

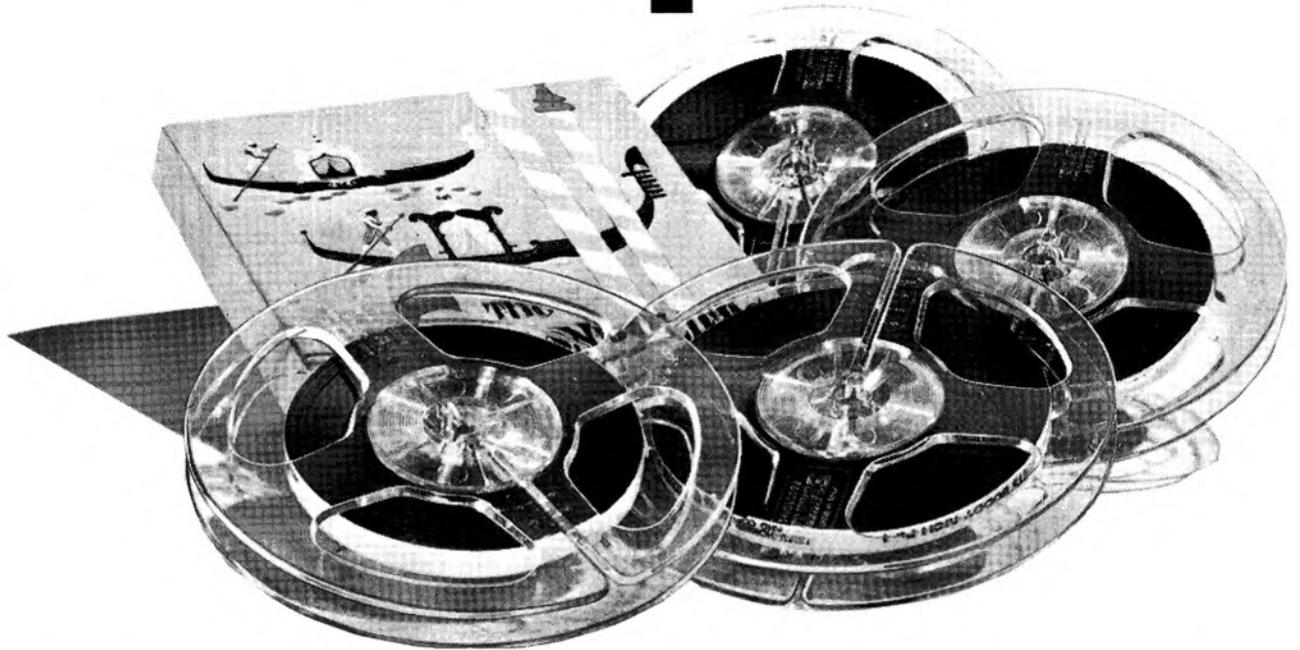
FEBRUARY 1965 TWO SHILLINGS

tape recorder



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<p>63 Cuban Carnival, Yesterdays, Blues in My Heart, and eight more great numbers played by George Shearing with vocals by Dakota Staton.</p>	<p>74 Superb Sarah Vaughan in ten great numbers. If I Loved You, Saturday—It's Delovely, You'll find me There, etc. Every one a hit.</p>	<p>108 Storms Weather, Sweet Charan, Somebody Loves Me, Hold Me, I Can't Give You Anything But Love, 7 more top numbers all with Fabulous Peggy Lee.</p>	<p>106 Mel Tormé's velvet voice in 12 top numbers. Body and Soul, Round Midnight, Blues in the Night, That Old Feeling, Where Can I Go Without You, etc.</p>	<p>14 Tchaikovsky Symphony No. 5. Sir Malcolm Sargent and LSO combine to give this famous symphony a dramatic and colourful rendering. Also in stereo.</p>	<p>44 Leopold Ludwig and LSO combine brilliantly in an exciting 'double'—two of the world's greatest symphonies receive vivid interpretations. Also in stereo.</p>	<p>53 These two suites, containing some of Bizet's most thrilling music are given magnificent performances by the Sinfonia of London under Muir Matheson. Also in stereo.</p>	<p>54 Tchaikovsky's last and greatest symphony, is here given a splendidly moving rendering by the Sinfonia of London conducted by Muir Matheson. Also in stereo.</p>
<p>77 In the Mood, Bugle-Call Rag, Chattanooga Choo-Choo, Serenade in Blue. 9 original tracks by the immortal Glenn Miller and his band.</p>	<p>48 Deep in My Heart, Drinking Song, Serenade—all the old favourites fresher than ever with Marion Grimaldi, Linden Singers and Orchestra. Also in stereo.</p>	<p>30 Ian Carmichael, Joyce Blair, star cast and orchestra. As Long As He Needs Me, Consider Yourself, all the hit numbers from Lionel Bart's great show. Also in stereo.</p>	<p>71 The smooth sound of the Nelson Riddle Orchestra in Touch of Your Lips, Body and Soul, The Tender Touch, As You Desire Me—11 favourites in all.</p>	<p>117 Strauss' most popular waltzes Blue Danube, Emperor, Vienna Woods, Voices of Spring, Roses from South, Vienna Symphony under Rudel. Also in stereo.</p>	<p>111 Ravel's Bolero, Dukas Sorcerer's Apprentice, Chabrier Espana, Falla Ritual Fire Dance and Dance of Terror. Scherchen conducts Vienna S.O. Also in stereo.</p>	<p>112 Faust Ballet Music: Dance of the Hours; Aida March; Ballet Music: Coo d'Or, Hymn to the Sun, Vienna Symph. conducted by Aliberti. Also in stereo.</p>	<p>103 'Take a Pair of Sparkling Eyes' and all the great songs from Gilbert and Sullivan's Gondoliers. Star cast, Westminster S.O. Faris/Linden Singers. Also in stereo.</p>

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128. The Telstars, The Young Ones and other top groups capture the newest of the new sounds and pay tribute to the lads who made these titles great: A Hard Day's Night, Needles and Pins, She Loves You, Have I the Right, The House of the Rising Sun, All Over Now, Bits and Pieces, Don't Throw your Love Away, Glad All Over, The Rise and Fall of Flingel Bunt, I'll Cry Instead and I Want to Hold Your Hand.

126, 12 of the top hit songs of 1964, recreated for you on this great new release honouring the singers who made them famous. Hello Dolly, You're My World, You Were

Made For Me, Secret Love, I Believe, Anyone Who Had A Heart, Do-Wah-Diddy-Diddy, My Boy Lollipop, World Without Love, As Usual, Can't Buy Me Love, My Guy.

130. The complete party background: shake and jump to side 1 and (later) smooth to side 2... Ray Ellington sings If I Had A Hammer, Let There Be Love, Fly Me To The Moon and nine more.

129. Name your 12 top hits from musicals in the last 10 years. Here they are, newly sung and arranged with today's wide sound and big beat. If I Ruled The World, Getting To Know You, Some Enchanted Evening, Tonight, 8 other hits.

102. A swinging new release for every mood! Dance with Steve Race and his Orchestra to new arrangements of Z Cars, Coronation Street, Dr. Kildare, Perry Mason and 8 more.

131. If you like blues then this is a must. The great Ray Charles sings See See Rider, Kiss Me Baby, Blues is My Name and 8 more. Available in Mono only.

127. The Seekers, new pace-setting group from Australia, already regulars on TV—and a great hit at the Palladium. The Ox Driving Song, The Eriskay Love Lilt, Chilly Winds and 9 more.

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016

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editorial

AFTER several months of near stagnation our correspondence columns are at last showing signs of regaining their former size and content. Two pages of letters acclaiming or denouncing recent remarks in the Editorial and airing pet annoyances and delights surprised us, and we are pleased that so many readers are reaching for their pens during these long winter evenings. But our surprise was no greater than the pleasure with which we welcomed the many letters commenting on the 'Ideal' recorder which have arrived over the past few weeks. It is blatantly obvious from these that the definition of the Perfect Recorder varies widely with enthusiasm, technical knowledge and financial outlay. If there is one machine that will suit every purchaser's needs then surely it is the 'add-when-you-can' device.

The tape spool appears to be in no danger of losing the support of the keen recordist, but whatever we, readers, or Kenneth Glenwood may say, the latest cartridge recorder is selling very well indeed—so well, in fact, that we wonder whether the future of tape recording lies not with the spool, but in a flimsy plastic container of narrow multi-play tape. Possibly the next stage in tape history will be the *Brand X* recorder offering a choice of $\frac{1}{2}$ or $\frac{1}{4}$ -track, mono or stereo, red or green cabinet, available with spool or cartridge deck.

Which?, the monthly journal published by the Consumers' Association, has once again entered the recording field, this time to produce a survey of magnetic tape. While we entirely support the principle of the Association, we feel that tape and tape recorders deserved rather more meticulous comparisons than they have been given. Even the most well-equipped technical journal would hesitate before producing a survey to determine which brand of tape or recorder came nearest to the common 'ideal'.

Basis of the *Which?* survey of recording tape was a series of listening tests, brand versus brand, conducted on three recorders in the domestic, high-priced domestic and semi-professional price categories. The use of three machines was meant to allow for the difference in bias level from model to model, with correspondingly different reactions to each tape. The impression that *C.A.* were probing vaguely in a fog of technicality was strengthened by the table of results produced from the listening tests. This table did not indicate comparative performance of each brand on each of the three recorders but simply listed what were presumably the overall results from the three tests. Many tapes were listed as being of average quality; none was strongly criticised. We are informed, incidentally, that a single make, submitted under two different trade names, obtained two slightly differing comments. This may, as our informant said, be due to variations in quality from sample to sample of that brand. Or it may have been due to the subtlety of tape comparison. Another brand, given up by one importer as hopelessly inferior, received a high rating even though it is known in the trade to be extremely variable. Perhaps *C.A.* were lucky in their sample.

Readers have often queried our own failure to produce a comparative

survey of tapes, as distinct from a normal review. The answer to this is simply that our expert on tape topics is closely associated with a leading tape manufacturer—a possible source of ill-feeling, should he attempt such a survey. One thing that readers looking for a reliable tape can do, however, is purchase, or exchange with acquaintances, small quantities of different tape brands. Spliced together, the sequence of brands from beginning to end of the spliced length having been noted, music and speech quality, background hiss level and dropout can be compared easily. The result?—One or two brands will probably show up as superior to the others.

A few manufacturers recommend a tape (often of their own make) as being particularly suited to their products. There is little reason to suppose, in many cases, that this 'recommendation' is based on anything more than a favourable financial arrangement between manufacturer of recorder and producer of tape.

On the occasion of our sixth birthday we would remind readers that, as from last month, the annual index is being published in the twelfth issue of each volume, rather than produced as an 'optional extra'. This is advantageous both to readers and ourselves, since the index is less likely to be damaged or lost. Frustrating delays awaiting the publication of a separate index are overcome, not forgetting a higher printing cost—which has in the past been handed on to readers in the form of a 2s. charge. And it helps us to off-load some of our back-numbers!

Readers may have noticed that our publication date has steadily moved forward over the last few months until it is now fixed at the 14th of the month prior to the nominal date. As a result of this move, casual buyers in some areas may have missed one or more issues. Whilst trying not to seem over-mercenary, we would remind readers that a firm order placed with a local newsagent (or taking out a year's subscription) is the only way of being certain that March's issue does not get lost between the February and April numbers.

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COVER PICTURE

Oh, what a waste of tape! Untold crimes are committed daily in the Reditune Cartridge Repair Department. Just what was wrong with this particular batch of tape we never discovered, but the operators were most amused when we enquired whether the tape would be disentangled for future use. Other aspects of our visit to the Reditune factory are described on page 22.

SUBSCRIPTION RATES

Annual subscription rates to *Tape Recorder* and its associated magazine *Hi-Fi News* are each 30s. in the U.K. and 32s. 6d. overseas (U.S.A. \$4.50) from Link House Publications Ltd., Dingwall Avenue, Croydon, Surrey.

world of tape

GRUNDIG PRICE CHANGES

POSSIBLY heralding a flood of price changes that are likely to appear in this column during the next few months, Grundig have announced alterations to some of their products due to the recent innovation of a 15% import surcharge. The new prices are as follows, with the old given in brackets: TK.6 Mains/battery—£76 13s. (£68 5s.); TK.40—£91 7s. (£82 19s.); TK.41—£87 3s. (£78 15s.); TK.46—£112 7s. (£103 19s.).

Similar price increases are announced for some of the company's radios and other audio equipment. The three tape recorders TK.14, TK.18 and TK.23A remain at their present price.

NORTHERN DISTRIBUTORS FOR B. & O. AND SONY

DISTRIBUTORS for Scotland and Northern Ireland have been appointed by St. Aldate Warehouse to handle *Bang and Olufson* and *Sony* products. Their addresses are as follows: *Bryterlite Electrical Co. (Glasgow) Ltd.*, 39/43 Robertson Street, Glasgow, C.2. And for Ireland: *Solom and Peres*, 67/69 Ann Street, Belfast, 1.

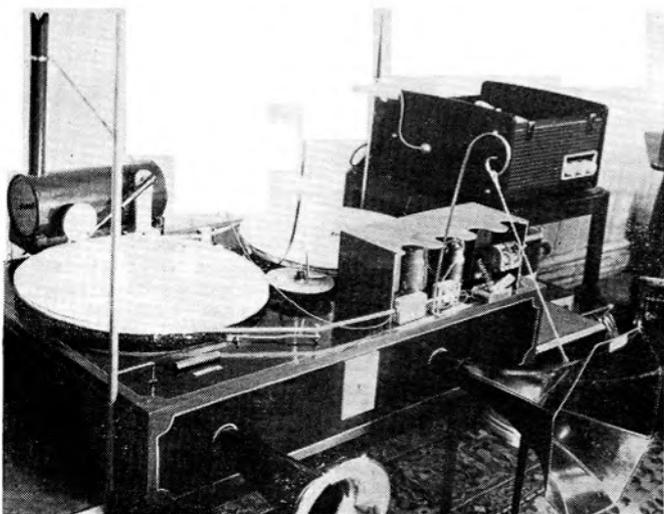
TRANSISTOR TAPE AMPLIFIER—POSTSCRIPT

SEVERAL letters have been received since publication of the *Welldon Transistor Tape Amplifier* constructional articles in the August, September and October issues of *Tape Recorder*, querying the values of certain components. Mr. Welldon has supplied the following note:—

The value of C28, omitted from the circuit diagram, is 0.01μF. Its function is to provide a high-frequency roll-off so as to reduce the amount of HF bias current circulating in the front end, due to capacitive coupling in the changeover switch and to the relatively high cut-off frequency of GET 880. If a low noise *audio* transistor such as the GET 106 is used in the first stage, then C28 may be omitted, since the lower cut-off frequency of the transistor will provide sufficient roll-off. If a GET 106 is used, then the biasing resistors R4 and R5 should each be changed to 220 ohms.

