

COVER PHOTOGRAPH: *An experiment at making "noise." Paul Ranger, deputy-headmaster of Boutcher C. of E. School in South London leads Class U4R for a tape recording session. Susan Ruler prepares to strike the cymbal backed by Christine Hopkins on the tambourine while, seemingly overcome by the row, Robert Everett prepares to record a narration. The recorder is a Grundig TK 18 L, the school's prize for their successful tape in the Grundig Schools Tape Recording Contest.*

"TAPE Recording Magazine" is published on the third Wednesday in the month, by Print and Press Services Ltd., from 7, Tudor Street, London, E.C.4.

"TAPE Recording Magazine" is available by a postal subscription of 25s. per annum (U.S.A. $7.5) including postage, or it can be obtained at newsagents, bookstalls and radio and music dealers. In the event of difficulty, write to the Publishers at 7, Tudor Street, E.C.4.

Back numbers, if still in print, are available at 2s. 6d. per copy.

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EDITORIAL — *FLEet Street 1455*
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Editor,
R. DOUGLAS BROWN

Assistant Editor,
FRED CHANDLER

Tape trends and tape talk

By the Editor

THERE IS JUST over a week remaining in which to enter tapes in this year's British Amateur Tape Recording Contest. The organisers are expecting a record entry this time, not only from individuals but from schools and clubs as well. The future development of the Contest may depend upon the success of the 1966 event.

The present committee, which represents all the big tape manufacturing and marketing firms, undertook to sponsor the British Contest for three years, and then to re-examine the matter. That re-examination will follow the judging of the 1966 Contest. By entering a tape now—if you have not already done so—you do more than open a chance of winning a prize; you help to ensure the continuance of the biggest national tape recording contest of its sort anywhere in the world.

* * *

LISTENING TO AMATEUR tapes in earlier contests, I have often been struck by the extent of BBC influence on amateur technique. This is particularly true of the documentary tape; and not surprising, for the BBC, over the years, has obviously explored all the possibilities.

But not all BBC programmes are in the same idiom; the Corporation is quite adventurous in encouraging experiment—more adventurous, I would say, than are amateurs.

Two recent programmes emphasised the point. One, called "Sono-Montage," was described by the BBC as "a highly experimental programme which attempts to combine the reading of poetry with electronically produced sounds. . . . The poems are read and then the poets' readings radiophonically treated to produce an effect akin to that of a musical setting."

One critic, at least, was not impressed. Paul Ferris, in his radio column in the *Observer*, argued that the sound effects only distracted from the poetry. If, like me, you missed this programme, look out for another later in the year, using the same experimental techniques with the story of the Battle of Hastings. Third Programme, of course.

I *did* hear another Third programme, a play called "The Man who Collected Sounds," with music effects supplied by the BBC Radiophonic Workshop. It was a rather surrealist piece about an American traveller's desert encounter with a millionaire who collected sounds. As entertainment, it did not please me; but it offered some stimulating recording ideas.

A third BBC effort, probably more to the taste of the average enthusiast, was a radio ballad written by Charles Parker for the Schools programme, based on "Romeo and Juliet." Parker, of course, can claim to be the creator of the radio ballad as an art form—remember "The Ballad of John Axon" and "Singing the Fishing?" "John Axon," incidentally, is now available as a commercial disc, and is as good a guide to an amateur recordist with ambitions as can be found.

Broadcasting Parker's latest ballad, the BBC said it did so "with the object of encouraging children to write their own ballads and record them on their tape recorders at school."

A splendid objective. Recordings in schools are still not being adequately used as our special feature this month is designed to show.

* * *

THE ANNUAL MEETING of BSR was told of intensive work going on in that company to develop car tape players for manufacture here. It looks as if the exploitation of this market may be next year's biggest development on the tape front—about 18 months behind the similar trend in the USA.

From across the Atlantic, incidentally, I now hear that some bright boffins are producing eight-track heads for car-players and that some companies have bought them for experiments with orthodox reel-to-reel home recorders.

The trade press over there takes the hopeful view that the market will support almost any number of variants and that standardisation and compatability are not all-important. I wonder.

Meanwhile, the next few weeks should bring news of big new developments with cassettes in this country. I shall be reporting on this next month.

* * *

BANG AND OLUFSEN'S new Beocord 2000 de luxe tape recorder has been generally acclaimed. So I particularly regretted not being able to accept an invitation from Ken Rogers of Debenhams, who are marketing the B. & O. range in Britain so forcefully, to see something of it in manufacture.

Our contributor Don Wedge flew to Denmark on my behalf on what was clearly a lavishly-hosted and fascinating visit.

The B. & O. main factory, he tells me, is at Struer, in Western Jutland. It is a remote farming country and satellite plants have been set up in the surrounding country towns.

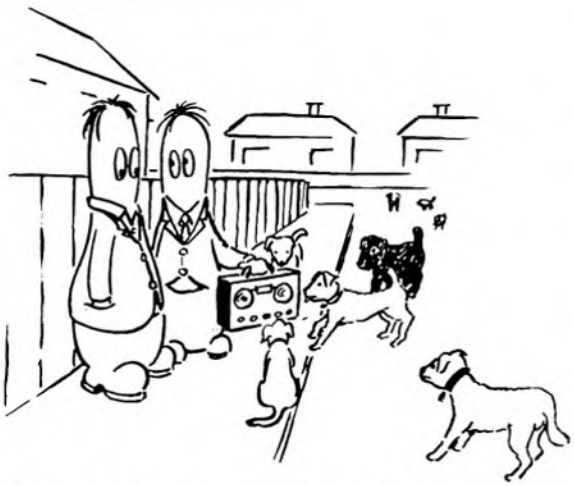
Television expanded production as here, and when saturation was reached, exports had to be intensified to maintain the plant at capacity. This in turn has mushroomed—including exports of tape machines.

In the last three years, personnel and factory space has more than doubled! This has brought great training problems. Instead of through-the-plant tuition it has led to the large scale employment of girls who have been intensively trained in limited assembly tasks.

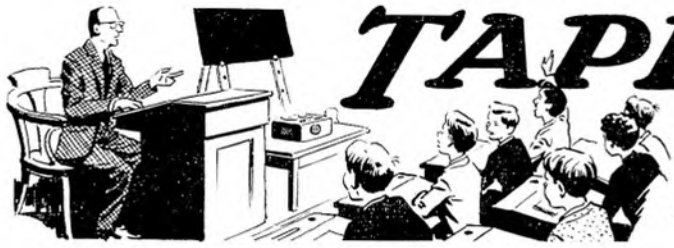
Quality is maintained by the most rigid testing Wedge has ever seen. Checks are made at every stage. The quality controller can over-ride any other executive and halt a production line if he is not satisfied. Both individual components and finished assemblies are continually checked, even to the point of taking a packed unit awaiting despatch and stripping it down!

Though assembly work is intense and demanding, there are compensations. Ten-minute breaks are scheduled every hour. The factory is clean, light and airy. Canteen facilities are first class and recreation is catered for to the extent of a swimming pool in the centre of the main plant. Though union organisation is strong, strikes are unknown.

LAUGH WITH JEEVES



"What makes you think it makes a supersonic hiss on replay?"



TAPE IN THE SCHOOLS

A 'TRM' SPECIAL INVESTIGATION

OR IS IT?

Recording equipment is available for the use of teaching staff in vast numbers of schools. The use to which it is put is limited entirely by the knowledge, imagination or capability of the teaching staff. Below, DENIS GILBERT reports that these points are, in the vast majority of cases, sadly lacking. In the following pages some of the exceptions report how they use their recording equipment, and GEOFFREY HODSON, Senior Inspector of Drama for the Inner London Education Authority, describes the facilities available for schools.

MY brief was quite simple and straightforward: to call on a number of schools and to report on the uses they are making of simple tape recording equipment. So back to school I went—to the nostalgic smells of chalk, wet raincoats and young people.

My first call was on Mr. Paul Ranger of the Boutcher Church of England Primary School, a grey building standing sombrely in the heart of Bermondsey, in South-East London. Built probably about the turn of the century it frowns sternly on an asphalt yard and narrow streets beyond. Here we find no showplace but the hard stone stairs and twisting corridors of half a century ago.

I found Mr. Ranger with his class of forty ten-year-olds on the first floor. The room was light and airy but very crowded. Every inch of space was treasured. The tape recorder was perched precariously on a shelf in the corner next to a white glazed sink on one hand and the blackboard on the other. It could not move an inch in either direction.

Such was the setting. And yet in spite of the surroundings these children quickly proved to me that they were the happiest, liveliest and best mannered bunch of youngsters I'd met for a very long time. My intrusion as a stranger was met only with ingenuous curiosity; Mr. Ranger controls his class with a skill and ability that will have my undying admiration. This was the class that won first prize in this year's Grundig Schools contest, and in fact the tape recorder I had noticed, a new Grundig, was their Trophy.

Paul Ranger told me something of his difficulties making the contest recording using a very ancient machine. The decision to produce a dramatised documentary on the story of Guy Fawkes was reached by the children themselves. Splitting up into groups, each performed a given part of the story which was recorded in short sequences. I was intrigued as to how the editing had been accomplished.

" Mostly I had to guess where to cut the tape," said Mr. Ranger, " because we had no proper editing facilities."

That was courageous enough but I wondered if the children had any hand in this delicate operation.

" Oh! Yes, the children helped quite a lot. As I cut up the tape I gave a short length to each child and told him to hold it. Then I called for them in turn and joined the pieces together. The result was rather surprising. Some of the children must have exchanged their lengths of tape without me knowing . . . ! "

Patience, thy name is Paul Ranger. Can you imagine forty little darlings let loose in a small room, each clutching an edited length of tape as he skips happily around, carelessly dropping it here, picking up another there? These are the realities of recording in Primary Schools and this is the job I would least like to undertake. Surely it is apparent that under these conditions nothing short of boundless enthusiasm, endless energy and patience could achieve the desired result.

But the important thing is what is the effect on the children? Our front cover illustration and the photographs produced in this feature answer that question adequately without the need for any words of mine. As a dedicated teacher it must be a great satisfaction to Paul Ranger to know that he is doing his job in the fullest and most complete sense of the word. I was genuinely sorry to leave these youngsters.

My next call was to Ewell County Secondary School in Surrey. There I met Mr. Garry Cornford and a group of older boys and girls in their teens. The school itself is a modern, redbrick building set in grass lawns in a residental area on the outskirts of London. The class I was seeking was run to earth in a Music Room, a detached out-building in the grounds. There is some wisdom in separating potential sources of noise from the rest of the school building!

At the time of my visit the recorder was in use. It may surprise some readers to know that the class was studying abstract rhythms made quite simply by tapping or whistling which were then played back at different speeds. Garry Cornford allowed them to carry on whilst he told me on one side something of his own activities in the school with recording equipment.

The new Certificate of Secondary Education includes an oral test in reading and speaking English. The examination comprises an interview of ten minutes in front of an assessor and this may be recorded. I was glad to hear Garry condemn this use of recording equipment as inappropriate. Recorders should be used in schools to suppress inhibitions, develop personalities and awaken new interests. By degrading the instrument to the level of an examination tool it becomes as dreaded as the dentist's drill. I felt this to be a very valid criticism of official policy.

As he continued describing his own uses of recording equipment it became obvious that this was a very personal story. As an individual teacher, he explained, it was entirely his option whether to use the equipment provided or not. If he did use it he had to work out his own ideas within the context of his syllabus and then put them into practice. Realising his need for guidance in basic recording techniques he has taken the trouble to attend Evening Classes in this subject for the past year. For this private endeavour he receives neither payment nor acknowledgment but only the satisfaction of extending his knowledge of his own job.

So far this story makes good reading. This has been a tale of devoted teaching staff struggling against adversity with inadequate equipment and no officially provided training. But these were only two teachers and I had an uneasy feeling there was another side to the coin. Close questioning drew carefully guarded answers.

My inquiries drew me regretfully to the conclusion that the Paul Rangers and the Garry Cornfords form a tiny percentage of the teaching profession. I had chosen to see them deliberately because I knew something of their recording activities. By doing

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Children of Boutcher C. of E. School are encouraged to experiment on their own.

this I knew I would get a story. It would be all too easy to offer them their well-earned congratulations and to leave the reader of this article with the feeling that all is well in our schools.

Deeper probing has shown the reverse to be true. All is far from well in our Primary and Secondary Schools.

Without prior announcement I contacted a well-known Girls' Direct Grant School. Let me say at once that the educational standards of this establishment are beyond reproach. The pupils go out into the world with the desired educational qualifications. But are they educated?

In reply to my question on the use of recording equipment I was at once referred to a Council School where I was told money was no object and a language laboratory had been installed. On questioning further they admitted to owning a recorder but said that its use was confined to recording BBC Sound Broadcasts for schools so that they could be played back at a more convenient point in the school timetable. The actual recording itself was usually done by the School Secretary as the teaching staff were either too busy or incapable of using the machine.

The contrast between the Girls' School and the Bermondsey Primary School was marked. In the one the children of dockers in the other the children of professional people, potential University Graduates. In the one an eagerness to experiment and profit from a new medium, in the other a refusal to admit of its existence.

Finally I visited the Headmaster of one of the biggest London comprehensive schools. This modern building, only a few years old, has every educational aid and convenience. Upwards of a thousand pupils walk its corridors in the Secondary Modern, Technical and Grammar streams.

The Headmaster was very co-operative and answered all my questions as carefully and as fully as he could. Many of the answers were very interesting. Apparently the sixth form in this school had assisted in the production of some of the BBC Schools Broadcasts. The school had established contact with a school in Western Samoa and was now exchanging tapes regularly with pupils over there. But this is a large school with a large staff and I was keen to pursue the question of how much use the teaching staff actually made of the recording facilities provided. It was agreed that the use of the recorder was left to the one or two younger, enthusiastic teachers, the rest either having no knowledge of it or preferring to ignore it.

The Headmaster is a man of great experience and wisely he made the point that it was not his policy to press the use of any particular teaching aid on any of his staff. Whilst agreeing on the value of the recorder in broadening the outlook of our children and in increasing immeasureably the depth of their experience, he felt he had to leave the decision to apply such techniques to the individual teacher. I have no doubt that this was a very wise decision. But the result? In this large educational establishment only a small minority of the children are able to take advantage of the new world that simple recording techniques could bring to their door.

More general inquiries have confirmed my first impressions. Recording equipment is available for the use of teaching staff in vast numbers of schools. The use to which it is put is limited entirely by the knowledge, imagination or capability of the teaching staff. That knowledge, imagination and capability is, in the vast majority of cases, sadly lacking.

Whose fault is this? Is it the fault of the Education Authority? So far as London is concerned special teacher training classes in recording techniques have been organised. In fact the Inner London Education Authority has its own recording studio. But compared to the total number of teachers only a minority are able or willing to take advantage of these facilities. A great many of our schools are staffed by older teachers to whom the mysteries of recording are as remote as the earthquake-shattered schools in the island of Samoa. The tragedy is that at virtually no expense the two could be brought together to the inestimable benefit of our children.

Is it, then, the fault of the parents? As a parent myself I find this difficult to answer. Schools tend to adopt the attitude that, as specialists, childrens' education should be left to them. So be it, but let the schools at least make proper use of the facilities they probably already possess. And if they don't, then we, as parents, should complain bitterly and strongly on every possible occasion.

If blame is to be apportioned then we of the Tape Recording Press must accept a share. An older teacher may be well versed in the principles of education but how is he to know of the uses of modern techniques unless he is told? And who is to tell him if not we journalists? It's up to us to do something positive about this appalling situation.

TAPE Recording Magazine has maintained its position in the recording world by taking its responsibilities very seriously. It is for this reason that the current series of articles on basic tape recording techniques is being published. Although not designed specifically for teachers the articles will contain a great deal of

information that every teacher should know. Back numbers containing the first two articles are still available and I do implore every progressively minded teacher to write for these, study them and then follow the series through to its end.

But this, you might say, is nothing more than publicity of the worst possible kind. Who is this man who is writing this article? We've never heard of him. So let me now please prove my point.