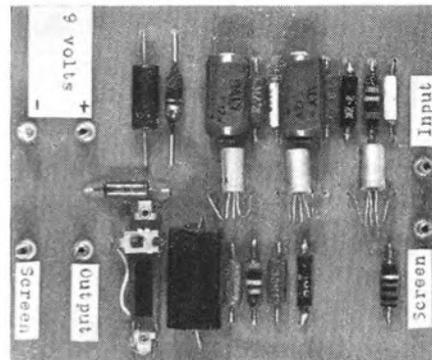
WORLD'S FIRST TAPE RECORDER

WE were amused to read in the house magazine *Grundig Gazette* of Mr. J. Boxall's 'restored' tape recorder. A member of the *Avis Cooke* of Ipswich Sales Staff, Mr Boxall says his home-renovated tape machine originally used tape made from linen washed in a solution of iron-oxide and benzine, heated to a very high temperature. The erase head was, logically, made from rubber and a spirit level ensured that recordings were never made with the machine in a lop-sided position. A degree of portability was obtained by terminating the earth lead in a small box of Ipswich soil. Woofer and tweeter horn

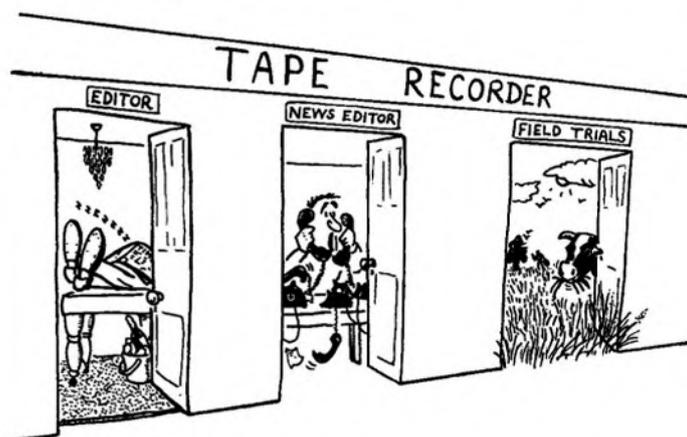


speakers (with independent suspension), mounted on the front panel, achieved a wide frequency range aided by flashing lights and a rotating aerial located above the deck. We understand that jams were caused when the recorder was placed in the window of Messrs. Avis Cooke's street premises—though are unable to determine whether these occurred amongst onlookers and passing traffic or in the highly complex steam-driven mechanism. The Grundig Technical Department disclaim any association with invention, which is vaguely reminiscent of Graham Balmain's *Nineteenth Century Nightmare*, outlined in our December 1962 issue.

UNIVERSAL TAPE PLAYBACK PRE-AMPLIFIER



PRINTED circuit boards and full details for the construction of a tape playback pre-amplifier are now available from Reginald Williamson, following his article published in a recent *American electronics magazine*. The unit utilises three RCA 2N412 transistors and can be used with any playback head of between 5mH and 5H inductance. Total construction cost should not exceed £1 10s., including printed circuit board costing 8s. Further information is available from: *Reginald Williamson, 'Bay Cottage', 18 Unthank Road, Norwich, NOR 28 E.*



RADIO SHOW TO BE INTERNATIONAL

IN an attempt to inject new life into the Radio Show, the Industrial and Trade Fairs Group, jointly owned by the *Financial Times*, *National Trade Press* and *Beck and Pollitzer*, are to take over management from the British Radio Equipment Manufacturers' Association. It is announced that the 1965 show will be open to importers of foreign equipment—which should considerably enliven it from the tape recording point of view (see Editorial of October 1964).

DEATH OF LESLIE GUEST

REGRETFULLY, we announce the death of Mr. Leslie Guest who has given lectures on behalf of Gevaert Ltd. over the last eight years. Mr. Guest was well known in photographic and audio worlds for his demonstrations of tape-slide programmes to amateur photographers and recordists. During the last two years he suffered poor health and had it not been for the assistance of his wife, who took over much of the work, the Lecture Service would have been forced to cease some time ago. Mr. Guest died in a Torquay hospital on 10th November after being taken ill in Paignton towards the end of October.

RADIOPHONICS AT THE B.K.S.

NORMAN Brooker, head of the BBC Radiophonics Workshop, was lecturer at a meeting of the British Kinematograph Society on November 19th. With the aid of a *Leavers-Rich* professional tape recorder, Mr. Brooker described techniques and equipment used in the production of radiophony—a term covering composition and intermixture of electronically produced sounds and *musique concrete*.

Despite the incorporation of complex multi-channel recorders, mixers and elaborate reverberation equipment, much of the equipment in the Workshop is 'borrowed' from neighbouring studios or rescued from the scrap heap. Pianos, parts of pianos, modified wind instruments and a large accumulation of wine bottles and domestic kitchen utensils are just a few of the devices used in generating or 'composing' unearthly or unusual sounds. The enthusiastic amateur experimenting in this field might be relieved to learn that initial construction of radiophony rests on little more than the creators' (more than one person may assist in compiling a single piece of music) ability to juggle with everyday sounds.

Having obtained a number of recorded sequences, they are generally superimposed on each other by means of a mixer and variable speed multi-track recorder. The latter uses a DC motor controlled and stabilised by negative feedback and is altered in speed to achieve synchronisation between an incoming sequence (often in loop form) and the sequence or sequences already taped.

It is thus possible to build an elaborate piece of music by intermixing the recordings on each track.

Mr. Brooker stated that the Workshop was rarely called upon to provide complete themes, although this has been done and, in some cases, the results made available as commercially recorded discs—*Dr. Who*, *Giants of Steam*, and *Time Beat* for example. Generally, however, only short sequences, without introduction or close, were required by programme producers, to accompany parts of radio, or more often television, broadcasts.



In a recent case, radiophony had actually been *seen* on television—in the introduction to the science-fiction series *Dr. Who*. Moving cloud effects were obtained by focusing a television camera on its own output to a television screen, the resulting picture being modulated by another camera monitoring the theme music on an oscilloscope screen.

Since Mr. Brooker's lecture the BKS has changed its name to: *British Kinematograph, Sound and Television Society* (BKSTS). There are various categories of membership, details of which may be obtained from The: Secretary, BKSTS, 164 Shaftesbury Avenue, London, W.C.2.

TAPE AIDS ELECTRIFICATION

ELECTRIFICATION of railway services between London, Manchester and Liverpool is at present being carried out with the aid of a *Fi-Cord* 101 battery tape recorder. One of ten such machines now used by the Midland Region of British Railways, the 101 takes the place of the inspection engineer's clerk, noting his comments and report on each stage of installation. No longer does the clerk suffer the incon-



venience of a damp note-book when transcribing notes in a tunnel dripping with rainwater; neither are British Railways required to pay double-time for two employees—the work is usually carried out during weekends when rail traffic is at its lowest.

PHILIPS PROFESSIONAL RECORDERS

PETO Scott are now distributing a new range of high quality *Philips* tape recorders. Four basic versions, the *Pro 20*, *Pro 25*, *Pro 50* and *Pro 75*, can be ordered to various specifications. All models incorporate speeds of 15 and $7\frac{1}{2}$ i/s, three motors and automatic tape tension. Other features include: variable bias to suit different brands of tape, provision for remote control, a minutes and seconds indicator, plug-in head assembly, and a choice of tracks. *Pro 70* models are designed for three and four-track operation on 1in. or $\frac{1}{2}$ in. tape. Frequency response for all units is 60 c/s—10Kc/s at 15 and 60 c/s—8Kc/s at $7\frac{1}{2}$ i/s, both ± 0 —2dB. By using special adaptors, European (CCIR) and American (NARTB) hubs and cine reels may be employed. Distributor: *Peto Scott Electrical Instruments Ltd.*, Addlestone Road, Weybridge, Surrey.

CONSTANT RECORDING CURRENT

A SMALL typographical error occurred in Graham Balmain's book review on page 500 last month. If the source resistance in a tape-head feed circuit is made twice the head impedance at the highest frequency, the head current will fall by only 1dB at that frequency, not 2dB as printed.

CHANGE OF ADDRESS . . . PAMPHONIC

PAMPHONIC Reproducers, manufacturers of the *Reflectograph* range of tape recorders and players, have now moved to: **Heath Works, Baldock Road, Royston, Herts.** Telephone: **Royston 2412/3.**

. . . JASON

JASON Electronic Designs Ltd. and their associate companies *Radio Traders Ltd.* and *Lorlin Electronic Co. Ltd.*, manufacturers of home construction kits and the *Lorlin* tape deck, have announced a move from their *Wardour Street* premises. The new showroom is at **Tudor Place, London, W.1.** Telephone: **Museum 4666/8.**

. . . RECOTAPE

ESOTERIC Productions Ltd., distributors of *Recotape* tape records have moved to new offices at **10 Wells Avenue, Southend-on-Sea, Essex.** Telephone: **544917.**

NEXT MONTH

THE March issue of *Tape Recorder* will be on the bookstalls on February 14th and will contain reviews of the *Grampian Echo Unit* and the *Philips EL3548*. Simple methods for improving the performance of tape recorders will be given by **J. B. Dance** and **Frederick Rubin** will outline the theory and practical applications of sleep learning. The *Grundig TK6* will be the subject of a *Field Trial*.



EVER READY HIGH POWER MEANS 4 TIMES MORE RECORDING PER BATTERY

This is the Ever Ready HP2 battery, one of the revolutionary new range of High Power batteries. At current drains of 300 mA in tape-recorders the HP2 has a working life over 4 times as long as that of the standard U2. HP batteries are extending the life and so the use of many types of battery-powered equipment from toys to photo-flash in the same way. Get full details from The Ever Ready Co (GB) Ltd., Hercules Place, Holloway, London N7. Telephone: ARChway 3030



for longer life!

THERE'S nowt so queer as folks; or, as Alexander Pope put it with greater elegance but less punch: the proper study of mankind is man. The world around us is full of interesting people, but how rarely we take any notice of them! And yet, with a tape recorder, the scope is unending. And just as a keen photographer will never stir abroad without a camera, so the true recordist always has his battery portable.

Battery portable: that is the instrument of choice. A good half of the fun and creative activity in recording cannot be attained without one. Fortunately, good machines are to be had now which are relatively inexpensive. Even so, beware of buying rubbish. A good deal of editing will be called for when your material is knocked into shape, so make sure that your machine will give results which can be dubbed up to 7½ i/s without revealing paralysing background noise, shrieking treble, tape rumble and motor crackle. There are machines to be had which will give results indistinguishable from 7½ i/s originals on a mains machine.

But let us talk about the matter, not the manner. For years my wife and I, and some of our friends, have been collecting people. The special interest of June and myself is to gather what we can of the life of the countryside of old, before all traces pass away. We are late in the field, and there is much that we missed in the past and regret today; but fortunately there are still riches to be had. The odd thing is that one so often misses them.

Ross, to do her shopping. She described her cottage, which had no electricity because she preferred to blow out her candle and be sure that it was safe; she spoke of her contempt for radio and television, because she made her own "musics" on her melodion and looked upon music as God's gift. The tape that emerged from that chance encounter is amongst the great beauties of any collection; and it happened as a result of a kindly gesture on a country road.

Much depends upon what you want to collect: our interests may not be yours. But if you want eccentrics and oddities, you have only to go out and find them. There was the world's champion crisp-eater (true, I assure you); the man who picked 350 pounds of Brussels sprouts in an hour and a half, and won a prize for doing it; the country innkeeper, a former policeman, who was building the first private house to be put up in his village for over a hundred years; there was the village postwoman who had walked over seventy thousand miles in twenty-five years; there was the man who started sweeping his chimney while his wife was frying sprats on the fire, and doused her and her sprats with soot; there was the old lady of 104, celebrating her birthday surrounded by four generations of her descendants. And then, of course, there are the village concerts... the man who sang a complete verse in a key totally different from the one being played by his accompanist; the cornet-player who blew silent notes about once out of every three; the teller of tales about the notorious Jolter from the

ON COLLECTING PEOPLE

BY PETER TURNER



The first obstacle to be overcome is one's own diffidence. To begin with, it isn't easy to produce a microphone and start asking questions. But in general people don't mind, provided one is not aggressive. If one lets them see that one has a genuine respect for them, and that one really does want to know what they have to tell, they open up quite readily—though it is true to say that interviewing is an art, and that to get the best out of a subject calls for experience, patience, and skill. These qualities are to some extent present or not in any individual; but they can also be developed.

When my wife's brother was a young man during the last war, he worked on a Cotswold farm with an old shepherd. My wife and I had never met this man, but we knew where he lived, and went to see him. After we told him who we were, he was delighted to meet us, and spoke lovingly of "Master John", who, he told us, had been up to his bed to shave him when he was lying ill, and had often spent nights in the lambing-pen, helping him with his work. He showed no sign of embarrassment when we produced the recorder, and talked away to us about his youth and his lifetime with sheep just as though the machine was not there. From that hour's talk we later edited a feature in which the old man's love for his horses and his sheep came out clearly, as he spoke of the teams setting out for the fields "like a regiment of soldiers", and how he could always tell when any strange sheep got in amongst his own. He told us how the way the sheep acted in the dawn hours enabled him to predict the weather, and how he had a special love for the old, long-staple Cotswold sheep—now, alas, reduced to one surviving flock. Before we left, we were admiring an old Staffordshire tea-pot which he had on a shelf. He insisted on giving it to us "for a memory of Master John", to whom he also recorded a message. That tea-pot stands between two Staffordshire dogs on top of a cupboard; and I can glance up at it as I write.

WAITING FOR THE MICROPHONE

There are so many people waiting for the microphone, if one will only take it to them. One day a friend of ours was driving in Herefordshire, and saw an old lady making for a railway station, soon to be closed under the Beeching axe, which heaven forgive. He stopped the car and offered her a lift, which she gladly accepted. They began to talk, and he realised that he had found a woman of quite exceptional interest. He asked her permission to record her, which was given with the modest readiness of the true countrywoman. She was on her way to

Forest of Dean. Oh yes, it still goes on; but it may not last very much longer, so get recording while there is time.

If your bent lies in that way, you can collect material about one subject. Years ago, we started to do this on the once-famous canal linking the Thames and Severn rivers. We found the man who brought the last barge up, in the nineteen-twenties, and who sang fascinating songs which they used to sing on the long-boats. We found out the last people who tried to get through the great tunnel at Sapperton, as well as those who had sailed through it many times in the old days; those who had repaired it; those who had taken the towing-donkeys over the top of it. We got fascinating descriptions of what the barges were like inside; of the meals that were cooked in them; of the days spent locked in ice, when frantic appeals for money were sent to the boat-owners. We learned of the high-jinks that took place in the canal-side pubs; and we got dark hints of bodies found floating in the water.

PARAFFIN BUT NOT ELECTRICITY

Do you know people who pull out their own teeth? Who hold that God gave man paraffin but not electricity? Have you talked to stone-masons and blacksmiths about their ancient crafts? Do you know where there lives a woman church verger who still collects all her own firewood? Or a woman chimney-sweep who had a brush stuck up a chimney for seven years? Of a man who used to eat four pounds of candles for a bet? Have you met a man carrying adders alive in his pocket? Or heard a dog sing and play the piano? Haven't you? Well, I have; and they all exist as I have described them to you—except for one or two who have died since, but whose voices are safe in our archives.

Truly, it is a fascinating world, full of fascinating people. It happens that we are entranced by a past that often seems much more interesting than the present, more filled with character and individuality. Yet if you don't share our interests, the modern world is full of its own charm and lure: social history is being made by the beat-groups as surely as it was by the craftsmen of old. Go out and get it! All you need is the will and the gear. Now, the gear is the thing that former generations did not possess, and even lovers of the past like my wife and me have to admit that were it not for electronics and magnetic tape, our hobby would be impossible. As one dear old soul said to us one day: I do like they things!

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OUR READERS WRITE . . .

. . . about leader tape

From: G. A. Brewster, 5 Dagger Lane, West Bromwich, Staffs.

DEAR SIR, In your Editorial of the November issue, you indulged in "an optimistic peep into the future" regarding cheap disposable tapes, adding that it is not the tape but the oxide composition that causes the price to be as it is.

In view of this, will someone please explain why coloured leader tape with no oxide is exactly twice the price of the same firms' brand of acetate base recording tape.

Yours faithfully,

Editor's Note: Mr. Brewster's interesting query prompted us to delve a little more deeply into tape production costs and we are grateful to those who assisted in unearthing the following information:

The raw material costs for magnetic tape and leader tape are similar, since the loading in either case is basically an ordinary pigment oxide as used in decorative paints. Processing the raw red or yellow oxide to make it magnetic costs very little. The higher cost of leader is due to the comparatively small quantities sold. Readers may be interested in the following breakdown of costs in mixed Polyester and PVC tape production:

Coating materials, including oxide	..	2%
Plastic base material	.. .. .	16.5%
Processing	.. .. .	5.5%
Spools and boxes	.. .. .	8%
Packing and transport	.. .. .	5%
Overheads	.. .. .	3%
Plant depreciation	.. .. .	2%
Research and development	.. .. .	8%
Manufacturer's profit	.. .. .	5%
Retail and Wholesale discounts	.. .. .	45%

Retail price: 100%

The plastic base material is the biggest single manufacturer's cost and on the face of it one might save on this to produce the disposable tape suggested in the December Editorial. But even if one goes mad and manages to halve this cost, it only reduces the retail price by about 9% and that is not cheap enough for a tape which falls to pieces after half-a-dozen playings. Whatever one uses for the base, it still has to be uniform in thickness to the degree required of tape bases and have a tough smooth surface which remains so during coating, or the tape is useless at any price. The final base cost is not likely to be less than that of cellulose acetate if these requirements are incorporated.

Disposable tape is not really a working proposition yet, and will not be until other costs are substantially reduced. With much ingenuity and development and a *huge* demand (which will not occur in this country until tape recorders become as common and as indispensable as radio receivers), it might be possible to reduce the price to 5s. per 1,000ft.—still five times greater than the cost suggested.

In view of all this we must unreservedly apologise to Mr. Brewster and others for making misleading suggestions—we will check the facts before filling our pen next time.

. . . about the competition

From: Ray King, 75 St. Aldate's, Oxford.

DEAR SIR, As a regular reader of *Tape Recorder* and as winner of the recent International Competition to which you refer in your Editorial in the December issue, I take exception to your last paragraph where you refer to the "apparent" success achieved by the Competition, and also to your opinion that the press and radio publicity was inflated hullabaloo.

In any specialised hobby, competition entrants are always few in number. As an amateur photographer of some twenty years standing, may I assure you that those who enter competition work are but a small percentage of those using respectable cameras.

I owe no allegiance to any magazine, manufacturer, or tape organisation. Tape has given me a great deal of pleasure and fun, and the

recent excellent publicity is surely the way of interesting others in the very worthwhile hobby, which will doubtless lead to more entrants.

I have many times heard very worthwhile amateur tapes which, in my opinion, should be broadcast, and this would be the best encouragement for all amateur recordists whatever their standards.

We must not take ourselves too seriously. Open *any* tape magazine and at first flip-through it would seem that one must be a technical genius to understand the articles.

Let's put about what fun creative recording is—for the whole family; let's have ideas for simple subjects to record; let's have amateur recordings available through dealers at a small hire charge, so that those who would like to have a go can hear other amateurs' work for themselves. Let's encourage the lone workers who enjoy the advantage of not having a 'club standard' to live up to. Let's have a hell of a hullabaloo!

Yours faithfully,

. . . about ditto

From: Anthony Dawson, 'Alphin', 4 Balliol Close, Woodley, Cheshire.

DEAR SIR, Thank you for your Editorial in the December edition of *Tape Recorder*. It has given me heart to have a go at a competition. Being the owner of two low-priced tape recorders I thought the standard of entries would be so high that any entry I made would have been laughed at. Your Editorial gives me hope.

However, could it be that "the trifling .007%" signifies that the entrants are all connected with the James Bond section of the Secret Service?

Yours faithfully,

. . . about the December Editorial

From: Robin Barclay, 64 Barrow Road, Streatham, London, S.W.16.

DEAR SIR, Your Editorial in the December issue intrigues me and I am wondering what, if anything, you are trying to prove? If I have understood the thing correctly (and I have read it three times to try and fathom any small reason for such wastage of valuable space) you appear to assume that because recording enthusiasts have not entered tape recording competitions there must automatically be thousands of recorder owners who just leave their machines to collect dust; who are suffering from apathy and lack of creative ability in this field.

Presumption on a grand scale!

As you say, it is "reasonable to hope that 20,000 owners" (out of the two million purchasers) "might become creative users of their machines". But what makes you think that they are not in the course of so doing?

What makes you assume that there are only 0.007% who bother to try and be creative? The fact that only one person out of 500 enthusiasts of an international tape exchange bothered to enter a tape competition?

One can only imagine that this is your yard-stick and one wonders why it has not dawned on you that the other 499 people (and the thousands of others) might be (a) Not a bit interested in tape contests as such and/or (b) Far too busy being creative and active for the benefit of blind, sick and otherwise disabled people, to have time to waste on entering competitions.

It could be claimed that those who *do* enter have nothing better to do with their recording equipment and the fact that people don't enter merely proves that they don't enter. It most certainly does not prove that the country is reeking with apathetic, non-creative recorder owners.

I spend a major proportion of my spare time being creative for the benefit of other people and in my small circle of tapespondents I know of at least six others who do exactly the same thing. Thousands more no doubt do likewise.

And why the implied slur in your query: "But how many tape recorder owners—the self-styled fanatics—in fact allow their talents and their equipment to progress further than the tape correspondent's three-inch reel?"

There are many who churn out dreadful rubbish on badly-produced

(continued on page 13)



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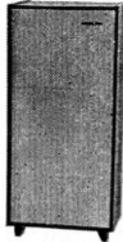


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"little spoils" as I have reason to know, but I also have good reason to know that there are very many who show great and promising creative ability even in the three-incher. The fact that they have not sent samples or written to you to brag about it, does not prove that they do not exist!

Were you to devote more space than you do to showing people *how* to become creative, then it would prove much more helpful than your recent Editorial appears to be.

Yours faithfully.

Editor's Note: Thank you, Mr. Barclay, for taking the bull by the horns and speaking out for the amateur recordist. You have, however, misunderstood the implication of the figure 0.007%. This refers, not to the single entry from the 500 members of the international organisation (which works out at the comparatively high figure of 0.2%), but to the entries received in a "recent national competition". We have since discovered that the number of entries had *fallen* compared with the previous year.

Regarding your final point, since announcing a change of magazine policy in the Editorial of July 1964, we have been trying gradually to increase the proportion of 'creative' material, whilst simultaneously catering for the technically-minded reader.

... about recording for its own sake

From: Wilfred Imison, 12 Prestbury Crescent, Woodmansterne, Surrey.

DEAR SIR, As a retired person, usually termed O.A.P., one of my hobbies is to try and make original tape recordings, particularly during the dark days of winter. I find it a good pastime, as I spend many hours during the day on my own.

The fact that hardly anyone ever hears my humble efforts does not worry me in the least, as I get quite an amount of pleasure and mental exercise in compiling a recording.

I was interested to read in your Editorial column about a contest in which members of a tape correspondence organisation were asked to submit a tape entitled *My Home Town* and how only one member entered. The reason why I was interested is that, not knowing, of course, anything about the contest and that your Editorial would be commenting on creative recording, I had very recently completed my latest tape which is entitled *Where I Live*, the same subject as *My Home Town*.

I live in a quiet and peaceful place where nothing ever seems to happen, so I thought it would be quite a challenge to make a tape on this subject. The completed tape plays for 45 minutes at 3½ i/s and it kept me occupied in my leisure time over a period of six weeks. Just one more finished tape for my collection and I enjoyed making it.

Yours faithfully.

... about tape reviews

From: L. Morris, 13 Market Place, Warminster, Wilts.

DEAR SIR, Such a pity to clutter up your paper with illustrations and condemnations of inferior tapes (December 1964). On my equipment—Quad with Wharfedale three-speaker set-up—I find these tapes particularly *lacking* in bass and rather strident on treble. I agree that the World Record Club Gustav Holst issue is one of the best they have done, reproduction-wise.

Please ask G.G. to tell us about some *really* worthwhile tapes next time.

Yours faithfully.

... about guarantees and service

From: H. W. Hellyer, Bargoed, Glamorganshire.

DEAR SIR, In his article *Some Thoughts on Guarantees* (December 1964), Martin York raises a question that has long exercised the radio dealer. Who pays for repairs done under the manufacturer's guarantee?

Far too often, the retailer subsidises his service department out of sales profits. When a piece of faulty equipment is returned to him by an irate owner, he puts it in order and waives such charges as he might legitimately levy. The cost of labour is by far the largest item of overheads and rectifying a small manufacturer's fault can waste too much of an engineer's valuable time. But to charge the customer for this labour would raise howls of protest—causing what is politely known as 'loss of good will'.

It is amusing to think what might happen if all dealers decided to

invoice manufacturers for service time spent in rectifying faults on new equipment. Manufacturers would no doubt come back smartly with the answer that such faulty machines should be returned to them. Again, who pays the carriage? And, more important, what does the poor owner do while he waits—and waits—and waits?

For the dealer, it should be stressed that the maker's guarantee covers only the replacement of faulty parts. It does not allow for the time and labour spent in diagnosis and repair. A bill of thirty shillings for a ninepenny capacitor is by no means unreasonable in these circumstances; but what dealer would dare charge it?

I suggest an experiment: dealer to charge customer for such repairs and customer to present the invoice to the manufacturer. Done often enough and by sufficient people, this could lead to a change in circumstances.

Yours faithfully.

... about the purchaser's viewpoint

From: M. W. MacLaren, "Tarquins", North Hill, Little Baddow, Chelmsford, Essex.

DEAR SIR, Dealers in audio equipment are a curious race and I well remember one in London who, at the end of ten minutes, was assuring me that I had no need of his wares. Astonishing, but true. I agreed with him and spent £100 a mile further up the road. After seven years I am still waiting for a man who on five occasions promised me a demonstration in my own home next week. But I have never met and can hardly believe in the existence of the dealer mentioned in Martin York's article in the December *Tape Recorder* entitled *Some Thoughts on Guarantees*. Who is this paragon who changes faulty recorders (for more expensive models at no extra charge!) almost at the drop of a Ferrograph? Why can't we all do business with him?

Only once have I met a dealer who expressed willingness to change faulty equipment, but even then I was told: "What a pity you signed the guarantee. I could have done a direct swap".

The dealer is always ready to express shocked surprise if a fault develops and is only too willing to make the necessary adjustment or repair, sometimes free and sometimes for a 'nominal' charge. The fact that one may be without the recorder for some weeks and has had to make several trips, forty miles there and back again, is no concern of his.

It seems to be an invariable rule that complaints or queries to manufacturers or their agents must always be made by the customer, never by the dealer. "You'll get much quicker service if you write to them, sir". Besides, why should the dealer saddle himself with a lot of extra paper work? With a bit of luck the customer might even let the matter drop.