"The academic has rightly tended to revere the book and has accepted it as the means for recording original thought and as the epitomiser of knowledge. It is argued that the ability to record . . . is simply an extension of this facility. The academic has tended in the past to be suspicious of them (mechanical aids such as recorders) for a number of reasons. He may have been so busy and preoccupied with books and with learning that he has been denied any real opportunity to assess and enjoy them. He may fear that they may interfere as books do not in the interplay between personalities. He may be convinced that their use demands a technical skill that he does not possess. He may doubt that there is any aid either to learning or to teaching: *in short he will teach as his teacher taught him and his students will learn as he did.*"

These words are not mine. They are quotations from the Report on Audio-Visual Aids in Higher Scientific Education, published by H.M. Stationery Office last year (11s.).

My own investigations were limited to Primary and Secondary schools: the appointed Committee investigated Universities and Higher Education Establishments. My investigation was hopelessly inadequate when compared with the work of the University Grants Committee. Perhaps by luck, or perhaps by intuition, I had arrived at broadly speaking the same conclusion. Even in our most advanced educational establishments where sophisticated equipment is available its use is limited by the ability and imagination of the staff. Let me quote again from the report:

"With some notable exceptions among individuals and groups of enthusiasts, most University Staff seem apathetic towards, and even unaware of the potential use of such aids. . . ."

The Committee reached several important conclusions and made recommendations. They stress the value of such educational aids and suggest that urgent action should be taken in setting up a national centre where training may be given and programme material made.

Techniques and equipment in Universities are bound to be complex. In the education of younger children at Primary and Secondary Schools only the simplest knowledge is required by the teacher. All too often it is only this that is lacking.

This magazine regards the situation as so bad as to warrant urgent action. As a result *immediate* steps are being taken to prepare a handbook dealing fully and definitely with the use of simple recording equipment in schools. This publication will be the result of collaboration between experts in education and recording. It will be essentially practical, describing in simple language exactly how to operate equipment and how to use it once it is working. It will deal with the use of recorders in both junior and senior schools. It will describe exactly how school programmes should be made. Perhaps even more important it will describe in detail how they should *not* be made. This handbook is being prepared as a social service, but it is sincerely hoped that it will find its way into the possession of every single teacher in the land.

Those amongst us who are parents should find out just what is going on at our children's schools. Those amongst us who are teachers should think deeply and seriously on what has been written in these pages. If you are a teacher we can offer guidance. But will you take advantage of it?

TAPE COURSES FOR TEACHERS

THE use of tape recorders in the classroom and notes on teaching with language laboratories will be among the lectures to be held next term at the Brentford Centre for Adult Education. Under the title "High Fidelity and Tape Recording," the course will cover the technique of hi-fi, tape recording and reproduction, and how to get the best out of existing equipment including notes on construction and maintenance.

Starting on September 26, the courses will be held on Tuesdays and Thursdays from 7-9 p.m. A course of two terms costs 20s. Further details from the Education Offices, 88, Lampton Road, Hounslow, Middlesex.

* * *

Whitelands College in Putney, London, S.W.15, will be the venue for this year's N.A-V.A. Conference and Exhibition. Te be held on September 13-15, the conference will include lectures on "School Radio and Television," "Programme learning in Schools" and "Sound Reproduction." Full details are available from the Secretary, N.C.A-V.A.E., at 33, Queen Street, London, W.1.

* * *

Preliminary details concerning their second School's Tape Recording Contest are now available from Grundig (Great Britain) Limited, Newlands Park, Sydenham, London, S.E.26. Open to all schools in Great Britain and British Service Schools overseas, the contest is divided into three classes for Infants (for school beginners and children up to seven years), Juniors (8-11 years) and Seniors (over 12 years). The winning school in each section will receive a Grundig tape recorder, and the overall winner will hold the Grundig Challenge Shield for 12 months. Closing date for entries is December 16.

THE LONDON TAPE STUDIO

GEOFFREY HODSON describes a special replica broadcasting studio for teachers

BERNARD SHAW was one of the first to speak of the power of the microphone, and President Roosevelt one of the first politicians to exploit the fireside chat. Real person-to-person communication is possible via the microphone, and children are quick to realise this given the right stimulus by the teacher. Given the deadlines of a weekly or monthly magazine they set to work with a will. They find ways of getting round the stilted interview, they discover the techniques of radio drama, they make sure that they can be heard and understood, they can give flight to imagination in fantasy—above all, they find out more about themselves and other people and the world around them.

The London Tape studio is essentially to help more children do this, and better. They are invited in to work with us, and they have already helped to act as host to such celebrities as Dame Sybil Thorndike and Frank Gillard. On our next five-day course, while the teachers are having lectures and discussions, forty to fifty young people will be preparing programmes for a local broadcasting exercise. And on Friday, July 29, it will be these youngsters who will have had editorial and technical control over the live and recorded inserts into the basic BBC programme, identifying them with the tag "This is London Tape."

The London Tape Studio is the outcome of running courses on the use of the tape recorder for eight years. This began with the National Tape Recording courses at the Rose Bruford Training College, and has continued chiefly for London teachers since 1962. On all these courses we have had single tape recorders and suites of tape recorders in different classrooms, and a reasonable radio studio and control room. At the College this was where the full-time students were taught broadcasting techniques; in London we had a portable booth which did yeoman service, and is now continuing a very active life at Crown Woods School, as Harold Rottesman describes on page 281.

Last year I was told the recording studio would have to be moved from its quiet pitch in the middle of Soho (we were never short of outside broadcast material), and we were offered a space in the new Teachers' Centre. I felt I had to decline this as it was next to Waterloo Station : no doubt my reasons will be appreciated. Some time previously the Headmaster of a Church Primary School had offered me a classroom in his school. His Management Committee and the Inner London Education Authority agreed terms, and a conversion was made. As the new studio is only a short distance from Broadcasting House Frank Gillard was invited to address the ribbon to prove that we were no pirates.

Our new control room is 11 by 9 feet, and solidly constructed so that there is good sound isolation between it and the rest of the classroom which is used as the studio. A 9 x 9 feet area has been treated with acoustic tiles, thick curtains and carpet to produce a reasonably "dead" acoustic area. There are two microphone points in this area, two more in the other part of the classroom, and two in the adjacent hall. A cue light and headphone socket is provided at each microphone point. There is a direct feed from the school radio system and a socket in the headmaster's room next to the telephone so that a sucker attachment feed can be provided.

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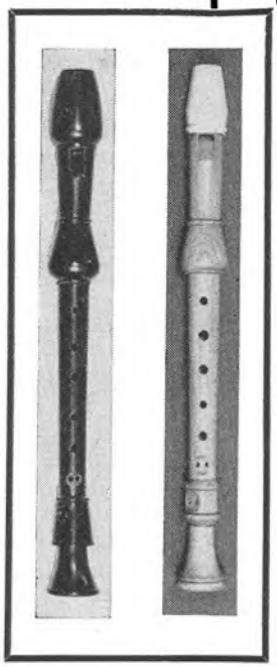
Taping music in school?



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Plastic Descant (left)—durable, yet it has the tonal qualities of more expensive models.
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Schott also manufacture concert recorders for the advanced amateur and the discriminating professional.

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Please send me full particulars of Truvox Tape Recorders for educational use.

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.....

.....

'This is London Tape'

(Continued from page 277)

All these lines are enclosed in trunking and terminate in a jackfield in the control room.

The outputs from two turntables and two tape recorders (Brenell's: Mark V Type M and one of the first STB1s) also terminate in the jackfield. and from this we can feed signals to the inputs of these tape machines. These various sound sources are fed to a Vortexion four-channel mixer and a PPM mixer with special facilities made for us by the same firm. A talk-back unit with cubicle loudspeaker volume control. red light key, and replay-to-studio key completes the control equipment.

The master tape recorder is a Vortexion WVB, and programmes are monitored on a Wharfedale loudspeaker. There are two Vortexion power amplifiers—one to feed the monitor circuit, and the other to feed the echo loudspeaker in the hall. Clearly this set-up allows us to tackle a variety of complicated recording projects, and a Son et Lumiere production is certainly stretching us pretty hard as an early project.

Does it seem strange to provide such elaborate facilities when teachers cannot expect to meet these in their own schools? Clearly I think not. And I think this way because I have always been convinced that the basic skills of the art and craft of broadcasting are the necessary tools we need to use the tape recorder creatively. By giving them a replica broadcasting studio, skilled tutors (half BBC men and women. half colleagues from schools), and imaginative exercises several hundred teachers have now discovered and tried out the potentials of this system of communication. Not all have been able to translate this into practice in the classroom, but a goodly number have done so.

In addition the Wandsworth College of Further Education has taken over the bread and butter job of giving basic instruction in operating tape recorders. Any group of half dozen or so London teachers can have instruction in or near to their own school, and

there are other short courses to follow this on simple uses of the tape recorder.

The system incidentally is not new. Kenneth Methold described a school radio studio in "Broadcasting for Children" (ULP) in the late fifties, and my good friend Graham Jones has created such conditions in four school buildings now. And there are a few others. In London there will be more because a small broadcasting suite is being included with a drama room in secondary schools of the future.

In a sense, the tape recorder is only incidental in the teaching situation. It is an aid, just as the blackboard is an aid. It can be a wonderfully creative aid in helping to explore the possibilities of the spoken word through broadcasting techniques. The spoken word has been grossly neglected in education, and "attention to speech" often means "speak up." Raising the volume is often necessary, but as a general injunction it is a crude method of teaching.

Recording is essentially a matter of simplification

By PAUL RANGER
Deputy Headmaster of a London Primary School

ONE Gothic classroom, forty bouncingly excited East London children and a tape recorder at the ready . . . what can we do? Our recording is an extension of classwork and not a unique entity. Often it springs out of the needs of the moment. Last year for example, we were asked to give some Derbyshire rural children an idea of life in Bermondsey. We put together an album, but our local sounds were missing—lorries, the river. factories, and best of all, our own distinctive voices.

So we made a tape to supplement the written and illustrated impressions. This term we are out of the classroom often so the tape recorder can be used to stabilise immediate reactions. Research on historical biographies can be presented visually through the classroom wall panels and emotional response to this induced by a recording. In this light our tape "Guy Fawkes" was produced. At the moment spoken and written English lessons are linked to a topic "The Sea," so we are recording sea-poems, extempore impressions, short scenes and characterisations all impinging on our theme.

Quickly the children became full of ideas. Once our subject is planned we begin by acting facets of it in the drama lessons. How does the sea concern our movement? There are the difficulties of sailors in a storm . . . snatches of "Lord Jim" or "The Tempest" are relayed over the chaos . . . storm music blares out of the speaker . . . words, phrases, sentences are evolving. Where do we go from here?

. . . inside the whale's belly: "I'm Jonah." Press the button and record the impressions and living within that cavernous rib cage. The whole class is murmuring echoes as it travels round the whale's interior.

If you come again to another lesson you'll find groups of smugglers climbing over the rostra with the look-out giving a running commentary or little groups rising and falling to the sound of waves breaking. In these early stages we discuss, sort out ideas, try out snatch recordings, act and talk. All this is a most important contribution towards the finished product.

Now organisation comes to the fore. The class is divided into small, carefully chosen groups, three to eight in each. In every group there is a producer-leader. Each has a specific task; one group may have to discover background sounds and atmospherics; another is producing a cameo portrait of a beachcomber; some are working on a characterisation of Davy Jones.

During this time the improvisations take on their eventual shape. We rarely combine our work with professional recordings or effects or music. The children themselves, working on Carl Orff's methods. evolve any simple shape tunes that we require. At times the noise is catastrophic, so much so that there have to be a number of quiet listening sessions followed by discussion.

By now it is time to record. Several children have been trained in the technical aspect of the machine. We are experimenting with a small vestibule outside the classroom as a recording place worked entirely by the children whilst the teacher continues to supervise the rehearsals. Editing again is a democratic business preceded by discussion. There is usually a small band of children around the desk whilst the teacher splices the tape in the relevant places: sorting, numbering and putting together is a routine business when each child knows exactly which section he has to look after.

How are the finished products used? Sometimes as a teaching aid for other children or in the daily assembly, as a record of activities on an "Open Day," as a link with slides and eventually, it is hoped, with film. and sometimes as a complement to exhibitions. This takes time to prepare. but the timetable is flexible and we are trying to develop a teaching unity in oral and written English, the drama, art and music. It is essentially a matter of simplification.

Our tape recorder never fails to add zest to a lesson

By WINIFRED A. BAYLISS
Head of English department at a London Secondary School

Garry Cornford and pupils of Ewell County Secondary School study abstract rhythms using a Philips recorder (see page 275)

THE tape recorder has been with us a long time now, and we might have expected the novelty to have worn off a little; yet it remains an invaluable teaching aid, and even in classes where it is regularly and frequently used, never fails to add zest to the lesson.

Since tape recording is a means of communication, it is generally in the English lesson that we expect to teach the mechanical techniques and explore the fascinating possibilities of creating our own tapes. Often, the reading, talking and writing becomes much more lively as a result. This is not surprising, since good recording demands so much concentration, such awareness of the senses and the imagination. Besides, the very act of putting something on tape imparts a sense of occasion and keeps the pupil on his toes.

The equipment available for classwork is usually a mains machine of medium quality, which is adequate for most needs. If offered a second machine, I should choose a portable, so that a few of the class could collect their material outside the classroom.

With thirty-odd pupils eager to get started, the problem is to give them sufficient instruction quickly. I generally explain the general principles very briefly, and make a few experimental tests to demonstrate how essential it is to be fussy about details if you want a pleasing result. After that, we plunge straight into a programme—or, more likely, a set of short programmes.

Probably the tape recorder is being used because the class has something they want to put on tape; but if the teacher has to suggest something, a good idea for a first attempt is a series of news items—local, national or classroom news, weather, market report, sport, etc. The class can be divided into groups of about six, each group being responsible for its own little bit of the programme. Each member of the group has a job—reporter, editor, secretary, studio manager, announcer, engineer. While the rest are collecting, editing, timing and practising, all the engineers can be given instruction in handling the machine. A strict routine of studio behaviour makes the children feel important and professional and a hint given to one announcer or engineer will be quickly picked up by the next. The sense of urgency to get the news "on the air" adds to their enjoyment and keeps them so busy that they come to the microphone nervous only in the best sense—that is, anxious to do the job well, but not miserably shy. The next time, members of the team change jobs, so that gradually they acquire all-round confidence.

I have gone into considerable organisational detail to emphasise that the tape recorder is not just for the elite of the school, but can provide varied and valuable occupation for the whole class. When, at the end of even the first lesson, a complete little programme has been prepared and recorded and played back, there is a gratifying sense of achievement.

There is no need for the teacher to wonder what to do next. Once started, the class will come up with plenty of ideas. "Live" interviews inserted into their news items may lead them to discussions, stories of personal experience, and various kinds of magazine programme. The class can undertake to "cover" a school event, including some "live" material recorded on a portable. Accounts collected at the time are later shaped and recorded in the classroom. When a party of visitors came to the school recently, they very willingly submitted to a kind of Press Conference: each group talked to a visitor and prepared a contribution to a taped record of the visit.

This "symposium" form of programme is very flexible, it enables a number of the class to be involved in something which can be quickly completed and is original and artistically satisfying. The addition of music, or better still, home-made sound effects can make an exciting programme out of a collection of ideas on, say, "Dreams" or "Shopping." Or the sounds themselves could provide the stimulus for "Ghosts" or "Laughing" or "The Macabre." In speaking or writing for "sound only" children can experiment in fantasy and enjoy the free play of ideas within the disciplines of the medium. They readily appreciate, too, writing intended for sound, such as "Under Milk Wood," which can be a rich source of inspiration.

Having discovered, through their original work, the possibilities of the microphone, a group can compile and perform a spoken anthology of prose and verse. This takes longer to prepare, but most groups enjoy searching for and arranging their material, and often the result is amazingly good.