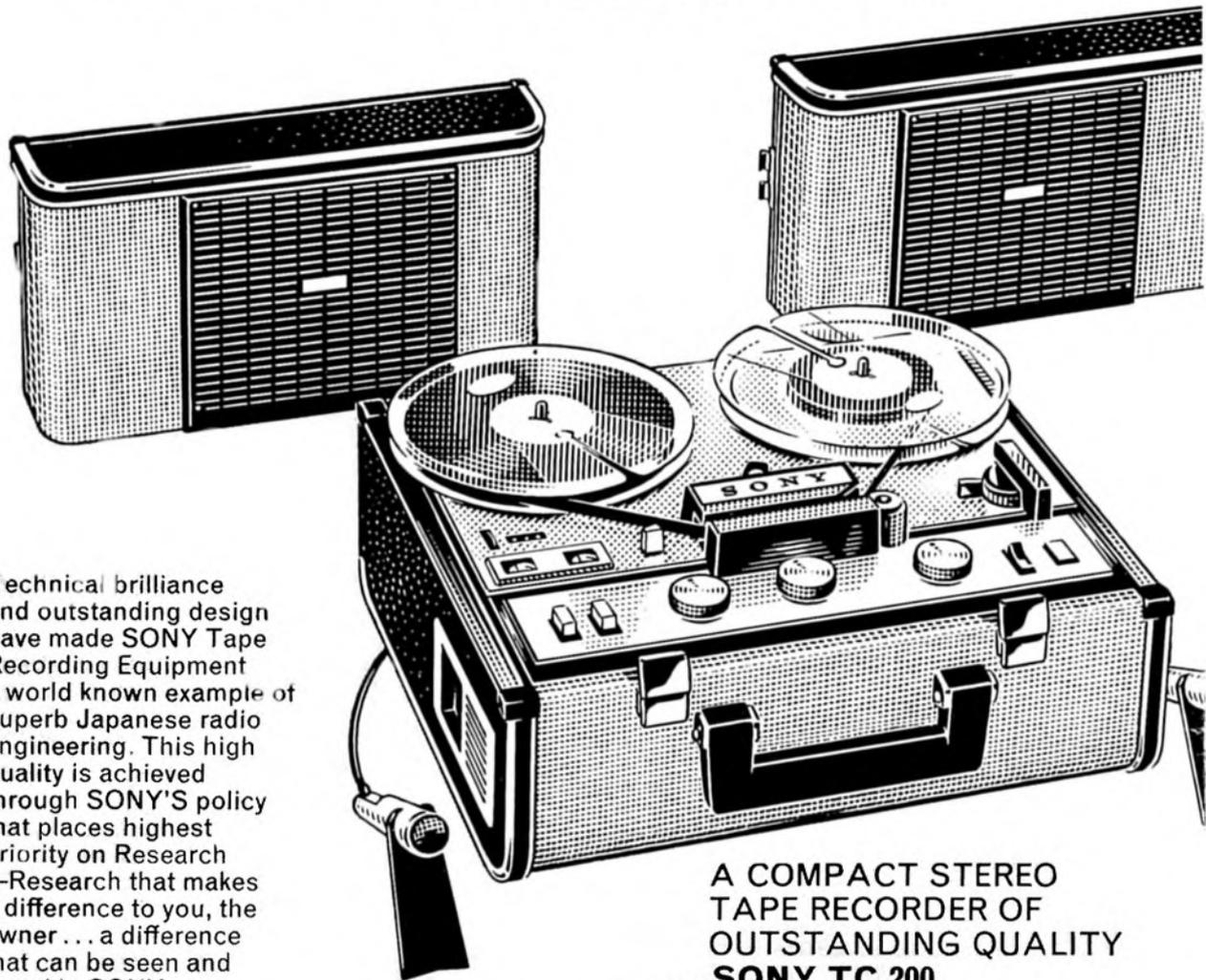
I once owned a tape recorder which took three years to get into proper running order. It must have taken at least eight trips back to the agent's service department, which was quite some distance off and cost quite a lot in rail fares. The guarantee never covered those, of course. And the dealer? Well, he opted out after the second complaint!

Yours faithfully.



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tape reviews

CLASSICS **GEORGE GOODALL**
 JAZZ & FOLK **TONY FARSKY**
 SPOKEN WORD **MAURICE PODBREY**



THE IMMORTAL FATS Fats Waller at the piano and Hammond Organ. **World Record Club TT 336.** 3½ i/s twin-track mono. 29s.

FATS Waller was a very fine jazz pianist, but it is doubtful if he would be voted as one of the greatest of all time. Fats' claim to immortality rests firmly on his great musicianship, his many fine compositions, his ability as a band pianist, and his zest for life which comes through on every performance—he always seems to be having a real ball. He was unique in that he broke through the pop barrier to become an international jazz entertainer; his tremendous output of records in the pre-war years bear witness to this achievement. No other jazzman except possibly Armstrong has had so wide an audience.

The first side of this tape shows off Fats' piano playing, at times robust, full-blooded, powerful, sometimes very subtle and delicate, always musically first rate. On most numbers Fats uses his gravel tones, often humorously, turning a rather banal lyric into something worthwhile. Some of the titles appear rather unlikely jazzwise, but the Waltz from *Faust* turns out to be a quite delightful jazz interpretation. The same is true of *Loch Lomond* and *Annie Laurie*—was Fats among the first to swing these Scotch ballads? *Oh Susanna* and *When you and I were young*, *Maggie* are also outstanding.

On Track 2 Fats plays the organ—he was one of the first to play jazz on this instrument. The organ is not, in my opinion, very suited to jazz, but Fats has come nearer to success here than most others. The Spirituals which make up most of this track are well served by Fats' organ accompaniment.

Altogether a welcome addition to the Jazz tape catalogue, with a playing time of over 45 minutes. **T.F.**



THE PATTERN OF POETRY No. 1 (Spoken word tape). Anthology compiled by William Kean Seymour and John Smith. **HMV TA-CLP 1724** (Laureate Series). 3½ i/s twin-track mono. 35s.

IS there any connection, one wonders, between the small interest in poetry and in its decline as a *spoken* art? For many years now our poet laureate John Masefield has worked to encourage the public speaking of poetry. And then one remembers how to have heard John Gielgud read Shakespeare's sonnets is to have *heard* them for the first time.

This issue therefore is greatly to be welcomed. The volumes have been taken from an Anthology *The Pattern of Poetry* published by the Burke Publishing Company for The Poetry Society. They should make an exciting addition to English studies in schools and colleges and, one hopes, encourage the speaking aloud of poetry.

Volume One is devoted to the two themes of Winter and Spring, ten on each track, and some good readers have been assembled to encompass the variety of styles and subjects.

Alec Clunes employs his strong storytelling ability to fine effect in

Wordsworth's *A Boisterous Winter Evening* and in an intriguing poem by Andrew Young called *Field Glasses*. Dulcie Gray on the other hand reads her choice, *The Snow* by Odette Tchernine, with careful objectivity. Her touch is light and crisp and this still winter scene is caught for us in a moment.

A few of the readers are guilty of self-conscious voicing of the poems but the lapses are not many. The editors have chosen from a wide range of poets and there will be exciting finds for everyone. I particularly liked a poem by Richard Eberhart *This Fevers Me* spoken by Laurance Baker and the poem *Spring* by Nasje, most pleasantly spoken by Dianne Speakman. I look forward to the ensuing volumes. **M.P.**



SLEEPING BEAUTY / SWAN LAKE Tchaikovsky. Philharmonia Orchestra conducted by Herbert von Karajan. **Columbia TT-33CX 1065.** 3½ i/s twin-track mono. 29s.

IT is possible that Tchaikovsky is so well known as a composer mainly because of these orchestral suites taken from the *Sleeping Beauty* and *Swan Lake* ballets. So, with a well known conductor and a well known orchestra to match, we should have a very popular record here. The orchestral playing was to me what ballet music should be, colourful and precise. Perhaps the humour of "Puss in Boots" from Act 3 of the *Sleeping Beauty* is not exploited to the full, but this is a small point.

The only really serious defect in the recording of the review copy was drop-out. This occurred during the slow introduction to "Czardas" in *Swan Lake*, and once again at the beginning of the lively sequence. This was serious enough to be disturbing if you want to sit and listen to the music, but might pass unnoticed if you used the tape to supply something like background music. **G.G.**



ELLINGTON SHOWCASE Duke Ellington and his Famous Orchestra. **World Record Club TT 309.** 3½ i/s twin-track mono. 29s.

NOT long ago *World Record Club* gave us the excellent *Toast to the Duke* tape, which was unusual in that it consisted of jazz 'standards' played by Ellington, but composed or featured by other band leaders. This tape is more typical, being made up of ten pieces created by the Ellington organisation, but apart from one number, not recorded before.

Recorded in the mid-fifties, there is more than a suggestion on some numbers, of the high-pitched noisy excitement of the great White bands; but for the most part what we get is unmistakably Ellington, and very good too if we overlook the rather trivial exhibitionist bulling atmosphere of *La virgen de la Macarena*.

(continued overleaf)



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TAPE REVIEWS CONTINUED

Track one opens with the Duke's very fine musical picture of the sounds of a Harlem tenement block—*Harlem Airshaft*.

Don't ever say goodbye, *Falling like a raindrop*, and *Blossom* are slow melodic pieces in the Ellington style, with some fine tone colours in the arrangements. Most of the numbers feature a particular soloist, *Gonna Tan Your Hide* is mostly a long drum solo by Dave Black. Jimmy Hamilton has a kind of little clarinet concerto in his own composition *Clarinet Melodrama*. Britt Woodman, trombone, has *Theme for Trambean*, and Harry Carney produces some rich sounds with his baritone sax on *Falling Like a Raindrop*.

The high technical quality of the recording adds much to the pleasure to be got from *Ellington Showcase*. The excellent notes that accompany the tape set out in detail the personnel of the recordings; unfortunately there is no indication as to which item the various sessions produced.

T.F.



BEETHOVEN VIOLIN CONCERTO Yehudi Menuhin (violin) with Vienna Philharmonic Orchestra conducted by Silvestri. HMV TA-ALP 1799. 3 1/2 l/s twin-track mono. 29s.

A **SPLENDID** work in the grand style of violin concertos, a famous violinist renowned for his technique and sensitivity, a well known continental orchestra and conductor all recorded on a widely reputable label should be worth listening to. And indeed it is. Fine playing and richly recorded sound combine to make this a very good issue.

Criticisms? There may be some purists who object to Menuhin's manner of phrasing, particularly in the slow movement where he makes the end of one phrase almost join on to the next. The orchestra may be recorded a little too close for some tastes, and mono tape violin tone never is the highest of fi. Personally I found the performance splendid, and the recording quality is certainly above average. G.G.

GRIEG AND SCHUMANN CONCERTOS. Solomon (piano). Philharmonia Orchestra conducted by Menges. HMV TA-ALP 1643. 3 1/2 l/s twin-track mono. 29s.

TH**ERE** must be many admirers of Solomon's playing who will welcome this coupling. It is difficult to say what it is, exactly, that makes Solomon's playing so striking. He is a virtuoso in the great tradition of concert pianists, individual but not original. One finds his performances highly satisfying, confirming existing conceptions rather than throwing new light on a work. This, I feel, is a highly desirable state of affairs for a concert pianist. The untimely stroke which put an end to Solomon's public appearances has left a considerable gap in the musical scene.

The concertos recorded here need no introduction to music lovers, and Solomon's seemingly effortless playing is a pleasure to hear. Points of detail here and there, the degree of expression he puts into an ornamental turn, for example, in the Grieg concerto, indicate that he is not tempted into dismissing the music lightly because of its popularity. Again in the Schumann, carefully chosen balance between melody playing right hand and arpeggio accompaniment playing left hand indicates further attention to detail.

The recording quality is not too bad. Frequency range is restricted, giving a rather 'old-fashioned sound' on wide range speakers, but it is clean and the piano sounds pleasantly closer than the orchestra. On the review copy there were two spots of momentary dropout, and some slight flutter on the piano tone here and there. There were also places where the woodwind tone tended to break up in the 'tutti', but none of these faults was seriously disturbing—to me at any rate. G.G.

THIS PLAY, like the previous two, covers one scene. *This time, however, the scene incorporates several changes of location.*

Changes in location (i.e., acoustic) are indicated in the script by a dotted line. The tape is stopped at these points to allow re-arrangements; it is then re-started without a break. Any switching-noise, etc., is cut out in editing.

It is often impossible (or undesirable) to record in every literal location. Available locations, therefore, must frequently "double" for the real thing. An entrance-hall might prove too "live" to depict the hall in the play; it would, perhaps, serve better as the imaginary basement. Similarly, a resonant stairway might be non-existent: the producer therefore installs his microphone inside a large empty wardrobe.

ANNOUNCER: We present a short play entitled *Don't Let Me Persuade You*.

(Fade in: outside front door of a large old house. [dead acoustic] Distant birdsong. Door knocked. Pause. Door opened.)

OLD MAN: *(morosely)* Yes? What d'you want?

ROBERT: *(briskly)* Good morning. My wife and I understand that this house is for sale.

OLD MAN: The agent sent you, did he?

DORIS: *(eagerly)* Yes, that's right. Could we have a look round?

OLD MAN: *(off-hand)* If you want to. Come in . . .

(Inside entrance-hall. [live acoustic] Door shut.)

ROBERT: Are you the owner?

OLD MAN: *(testily)* Who d'you think I am? There's no one else living here.

DORIS: *(politely)* We're not disturbing you, I hope?

OLD MAN: *(surly)* It's you rich young people who want to buy the place. I just want to sell it.

ROBERT: *(friendly)* It's a very historic house, I'm told. Have you lived here long?

OLD MAN: Ever since I was a boy. *(gloomily)* I inherited the place. *(turning away)* Well, this is the lounge . . . *(opening door).*

OLD MAN: By all means. Don't let me persuade you into buying the place against your better judgement. *(pause)* What d'you want to see?

ROBERT: Let's start with the basement.

OLD MAN: All right. *(turning away)* This way . . .

(All progress briefly across hall and slow to a standstill.) [live acoustic]

ROBERT: *(cautiously)* Down there?

OLD MAN: That's right. Down there.

DORIS: Perhaps you'd better lead the way.

OLD MAN: Certainly. Follow me—and mind how you go.

(All descend short stone stairway.) [Echoic acoustic]

OLD MAN: *(continuing)* These steps can be very treacherous. My uncle broke his leg coming down here. Years ago, of course. He's dead now, the silly old fool.

(All enter basement passage.) [live acoustic]

OLD MAN: *(continuing)* You're now in a sort of passage. The old kitchen is on this side . . . and there's a cellar down there . . .

DORIS: It's very dark. I can't see a thing.

ROBERT: Can't we have a light on?

OLD MAN: The fuses have gone. The wiring is all rotted, you see.

Fortunately, I don't come down here very often.

DORIS: *(screaming suddenly)* Aaaaah!

ROBERT: *(alarmed)* Doris, what's the matter?

DORIS: *(hysterically)* These cobwebs—they're like curtains! I walked right into them!

OLD MAN: Spiders like the damp, you see. Can't say I do. My left shoulder gives me hell—no matter what part of the house I sleep in. It gets all knotted up. Like a bunch of grapes . . .

ROBERT: *(to Doris)* Are you all right, Doris?

DORIS: *(tearfully)* I think so . . . Robert, do let's get back to the car.