These are only some of the ways in which the tape recorder can be used in the classroom. There are so many things the class can do that time is very precious. Editing is a fascinating but time-consuming job, and not a practicable class activity, so it has to be kept to the minimum. In any case, the artistic shaping of a programme as they are preparing it is of much more value to the class than the wholesale application of the razor-blade.

ORGANISING AN INTERNAL BROADCASTING SYSTEM IN A SECONDARY SCHOOL

HAROLD ROTTESMAN initiated a broadcasting system at Crown Woods School in London, last September. Since then pupils have broadcast interviews with numerous personalities including Frank Gillard (Head of B.B.C. Sound Broadcasting), Brian Rix, The Yardbirds, Sir Edward Boyle, a Yeoman of the Guard and countless fellow pupils and teachers.

WHAT are the uses of a School Internal Broadcasting System? There are obvious benefits to the pupils actively participating, but to the school as a whole such a system has much to offer: well used, it can be a mirror held up to the school, whose beauties and defects, large and small, can be reflected before the eyes (or ears, I suppose) of the whole school community. The Crown Woods Broadcasting System (CWBS) has functioned as a disseminator of news (*Crownweek*), entertainment (*Along the Link* and *Spinalong*), discussion (*Topic*) and quasi-religious instruction in dramatic form (*Castle Wood*). With schools getting larger and larger, it can only be beneficial to have such an instrument of intercommunication and togetherness.

EDUCATIONAL VALUES

Little need be said on the attractions sound recording has for many adolescents. No school will find itself short of pupils eager to work on the technical side of its Broadcasting System, and most schools will have one or two pupils whose skill in that field rapidly attains professional quality.

Comperes and interviewers will also offer their services. To the sceptical we can declare these undeniable educational values for the participants: responsibility to a team; the social education involved in getting interviews (in not one of the interviews listed above did anyone other than the pupil-interviewer concerned make the arrangements for appointment, travel, and interview); the responsibility of a senior studio manager for organising rotas, supervising daily duties; every broadcaster's sense of responsibility to the listener (it grows endlessly); the insights gained into professional broadcasting techniques and problems, and into the reasons for the mediocrity of so much mass writing and production; the creative joy of putting a programme together, heightened by the disciplines of timing and deadlines; the humiliating disciplines of meeting listener-criticism (in an incomparably more direct and immediate form than any professional broadcaster could hope for—or be thankful for the lack of); and of course the tremendous increases in confidence which result from almost any activity of a public-performance nature.

NECESSARY FACILITIES

There's one snag. None of the above benefits can accrue properly unless the Broadcasting System functions efficiently; and an absolutely essential requirement for that efficiency is that the technical facilities available should be adequate and dependable.

The depths of frustration and exhaustion that result from technical breakdown can only be realised by those who have experienced them. Once you embark into any "technical" medium, you are absolutely at the mercy of the equipment, and all your energy, skill and talent are as nothing when the equipment goes wrong.

The truth of this was borne in upon me at one particularly grim stage in the long series of technical catastrophes that beset the CWBS, when into my disturbed dreams one night came the thought and sentence: "Even if we had Laurence Olivier down there we couldn't do anything if the equipment wasn't working." It is unfortunately true.

There is an absolute minimum of facilities which should (to my mind) be insisted on: a soundproofed studio with adjoining, sound-insulated, control-room; two tape recorders of not less than "Ferrograph" quality; three ribbon microphones with cables and stands; a four-way mixer panel of not less than "Vortexion" quality; a "talk-back" system between control-room and studio (with switching to eliminate feed-back); reliable cue-lights; ample supplies of tape, splicing tape, razor blades, leader tape and empty spools. Those who wish to attempt regular broadcasting work on less than those facilities have my sympathy in advance.

ORGANISATION

A school wishing to make regular broadcasts (e.g., one weekly ten-minute magazine) will quickly realise that detailed organisation is necessary. At the time of writing, the weekly schedule for *Crownweek* is like this:—

Friday, 1.00: Planning Meeting (two weeks ahead).

Tuesday 12.00: All actuality (interviews, etc.) for the current week's programme to reach Producer, edited to time; Tuesday evening: Producer writes continuity script and types stencil.

Wednesday morning: Script stencil to school office for duplication; Wednesday lunchtime: Scripts collected, stapled and distributed; Wednesday 4.00: Rehearse and record programme.

Thursday lunchtime: Record News Bulletin (delayed for topicality) and edit into programme.

Friday 9.25 a.m.: On air.

It need not be emphasised that only reliable pupils should be retained as broadcasting staff. The weekly deadlines are inexorable and members of a broadcasting organisation are vitally interdependent on one another. But with the proviso, useful jobs can be found for pupils of any age and any ability; the CWBS currently employs seventy pupils in the following capacities: Electronic Installations, Studio Managers, Works, Postal Service, Commissionaires, Secretariat, Listener Research, Catering Unit, Art and Design, Writers, Interviewers, Comperes, Researchers, Reporters, Producers-in-Training, Service Group, Blind Section, Editors, Public Relations, and Press Office.

TAPE RECORDING TECHNIQUES

Earlier in this series DENYS KILLICK dealt with the nature of sound itself and gave a short history of recording, followed by a description of the deck, or tape transport system. This was the purely mechanical part of the apparatus. Now we are going to think about the electronic side of the equipment, and, in the simplest terms, how it works.

AN understanding of the basic principles involved in recording requires no more technical knowledge than the fundamental law of magnetism which most of us will recall from our schooldays.

"Unlike poles attract," we were told, "whereas like poles repel." This was proved in the classroom with bar magnets. If these were laid on the bench and we brought the two north poles together they will try to push themselves apart; alternatively if we reverse one of the magnets and bring a south pole to a north pole they will tend to slide together. If this simple fact were not so there would be no magnetic recording.

For an understanding of how this takes place we must consider the tape itself for a moment. Magnetic tape has an oxide coating which, in effect, consists of numberless very tiny metallic particles spread evenly on its recording surface.

If we stretch our imagination a little it's convenient to consider each one of these tiny particles as equivalent to a bar magnet, having both a north and a south pole and obeying the laws of attraction and repulsion. When a tape is recorded these tiny particles are influenced by the magnetic flux at the record head and are arranged, magnetically, into a logical pattern. That pattern will conform precisely to the impulses that were passed from the record head to the tape, and will on playback reveal itself as the recording we have just made.

The record head

We can show this rather more clearly in diagrammatic form, but first let's take a closer look at a record head. This is shown in **Fig. 1** from which we can see the laminations out of which it is built and also the gap, known as the "air gap" (although it is usually filled with some plastic material nowadays) which is really the business end of the head. It is at the gap that the magnetic pulses are passed to the tape, having been induced in the head by electric currents in the coils wound around it. These currents are the electronic "translations" of the original sound.

As we know that sound originates as vibration, and that the pitch of the note governs its frequency, it would not be unreasonable to sketch a length of tape and to draw a wavy line running down its length to indicate that the magnetic particles on this tape have been arranged in some specific, logical pattern, or in other words to

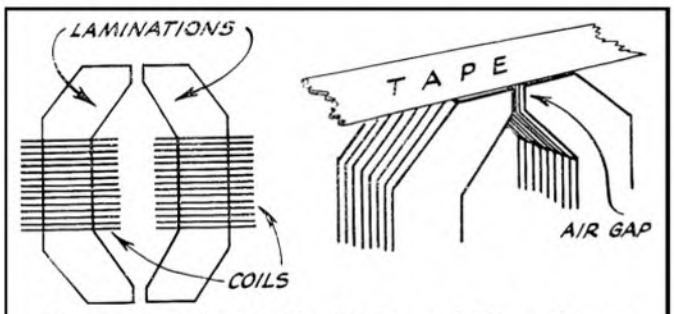


Fig. 1. Magnetic recording heads are built up from a number of laminations. Coils of wire induce the magnetic fluxes at the "air-gap" in the head.

show that this tape has been recorded. It helps to get things into perspective if we regard each complete undulation as shown in the diagram in **Fig. 2** as one full cycle. When we think that we are dealing with frequencies of hundreds or thousands of cycles per second it makes our sketch look very inadequate, but it would be impracticable and confusing to attempt to simulate reality.

Let us now turn to **Fig. 3** and go through the entire sequence of erase and record. The diagram shows the tape to the left of the erase head bearing a wavy line to indicate that it is pre-recorded. When in motion it will travel to the right past the erase head, and the existing recording will disappear. That happens simply because our magnetic particles are obeying the first law of magnetism.

We referred last month very briefly to the "oscillator." Without an oscillator one can neither properly record, nor erase. The oscillator is a valved (or transistorised) part of the circuit whose sole function is to produce, as its name implies, "oscillations." Oscillation is really only another word for vibration—and vibration as we have seen is said to have frequency. The oscillator passes a very high frequency signal or current to the erase head, inducing in it a rapidly alternating polarity. This changes from north to south about 50,000 times per second or more. Now we begin to see what happens when our logical pattern of magnetic particles approaches this rapidly alternating polarity. The particles are bound to obey the law of magnetism. Unlike poles will attract, like poles will repel. When they get north-south, north-south thrown at them in such rapidity they get themselves hopelessly mixed up. This, in magnetic terms, literally does happen and when the tape has passed the erase head the logical pattern will have gone and the particles will be rearranged *in a completely random fashion.*

If we play back an erased tape we get, to all intents and purposes, silence. The reason for this is simply due to this random arrangement of magnetic particles where every north and south polarity is tending to cancel itself out and so no intelligible signal is passed to the playback head. In fact we don't quite get silence. The sound heard from an erased tape is completely random, conforming to the random pattern of the particles and is known as "white noise."

So we have managed to erase the tape. But it is now going to pass the record head to have a new recording imposed upon it. Sound picked up by the microphone has been converted to electrical impulses and has been passed to the coils of wire around the laminations in the record head. As this current flows through the head it produces magnetic fluxes corresponding to it and therefore corresponding to the original sound. As the tape passes it is influenced by this head and the particles, again obeying our first law of magnetism, arrange themselves magnetically into a logical pattern corresponding exactly to the original sound. So the new recording is passed on to the tape which then passes to and is stored on the take-up spool.

High frequency bias

This has reduced the procedure to its very simplest form. It is, of course, much more complex than this, but we only need to study it further in one respect. In our first article (*June issue*) reference was made to the "high frequency bias" which was discovered accidentally in the 1920s, and without which quality recording would not be possible. The production of this so-called high frequency bias, which is an alternating polarity not dissimilar to that applied to the erase head, is another function of the oscillator. At the moment of record we do *not* merely feed the signal from the microphone directly to the record head; a high frequency current is fed to it at the same time. The true function of bias is still something of a mystery and is not really properly understood. I have described its effect to my students by likening it to a "swift kick in the pants" which is delivered to the magnetic particles on the tape at the same moment as the signal we wish to record. The result is the equivalent of giving them an initial impetus which assists them to re-arrange themselves properly in conformity to the pattern we wish to impose. This, let me admit, is a very crude explanation; none the less it is effective.

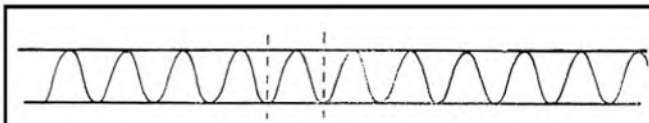


Fig. 2. A length of tape showing schematically a recorded signal. The space between the dotted lines is one full cycle.

I have said that there is a similarity between the alternating polarity at the erase head and the bias current fed to the record head. This is indeed true; so much so that if we pass a pre-recorded tape over the record head only, by-passing the erase head, the live record head will partially erase an existing recording. A closer examination of the effects of bias will show it to be closely related

TAPE RECORDING TECHNIQUES

to the particular head on the recorder in use and also to the kind of tape that is being recorded. On professional equipment bias is variable. It can be set deliberately to the level appropriate to a particular spool of tape to be recorded on a given machine. The same spool of tape on another machine on another tape on that same machine would require different bias levels.

Such precision is, however, only found as a rule in professional studios where optimum quality is required. In domestic recorders an average figure for bias is decided by the manufacturer and it is pre-set. It is for this reason that one should carefully note the brand of tape recommended by the manufacturer, and use either that or its magnetic equivalent if it can be established. One method of doing this was mentioned last month by L. Reid in his article "Choice and care of Magnetic Tape."

When talking about the tape transport system I deliberately refrained from mentioning the speed at which the tape is to travel, apart from saying that it must be constant and fixed. Some machines record at one speed only; others may have two, three or perhaps even four different speeds. If more than one speed is present it will be noted that they are always in direct multiples. The sequence of speeds is: 15/16, 1⅞, 3¾, 7½ and 15 inches per second. Each progressive step up the speed ladder is precisely double the one before.

Multiple speeds

What is the reason for such a wide range of speeds? They have come about due to the need to reconcile two irreconcilable factors; firstly the need for *economy* in tape and secondly the need for *quality* in the recording. A tape travelling at a relatively slow speed. say, 1⅞ ips will offer more playing time per foot of tape than if it were to be running, say, at 7½ ips. It would give exactly four times as much playing time. But this *economy in tape* must be paid for, and the price is a *reduction in quality*. One of the principal objectives of designers and manufacturers is to produce equipment which is capable of operating at relatively slow speeds and yet still maintain the quality that is associated with high speeds. Although the factors are irreconcilable, the gap between them has been appreciably narrowed. But let's see just what happens as we change the tape speed.

Imagine we are able to record a signal of 1,000 cycles per second for a duration of one second at a speed of 15 ips. At the end of our recording what should we have? A length of tape exactly 15 inches long (since we were recording for one second at 15 ips) which will contain the magnetic impression of precisely 1,000 cycles (since it was a 1,000 cps signal we were recording). Suppose now we do the same thing with a reduced tape speed of 7½ ips. This time we have exactly 7½ inches of tape but it will contain the same 1,000 cycles. Now the effect of recording the same number of cycles per second on a shorter length of tape must obviously be to "squash them up together." If we now further reduce the speed to 3¾ ips we shall again halve its length and yet still we shall have recorded the same 1,000 cycles. Our pushing up together has now become a process of crowding. If we extend the argument to record at 1⅞ ips and then 15/16 ips these magnetic patterns are going to be squashed into shorter and yet shorter lengths of tape.

Bar magnets

Earlier we likened the magnetic particles to bar magnets. If we now imagine our lengths of tape greatly magnified, so much so that each particle is on the scale of the schoolroom bar magnet, we will begin to realise what is happening. As the speed is decreased we are having to push the same pattern into a shorter length of tape. Our first law of magnetism begins to assert itself. As our bar magnets are pushed ever more closely together they will begin to influence each other; like poles will begin to repel; unlike poles attract. Each magnet will be pushing or pulling. trying to orientate itself in relation to its neighbour instead of accepting the pattern which we had imposed.

Now this is not likely to happen with a signal of 1,000 cps. But it most certainly will happen if we reduce speeds in the drastic manner suggested and try to record a signal of say 12.000 cps. To prevent this the manufacturers of tape have developed coatings which are resistant to losses of this kind. Such tape, known as "high coercivity" could be said to be more suited to recording at slow tape speeds. However as it is more resistant to accidental losses it is also more resistant to the deliberate loss that occurs when the tape passes the erase head; similarly it is more difficult to impose a new magnetic pattern on the particles. The old adage, "one never gets anything for nothing," was never more true than in the world of recording.

And so there is a rule, a good old rule, which is as true today as ever it was: all other things being equal the faster the tape speed the better the quality. But although quality will be better the recording will be more expensive because more tape will have been used.

Even if we use high coercivity tape there is another factor which must be borne in mind if we want to record high frequencies at low speeds. There is a definite relationship between the size of the air gap in the head and the physical space occupied on the tape by a single given frequency. We have seen that the more slowly we record the less room will each individual cycle have to occupy on the tape.

Suppose this time we record a signal of 12.000 cps at a speed of 7½ ips. The amount of space each single cycle will occupy on the tape must be 7.5 inches divided by 12,000, or .000625 inches; if we halve the tape speed to 3¾ ips and again record a signal of 12,000 cps each full cycle will occupy half as much space, i.e., 3.75 inches divided by 12,000, or .0003125 inches.

The significance of these figures will become apparent if we accept the figure .0003 inches as the length of the record head gap. If a gap should be of this dimension, then when recording a signal of 12,000 cps at a tape speed of 3¾ ips one complete wave-form may be contained within the gap at any one time. Again our law of magnetism will operate and north and south will tend to cancel each other out; as a result loss of quality will occur.

Narrow gap heads

Manufacturers are continually striving to give us better quality at slower tape speeds and one way of doing this is to halve the length* of the gap. A little thought will show that

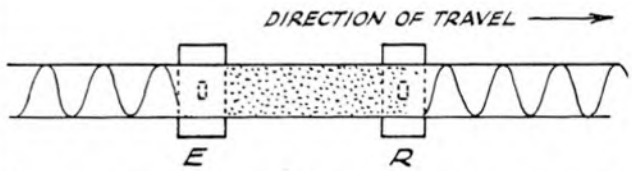


Fig. 3. A section of recorded tape is erased at the erase head (E). A random arrangement of magnetic particles passes to the record head (R) where a new pattern is imposed.

in terms of dimension a gap of .00015 inches will have roughly the same relationship to the wave-form as a gap of .0003 inches at double the speed. Unfortunately "narrow gap heads" as they are called, are expensive and may be subject to early wear. The abrasive action of the tape as it passes the head is to open up the gap. The result of opening up the gap (make it longer) is always the same—loss of high frequency response —for the reasons given.

I have tried to reduce some complex notions into basic, simple facts. Last month I pointed out the possibility of a fallacy in some machine specifications. I hope that this explanation of the truth underlying the capabilities of equipment to both record and play-back high frequencies, quite apart from the ability of the tape to actually hold and retain high frequencies at slow speeds, will help to clarify the position. Figures may be dull—these are worth studying and thinking about. Next month we'll be rather less serious-minded and talk about—starting to record.

* The horizontal measurement of the head gap is known as its length: not to be confused with the width (vertical measurement) which governs the width of the programme on the tape for two- and four-track recording which will be discussed later in the series.

SCHOOLBOYS IN THE SAHARA

Alan Carr records an enormous water wheel in Morocco, near Fes.

WHAT does one do when a donkey twitches its ears and begins to focus its eyes on something over your shoulder? What I did was to leap for the Land Rover door, snatch at the tape recorder inside, and spend a frustrating minute or so unravelling the microphone lead from the camera case straps. I lost the vital minute as the second donkey approached, during which the first animal lifted its head high, bared its teeth and began its preliminary snigger. One cannot stop a donkey in mid-bray and it is disappointing to record it from half-way through. However, there was no shortage of donkeys in this Oasis of Zagora, Southern Morocco, and on market day I stood in the Souk, surrounded by about 300 of them. Came out alive too, together with some fine colour shots and a useful stretch of Souk noise.

I was with the Sixth form Expedition from the Mortimer Wilson School in Derbyshire. Schoolboys in the Sahara? Well, at 18, they are young men and just take strange situations, language and customs in their stride. They were there to complete a field study—all are taking Geography A level at school—which seemed to me rather like travelling 6,000 miles to voluntarily take an A level practical examination.

The idea of going to the Sahara instead of doing a field study in Bognor Regis or Clacton, or somewhere over Easter followed a slide talk given the previous year by my brother Dennis. He had shown the school colour slides taken during his travels, giving a live commentary and running occasional "wild" background sound and music to bring extra realism.

The boys were thrilled with the Himalayas, and at question time popped up with: "How about taking us on your next expedition?" He parried with the suggestion that the boys organised their own expedition. So they did, and asked three of us to go with them.

Dennis was to be the official leader and driver, I was to help with cine, sound and driving, and "Tiddler" a Rolls-Royce mechanic, was to help with the driving and put the engine back should it ever fall out.

We hired a long-wheelbase Land Rover and had the loan of a custom-built trailer for the kit from an industrialist in their home town of Alfreton. We took scientific gear (the boys knew how to use it) together with numerous cameras and a tape recorder. This last item was my brother's much-travelled Philips EL 3585 transistorised battery portable. Already this machine has been to Tanganyika, Kenya, West Africa, Yugoslavia (down several hundred feet on a caving trip) and, in 1964, it went 9,000 miles through the Sahara. The trip we envisaged was to take it a further 6,000 miles through Morocco.

The recorder is also in continual use as a notebook and for letter dictation. During the 1964 Sahara trip the recorder was used as a notebook whilst travelling (Land Rover again), the notes being typed out at night. I thought we could use it the same way for our trip as the boys all had notes to take. In the event I found this impractical due to the numbers involved. However, some tape letters made whilst travelling were sent home and much appreciated.

What are the advantages of taking a tape recorder on such a trip? The most obvious is for the collection of background and location sound for slide and cine talks. One has only to see a slide lecture with and without sound accompaniment to realise what an immense difference there is.

Less obvious is the use of a tape recorder for making friends. We used the portable in Spain and had half of the village round us in the square busy Flamenco-ing like mad, before we ended up in the back room of a bar with an evening session. Cameras were ignored under the spell of hearing themselves sing.

Spanish performers were liable to get carried away and snatch the microphone from one's hand, bend tenderly over it (microphone, not hand) to test the recording meter's limits. One had to be nifty with the level controls. More success was gained by propping the microphone on a solid surface—not a table top which would be beaten in rhythm—and using both hands to fend off the performers, and tip the bottle.

Once in Morocco, at one of our camp sites, the local shepherd boys were shy and hid as soon as I lifted my camera. I despaired of taking any close-up shots. The next morning, whilst packing to move off, a young man walked past playing a pipe as he drove some goats before him. The tape recorder was quickly produced and as soon as the playback was heard, goats and cameras were completely forgotten, and a little group gathered to listen. We spent an hour recording and photographing, and could have continued all day.

On expedition I try to keep the recorder near the top of the luggage. For protection I recommend a cardboard box lined with expanded polystyrene, just big enough for recorder and camera gear. The polystyrene gives a measure of insulation against heat and bumps. When we *know* the recorder is not to be used for some time, we wrap it first in two large plastic bags, one inside the other—to keep the dust out. If the equipment is used regularly then this of course is not possible, it just has to stand up to a little rough treatment. Our machine has certainly seen life, and come up trumps.

Recording on the move in the Land Rover was successful using "close lip" technique. Recording while walking, however, was not so good. Speed fluctuations were noticed due to swinging the recorder, and a rather breathless effect was usually achieved.

Handling noise—both microphone and cable—was a danger overcome where possible by the simple expedience of not handling them. The microphone could often be propped up, away from the recorder, whilst one concentrated on the level control. Normally, three hands are required to commence recording with this machine, although I understand this inconvenience has been largely reduced in the more recent models.

We used Kodak P300 tape throughout, recording on one track only for ease of editing and filing. Kodak P400 had been considered, but without experience of this ultra-thin tape and deeming this not the occasion for experiment, the proven triple-play tape was taken.

We loaded the recorder with Ever-Ready HP batteries and took a spare set: supplies would be doubtful on site. In fact, the original batteries are still in use after two months intermittent use. We tried to keep the modulation level well up, and, for commentary, set the recorder in the dark by "one finger twist of level control."

Wherever possible, I made a trial recording first, playing back

SCHOOLBOYS IN THE SAHARA

ROY KEMP describes how a team of schoolboys organised a tape recording expedition

the result to check the modulation level was satisfactory. Recording a very large waterwheel (making a lot of noise, too) raised a snag. One could not switch the water wheel off, so playing back a trial recording is not much use unless you like to walk off a hundred yards or so. I trusted the meter reading that time.

I hoped we had learned from previous lessons, and had taped long enough stretches of "background sound." There always seems to be some unwanted noise about half-way through the tape. That leads to the necessity for tape loops being made up, with possible loss of quality apart from the bother this entails. Dealing with the tape on our return takes a great deal of time . . . one's wife is liable to complain and go off and buy a fridge or new curtains in self-defence.

The tapes are firstly played back at $1\frac{7}{8}$ ips on our Tandberg 62—the quality is really amazing. A log is then made of the different items on the tape. We had planned to complete this in the field, but there just wasn't time to start on it, let alone complete it. Then the decisions made on what to keep and what to discard. Wife's co-operation and advice invaluable here, gives a feeling of participation, and prevents her going off to buy a new washing machine.

This is the stage where we are glad only one track is recorded: the bits we want to keep—most of it, it seems—being cut out, separated by leader tape with the log forming an index of items. Unwanted bits are spliced together, bulk erased and put by for future use.

During this time, those little yellow boxes of processed film have been coming back in the post from Hemel Hempstead. The next stage is to sort out about 160 slides telling the story of the expedition.

The slides are laid out on a sheet of opal perspex illuminated from below. We then plan what we want to say, and where to bring in the recorded sound. My brother is an expert at this. He works for Kodak, lecturing at schools all over Britain. His technique is to use live rather than recorded commentary. He believes it makes all the difference to the children who realise that the photographs they see are "taken by that chap talking up there." A "canned" commentary would not be the same thing, and I am inclined to agree with this.

My own lecture tape is to be a fairly simple one. This is the first I have done, and I shall be showing slides to local friends and colleagues. Holiday slides can be so boring, but I am determined mine will be an exception.

The five boys have had their films returned too. They used Instamatic cameras and have some really "smashing" pictures. Once they have finished their A level exams, they too, with my brother's guidance, will make up their own lecture tapes: they are already heavily booked locally to give talks about their expedition.

The technique used making the lecture tape began with the drawing up of the script. Typical examples would include the following:

Sequence 1: Marrakesh, entertainers on square . . . 1 min 30 secs.

Sequence 2: Ouarzazate to Zagora piste: engine noises, gear changing . . . 1 min. 30 secs.

Sequence 3: Zagora camp: goats, shepherd boys, Arabic chatter . . . 2 mins.

Sequence 4: The Sunday Souk . . . 3 mins. 45 secs.

Each sequence may consist of a number of items edited from the original tape. Editing is done in a number of ways, depending on the complexity called for. If it is a simple question of items, a, b, c, d, etc., just spliced together (with a slide change at each splice for instance) then these are played on our Tandberg at $1\frac{7}{8}$ ips. Kodak P200 is used to dub these originals on to a borrowed Telefunken (another Tandberg would be heaven) at $7\frac{1}{2}$ ips. Once the unwanted sections have been spliced out, we now have Master Tape A.

This tape is then played on the Telefunken and re-dubbed at either $7\frac{1}{2}$ or $3\frac{3}{4}$ ips, whichever is required, on the Tandberg, and this is the tape that will be used at lectures. This system obviates azimuth and speed differences. If the lecture tape is damaged in any way, the Master Tape A is available carefully indexed and filed for further copies to be made.

On occasion, however, it is desirable to mix tapes rather than make straightforward splices. The sound-on-sound system available on the Tandberg enables this to be done quite simply. It is just a question of organisation.

First, two tapes are made up of exactly the same length. Each contains the required sounds in the correct time sequence and separated by blank tape. These tapes have been dubbed as described above, except that tape B is recorded on channel 2 of the Tandberg. Using start marks, the tapes are then run through on the two machines and the programme combined as required and, using the sound-on-sound procedure, recorded on to channel 1 of the Tandberg.

Both the original programmes being intact, the tapes can be rewound to the start marks for a fresh attempt to be made if

Village goatherds hear themselves for the first time.

mistakes occur when waggling the various level controls. I find it usually succeeds at the third attempt.

The mixed programme is then treated as Master A and a lecture tape copied from this.

The boys came from a school with quite a reputation in Derbyshire. Their forward-looking headmaster Mr. W. Dawes was very keen on the trip, and the geography teachers worked hard on the preparations. The boys financed their part of the expedition by working evenings, weekends and holidays, and arranging slide lectures. They have since raised more money to cover the deficit by giving slide lectures on their return.

Subsequent experience with more versatile and expensive portables has endeared me still further to Philips. It would be nice to have it running at $7\frac{1}{2}$ ips for ease of editing and, since I only use one track, a full-track head. But not at the expense of reliability.

We all found the effort involved in this expedition well worthwhile, and I certainly enjoyed the experience. Any Sixth formers want to go on a similar trip? . . . then get the maps out.

CROSS TALK

By Audios

DO you remember the thrill of excitement as you listened to the playback of your first recording? I can remember as clearly as if it were yesterday; unbelievably this was my voice, recorded by me and reproduced in my loudspeaker. That was many years ago, but even today the same tingle runs up and down my spine when some of my own recordings are being played back. I say "some" deliberately—the others are best forgotten.

As time passes we, and our equipment, become more sophisticated; recordings that pleased me a few years ago are now evaluated with a sterner and more critical ear. And so when, the other day, I took a short voice recording and on playback found it to be of the best quality that I personally had ever achieved, you will understand my feelings. For me this was as significant as the day I took my first recording and certainly as exciting.

This all came about through the courtesy of Audio Engineering Ltd., the distributors of the Sennheiser range of microphones, which made their first appearance at the recent Audio Fair. As something new I determined to find out about them.

Both Mr. Druce and his assistant, Mr. Desmond, went to extraordinary lengths to meet my request—even to supplying a selection of microphones with the leads ready wired to GPO jacks so that I could connect straight into my own equipment without so much as raising a screwdriver. These may be businessmen, but they are also enthusiasts and it is a great pleasure to deal with such people.

It is a very dangerous thing to record on two or more different microphones, listen to the playback, and then on the basis of the sound produced form a judgment that this microphone is or is not better than that. It must always be remembered that in playback alone the sound will be coloured by a number of variable factors, including speaker location, playback level, room acoustics and possibly even limitations in the playback machine itself. Quite apart from which some microphones are specially designed to do different kinds of jobs which require them to modify the original sound in some way. I understand this complex subject will be dealt with fully and adequately by Denys Killick in his "Tape Recording Techniques" series of articles so I will leave him to discuss technicalities at a future date.

The quality achieved using the Sennheiser Condenser microphone has to be heard to be believed. In my opinion the sound reproduced by my Goodman three-speaker infinite baffle unit was definitely the best I have ever heard from a home recording. So impressed was I that I felt it necessary to check the result. Accordingly, I "acquired" the use of an only slightly more expensive condenser by another firm.

To all practical purposes there were no audible differences in the two recordings. At one time the word condenser implied a cost of well over £100. The Sennheiser microphone is under £80 complete with battery pack; the omni-directional Hammond, which I've not yet tried, is only 29 guineas. I firmly believe that more and more serious amateurs will consider the acquisition of a condenser microphone as the proper solution to the search for quality.

However, if you feel the price is high, as indeed it is, I must draw your attention to the Sennheiser moving coil microphone, the MD 211. This little instrument has a frequency response roughly comparable to a condenser at the very much lower price of about £35. It is, however, rather less useful as it has an omni-directional pattern and therefore home recordings are likely to be coloured rather strongly by the room acoustics. Nevertheless, it is a beautifully made and very excellent microphone that I would be proud to own. Regretfully these borrowed microphones must be returned. May I thank their owners for the opportunity of using them. Dare I paraphrase a famous quotation by murmuring "Spirit of fidelity, tarry yet a while"?

* * *

Last month I referred to an old clockwork portable recorder which had been given away as a piece of junk. This machine is now working and has been satisfactorily recording and playing back. This surely is progress and yet it has all happened in a comparatively short period of time.

As I suggested there must be many old relics like this scattered around the country. These old machines are treated as junk and they are destined to be dumped either on the rag and bone man or in the dustbin.

Just the same thing happened to many fine old motor cars in the years before the last war. They were allowed to lie around derelict in fields until they rusted away. In this more enlightened age many of them are being recovered and reconditioned to preserve for all time, we hope, the realities of the history of the development of the motor car.

Why should we think any less of historic curios in our own chosen sphere? In the case of recording instruments development has been so rapid that one tends to regard a machine as "obsolete," rather than "antique." The responsibility for securing a representative collection of such machines lies with us. It was for this reason that I suggested the possibility of forming an "Owners' Veteran Association." Since then I have heard of another man who has acquired an old MSS recorder in broken-down and unworkable condition. This is now fully operational again thanks to his care and enthusiasm.