OLD MAN: *(not hearing)* There's an old pantry down the end of the passage. That's where I keep my home-made wine. Perhaps you'd like to try some?

ROBERT: *(hastily)* Please don't trouble—

(continued on page 24)

a tape play for amateur production

DON'T LET ME PERSUADE YOU

BY DAVID HAINES



TECHNICAL NOTES

Perspective

All actors start at close-mike voice-positions; they "turn away" where indicated, "turning back" after the line or where indicated.

Acoustics

Each location should contrast with the one following. Locations 5 and 6 can be briefly interpolated with a "dead" acoustic, thus creating a slight change in progression and securing the contrast.

Sound-effects

Birdsong should be pre-recorded and mixed with the dialogue or the dialogue superimposed over a pre-timed recording of birdsong.

Door latches etc., should be carefully auditioned and operated to suit the character. e.g., the old man would open the front door with ponderous ritual, working through a fixed sequence of bolts, locks and chains.

Footsteps should characterise their owners, e.g., shuffling slippers, high-heels, stout brogues. Note that footsteps "accompany" the voices down the steps. Pre-record and mix with dialogue or enact "spot". Method: slowly encircle omni-directional microphone, treading on gritty slates laid out like stepping-stones.

(All enter lounge.) [dead acoustic]

ROBERT: *(enthusiastically)* What a splendid room!

DORIS: *(excitedly)* Oh, Robert—it's got wonderfully big french-windows! *(turning away)* Come and look at the view!

OLD MAN: I'm thinking of getting myself a small flat—once I get shot of all this. Something modern.

ROBERT: *(reproachfully)* But how can you give up such a beautiful old house? It's got atmosphere—a genuine sense of the past . . .

OLD MAN: *(quickly)* Young lady, don't open that french-window!

DORIS: *(startled)* Why not?

OLD MAN: All the insects will start coming in.

DORIS: Insects?

OLD MAN: The insects that live in the ivy. The house is covered in ivy. They come in and start walking up your leg.

DORIS: *(haughtily)* I regard the ivy as being romantic and picturesque.

OLD MAN: *(heavily)* You can open the french-window if you like.

But you'll soon get something walking up your leg. Not just one leg—both legs. And not just your legs—but all our legs.

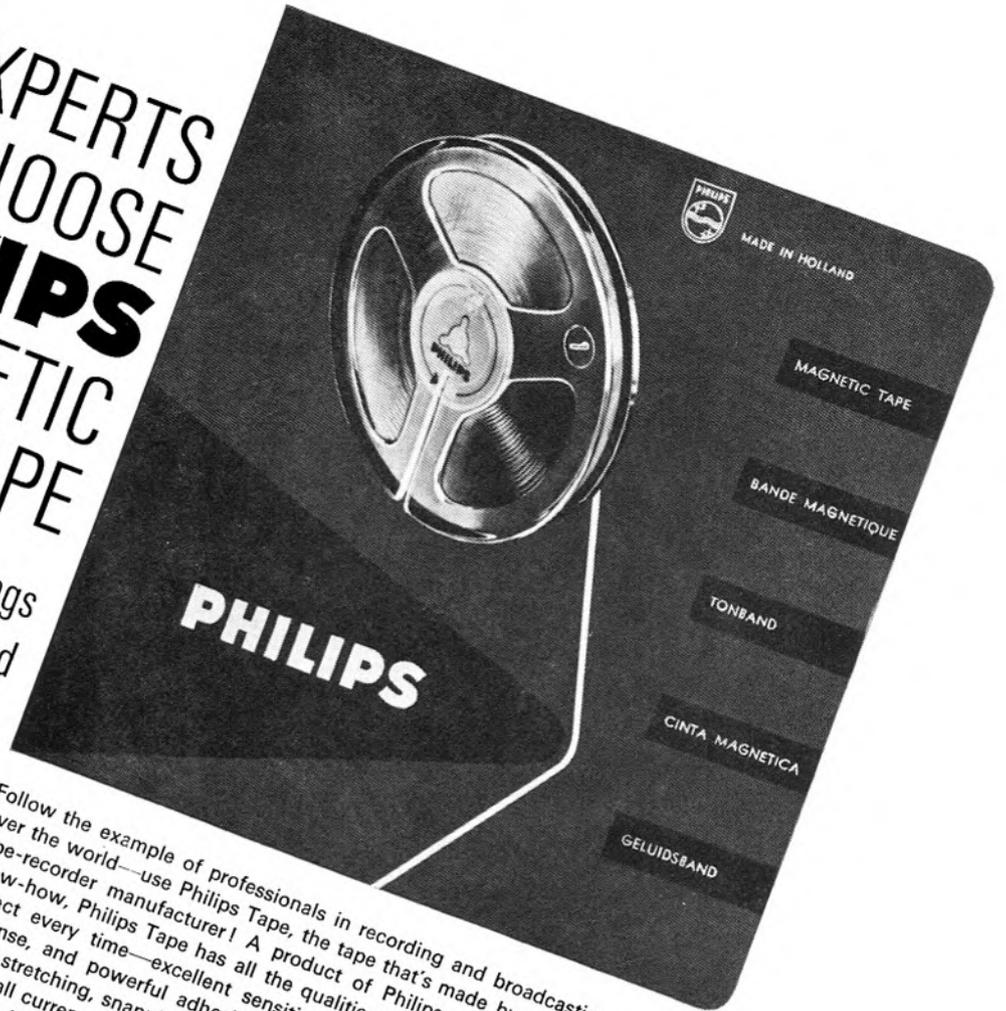
DORIS: *(changing the subject)* I like the fireplace, Robert—don't you?

OLD MAN: It smokes. That's why I've got watery eyes.

ROBERT: *(thoughtfully)* I think we'd better look at the rest of the house before we make up our minds.

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LAST month we looked at monitoring from the enthusiast and professional viewpoints. Before finishing with this subject it should be said that loudspeaker monitoring is possible on some tape recorders by feeding some of the signal in the record channel—when a recording is being made—to the playback amplifier, via the latter's volume control. This is possible, of course, only if the playback channel is free during the recording process. On many domestic models the playback output stage is changed on 'record' to a bias oscillator. Such machines just cannot be adapted for this kind of monitoring.

With instruments on which this kind of monitoring network can be accommodated, the monitor signal should be extracted from the grid of the record amplifier/output valve and applied, via a coupling capacitor, to the top end of the playback volume control by way of a changeover switch, as shown in fig. 1.

Special care must then be taken when recording to avoid acoustic feedback. This feedback happens when a 'live' microphone is placed near a 'live' speaker on a common amplifier system. Feedback may then take place from the microphone input of the amplifier, through the amplifier and then back from the speaker to the microphone by way of sound waves (i.e., acoustically). Such a coupled system tends to develop a nasty howl which can only be prevented either by increasing the distance between the microphone and speaker or by reducing the loop gain of the system by turning down the monitor and/or record level control.

TOWARDS BETTER TAPING

PART ELEVEN • SUPERIMPOSING BY GORDON J. KING

It should be noted here that even if the loop gain is insufficient to sustain oscillation, the tendency for acoustic feedback can promote peaky response effects in the record amplifier due to the resonant properties of the acoustical path. Such a feedback tendency can, therefore, impair the quality of a recording by subjecting it to 'ringing' effects at certain frequencies. To be on the safe side the recording

microphone should be as far as possible away from the monitor speaker, or the monitor volume control should be turned down as low as possible (or both). Of course, the question of acoustic feedback does not arise when the record programme material is derived from sources other than a microphone. Full gain may then be given to the monitor channel and there is usually no trouble when the programme equipment is close to the monitor speaker.

Another tape recorder extra is the *superimpose* facility. This allows a second recording to be made over an existing one. In the normal way, when a recorded tape runs through a recorder the original recording is eradicated by the erase head before it passes the record head. We have probably discovered ourselves that it is not always possible to clean a tape *absolutely* by relying solely upon the erase facilities of the recorder. If the tape is extra heavily recorded or if the erase oscillator is failing to put sufficient HF signal power into the erase head, a vestige of the original recording remains. The new signal is thus 'superimposed' upon the old signal.

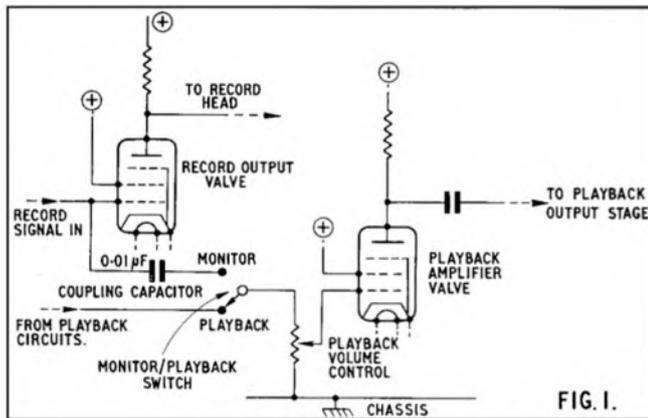
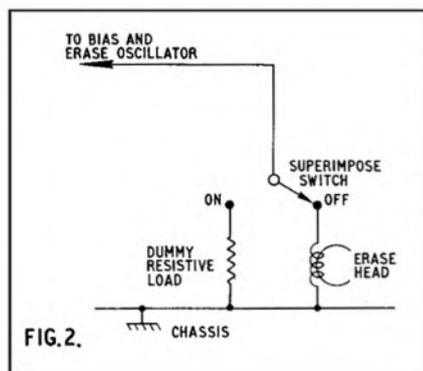


FIG. 1.



Above: Locating a change-over switch.

Left: A resistor wired to pass erase current.

FIG. 2.

BY-PASSING THE ERASE FIELD

It follows, therefore, that by arranging for the recorded tape to be unaffected by the erase signal a second recording can purposely be superimposed upon the first recording. The simplest way of making this happen is by blanking-off the erase field at the erase head from the tape. This can be done to some extent by sticking a small piece of paper or thin plastic over the working surface of the erase head. This generally results in a little erase field finding its way upon the tape, but since this is then much smaller than it should be for successful erasure, the original recording is reduced in level while the new programme is recorded at full level on the 'unclean' tape.

Some machines embody a mechanical method of superimposing. This simply consists of a small lever operated by the superimpose switch which lifts the tape away from the erase head. This, in effect, does the same thing as blocking the erase field by paper or plastic.

A more elegant and efficient way of achieving the same effect is by electronically switching off the erase signal at the erase head. This, unfortunately, is not quite so easy as it may sound. For one thing, the erase oscillator generally supplies HF *bias* to the record head while at the same time energising the erase head. Thus, if the oscillator

(continued on page 21)



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load is decreased by a switch cutting out the erase head it is very likely that the amplitude of the record HF bias signal will rise substantially, thereby over-biasing the recording. While this may not appear to introduce excessive record distortion it may well reduce the apparent sensitivity of the record channel, making it necessary to record with greater than normal peaks on the record-level indicator. Too much HF bias can, of course, result in distortion and also impair the frequency response. A point to note here is that the equalising in the record (and playback) channel of a tape recorder is often tailored to take into account the amplitude of the HF bias signal.

Another angle here is that the oscillator conditions may alter considerably when the erase head load is removed. In some cases the oscillator may cease to work altogether, while at other times the bias signal may become badly distorted. Bad distortion on the bias signal will almost certainly impair the signal/noise ratio (by putting a severe hiss on the recording) and in extreme cases it may result in beat effects due to the production of high-level harmonics of the bias frequency.

PART OF THE OSCILLATOR

Indeed, some recorders use the erase head as the 'tank inductor' of the oscillator, in conjunction with a parallel capacitor. Thus, by switching out the head there would be no inductor and no oscillation. Even if the circuit continued to oscillate, the conditions of the oscillator valve would alter, which could precipitate valve failure.

All this means that if we want to switch the erase head out of circuit we must switch in something else to take its place. What is switched in must 'look' to the oscillator as an electrical equivalent to the head. An erase head is essentially inductive in make-up, but it also possesses some resistance and capacitance. The obvious thing to do is to switch out the erase head and switch in a dummy head. But this is costly.

Alternatively, an inductor of similar electrical characteristics to the head can be switched in. Such inductors (chokes) are not too difficult to acquire once the characteristics of the erase head are known.

In some circuits an ordinary resistor can be switched in to take the place of the head. This is by far the least expensive method if it will work properly, and the circuit in fig. 2 shows the connections of a resistive dummy load and superimpose switch. There is not a great deal of difficulty in rigging up this arrangement in most models. The resistor, however, should be rated (in terms of watts) to carry the unwanted erase signal power without overheating and its value (in ohms) should match the operating impedance of the erase head—that is, the impedance of the head at the HF oscillator frequency. The impedance is a function of frequency, as is probably known, and it is equal to $2\pi fL$, where f is the frequency in c/s and L is the inductance in Henries.

The resistor should be of at least 1W rating, and a typical value is 500 ohms. It is worth noting that the switched resistive load technique is adopted by certain manufacturers of machines employing a superimpose facility.

VARIABLE BIAS

It is sometimes desirable to be able to adjust the HF current in the erase head to reduce the level of the background recording. A small erase head current, for instance, will fail to erase the original recording completely, but it will tend to erase it partially, thereby allowing the superimposed material to have greater prominence.

Technically, then, the problem is one of varying the current in the erase head while keeping the load as seen by the HF oscillator reasonably constant. There is no simple solution to this problem. If one wishes to be a purist in this respect, a constant-impedance attenuator would represent a solution. However, from a practical aspect all that is usually necessary is a variable resistor connected in series with the erase head circuit, as shown in fig. 3. Here a three-position single-pole switch is employed to give "superimpose on", "variable superimpose" and "superimpose off".

The variable resistor can be either a pre-set type or an ordinary control with a knob. Its value should be in the order of 5K and it

should have a rating normally of at least 1W to handle the rather heavy erase signal power.

The superimposing facility enables various interesting effects to be produced, including the over-recording of a vocalist to accompany a previously made music recording. The quality of the over-recording is rarely up to the standard of the original recording, and it has been found that the bias signal applied to the record head can partially erase or even distort it to some extent.

The author has experimented with over-recording techniques at different levels of HF bias signal. It seems that the best results are obtained with a record bias at a slightly lower level than that used normally. To avoid distortion, this should be used in conjunction with a record signal also of a lower level than is normally used. In that way it has been found that quite reasonable superimposition quality can be obtained, although the recording level is below that of a single recording.