The very first edition of "TAPE Recording Magazine" dated February 1957 (reprints now available, 2s. 6d.) carried an advertisement for a Philips tape recorder. I know of one person who is still using this very model for his every-day recording work. So if you know of the existence of an old piece of equipment lying derelict in an attic, or, better still, if you regularly use such an old machine do please write giving full details of the recorder, as far as is known, and your own name and address.

* * *

THERE is one single statement I would like to add to last months' information about tape. Simply that it's too dear. We know what a wonderful product modern tape is and we owe a debt of gratitude to manufacturers for developing it in the way that they have. This does not alter the fact that profits are considerable and prices could come down.

In creative work it is essential that the enthusiast should be able to cut and splice at will without experiencing the nasty feeling that he is chopping up five pound notes. It's time someone said it, so I will. Recording tape is too dear. Can we not have a general reduction in price? And please note, Mr. Tape Manufacturer, when I buy a spool of tape it's the tape I'm after, not the plastic boxes or other sales gimmicks. Please leave such things to the makers of detergents and the housewives. All we want is good tape for less money.

A few years ago I roughly calculated that an American will, on average, earn enough money in one hour to purchase one seven-inch spool of tape. By contrast it took half a day for an Englishman to earn enough money to purchase the same amount of tape. The situation is illogical and unbalanced. Something should be done about it.

* * *

MUSICIANS tend to be serious-minded people, particularly where their music is concerned. I was recording an orchestra the other day and had arrived early to set up my equipment.

Asking the conductor about the seating arrangements for the instrumentalists you can imagine my amusement when he replied: "Oh! quite conventional, saws in the front, blows in the middle and bangs at the back . . . ."

BBC TO START STEREO BROADCASTS

REGULAR stereo broadcasts by the B.B.C. are to begin this month. From July 30, two to three programmes will be broadcast daily on VHF in the Third Programme.

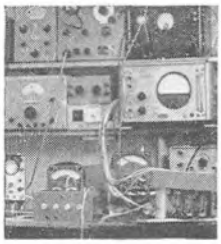
Initially available only to listeners within range of the Wrotham and Dover transmitters, the broadcasts are to be extended to Sutton Coldfield in approximately twelve months, and to Holme Moss three months later.

The system to be used is the established pilot-tone system extensively tested in the Music Programme and used in America and on the Continent. The fully compatible programmes can be heard in stereo by listeners with stereo receivers or in the normal way by listeners with ordinary receivers.

With the emphasis mainly on music, the broadcasts will include live and specially recorded music together with disc records. It is hoped to broadcast in stereo the forthcoming Promenade Concerts.

NEXT MONTH

H. Burrell Hadden will be describing the latest B.B.C. developments and current progress in our special issue next month devoted to stereo recording and broadcasting.



TEST BENCH

ROBUK RK5

By H. Burrell Hadden

THE Robuk Royal is a mains-operated mono tape recorder, available in two versions, model RK5 for two-track operation, and model RK54 for four-track. It will accommodate tape reels up to seven inches in diameter, and has three available tape speeds, $7\frac{1}{2}$, $3\frac{3}{4}$, and $1\frac{7}{8}$ ips. Mixing facilities are provided for two inputs, one a microphone, and the other a high level input such as radio or gramophone. The machine is contained in an attractive wooden case finished in imitation leathercloth, with natural wood decoration. The dimensions are 20 x 14 x $8\frac{1}{2}$ inches.

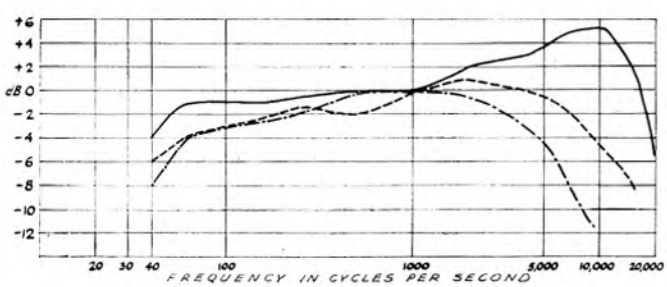
The tape deck used in this machine is the now familiar Robuk unit, manufactured at their North London factory, and all tape motion is controlled by five piano-type keys. On the left is the "stop" key, coloured red, on the right of which are the two keys for rewind and fast forward wind. The rewind time for the machine sent for review was 54 seconds for 1200 ft. of tape. The next key sets the machine in the play condition, and the last key switches it to "record," accidental operation of this key being safeguarded by a small push button which must be pressed before the key can be operated.

The tape speeds are controlled by a rotary control on the right hand side of the machine, with marked positions for the three speeds. This control has intermediate positions where the capstan motor is running but the tape is stationary, providing a quick start operation of the tape. At the left-hand side of the deck, a pause control is provided as an alternative method of halting the tape movement. Superimposing facilities are given by a push button which interrupts the feed to the erase head. The deck unit also houses a digital tape position indicator, and a magic-eye type record level indicator of the linear variety.

All the amplifier controls are mounted on a narrow panel at the front of the machine, below the deck controls. At the left-hand side of this panel, the first control acts as microphone gain control on record, and volume control on replay. Next comes the record gain control for high level input, marked "radio/gram," and next to this is the switch giving equalisation at the three tape speeds. (On this machine this equalisation is not switched with the speed change on the deck unit). The fourth control is the playback tone control, and lastly comes the volume control for the monitor circuit on record. Monitoring of the input to the

machine only is provided, this being a two-head machine; monitoring from the tape is not possible.

The four input and output sockets are also mounted on the amplifier control panel. On the left-hand side of the panel are the two input sockets for microphone and high level input, and at the right-hand side are the two output sockets, one to feed an external high quality amplifier, and the other for an extension loudspeaker of 15 ohms impedance. No input or output impedances are specified for any of the other sockets; the operating manual does not contain any technical specifications or information as to the performance to be expected from the equipment. However it is evident that the input impedances for both microphone and high level must be high, as not only is the microphone supplied of the the high impedance crystal type, but the operating instructions say that it is possible to use a high output high impedance microphone in the high level input socket if desired. The operating manual is otherwise very well written, and quite comprehensive.



Record/replay frequency response of Robuk RK5
$7\frac{1}{2}$ ips ——————;
$3\frac{3}{4}$ ips - - - - - - - -;
$1\frac{7}{8}$ ips — . — . — .

The amplifier is of the valve type, and in addition to its normal functions of recording and reproduction it can be used as a straight through amplifier for radio or record reproduction.

Access to the interior of the machine, necessary to change a valve or even to set the mains input voltage selector, is not so simple as one would expect. It is necessary to remove first the plastic cover over the deck controls, and then the top plate of the deck, after which the whole equipment, including the amplifier, can be removed from the case as one unit. The loudspeaker leads are easily removable on small clip connectors. The internal construction is good, with the amplifier on a small printed circuit board, and servicing should be simple.

The machine was given the usual practical and technical tests and performed very well, and here it should be pointed out that the review model was selected at random from one of Robuk's delivery vans. Recordings of speech and music were reproduced with good fidelity, and some slight toppiness at the $7\frac{1}{2}$ ips speed was easily adjusted by the tone control. Wow and flutter were only barely noticeable at the lowest speed. The record/playback frequency response at the three different speeds was as shown in the diagram, and the reason for the toppiness mentioned above can be seen. These curves were all taken with the replay tone control at maximum top. The signal-to-noise ratio was 36 dB, not perhaps as good as might be hoped, most of the noise being hum, and not very audible on the internal loudspeaker.

The Robuk Royal is supplied with an Acos crystal microphone, and a recording lead for use with external equipment. It is a pity that a low impedance microphone could not be provided, for the reason that it is not possible easily to extend the leads with the high impedance crystal type.

I can recommend this machine as being good value for money at 42 guineas (45 guineas, four-track).

MANUFACTURER'S SPECIFICATION

Speeds: $7\frac{1}{2}$, $3\frac{3}{4}$, $1\frac{7}{8}$ ips.
Recording sense: Four-track: international standard.
Heads: Motek (two-track); Miniflux (four-track).
Maximum spool size: Seven inches.
Frequency response: 40-15,000 cps ± 3 dB at $7\frac{1}{2}$ ips; 50-9,000 cps ± 3 dB at $3\frac{3}{4}$ ips; 50-4,000 cps at $1\frac{7}{8}$ ips. Amplifier: 40-18,000 cps ± 2 dB.
Wow and flutter: Less than 0.2 per cent at $7\frac{1}{2}$ ips; less than 0.3 per cent at $3\frac{3}{4}$ ips.
Signal-to-noise ratio: Better than 45 dB (fully modulated tape).
Distortion: Three per cent at three watts.
Rewind: 1,200 ft. within one minute.
Power output: Five watts (push/pull).
Loudspeaker: Eight-inch elliptical.
Inputs Microphone (high impedance/1.8 mV); radio/pick-up (350 mV/250 K ohms).
Outputs: Extension loudspeaker (15 ohms); external amplifier (one volt).
Valve line-up: Two ECL82, EL84, ECC83, EM84 plus silicon rectifier and diode.
Mains supply: 200-250V, AC, 50 cycles (60 cycles to order).
Power consumption: Maximum 100 watts approx.
Dimensions: $20\frac{1}{2}$ x $14\frac{1}{2}$ x $8\frac{1}{2}$ inches.
Weight: 30 lb.
Accessories: Tape, take-up spool, microphone, recording lead.

Manufacturers: Robuk Electrical Industries Limited, 559-561 Holloway Road, London, N.19.

SERVICE BUREAU

A glossary of tape terms—part 7

BY HARRY MACK

PRE-RECORDED.—The term is largely self-explanatory. To be exact, it means a recording made to accepted standards, and which can thus be replayed on any machine equalised on those standards. Commercial tapes are pre-recorded to CCIR or NARTB standards, at the specific replay speed. (*See also STANDARDS.*)

* * *

PRESSURE PADS.—There are several methods employed to keep the tape in intimate contact with the recording and replay heads (and the erase head). Professional machines have tape transport pins and guides which impose the minimum of pressure on the tape, while ensuring it runs exactly across the head facing. Ordinary domestic models usually employ pressure pads; small felt pads which are spring-loaded against the back (shiny side) of the tape when the "record" or "play" function is selected.

Variations are the pressure sling, now used by Grundig, which provides a more even pressure against the tape, and the tape pins used by several other deck manufacturers, which lap the tape across the head facings, usually in conjunction with levelling guides. Incorrect pad pressure is a prevalent cause of flutter. Pads should always be kept clean and soft for effective operation.

* * *

PRESSURE ROLLER.—Known also as the PINCH WHEEL. This vital piece of machinery keeps the tape in contact with the rotating capstan. It should be free moving, and the contact surface should be clean and perfectly vertical. A common cause of tape "run-up" is a deformed or softened pinch wheel. This item is generally mounted on an adjustable bracket, held in contact with tape and capstan by spring pressure. Decrease in this pressure will cause tape slippage, and, in the worst cases, wow. Increase in pressure usually causes erratic running, varying speed, and a tendency for the tape to run out of true level.

* * *

PUCK-WHEEL.—This term is seldom met in the UK but is used in the USA and may be encountered in literature dealing with some Continental and Oriental machines. The puck is the method of driving the tape capstan by a friction process, such as the motor spindle against a flywheel, or intermediate wheel. Thus, what we normally term an intermediate wheel or (not always correctly) jockey pulley, may be known as a puck wheel.

* * *

PUSH-PULL OSCILLATOR.—It is essential that the bias waveform shall be perfectly sinusoidal, to avoid distortion. An oscillator that generates harmonics in addition to its fundamental frequency will produce a distorted waveform. **Fig. 1** shows the kinks in the ultimate waveform when (*a*) in-phase and (*b*) 90 degree out-of-phase second harmonics are added to the fundamental.

The use of a push-pull oscillator cancels these second harmonics and helps reduce distortion. **Fig. 2** shows (*a*) a valve and (*b*) a transistor push-pull oscilator. Note that the main circuit is balanced and the primary of the oscillator coil centre-tapped, but bias feed and erase current are taken from the required matching points of the secondary winding.

* * *

QUARTER-TRACK. Strictly speaking, this should refer to the head gap configuration, but the term is widely used to denote four-track recording. The recording head-

winding is energised to produce a flux at a gap which " scans " nearly a quarter of the width of the tape. For a standard quarter-inch tape the quarter track takes up approximately 43 thousandths of an inch with a 25 thou' safety lane between each of the four tracks. A proposed " compatible system " which would allow acceptable replay of four-track tapes on a two-track machine and *vice versa* has edge lanes of 8 thou', separation lanes between tracks 1 and 2 and 3 and 4 of similar width, with a central blank lane of approximately 30 thou'.

In practice, quarter-track recording is carried out with a head having two gaps, one perpendicularly above the other, scanning tracks 1 and 3. For stereo purposes these are recorded and replayed simultaneously, the top track handling the left-hand channel signal and the third track the right-hand signal. Inversion of the tape then places the two unused tracks correctly in position for further recording or playback.

* * *

RANGE. Some specifications quote " frequency range " but give no more than the lower and upper limits that the tape recorder will handle within, say, 3 dB of a standard level. This standard is not always quoted, but will usually be 1,000 cps. However, this specification is not really valid unless the frequency response of the machine is given (see *Response*). To be correct, the range figure only indicates the outer limitations, never the " goodness " of the amplifiers.

The term " range " can refer to the frequency span or the dynamic range, which is a statement of relative loudness. The frequency range of commonly recorded sounds is very wide, and must take account of the harmonics which provide " colouration " of the tones and inform our ears which instrument is playing. But there is a useful upper limit, determined by the distortion which sets in at the upper end of the amplifier's useful range. Although the limits of human hearing extend to 15,000 cps and beyond, reproduction of more than 10,000 cps may not be desirable, except with extremely well designed equipment.

At the lower end, frequencies below 30 cps are unlikely to be employed, even though the lowest note of an organ is below this limit (and the lowest note on the piano, A, four octaves below middle C, has a fundamental frequency of 27.5 cps). In practice, the fundamental can be eliminated, yet our ears will tell us what note is being played from the combination of overtones that are heard. (**Fig. 3.**)

The dynamic range can be plotted on a graph with a relative loudness (the unit being the Phon) to a note of 1,000 cps so that each sound produces a subjective sensation equal to this reference level. The differences are read off in decibels and we then have a " dynamic range " of X to Y decibels relative to 1,000 cps level. The orchestra dynamic range may be from 30 dB (a very soft solo instrument) to more than 100 dB with full *tutti*! In practice, the equipment is limited by its overload characteristics and the loudspeakers being used and a dynamic range of 40 to 100 dB (or total 60 dB dynamic range) will give us the subjective impression we require.

* * *

REPLAY. The process of playing back recorded material. The term " Playback " is used alternatively, and in many cases is taken to refer to replay of recordings made on the same machine. Standards are introduced to enable replay of tapes made on any machine via the head and amplifier system of any other.

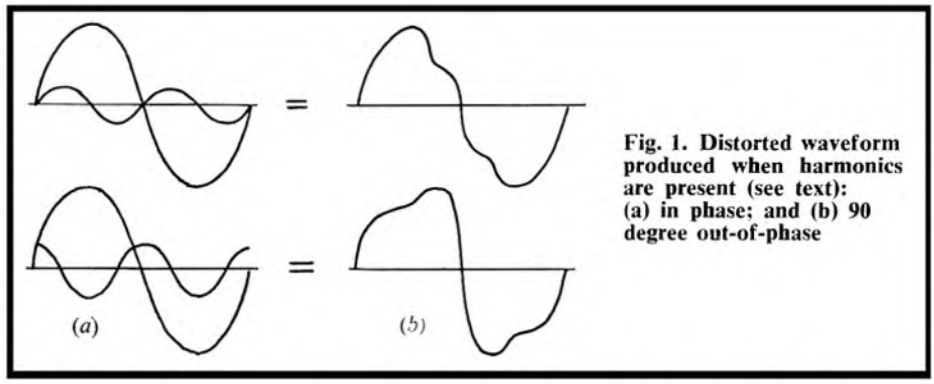


Fig. 1. Distorted waveform produced when harmonics are present (see text): (a) in phase; and (b) 90 degree out-of-phase

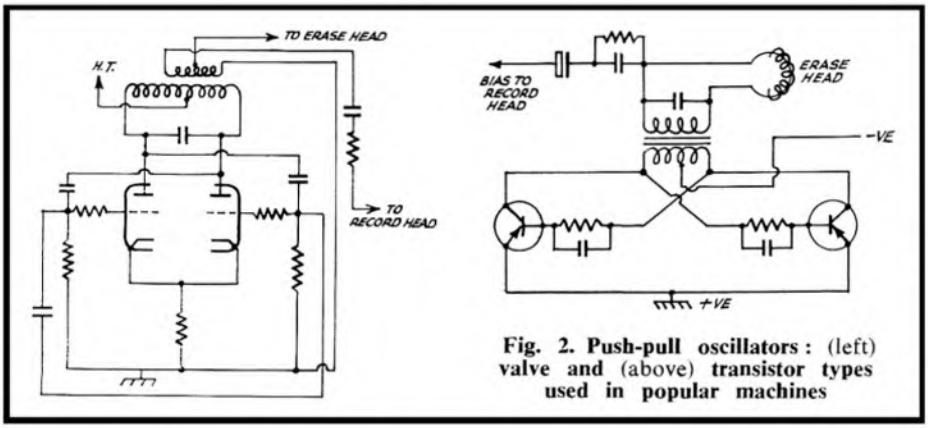


Fig. 2. Push-pull oscillators: (left) **valve and** (above) **transistor types used in popular machines**

REMOTE CONTROL. It is often desirable to switch a tape recorder from a position removed from the actual machine. Such switching may be a mere interruption of power, as with some battery-operated machines using switched microphones. But generally the term is intended to denote function switching, which both changes over the amplifier operation and removes the tape transport system from engagement, either by neutralising the mechanical controls or reverting to a neutral position with the aid of relays and solenoids. Refinements that are widely employed in office machines include back-spacing, fast winding and inching. Some fairly complicated switching may be necessary with machines of this type.

* * *

RESONANCE. The condition that obtains when the reaction of a capacitance and an inductance in a tuned circuit are equal. The circuit is then said to be in resonance at the particular frequency.

In audio matters, resonance is used to indicate the natural frequency of a transducer system, and in particular applies to loudspeaker design. When the natural frequency of the cone of a loudspeaker is the same as the sound being reproduced, a resonant peak builds up. For smooth reproduction, such peaks should be avoided. Design of the loudspeaker housing helps to balance out resonances. A good deal of work has gone into this subject and the serious tape recording enthusiast should always be prepared to judge the performance of his machine, not on the loudspeaker fitted in the tape recorder, good though this may be in many cases, but on the sound that can be obtained from correctly housed external loudspeaker. Very often, the improvement in performance is dramatically noticeable.

TO BE CONTINUED

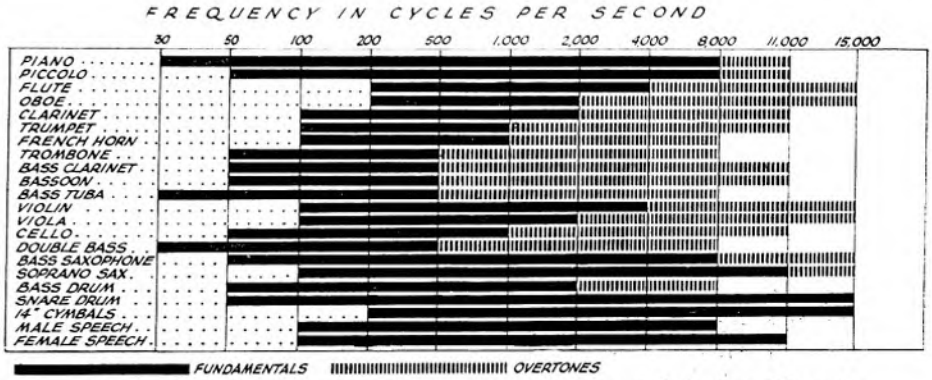


Fig. 3. The frequency range of commonly recorded sounds is very wide, and must take account of the harmonics (or overtones) which provide " colouration " of the tones and inform our ears which instrument is playing

Tape records reviewed

CLASSICS

Unusual point and clarity to this work

By Edward Greenfield

BRAHMS. Piano Concerto No. 1 in D minor, Opus 15. Daniel Wayenberg with Sudwestfunk Orchestra conducted by Ernest Bour. WRC (TT 503), 29s. 6d.

You would never guess that this grandest of piano concertos was the work of a young man at the very beginning of his career. Brahms started work on it when he was barely twenty at a time when he was much upset by the attempted suicide of the composer and friend who had first spotted his budding genius, Schumann. At first Brahms put his ideas into piano duet form, and then when he realised they were bursting out of that limited medium tried to orchestrate them in the form of a symphony. Only later did he realise that a piano concerto was what he intended, and that was the form the work finally took, his first major work with orchestra.

The trend among the composers who had followed Beethoven was to make the solo concerto more pithy and less expensive, so that this very large and ambitious work marked a new trend in a number of ways, for Brahms had no patience whatever with the idea of a concerto being an urbane discussion between soloists and orchestra. Rather it was a struggle for supremacy, and for any soloist the work presents the most formidable problems of interpretation.

Daniel Wayenberg, the young French pianist, brings an unusual point and clarity to the work—his youth and Frenchness both helping in that. For all the size and massiveness this is after all a young man's work, and a performance should hardly conjure up the well-known picture of Brahms as a boorish old bachelor with a great beard and shaggy hair.

The first movement is taken at rather too slow a speed, so that in places it tends to sag a little, but that is rather the fault of the conductor. Some of Wayenberg's solos have a fine rhythmic urgency and the great, urgent second-subject in the finale with its very Brahmsian triple rhythms is most excitingly done. Surprisingly this is the only Brahms Piano Concerto currently available on tape. Recording good.

The tapes reviewed this month are issued by the following companies:

"Columbia," "H.M.V.," "Parlophone" and "Verve": E.M.I. Records Ltd., 20, Manchester Square, London, W.1.

"W.R.C.": World Record Club, Box 11, Parkbridge House, The Little Green, Richmond, Surrey.

"Global": Global Products, 14, Underwood Road, Rothwell, Northamptonshire.

WALTZING IN VIENNA. Volume 4. Vienna Volksoper Orchestra conducted by Josef Leo Gruber. WRC (TT 468), 3¾ ips, mono, 29s. 6d.

A Viennese waltz selection without a single item by any of the Strauss family. But in case anyone should be put off by that let me emphasise the wealth of delight in these twelve waltzes—three by Waldteufel including "Espana" two by Fucik and others by Lehar and Arditi, whose famous song "Il Bacio" here becomes (in Viennese style) "Der Kusswalzer". Though the refinement of Strauss's musicianship led to more sophisticated composers copying him, it is good that the Viennese operetta tradition was kept alive so successfully in such unpretentious music as this. The Orchestra of the Vienna Volksoper plays with the mastery of long affection, and the recording is fittingly bright and forward. Like the earlier tapes in this series an ideal source of background music.

POPULAR

One of the cutest novelty pop albums

By Don Wedge

BURL IVES SINGS IRVING BERLIN. Burl Ives. WRC (TT 515), 3¾ ips, mono, 29s. 6d.

Burl Ives reaches back into the treasury of Irving Berlin songs for one of the cutest pop novelty albums ever.

Ives is no singer, but what a huge personality! His slight voice, manipulated with enormous authority, throws an entirely fresh conception on Berlin's songs.

Alexander's Ragtime Band, Berlin's first big hit, is the starter and perhaps the weakest Ives' performance. But from the next track *Let's Have Another Cup of Coffee* (in retrospect a witty, over-optimistic commentary on the age of President Hoover) the record becomes something unique.

Ives has a delightful economy of lyric which helps emphasise the cleverness of Berlin at his best.

Most of the songs have been recorded before. Few versions have been as interesting as Ives'. Like *Coffee* there is *You'd Be Surprised* and *International Rag* which are rarely heard.

SWEET THINGS. Georgie Fame. Columbia (TA-SX 6043), 3¾ ips, mono, 35s.

Britain's leading exponent of rhythm and blues has found new pop success with his *Get Away* hit and this LP's tape release is unusually well-timed.

Fame always has a big following. He is one of Britain's biggest selling album artists, even though he rarely appears in the Top 20.

Such records as this usually create a mood and do not encourage being listened to. Fame and his producer, Denny Cordell, have contrived to meet both demands.

My highlights were *Funny How Time Slips Away* and, not out of place, a calypso, *Dr. Kitch.*

CRYING TIME. Ray Charles and the Raelets. HMV (TA-CLP 3533), 3¾ ips, mono, 35s.

Ray Charles is much closer to the original home of rhythm and blues, but the opening title song puts him at a severe disadvantage to Fame.

Crying Time gets a country and western treatment which does not suit Charles at all. Fame is a cool soul singer, but Charles on this track seems washed out.

Fortunately things improve enormously afterwards and *Let's Go Get Stoned* is witty and wild.

CILLA SINGS A RAINBOW. Cilla Black with orchestra directed by Mort Shuman, Nicky Welsh, Johnny Scott and Johnny Pearson. Parlophone (TA-PMC 7004), 3¾ ips, mono, 35s.

The typical pop LP does not have a theme. The artist goes into the studios several times. From the sessions comes a single, and the rest of the songs go to the LP.

This is the way one suspects parts of *Cilla Sings A Rainbow* was made. There is no theme, although there are versions of several hits of other artists, obviously included with the LP in mind.

Cilla Black has quite a different way with the Walker Brothers' *Make It Easy On Yourself* and Len Barry's *One Two Three*. Her Liverpool song-writing friends are remembered with *Yesterday*.

But she is at her best with the edgy, dramatic treatment of the first song, *Love's Just A Broken Heart*.

I LIKE MEN. Peggy Lee with orchestra conducted by Jack Marshall. WRC (TT 518), 3¾ ips, mono, 29s. 6d.

This famous LP now appears under WRC colours and has lost nothing over the years since it was first recorded. The title song superficially provocative, is an excuse for a collection of numbers mainly dedicated to named men—Charley, Joe, Harry, Bill, etc.

Peggy Lee is at her best with *I Love To Love* and even applies her exacting standards to such trivia as *I'm Just Wild About Harry* and *Oh Johnny*.

A lavish style of living in Hollywood

ORGAN

By Grahame B. Walsh

THE THEATRE ORGAN. Demonstrated by Buddy Cole. Global (65316), 3¾ ips, four-track stereo, 30s.

Hollywood's lavish style of living is well illustrated in this demonstration tape by Buddy Cole. In a twenty-minute programme, he describes the three-manual, 27-rank organ he has had installed in his American home. Utilising pipes from former Wurlitzer and Robert Morton organs, he has placed the ranks in three adjacent chambers with accompaniment on the left, solo ranks on the right, and effects in the centre, producing a very impressive stereophonic image.

After describing the equipment, Mr. Coles introduces each section and details the effects obtained. As this is a tape for the more technically-minded organ enthusiast, a little more explanation about each of the ranks and the problems involved building such an organ would have been appreciated. And what a pity such a short time was given over to letting us hear how the organ sounds as a complete unit.

Let's hope that his next tape will deal more specifically with the musical sounds obtainable, as this organ is proving to be an interesting experiment in stereo sound.

Predictable, but very good Miss Gilberto

JAZZ

By Mike J. Gale

THE SHADOW OF YOUR SMILE. Astrud Gilberto. Verve (TA-VLP 9107), 3¾ ips, mono, 35s.

Fly me to the Moon has become associated more and more with Miss Gilberto and she predictably sings it on this album accompanied by an unnamed orchestra. She has a very distinctive style—it could be simulated by Miss Fielding sitting in a cold water bath in an amplified bathroom—which is agreeable in a general record programme.

On this album, everything sounds alike: for a fan this is great; for a critic it is easily forgettable. The great fault is the similarity of every arrangement. Given different material it would be interesting to see how Miss Gilberto could handle herself in a purely jazz function. There are indications—admittedly sparse ones—that she would be more at home there leaving this sort of material to those who are so much better—Miss Warwick for instance.

The programme covers: *Love theme from "The Sandpiper," Take me to Arunda, Mahha de Carnaval, Fly me to the Moon, The Gentle Rain, Non-Stop to Brazil, O Ganso, Who Can I Turn To? Day by Day, Tristeza* and *Funny World*.

PRES AND TEDDY. Personnel: Lester Young, tenor; Teddy Wilson, piano; Gene Ramey, bass and Jo Jones, drums. Recorded January 13th, 1956. In addition Roy Eldridge, trumpet; Vic Dickenson, trombone and Freddie Green guitar for January 12th, 1956. WRC (TT 517), 3¾ ips, mono, 29s. 6d.

This is an unpretentious and hectic album with constant injections of strength and buoyancy. It is rather sad that Lester Young, who died three years after this session, was analysed by the now defunct *Jazz Quarterly* in 1959: "In the last records I hear an unspeakable sadness—an actual pessimism which is rarely found in the art of the American negro up to now. The existence of this quality is not susceptible of rigorous demonstration in prose, but it's there for anyone who can hear. Why so sad, Pres?"

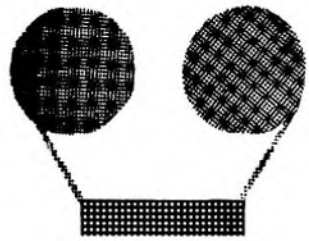
This album was therefore probably the last good work of Young's before his performance became erratic. It is even more ironical that it was also the first session after a rest cure in hospital when, urged by Norman Granz, Young obviously found, briefly, the will to live. I don't know what experiences he endured in the US army but many of his friends maintain that whatever it was, it crushed his will to live.

This album is even more valuable, then, because there is little hint of his personal torment.

The qualities of the other personnel are characteristically projected in a tasteful and responsive manner.

The six items are *Prisoner of Love, Louise, Pres Returns, Love me or leave me, Love is here to Stay* and, recorded on January 12, *Gigantic Blues*.

NEW PRODUCTS



AKAI ANNOUNCE VIDEO RECORDER

AKAI announce their entry into the video field with the introduction of their video tape recorder the VX-1100.

The new model, illustrated right, employs the linear system and runs at the tape speed of 30 ips. Standard quarter-inch magnetic tape is used providing a playing time of 50 minutes using 10½-inch reels accommodating 7,200 ft. of tape.

The Akai Cross Field bias head is incorporated to obtain the necessary video band width. Their quoted frequency response is 60—1 M/c ± 6 dB, with the signal-to-noise ratio rated at better than 34 dB. Audio signal recording response is 50-10,000. Signal-to-noise ratio is given as better than 40 dB.

Designed for operating vertically or horizontally, the VX-1100 records on four channels. It is powered from 100, 110, 120, 200, 220 or 240 volts, switchable by a variable transformer. Power consumption is rated at 100 volts.

Other features include VU recording level indicators, meter push-button controls, and a four-digit rev. counter.

Measuring 17 2/5 x 16 2/5 x 10⅓ inches, it weighs approximately 45 lb. The price is still to be announced as is its availability in the UK.

Pullin Photographic, Ellis House, 11, Aintree Road, Perivale, Greenford, Middlesex.

SONY INTRODUCE TWO NEW MODELS

TWO new tape recorders have been added to the Sony range of Japanese-manufactured models. First of these is the battery and mains-operated half-track TC800 with tape speeds of 3¾ and 1⅞ ips. It has a quoted frequency response of 50-13,000 cps at 3¾ ips and 50-7,000 cps at 1⅞ ips and accommodation for five-inch reels providing a playing time of 32 minutes per track using standard-play tape (600 ft.) at 3¾ ips.