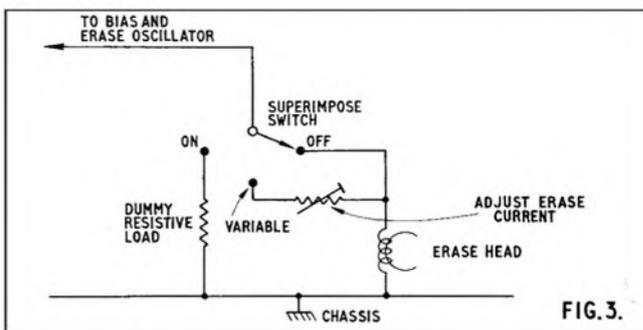


FIG. 3.

It is a good idea to under-modulate a tape when it is known that the programme material will later be employed as a background for an over-recording. No hard and fast rules can be given in these respects and there is room for a great deal of experiment here.

Some recorders feature a pre-set adjustment for record bias, and this can be employed to vary the bias level when superimposing. This is not generally a good idea, however, for it means that the machine should really be set up again to the correct bias level for a single recording afterwards.

A better arrangement is shown in fig. 4. Here a separate variable bias control is introduced in series with the bias signal feed to the record head. As the circuit shows, the record head is generally

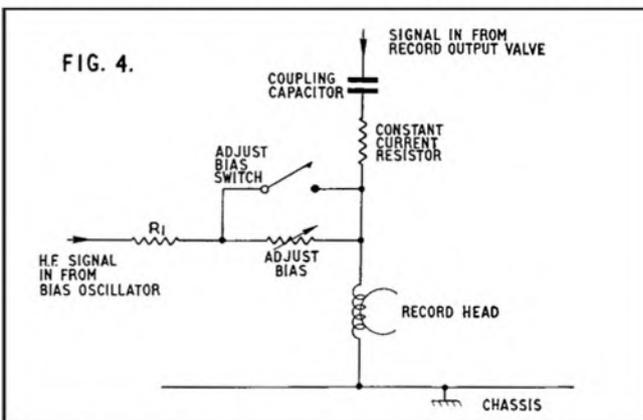


FIG. 4.

energised from the anode circuit of the record output valve through a coupling capacitor and highish value resistor, whose job it is to keep the record current in the head at a fairly constant level at all frequencies. The HF bias signal is fed into the head usually through a resistor (fixed or pre-set) given as R1 in the circuit. Now, the idea is to break this feed and insert a variable resistor and simple parallel switch.

With the switch open, the "adjust bias" control comes into operation and any desired level of bias can be fed to the head. With the switch closed, the variable resistor is shorted and the original fixed level of bias is restored.

For a really wide range of new tricks, including superimposition by a mixing process, the ¼-track tape recorder is ideal, and this will be dealt with next month.

MMUSIC to eat to, music to type to, music to drink, drill and buy to; all these can be obtained from *Reditune* or one of several other distributors of 'canned music'. *Reditune* are something of an exception, however, for, should you require it, they can provide music to *relax* to. They are one of the few companies who can claim to achieve reasonable quality in the tapes and reproducing equipment which they hire out at a basic rate of some £70 per year. We recently visited their premises, conveniently located within five minutes walking distance of our Croydon office, and were shown round the equipment used to record music programmes on tape in what *Reditune* choose to call "cassettes", though readers will know that we prefer the word "cartridge".

A *Reditune* installation comprises a transistorised tape player, one or more speaker enclosures and four cartridges. The hirer exchanges his tapes in pairs, receiving two more recordings of his own choice,

outer winding. It is fairly obvious that the system is very prone to speed fluctuation, but a well-designed cartridge, such as that produced by *Reditune*, can be made to give remarkably good performance.

We are grateful to the chief engineer of the recording section, John Childs, for his detailed account of the way a cassette is produced, and for his description of the countless ingenious devices, many of them developed by *Reditune* themselves, which assist in making the service quick and efficient.

When adding to the library of 12,000 recordings, the music producer and programmer select currently popular tunes and traditional music which seem suitable for unobtrusive accompaniment to everyday life in a factory, hotel or supermarket (a blaring 1812 *Overture*, for example, detracts from, rather than increases, the efficiency of a hairdresser or watchmaker). Arrangements are then made for these to be included in a list of items to be taped at a recording session—usually in a London



by return post. Present cassettes contain endless loops of double-coated $\frac{1}{4}$ in. tape and have a total double-track playing cycle of 90 minutes. A pinch wheel mechanism is embodied in the cassettes currently being produced, overcoming the difficulty of threading tape through a head channel. Only one of the two sides of the tape is used for recording at a given position on the width of the tape, but by incorporating a single twist, when splicing the tape together, a *Mobius Loop* is formed. As can be seen from fig. 1, this causes the head to scan on both coatings in succession, thus doubling the playing time without resort to mechanical or electrical track switching. Fig. 2 shows the principle of the endless loop and can be compared with the *Reditune* version, shown in the photo. Similar devices can be purchased for standard recorders and all utilise a well-lubricated tape revolving round a moving centre hub. Driving force is applied by the capstan, which pulls tape from the centre and feeds it in again at the



ENDLESS MUSIC

THE REDITAPE SYSTEM OF TAPED ENTERTAINMENT

studio. Copyright problems are overcome at this stage, the fees being added to the subscribers' annual bill. Should the hirer, for some reason, wish to pay Copyright charges independently, he is quite free to do so.

Once the music has been recorded to the producer's satisfaction, the master tapes (produced at 15 i/s) are dubbed. A further copy is then made from the master which is subsequently filed in the hope that its contents return to popularity at a later date. The complete selection, lasting ninety minutes, is edited together, interspersed with short lengths of leader. This, in turn, is copied on to a tape at 15 i/s. This operation serves a purpose less pedantic than to eliminate the splices: the output of an Ampex professional recorder is passed through an impressive piece of equipment whose purpose is to alter the dynamic range and volume level of each piece of music, to allow for variations in the quality of the machines which made the original master recording. This eliminates the disconcerting effect of quality varying between each piece of music.

Re-recording to $3\frac{1}{2}$ i/s is now carried out on Ampex machines for loading into master cassettes. Precise speed control is obtained by using stroboscopically graduated capstans, but in order to be certain of incorporating the full programme on to the endless loops, the latter are deliberately made overlength, the waste being edited-out afterwards. Bulk copying now commences.

The few cassettes currently in existence are positioned on players at the end of three rows of ten recording 'slaves'—each loaded with bulk-erased tapes. The designers' ingenuity shows itself particularly well in the sensing device fitted to each slave recorder, which is arranged to prevent over-recording when a short loop begins its second cycle. In fact, all the cassettes play for under 90 minutes, to eliminate the need for manual editing of unused tape.

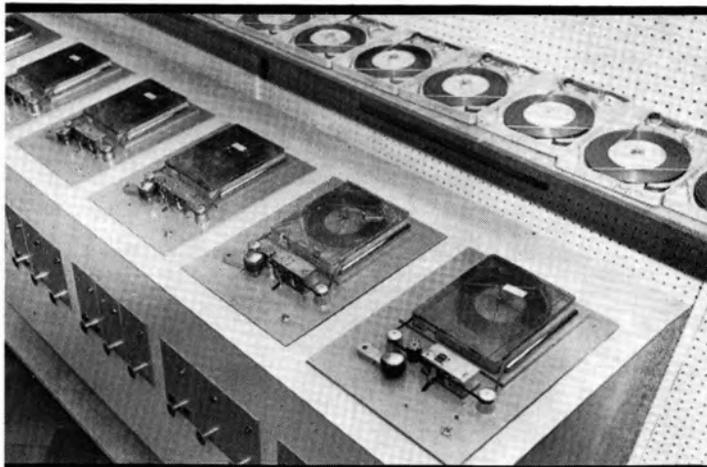
The slave deck, designed and built by Reditune at their Jersey factory, is fitted with two magnetic heads—one for recording and one for replay of a low frequency 'sensing' tone which precedes the audio signal transcribed to the tape. High speed copying reduces the time needed to dub a complete programme from ninety minutes to eleven-and-a-half minutes. This involves running both master and slave machines at 30 i/s, 'speed-to-speed' copying the 3 1/2 i/s recording. A 200 c/s sensing tone recorded at 30 i/s would thus be totally inaudible

and subscribers complaints few and far between.

Cassettes chosen from the catalogue of music selections (which lists, not individual titles, but *atmospheres*—i.e., Bright, Continental, Piano, Latin American) are posted to the subscriber inside pre-paid return packs. They might find themselves playing in public houses, hotels, supermarkets, or the Reditune building itself.

Proceeding to the next point in the life story of a music cassette, the tape finds itself returned to the library shelf awaiting a further borrower. Eventually it will either fall victim of mishandling and require repair, or the music embedded in its oxide will go out of favour with subscribers. In either case, the cassette will leave the library for service, bulk erasure and, if in good condition, re-copying with currently popular music.

The Reditune repair department is a truly fascinating place. 'Home-
(continued overleaf)



ENDLESS MUSIC

THE REDITAPE SYSTEM OF TAPED ENTERTAINMENT

on replay at 3 1/2 i/s (25).

The sensing circuit is essentially a simple device. When the endless loop has completed a full cycle and recording is taking place over an earlier part of the programme, the replay head passes the low frequency tone to the sensing circuit which activates a relay. Accordingly, the audio signal being recorded and, seconds later, the bias current are faded out, creating an illusion that the previous recording had been faded in. The process completed, the recorder stops itself and can be reloaded and started without interrupting the other slaves.

From here the recorded cassettes are taken to one of several listening booths to be examined for faults in transcription. The listeners are kept busy polishing cassette cases but, even so, do not have sufficient time to listen to the entire tape length. Once again, 90 minutes is a long while to spend on a single cassette, so a machine has been developed that will fast-wind the tape to enable spot checks to be made for recording continuity throughout the loop. This is a difficult task when endless loops are in use—due to severe friction and likelihood of damaging the tape. It has been overcome, however, by driving the loop with a capstan rotating at fairly high speed.

Although it is impracticable to monitor the entire length of every tape, we were informed by Mr. Childs that faulty tapes, though rather prominent in the early days of Reditune, were now comparatively rare

From left to right

Master tapes, recorded at 15 i/s, are carefully filed for possible future use.

The Reditune tape player currently in use. Note track selector (top right) and volume control (lower left).

One of three rows of ten slaves used in dubbing music cartridges. Spare tapes await their transcription on shelves to the rear. Copying is carried out, speed to speed, at 30 i/s.

Splicing bench fitted with endless loop tensioning deck. The left-hand guide incorporates a switch which is triggered when the loop is wound to a predetermined tension.

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REDITUNE VISIT CONTINUED

made' equipment for splice-finding, drop-out analysis, loop lubrication and just about everything else abound amongst unemployed cassettes and spools. The splice-finder, more accurately described as a bad-splice-finder, comprises a sensitive micro-switch mounted on a plate with a series of tape guides. The tape is passed at fairly high speed round the guides and when a splice comes through the sharp angle by the microswitch it may, if loose or badly joined, shudder away from the guide against the sensitive arm of the switch, halting the drive motor. Another interesting machine, illustrated on the previous page, is a loop tensioner. Tape is passed round three guides, one of which is connected to a switching device. The loop is loosened by rotating the cassette's central spindle to free a quantity of tape for editing or examination. The operation completed, the loop is left sprawling on

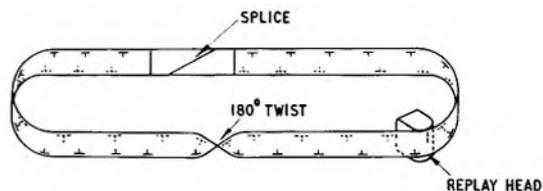


FIG. 1. DOUBLE-COATED TAPE FORMING MOBIUS LOOP.

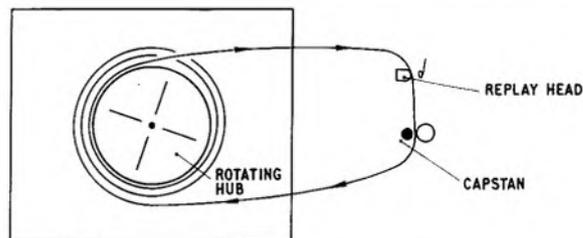


FIG. 2. PRINCIPLE OF ENDLESS LOOP CARTRIDGE

the deck and the machine is turned on. This powers the cassette which begins to wind tape on to the outer reel. After a few seconds the tape is wound to the exact tension required for efficient spooling and unwinding of the endless loop. At this predetermined tension, the tape-guide-cum-switch is dragged back as the tape tries to straighten itself out—switching off the machine.

The repaired cassette is now ready to return to the copying room and here the process begins again.

Subscriptions to the Reditune service have been taken out in all parts of the world, and in some countries agents have been appointed to run a cassette library to cater for particularly large demands from the area they cover. These libraries are fed from stocks in Croydon, but operate independently. It is interesting to note, in closing, that many overseas subscribers, for example the Japanese, though having their traditional styles of music in cassette form, invariably prefer the sounds of the West.

DON'T LET ME PERSUADE YOU CONTINUED

OLD MAN: It's no trouble, I assure you. Stay here and don't move until I get back. Especially you, young lady, with your pretty little shoes. You'll hurt your toe if you tread on one of the mouse-traps. [turning away] I won't be a moment . . .

(The old man's footsteps depart down the passage. He rummages distantly among clinking bottles and then returns.)

OLD MAN: (breathlessly) [turning back] Here we are . . . one of last year's bottles. Mulberry wine. I'll soon clean the dust off with my hanky. We'll take it upstairs and have a nice little drink—(breaking off) where are you? (pause) Are you there? (pause) That's funny . . . must have gone. (defiantly, raising his voice) All right—I won't give you any! I'll save the bottle for the next people who come! (muttering to himself) Someone will buy the place eventually. . .

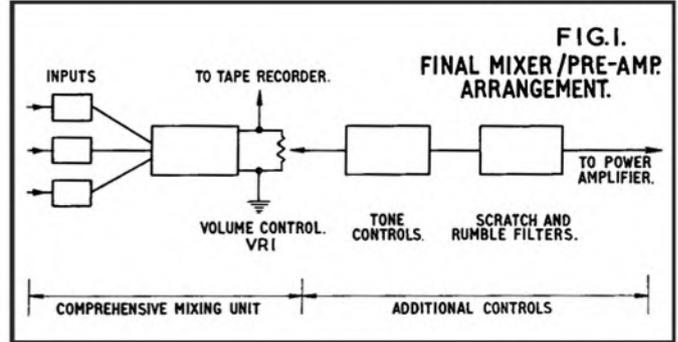
At the moment the mixing unit combines several inputs and feeds them into a tape recorder or pre-amplifier. At the end of last month's article I suggested that tone controls and scratch and rumble filters could be added to the mixer to convert it into a mixer/pre-amplifier.