Among the features are automatic recording level control, VU meter recording level indicator, facilities for loudspeaker monitoring, straight-through amplification, tape inching, instant conversion from battery to mains supply without adaptors, and remote control stop/start from the microphone.

The TC800 features a 6¼ x 3⅛ elliptical loudspeaker handling the power output of one watt. Power consumption is rated at approximately six watts. The power supply is from eight 1½ volt UM-1s or equivalent or 110, 120, 220 or 240 v., 50/60 cycles AC.

Measuring 12¼ x 10½ x 4½ inches and weighing 11¾ lb., it has optional extra accessories, including car battery cord and carrying case. The TC800 cost 65 guineas.

Second of their new models is the TC260 which is to be reviewed in our "Test Bench" feature next month. This is a four-track transistorised stereo recorder, illustrated below, operating at 7½ and 3¾ ips.

The quoted frequency response is 30-18,000 cps (30-15,000 ± 3 dB) at 7½ ips and 30-13,000 cps at 3¾ ips. Wow and flutter is given as less than 0.19 and 0.25 per cent respectively, and signal-to-noise ratio as better than 50 dB. It accommodates seven-inch reels, providing a playing time of 64 minutes per track using standard-play tape at 3¾ ips.

Among the features are facilities for loudspeaker or stereo headset monitoring, vertical or horizontal operation, sound-on-sound recording, straight-through amplification, separate bass and treble controls, VU meter recording level indicators, automatic

shut-off switch, digital rev. counter and two dynamic microphones.

Inputs are provided for microphones (0.3 mV for 250-1 K ohms) and high impedance sources. Outputs are for low impedance line, external loudspeaker (8 ohms) and radio/pick-up. The built-in loudspeaker is a 8 x 4 inch elliptical handling the power output of five watts per channel.

Power supply is from 100, 110, 117, 125, 220 or 240 volts, AC, 50/60 cycles. The TC260 measures 21¼ x 15½ x 8 inches and weighs 34 lb. The price, including 5-inch demonstration tape, 7-inch spare spool, recording lead and head cleaning ribbon is 95 guineas.

Sony U.K. Sales Division, Mercia Road, Gloucester.

LATEST RECORDER FROM BRITIMPEX

A NEW mono half-track tape recorder suitable for use as a Mini-Lab language laboratory has been introduced by Britimpex.

The new model, illustrated below, is the Luxor MP 283 Swedish manufactured recorder which will sell at 59½ guineas. This can be equipped as a Mini-Lab using the earphones, microphones and amplifier supplied as an optional extra.

The MP 283 operates at 7½, 3¾ and 1⅞ ips, and has a quoted frequency response of 50-19,000 cps, 50-12,000 cps and 80-6,000 cps at the three speeds. Wow and flutter is given as better than 0.1, 0.2 and 0.35 per cent respectively. With accommodation for

seven-inch reels a playing time of 64 minutes per track is available using standard-play tape (1,200 ft.) at 3¾ ips.

Among the features are push-button controls, separate treble and bass tone controls, pause control, magic-eye recording level indicator, digital rev. counter and a built-in 6 x 4 elliptical loudspeaker handling the power output of three watts.

Inputs are provided for microphone (0.5 mV/1 M ohm), radio/pick-up (20 mV/1 M ohm) and outputs for an external amplifier (1 volt/50 K ohms) and extension loudspeaker (4-8 ohms).

The valve line-up included two ECC83, an ELL80, an EAM86, plus selenium rectifiers.

The MP 283 measures 14¼ x 12¾ x 6½ inches, and weighs approx. 24 lb.

Britimpex Limited, 16-22, Great Russell Street, London, W.C.1.

AMPLIFIER RANGE BY SOUND COVERAGE

A RANGE of mains/battery operated transistorised amplifiers and a mixer unit has been introduced by Sound Coverage. Four integrated amplifiers of 15, 30, 60 and 120 watts output and the five-channel mixer are available in free-standing cases or for rack mounting. Each is equipped with its own power unit for AC mains (205-250 volts) supply or from low voltage DC source (12 volts).

Among the basic features are ease of operation with graduated control knobs and rationalised mixing facilities, printed circuitry with space for additional circuitry, and ease of access for maintenance.

Quoted frequency response for each of the amplifiers is 50-10,000 cps ± 2 dB at full power 100 volt line. The signal-to-noise ratio is given as better than 60 dB for all inputs which are for high (100 mV at 100 K ohms unbalanced) and low (200 uV at 30 ohms balanced).

Measuring 17 x 12¼ x 5¼ inches (case model) the units designated SCA/15, SCA/30, SCA/60 and SCA/120 weigh respectively 23, 26, 28 and 36 lbs.

The mixer unit has five high and five low inputs (sensitivities as for the amplifiers) and an output of one volt. Quoted frequency response is 40-12,000 cps ± 2 dB. It weighs 10 lbs.

Prices for the amplifiers in ascending order of power are £45 5s., £66 11s., £86 11s. and £124 10s. The mixer unit costs £58 16s.

Sound Coverage Limited, Decibel House, Wellington Town Road, East Grinstead, Sussex.

NEW TAPE RANGE FROM FERROGRAPH

FERROGRAPH, together with 3M Company, announce the introduction of a range of low noise standard and long play tapes.

The new Ferrotapes, specially selected and wound on Hublok metal spools, will be available on 7- and 8¼-inch spools. **Standard play** tapes will cost 50s. on a 7-inch spool (1,200 ft.) and 71s. on an 8¼-inch spool (1,800 ft.). **Long-play** tapes will cost 70s. (1,800 ft., 7-inch spool) and 90s. (2,400 ft., 8¼-inch spool).

Ferrograph have also increased their range of standard type tape. Now available are **Standard-play** tapes at 45s. for 1,200 ft. (7-inch spool) and 63s. for 1,800 ft. (8¼-inch spool) and **Long-play** tapes at 62s. for 1,800 ft. (7-inch spool) and 80s. for 2,400 ft. (8¼-inch spool).

The Ferrograph Company Limited, 84, Blackfriars Road, London, S.E.1.

NEWS IN BRIEF

FOUR-SPEEDS for 29 guineas. Preliminary details of a new four-speed tape recorder selling at 29 guineas is received from Robuk Electrical Industries Ltd. Their new model, the Statesman, will be available in two- and four-track (32 guineas) versions, will operate at 7½, 3¾ and 1⅞ and 15/16 ips. and will accommodate 5¼-inch spools. Full specifications and an illustration will be published next month.

* * *

THE range of pre-packed tape recording spares and accessories marketed by Tape Recorder Maintenance Ltd. are in future to be supplied by their sister company Tape Recorder Spares Ltd. of 323, Kennington Road, London S.E.11.

* * *

R.E.W. EARLSFIELD announce they have acquired sole distribution rights of the Cinecorder tape recorder and they shall be marketing it to radio, electrical and photographic dealers. All inquiries for spares and accessories, including perforated tape, should now be addressed to them at 266-268, Upper Tooting Road, London, S.W.17.

* * *

LOUDSPEAKER systems by Rank Wharfedale Ltd. and Sound Coverage Ltd. have been accepted by the Council of Industrial Design for their Design Index. Limited to production models, units selected for this honour must have been in production for over a year, and are exhibited in the Design Centre in London's Haymarket.

The Wharfedale loudspeakers selected are the Linton, Dalesman, Dovedale and Airedale designed by Robert Gutmann, F.S.I.A. The Sound Coverage models are their eight units ranging in power output from 500 mW to 50 watts.

TAPE Bookshop offers YOU the kind of books other Tape Recordists have most requested!

Check through this list. Normal retail prices—we pay the postage on all orders.

3. A to Z in Audio by Gilbert A. Briggs (1960). 224 pages, 160 illustrations. **15s. 6d.**
A first-class book of reference for the subject.

4. Audio and Acoustics by Gilbert A. Briggs (1963). 168 pages, 140 illustrations. **12s. 6d.**
Acoustical Consultant James Moir as sub-editor. A revised but basically original work from the well known "Sound Reproduction."

5. Audio Biographies by Gilbert A. Briggs and 64 collaborations (1961). 344 pages, 112 photographs and illustrations. **19s. 6d.**

7. Cabinet Handbook by Gilbert A. Briggs (1963). 112 pages, 90 illustrations. **7s. 6d.**
Intended for the do-it-yourself man, and contains vital information on design and acoustic principles particularly in relation to compact enclosures which are now so popular for stereo.

8. Direct Current and Magnetism. Edited by Edgar J. Black (1964). 120 pages, 92 illustrations. **10s. 6d.**
Gives a very simple account of basic electrical theory.

10. High Fidelity Pocket Book by W. E. Pannett. 304 pages. **40s.**
Clear explanations of each item in the chain of a high fidelity installation are accompanied by practical hints for the enthusiast.

11. High Fidelity Sound Engineering by Norman Crowhurst. 336 pages, 262 illustrations. **50s.**
Comprehensive coverage on the engineering of modern single-channel and stereophonic sound equipment.

27. Stereo and Hi-Fi as a Pastime by Douglas Gardner (1959). 148 pages. **15s.**

15. Loudspeakers (Fifth edition) by Gilbert A. Briggs (1963). 336 pages, 230 illustrations. **25s.**
All aspects of the design and performance of loudspeakers and enclosures are dealt with in non-technical terms.

20. More About Loudspeakers by Gilbert A. Briggs (1963). 136 pages, 112 illustrations. **8s. 6d.**
Deals with the latest trends in non-technical terms, and takes a new look at questions such as response and impedance, load matching, adding a speaker, listening tests, stereo.

36. The Grundig Book by Frederick Purves. Comprehensive 1964 edition. **15s. 6d.**
Includes working instructions and data sheets for individual Grundig models.

37. Tape Recording for Pleasure by Wallace Sharps. 128 pages. **3s. 6d.**

38. Ribbons of Sound by Karl Barleben. A U.S.A. publication and guide. **8s. 6d.**

40. Simple Radio Circuits by A. T. Collins, editor of Practical Wireless. **3s. 6d.**

41. Hi-Fi and Audio by A. T. Collins. Useful introductory paperback. **3s. 6d.**

TAPE HANDBOOKS

no newcomer to the hobby, or enthusiast, should be witnout!

Advice on Buying a Tape Recorder by J. F. Ling.
2s. 6d. (U.S.A. $0.65) post free.
Chapters on preliminary considerations, tape deck, amplifier, etc.

Introduction to the Tape Recorder by C. Langton.
3s. 6d. (U.S.A. $0.75) post free.
Also, ideal for the apprentice in Radio servicing.

Sound Effects on Tape by Alan Edward Beeby.
3s. 6d. (U.S.A. $0.75) post free.
How to achieve realistic effects simply and economically.

Tape and Cine by John Aldred.
3s. (U.S.A. $0.70) post free.
With practical advice on synchronising methods, etc.

How to Record Weddings by Paul Addinsell.
3s. (U.S.A. $0.70) post free.
Illustrated. Covers preparation, mike positioning, equipment, etc.

Hi-Fi for the Music Lover by Edward Greenfield.
3s. (U.S.A. $0.70) post free.
Aims at giving the music lover basic technical know-how.

REMITTANCE MUST ACCOMPANY ORDERS!

29. Tape Recording and Hi-Fi by Douglas Brown (1961). 160 pages. **5s.**
Now as a paperback this interesting book by the Editor of "TAPE Recording Magazine" is very good value.

33. You and Your Tape Recorder by Norman Paul (1962). **4s.**
Very good value by a past winner of the British Amateur Tape Recording Contest.

12. High Fidelity Sound Reproduction (Second edition). Edited by E. Molloy. 212 pages. **20s.**
Contains a mass of valuable data for the serious amateur, and the maintenance engineer, and covers the expensive and complex equipment now on the market. Chapters on amplifiers and preamplifiers, dynamic loudspeakers.

25. Sound Recording Works Like This by Clement Brown. Illustrated. **10s. 6d.**
Part of "Science Works Like This" Series the book is intended for the younger members of the family.

39. Tape Recorder Manual by Wallace Sharps. (New cheap edition). **10s. 6d.**
Sections on its uses in business, education and pleasure, how it works, etc.

2. Alternating Current and Acoustics. Edited by Edgar J. Black (1964). 116 pages, 86 illustrations. **10s. 6d.**
Deals in simple terms with the origin and generation of alternating current, construction of coils and capacitors. The second part deals with the nature of acoustics and construction and operation of devices used for sound recording and reproduction.

21. Practical Hi-Fi Handbook by Gordon J. King. 224 pages. **25s.**
A guide to choice, installation and servicing of equipment, for dealer, engineer, and amateur enthusiast.

22. Practical Stereophony by H. Burrell Hadden (1964). 159 pages. **37s. 6d.**
The author, an instructor at the BBC, has been actively engaged for many years in research in this field, as a result the book is mainly directed towards those who make this art their profession, but there is much for the amateur enthusiast.

35. Tape Recording Yearbook 1965. 7s. 6d.
The 1965 edition contains all the well-known facts and figures of earlier editions, revised to date, as well as important contents vital to all interested in this field. Compiled by the staff of "TAPE Recording Magazine" this Yearbook is a must.

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News from the Clubs

BARROW

A reorganisation of their club nights for members of the Furness Soundtrack Club in Barrow. Meetings are now being held every Monday at The Nook, Infield Park. Alternate meetings are designated "Project Night," the latest involving members in the production of their entry in the British Amateur Tape Recording Contest.

Among recent activities have been the production of sound effects for a local presentation of "Macbeth" and a similar venture for the open-air mystery plays at Furness Abbey. Over 200 actors portrayed the story of "God, Mankind and the Devil" which involved the tape enthusiasts in sound-effect production, provision of a P.A. system, and supplying interval music during the two weeks presentation.

Secretary: Mrs. Jane Rayner, 123, Abbey Road, Barrow-in-Furness, Lancashire.

BIRMINGHAM

A thirty-minute humorous production by three young enthusiasts was enjoyed by members of the Birmingham tape and audio club at one of their latest meetings. Presented by vice-chairman Laurie Watson, the tape "The guns of the Isle of Man" was produced by David Ball (17) John Hayes (18) who wrote the script and played all the characters, and Paul Simms (21) who edited and introduced music and effects. Later that evening Alan Bird demonstrated his Beocord 200 tape recorder coupled to a Garrard transcription deck.

Transport difficulties led to the absence of any recorders at their June 27 meeting which eventually turned into a discussion session. Chairman Terry Morris drew names from a hat and members were called upon to air their views of listed subjects. At an earlier June meeting members heard some stereo music tapes sent by a member of the Kettering tape club, and a programme of humorous tapes presented by Alan Crook.

Other tapes heard recently included "Playback" a programme of bell-ringing, brass band music, and hints on using battery portables from the Middleton Society, and a programme of live recordings of "Die Fledermaus" recorded in stereo by Trevor Gilbert.

At one of their last May meetings members heard and recorded several of Edison's Phonograph records when Mr. Alfred W. Croton visited the club with an original Edison Cylinder Phonograph and a large collection of Amberol cylindrical records.

Secretary: Alan Bird, 15, Watt Road, Erdington, Birmingham 23, Warwickshire.

BRIGHTON

Following its successful reception at the Brighton club's recent "Open Night," a programme of tape, films and slides is being presented to other clubs in the area. First on the list was the Southwick amateur film group followed by the Brighton and Hove Motor Club.

As a result of the open night, the club has welcomed two lady members, the first to join for some four years.

Members are currently putting the finishing touches to their two entries in the BATRC and are preparing to record a local school production of "The Creation." Other activities include preparation of sound effects for the Brighton Youth Theatre productions and recording an item for the Dartford tape society's magazine *Sound Link*. June 8 saw members battling with scissors and splicers for a practical session on editing. This was to be followed on June 28 with a visit by the Albany Production Film Unit who were to present a cine programme.

The club has recently purchased an audio oscillator which will be available on loan to members. Steps are now being taken to buy another microphone for club use.

Secretary: Keith Upton, 47, Kingsley Road, Brighton 5, Sussex.