The block diagram of the complete set-up is shown in fig. 1. As the diagram suggests, no modification is necessary to the mixer, save the addition of extra components. The slider of the final volume control (VR1) now goes to an 'add-on' unit. The output to the tape recorder is taken from the top of VR1, so that recording level is set up on the tape recorder. VR1 now operates as the listener volume level control. We have a tape playback input at the beginning of the mixer. Now obviously we cannot record and play simultaneously. If our recorder has a combined record/playback head then the tape recorder switching will automatically select the two functions for us. If the machine has separate record and playback heads then a variety of operations are possible. Typically we can: (a) Play back track 1 or 2; (b) play back track 1 or 2 and mix with another input; (c) play back track 1, mix with another input and record back on to track 2; and (d) play back off track 1 and record back on to track 1 to give a decaying echo effect.

We have considered how to use our tape recorder with the pre-amp and I can now go on to describe the addition of the extra controls. The circuit of the tone control section is given in fig. 2. From VR1 the signal passes into the emitter-follower of TR1 and then into the tone control network.

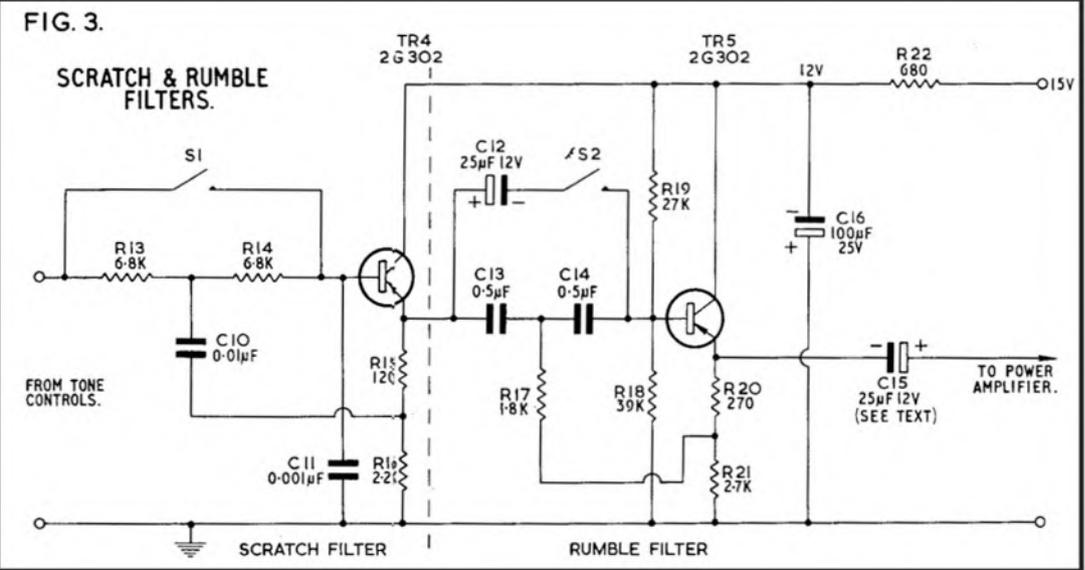
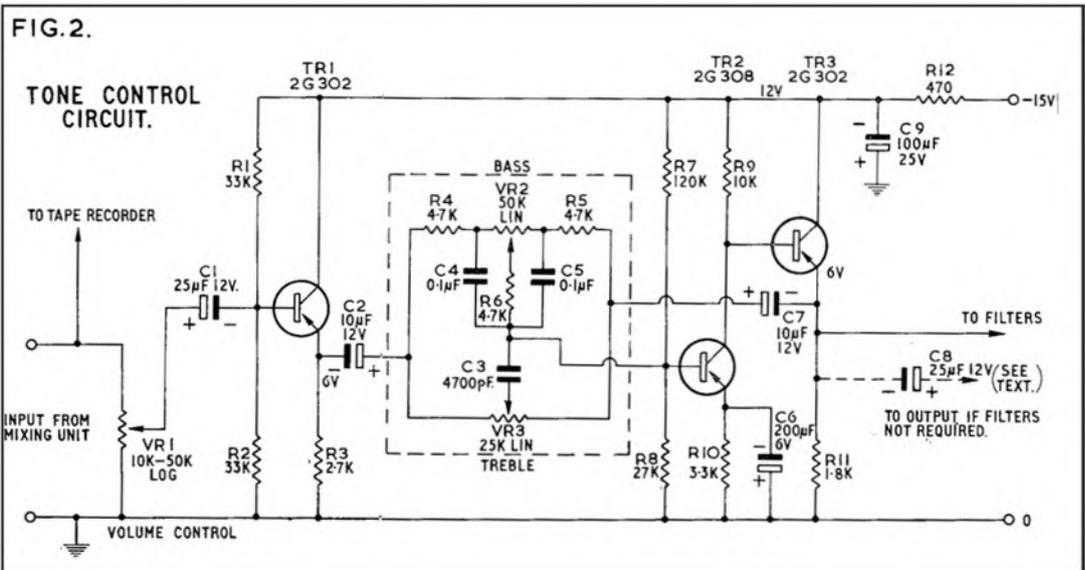
The bass-treble controls are of the negative feedback type commonly used in audio equipment today. The voltage gain between TR1 emitter and TR3 emitter depends on the feedback network between TR2's base and TR1 and TR3's emitters. At about 1 Kc/s where a flat response is required this gain is in the ratio of R5 to R4 and is unity. At high frequencies the reactance of C3 becomes small, and VR3 gives treble boost or cut. At low frequencies the reactance of C4 and C5 increases, so that the varying VR2 gives bass boost or cut.

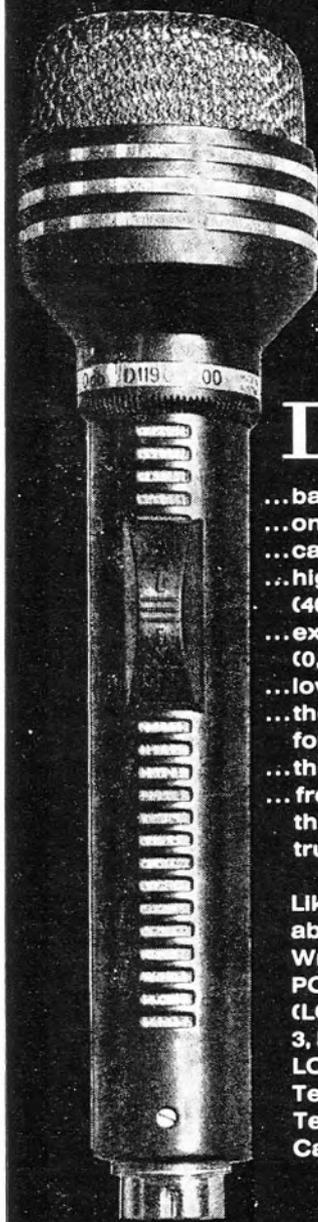
If we wish to have 10dB of boost available, then we obviously need extra amplification. Transistors TR2 and TR3 provide the gain
(continued overleaf)



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A. FOORD PART 2. TONE CONTROLS AND FILTERS





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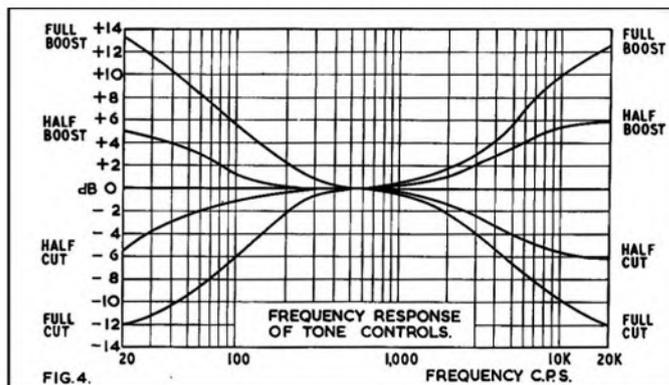
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COMPREHENSIVE MIXER CONTINUED

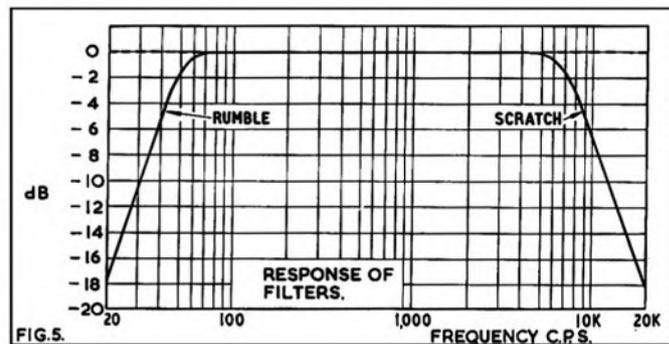
required. TR3 also provides a low output impedance to feed the tone controls and the output of the filters. If the output of the pre-amp is taken directly from TR3 and the filters are not required, then C8 will need to be added. It gives DC isolation of pre-amp and power amplifier. The polarity of C8 will depend on the DC potential at the power amplifier input.

If filters are required, the circuit is shown in fig. 3. R13 is connected directly to the emitter of TR3, since the transistor TR4 receives its bias via R13 and R14. Transistor TR4 and associated components comprise the 'scratch' filter. With S1 closed TR3 (which has a low impedance output) feeds the signal directly into TR4 and the signal is not attenuated. With S1 open, at frequencies above 5 Kc/s the reactances of C10 and C11 decrease and the signal is bypassed to earth.



From TR4 the signal passes into the rumble filter. With S2 closed the signal suffers no attenuation. With S2 open the signal passes through C13 and C14. At frequencies below 60 c/s these capacitors have a high reactance and low frequency signals are attenuated.

From the emitter of TR5 the signal passes out to the power amplifier. Again the polarity of C15 should be checked, as the DC input potential of the power amplifier may be more or less than the DC potential of the pre-amp.



Typical response curves for the tone controls, scratch filter and rumble filter are shown in figs 4 and 5. If panel space permits the extra controls and components could be placed in the Mixing Unit; alternatively a separate 'add-on' unit could be used. If the components in the tone control section (fig. 2) inside the dotted lines are wired directly to VR2 and VR3, then the number of wires to the board containing the transistors is reduced. The construction could follow the lines suggested for the original Mixing Unit, using separate 'plug-in' boards for the tone control section and for the filters.

Footnote: An error appeared in fig. 5 of the tape pre-amplifier circuit given on page 498 of the January issue. The value of the 0.03µF 5% capacitor shown connected to the emitter of TR1 should have been: 0.0267µF, to be made from an 0.022µF Polyester and 4700pF silver mica capacitor in parallel. Substitution of this value will result in a 2dB improvement in bass response.

ONE of the most popular ways of buying a tape recorder or other associated equipment is by means of hire purchase. Admittedly, this may not be the cheapest way of obtaining the necessary credit, but in practice it often proves to be the most satisfactory, for bank managers are by no means always delighted to provide one with an overdraft or a loan for this purpose!

Quite often the question of hire purchase can be arranged with the dealer from whom one buys the equipment, as he is likely to be an agent for a finance house. Rates of service charge in connection with hire purchase do vary between different finance houses. One is not obliged to accept the terms offered by a dealer, for one can go direct to any other finance house. On the whole, however, the saving in hard cash is likely to be negligible, and this could be more than outweighed by the extra trouble involved.

At the beginning of this year, a new Hire Purchase Act came into force. It has brought with it a number of changes, most of which are distinctly in favour of anyone buying by means of hire purchase as they provide more protection than has been given in the past.

At this stage it should be mentioned that, although the Scottish Provisions are set out separately in the second schedule of the Act, for all practical purposes the statute law for hire purchase is the same in Scotland as in England and Wales. Nevertheless, a point which should be watched is that the Acts do not apply to the Channel Islands or to the Isle of Man (which has its own Hire Purchase Acts). Nor do they apply to Northern Ireland, for this has its own legislation. Nevertheless, for all this, the practical position in the Isle of Man and Northern

BUYING ON HIRE PURCHASE PROVISIONS OF THE NEW ACT

Ireland is very much the same as that which existed in England and Wales before the latest Act came into force.

In the past, the various Acts of Parliament have applied only to hire purchase transactions where the hire purchase price was £300 or less. Now, however, the new Act applies to all hire purchase, credit sale and conditional sales where the hire purchase price or the sale price (as the case may be) is £2,000 or less.

In passing, it should be mentioned that the Act does not apply to a business which is a limited liability company. The actual position is that if a buyer or hirer is a body corporate (and this term includes a limited company) the Act does not apply to the transaction, even though the price may be well within the limit of £2,000.

An important part of the Act provides what is popularly known as a "cooling off" period. In other words, in the event of a doorstep sale, one is not bound by one's signature but, after reflection during a limited period, may ask for the contract to be cancelled. This provision applies to contracts which are not signed on "appropriate trade premises". This rather strange term can be taken to mean the business premises of the owner or seller (or of the dealer who is negotiating the hire purchase transaction on their behalf). In this case, one has the right to cancel the contract within a stipulated period, which is from the time of signing the original agreement form until four days after receiving the second copy of the agreement; this is sent within seven days of the "making" of the agreement.

Virtually the only formality in connection with this cancellation is that, whatever the reason for wishing to reject the contract, this must be done by serving a notice. This is referred to in the Act as a Notice of Cancellation, but in fact no special form is needed for it. Really the only point to bear in mind is that it should be made in writing and it should simply state that one wishes to withdraw from the transaction.

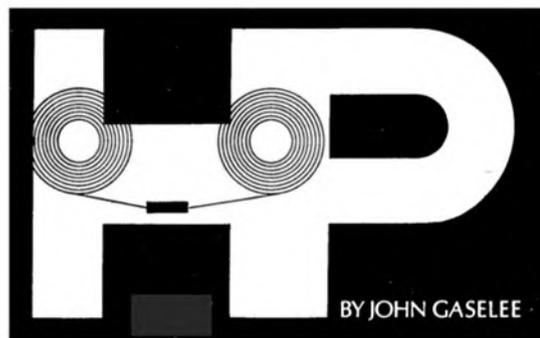
If this course is adopted, the notice must be "served" either on the owner or seller, or on the agent of the owner or seller. Since in many cases a dealer acts as the agent, one is quite at liberty to serve the notice on him. In other cases, it will be found that the copy agreement contains the name and address of the person to whom notice may be given. Incidentally, the notice is deemed to have been served from the time when the letter is posted.