COTSWOLD

A change of secretary for the Cotswold Society following the club's AGM on May 9. Eric Jones replaces Peter Turner who has held the post for some years. During the meeting the society was reported to be in good financial condition and with a slightly increased membership. "Cotswold Roundabout" now reaches a monthly audience of some 2,000 listeners and is regularly received by nearly fifty organisations for the blind and infirm.

One of the largest attendances for years included a number of guests for a recent demonstration of the Heathkit equipment. Chief Engineer Mr. Alex Powell and Project Engineer Mr. Allan Evans of Daystrom Ltd. visited the club to present a comprehensive selection of music using disc-reproducing equipment.

Another unusually large attendance was recorded for their May 23 meeting for a further manufacturer's demonstration, this time presented by Elstone Electronics. Mr. A. W. Dakin travelled from Leeds to make this company's tape club demonstration debut to show their range of Tandberg recorders.

Centre of the demonstration was the recently introduced transistorised Series 12. With a pair of Lowther speakers loaned by University Audio of Cheltenham this and the well-known Series 6 was used to provide a varied programme of pop and classical music. Included in the presentation was a recording of a small jazz combination made by the demonstrator in a Leicester pub.

Secretary: Eric Jones, 44, Barbridge Road, Hesters Way, Cheltenham, Gloucestershire.

DARTFORD

A demonstration of the Truvox range of tape recorders was presented by Mr. Ken Smith of that company for one of the recent meetings of the Dartford tape club. The Series 100—operated at one stage upside down with no detrimental effect—was shown together with the new Series 40, their TSA amplifier and a tuner unit.

These members also have been showing an interest in early recorders, and have made a second visit to Dartford Museum to record some Edison discs for their library archives. One of the recordings made is believed to be the only record of Florence Nightingale's voice.

Two recent visits included a trip to the Grundig West End showrooms for a special demonstration of their products, and an evening at a local cine club to present a demonstration of tape recorders, including a Fi-Cord 202A, Revox 736, Brenell deck in a home-bulit recorder and various microphones and speakers.

Secretary: E. H. Foreman, 117, Westgate Road, Dartford, Kent.

DONCASTER

Four outside recording sessions were almost enjoyed by members of the Doncaster tape club during June.

The first venture to the Wilsik Hall traction engine rally was nearly ruined by weather conditions. Windshields were very much in evidence. Further near calamity during their bird song recording night when they discovered the best location was near a railway line with a two-minute train service.

Undaunted they then proceeded a week later to the woods to record some of nature's wild life. Ralph Broome found most of it, and spent two days in bed suffering from gnat bites. However, eventually they were successful and repeating their first attempt, attended another traction engine rally where they finally succeeded recording six organs.

Tenacious to the end. Following a recent slide show presented by a fellow member, the club has decided to produce its own slide programme complete with taped commentary. One hopes they have success in this venture, but doubts must be expressed regarding their subject: The Sights of London!

Secretary: C. K. Young, 28, Chelmsford Drive, Doncaster, Yorkshire.

DUBLIN

The formation of a tape club in Dublin is announced. Thirty interested enthusiasts attended the inaugural meeting held on June 24, and a fortnight later a committee was to be formed to establish rules and conditions. A taped message was sent to the club by the Federation of British Tape Recording Clubs.

Secretary: J. P. (Sean) Logue, "Ard-a-Rath," 17, Shanboley Road, Brookville Estate, Santry, Dublin 9, Eire.

FRIERN BARNET

Production of a ten-minute documentary tape recorded on location and without editing was the exercise set for a recent meeting of the Friern Barnet tape club. Some of the results of this seemingly impossible task were described as outstanding and further similar exercises are planned.

Recent activities have included a technical session with members checking their recorder's performance with an array of test equipment. Future activities are to include a visit by Douglas Brown, Editor of *TAPE* in his role of President of the Federation of British Tape Recording Clubs, and a demonstration of their range of microphones by Lustraphone Ltd. During the summer, members will prepare a tape slide show of their proposed visit to Cosgrove Lodge Park, a well-appointed inland watering place.

Secretary: Rod Longhurst, 72, Grasvenor Avenue, Barnet, Hertfordshire.

REDBRIDGE

Another group recently involved with a local exhibition is the Redbridge tape society.

When the Redbridge Arts Council held an Arts and Crafts show at a local multiple stores, the tape club members were invited to erect a stand. They displayed a number of recorders, including the Beocord 2000 stereo machine which was demonstrated to the Mayor during his opening day visit.

Secretary: Dave Bolton, 36, Little Ilford Lane, Manor Park, London, E.12.

TAPE EXCHANGES

TAPE recorder owners who wish to contact others with similar interests, to exchange news and views by tape are invited to fill in and return the form on page 296 giving their name, age, address, and special hobby or interest for this free service.

Details given here also include speeds available, spool size, name of recorder, and special area to be contacted.

Lewis, David (17). 67, Woodville Road, Thornton Heath, Surrey. Electronics, hi-fi, chess. 7½, 3¾, 1⅞ ips. 7-inch spool. Truvox PD102, stereo. **UK, Australia, USA, Canada.**

Millward, Clifford K. (13). 181, Ebenezer Street, West Bromwich, Staffordshire. Electronics, folk and light music. 7½, 3¾, 1⅞ ips. 7-inch spool. Fidelity Major. **USA, Wales, Canada.**

Minnis, Barrie (16). 89, Tan-y-Bryn, Risca, Monmouthshire. Stereo, cycling, pop music. 7½, 3¾, 1⅞, 15/16 ips. 7-inch spool. Philips EL3534, four-track stereo and EL3300 cassette battery portable. **UK** only.

Nuttall, John (13). 10, Industrial Street, Todmorton, Lancashire. Numismatism, pop music. 1⅞ ips. 4-inch spool. Philips EL3585 battery portable. **USA, Australia.**

Owens, David (18). 62, Constable Road, Ipswich, Suffolk. Electronics, athletics, all music. 7½, 3¾, 1⅞ ips. 7-inch spool. Collaro studio deck with home-made amplifier. Female contacts (own age) required **Overseas** only.

Penny, Simon George (16). 14, Ravensfield Gardens, Ewell, Surrey. Electronics, other countries, pop music. 7½, 3¾, 1⅞ ips. 7-inch spool. Martin Recordakit.

Radville, Gary (14). 109, Wick Hall, Hove, Sussex. Pop music. 3¾ ips. 5¾-inch spool. Grundig Tk120E. **USA.**

Rickards, Alan (17). 11, Buxton Road, Grays, Essex. Amateur dramatics, bowling, pop music. 7½, 3¾, 1⅞ ips. 7-inch spool. Elizabethan LZ29. Female contacts required. **UK, Continent.**

Shankster, Keith R. F. (16). 19, Woodland Road, Stoke, Guildford, Surrey. Films, pop music. 3¾, 1⅞ ips. 3-inch spool. Dansette recorder. **Scotland.**

Smyth, Alastair, J. (19). "Strathleven," Toombe Road, Balymena, Co. Antrim, Northern Ireland. Dramatapes, Hospital programmes, round robins, c/w music. 3¾ ips. 3-inch spool. Sobell and Philips four-track.

Sullivan, Barry (17). 182, Keighley Road, Leicester, Leicestershire. Electronics, climbing, pop music. 3¾, 1⅞ ips. 7-inch spool. Stella recorder. Female contacts preferred.

Trussler, Christopher (15). 3, Hamilton Way, Wallington, Surrey. Slide photography, pop music. 3¾ ips. 5¾-inch spool. Civic T52. **England, USA.**

Wells, Malcolm (19). 21, Baldwin Road, King's Lynn, Norfolk. Sound effects, traditional music. 7½, 3¾, 1⅞ ips. 8¼-inch spool. Ferrograph 631. **Europe, Middle East.**

Wilson, Roderick S. (17). Exhall Grange, Wheelwright Lane, Coventry, Warwickshire. Aviation, cycling. 3¾, 1⅞ ips. 5¾-inch spool. HMV four-track, Philips cassette battery portable. Female contacts required. **USA, Japan, UK.**

TEENAGE READERS

Aindow, Steven (17). 61, First Avenue, Acton, London, W.3. 8 mm cine photography, pop music. 3¾ ips. 5¾-inch spool. Cossor recorder. **UK** only.

Lavery, J. P. (17). 3, Beechlands, Malonerd, Belfast 9, Northern Ireland. Skin diving, English literature, jazz and pop music. 3¾, 1⅞ ips. 5¾-inch spool. Ultra 6204, four-track.

(Continued on page 296)

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TAPE EXCHANGES

(Continued from page 295)

Coeshall, Roger (14). 45 Essex Road, North Chingford, London, E.11. Animals, sport, pop music. 1⅞ ips. 4-inch spool. Philips EL 3586, battery portable. Female contacts required. **England.**

Commander, Graham (18), 89, Medlicott Road, Sparkbrook, Birmingham 11, Warwickshire. Sound effects, photography. 7½, 3¾, 1⅞ ips. 7-inch spool. Civic recorder. **UK.**

Dalby, Peter D. (18), 7, Wright Crescent, Bridlington, East Yorkshire. Ships, humour, folk and pop music. 3¾, 1⅞ ips. 7-inch spool. Philips EL3548, four-track. Female contacts preferred. **UK, Australia, USA.**

Ewen, Peter David (14). 1, Knivet Road, Fulham, London, S.W.6. Reading. 1⅞ ips. 4-inch spool. Stella ST471/00. **Australia.**

Fiddes, W. (15). 97, Fort Street, Broughty Ferry, Dundee, Scotland. Music. 3¾ ips. 5¼-inch spool. Marconiphone recorder.

Gisbey, Matt (16). 19, Blackstone Avenue, Pollock, Glasgow, Scotland. Fishing, pop music. 3¾, 1⅞ ips. 7-inch spool. Stella recorder. Female contacts required.

OVERSEAS READERS

Ferguson, Desmond (22). 425, Landen Road, Ballyfermot, Dublin 10, Eire. Cine and still photography, travel, wide sporting interests, music. 3¾, 1⅞ ips. Tandberg Series 8.

Gregg, Ralph R. (55). Box 15494, Los Angeles, California, 90015, USA. Photography, philology, archaeology, Spanish language, classical and folk music. 7½, 3¾, 1⅞ ips. 7-inch spool. Roberts, Bell and Telectro stereo recorders. **UK, Spain, South America, Australia, New Zealand.**

Keogh, Eamon (22). 45, Kylemore Drive, Ballyfermot, Dublin, Eire. Folk and pop music. 3¾, 1⅞ ips. 5¼-inch spool. HMV four-track recorder. Female contacts preferred.

McKechnie, Graeme (37). 35a, Byron Avenue, Ta Kapuna, Auckland, New Zealand. Stereo music. 7½, 3¾, 1⅞ ips. 7-inch spool. Akai M7 and National 773, four-track stereo.

McKenna, Anthony (26). 28, The Crescent, Ballyfermot, Dublin, Eire. 8mm. cine photography, aircraft, travel, films. 7½, 3¾, 1⅞ ips. 7-inch spool. Truvox R44. Female contacts preferred.

O'Kelly, Christopher (24). 36, Cloncliffe Gardens, Drumcondra, Dublin 3, Eire. Cine and still photography, electronics, travel, theatre, music. 7½, 3¾, 1⅞, 15/16 ips. 7-inch spool. Female contacts preferred.

Paterson, Harry (45). 61, Waimea Road, Nelson, New Zealand. Photography, sports, gardening. 7½, 3¾ ips. 8½-inch spool. Ferrograph recorder.

Werremeyer, Gordon (24). Box 63, Holland, Indiana, USA. Travel, all music. 7½, 3¾, 1⅞, 15/16 ips. 7-inch spool. Uher 4000S, Ampex F-44 and Sony four-track.

Williamson, Geoffrey (32). 36, Morton Street, Crow's Nest, Sydney, New South Wales, Australia. Films, reading, light classical and pop music. 7½, 3¾, 1⅞ ips. 7-inch spool. Philips EL3516G. Female contacts only.

FAMILY EXCHANGES

Atkins, Ron & Freda (44/29). 16, Highfield, Meriden, Warwickshire. Stereo, hi-fi, cine photography, all music. 7½, 3¾, 1⅞ ips. 7-inch spool. Tandberg four-track stereo and EMI recorder. Letters not required.

Glass, Mr. & Mrs. D. H. (32). 3, Pear Tree Road, Huyton, With-Roby, Liverpool, Lancashire. Sound effects, humour tapes, motoring, c/w music. 15, 7½, 3¾, 1⅞ ips. 7-inch spool. Brenell Mk 5 Series 3, HMV DSR1.

Jackson, Mr. & Mrs. Michael (48). 32, Northwood Lane, Clayton, Newcastle-under-Lyme, Staffordshire. Photography, French language, church and youth work, light opera and folk music. 7½, 3¾ ips. 7-inch spool. Elizabethan LZ32. **French family with children (15-25 years).**

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Recorder owned .....

Areas to be contacted .....

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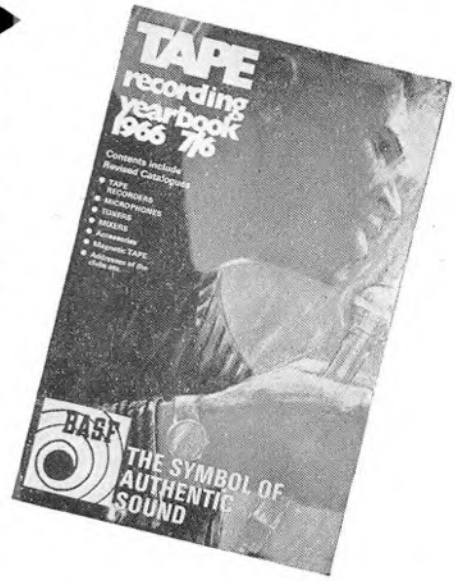

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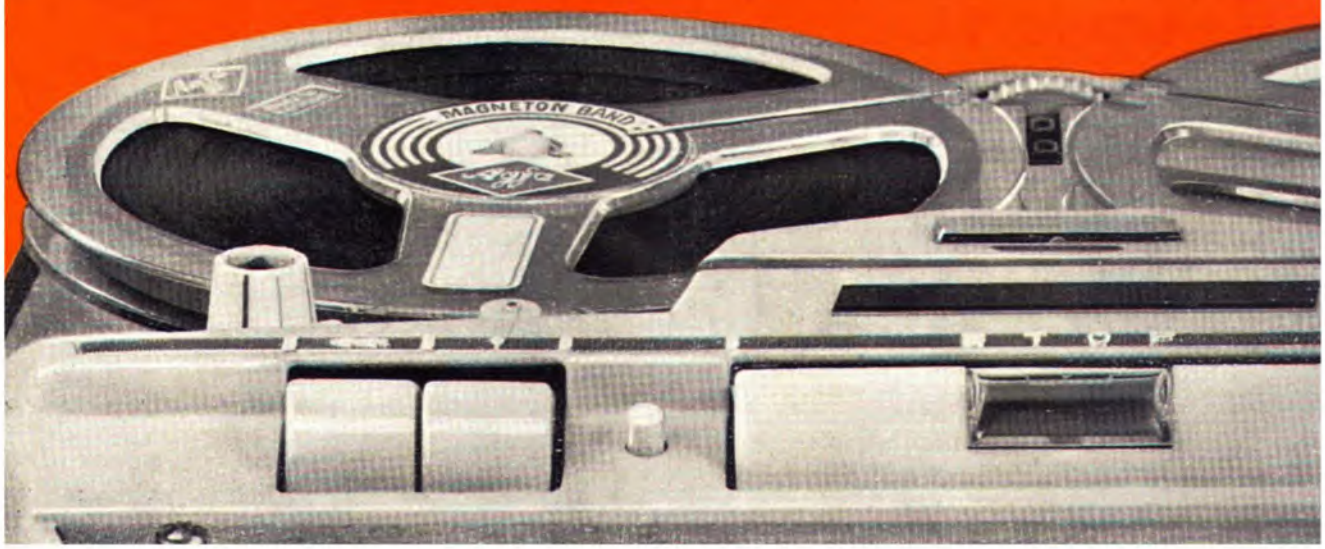

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