No cancellation fee has to be paid. And, in fact, if the equipment has been delivered already, one is not even obliged to take it back to the

firm—but merely to hand it over at one's own premises. Nevertheless, one is, of course, under a duty to take care of it. Should a deposit have been paid before the contract was cancelled, this must be returned to one in full. One need not return the equipment until this refund has been made.

Incidentally, if the new equipment has been bought on a part-exchange basis, unless within ten days from the notice of cancellation the equipment taken by the dealer in part exchange is returned to one (in substantially as good a condition as when it was handed over), one is entitled to recover from the dealer a sum equal to the part-exchange allowance. This is another case where one can retain the new equipment until either the old equipment is handed back or one receives the part-exchange allowance.

One of the main points about hire purchase is that the equipment is only on hire until the last payment has been made. Should one default over a payment before the end of the period, the finance company will be entitled to take possession of the equipment. Nevertheless, once one-third of the hire purchase price has been paid, the finance house cannot take the equipment unless it brings an action in the courts. This rule about re-possession after one-third of the price has been paid



is absolute—subject to one exception. If a hirer determines the contract himself, the finance house is entitled to take possession of the equipment whether one-third of the price has been paid or not.

Incidentally, in any case where the owner can recover the goods as a result of default, the new Act has brought in some protection for hirers. This re-possession cannot take place until the owner serves on one (by post or otherwise) what is known as a Notice of Default. The main point about this notice is that it must contain a statement showing quite clearly how much is due but unpaid. And it must demand the payment within a stipulated period—which must not be less than seven days after the day of posting. This means that one has a period of grace in which to make the payment.

Brief mention has been made of copies of the hire purchase agreement. The position now is that one must be given a copy of the agreement after one has signed it. Besides this, if the agreement is not completed by the finance house at the same time, not only is one given a copy of the document one actually signs, but also, when the agreement has finally been "made" (i.e., when the finance house or its agent signs), within seven days one must be sent a copy of this agreement also.

Another point, which is not new, is that the owner or seller must declare the cash price of the goods in writing. It is not good enough for the cash price simply to be declared in the agreement (although it must contain it).

Incidentally, it is well worth calculating just how much will be paid in "service charges". It is likely to be very much cheaper to save the money and to be able to pay for the equipment in cash.

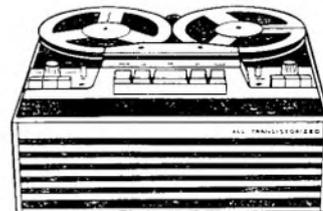
The rate which will be quoted will be on an annual basis. This means that if the repayments will be made over a period of two years, this rate should be doubled.

Bear in mind, too, that this is not the true rate of interest for the credit given. For the service charge is calculated on the total amount outstanding at the outset. Since the repayments will be made at

(continued on page 40)

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Grundig TK14 ...	3 13 6	2 15 2	35
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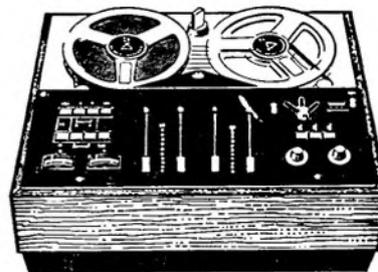
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Uher 4000S ...	9 16 0	7 6 5	93
Ficord 202 ...	7 0 0	5 3 10	66
Grundig TK6 ...	6 17 0	5 2 4	65
Butoba MT5 ...	6 4 0	4 12 11	59
Telefunken 300 ...	6 4 0	4 12 11	59
Optacord 414Bat/Mains	4 19 0	3 14 0	47
Nat'l Voice Operated	4 14 0	3 9 2	44
Philips EL3586 ...	2 16 6	2 0 10	26



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TAPE RECORDER SERVICE

NO. 38 CLARKE & SMITH 634 / 635

BY H. W. HELLYER

LAST month's dissertation on the *Truvox* 80 range of decks leads us to a type of machine which uses the '80' deck in conjunction with some extremely well-built circuitry. An additional attraction, from the technical writer's point of view, is the chance of discussing some of the problems that arise from transistorised, relatively high output, mains-powered equipment.

Not that these problems arise very frequently, it must be said. Although many of these machines have been placed in schools up and down the country, and suffer the hard handling that this implies, remarkably few 'repetitive faults' have been noted. The random faults, caused by component breakdown, or even misuse, can hardly be blamed upon the makers. From my own experience of visits to schools, the principal trouble arises from a lack of staff knowledge in the matching of loudspeakers and other accessories, aggravated by the *Clarke & Smith* technique of allowing for all eventualities. A secondary complaint is that not enough of these excellent machines are produced, leading to waiting lists that are unforgivable in these days of hard competition—but that is a subject which exceeds my present brief.

The TR634 has the *Wearite Series 4* deck, while the TR635 uses the *Truvox D82*. Otherwise, the two machines are similar, housed in sturdy light oak cabinets with large carrying handles. The handles are hinged to the sides of the deck, and release of the four base screws enables the complete deck with amplifiers to be lifted, by handle, the recess at the rear of the deckplate enabling completely free access to the innards. The service engineer may offer up a prayer of thanks to the designer.

Specifications of each machine are to some extent dependent on the deck. Common points are: speeds— $7\frac{1}{2}$ and $3\frac{3}{8}$ i/s; consumption—120W; $\frac{1}{4}$ -track; signal-to-noise ratio at $7\frac{1}{2}$ i/s is 50dB unweighted; record-level indicator—meter; power output—10W; distortion—less than 1% at 1 Kc/s at 10W; continuously variable bass and treble tone controls fitted to the replay amplifier. Input sensitivity is 1mV at 300K, suitable for crystal, ceramic, or moving-coil (high impedance type) microphone. Second input is a low impedance match, with 10μ V sensitivity, suitable for 15-30 ohms ribbon or moving-coil

microphone, balanced input. Third input has a sensitivity of 60mV at 0.5 Meg.

Output facilities are comprehensive. No. 1 is a normal 15-ohm output for direct loudspeaker connection. No. 2 is the 70V line and No. 3 gives 1V at 5K. The internal 9×5 in. speaker is disconnected automatically when either the No. 1 or No. 2 output is in use. The 70V line is used to feed a public address system in the usual manner, a popular method in the schools being line-source speakers with inbuilt matching transformers, separate A-B-off switching and attenuators so that a complete range of central and remote control can be obtained.

The differences mentioned above are as follows: Spool size: the 634 uses standard cine spools of up to 8 $\frac{1}{2}$ in. diameter, the 635 having a maximum spool size of 7in. Fast wind time for the 634 is less than one minute for 1,750ft. of standard play tape, and for the 635, less than one minute for 1,200ft.

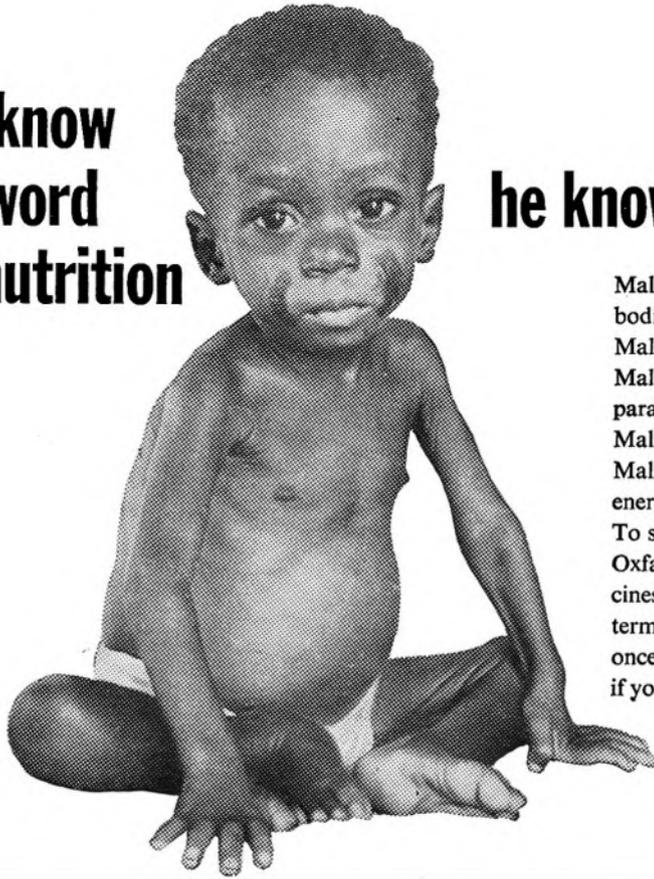
Wow and Flutter: 634, at $7\frac{1}{2}$ i/s, better than 0.16%,
635, at $7\frac{1}{2}$ i/s, better than 0.1%,
634, at $3\frac{3}{8}$ i/s, better than 0.2%, and
635, at $3\frac{3}{8}$ i/s, better than 0.15%.

The frequency response of the amplifiers (there being separate record and replay amplifiers), is given as 50 c/s—15 Kc/s ± 3 dB, at $7\frac{1}{2}$ i/s, up to 9 Kc/s at $3\frac{3}{8}$ i/s, with recording characteristic to CCIR specifications and replay characteristic 120μ S. Tape distortion is given as 3% third harmonic at 1 Kc/s for peak recording level.

This question of peak recording level is one that has vexed a number of users—admittedly not experienced tape recording enthusiasts—and also some readers who have evidently not digested some of the excellent articles that have been appearing on the subject of peak programme, VU-meters, and magic eyes, etc. More about this later. For the moment, let us take a look at the circuit as a whole before picking out the specific points that relate to service problems. For obvious reasons,

(continued on page 31)

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it is not possible to give a complete circuit, but the block diagram of fig. 1 shows the signal path and some of the switching relevant to this discussion.

To run through this circuit briefly, the recording input is applied to the first transistor, an OC 306/2 in the grounded-emitter mode, and passed to another, similar, stage VT2. An interesting point is that the necessary high impedance input for crystal or ceramic microphone is achieved by the jack switching. When the microphone plug is inserted, the secondary of the low impedance input transformer T1 is disconnected from the base of VT1 and another contact on the socket isolates the 10 μ F emitter decoupling capacitor from chassis. The high impedance input is then coupled to the base of the transistor via a 0.05 μ F capacitor, but since the collector is now earthed as far as AC is concerned, the stage operates in the grounded-collector mode to provide the necessary matching. Readers who have been experiencing some problems with mixer construction may be interested in this solution, which nevertheless requires the use of three-pole jacks in place of the usual GPO types for the low-impedance input.

The output from the second stage is taken, via the microphone gain control, to the base of VT4, another grounded-emitter stage. The auxiliary input has its own pre-amplifier, VT3, and separate gain control, and the output of VT3 is also applied to the fourth stage. Again, as the auxiliary input is at high impedance, VT3 must be operated in the grounded-collector mode. The two outputs are divided by being fed across what is virtually a potentiometer formed by two 22K resistors.

Frequency-selective feedback is applied across VT4, with an additional measure of boost, the turnover point being operated by the speed-change switch on the tape deck.

The recording output stage is a two-transistor combination, with VT5 and VT6 operating in grounded-emitter and grounded-base mode respectively. The former is an OC71 and the latter an OC84. The recording head is fed from a transformer in the collector circuit of VT6, via a bias trap, consisting of a tuned circuit, with adjustable core coil and fixed 120 pF capacitor.

Bias and erase voltage is supplied by the push-pull pair VT7 and VT8, the frequency being approximately 50 Kc/s. Superimposition is afforded by disconnection of the erase head, when a 5.6K resistor is substituted to maintain correct loading, and the 0.005 μ F capacitor normally across the erase head for tuning purposes is disconnected in order that the oscillator frequency shall not be affected. A variable 460 pF capacitor is provided for bias adjustment.

Either the input signal or the recorded signal can be monitored by selection either of the output of VT5 or the signal from the replay head via the complete amplifier (this demands a three-head system).

The replay channel is fairly straightforward. Signals from the head are applied to the grounded-emitter OC306/2 transistor VT9. A 1,000 pF capacitor is put across this input to cut out signals that the makers quaintly describe in their literature as "frequencies above the audio range of the recorder", ostensibly to prevent bias breakthrough. But readers who have been vexed with the Light Programme inexplicably asserting itself when all else is quiet will not overlook this small point.

Equalisation is achieved by a feedback circuit across VT10. After the monitor switch, the signals are again amplified by a grounded-emitter stage, VT11, and VT12 provides the necessary tone circuitry. From the output of this OC84, the signals are fed either to the high-level output, to power an external amplifier in the normal way, independent of the gain (volume) control, or to the power amplifier.

The power amplifier is DC-connected and both AC and DC feedback are incorporated. AC feedback is, of course, familiar to readers as a measure which attempts to reduce distortion, but DC feedback in this instance has the more direct purpose of stabilising the amplifier under conditions of varying temperature. VT15 is a grounded-emitter amplifier, its output directly coupled to the base of VT16, in the same configuration. The amplified output is taken to a complementary p-n-p/n-p-n pair, VT17 and VT18, providing the necessary phase-splitting for application to the push-pull output stages VT19, VT20.

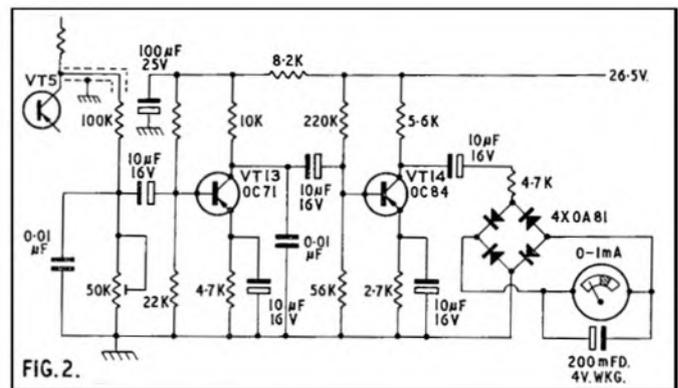
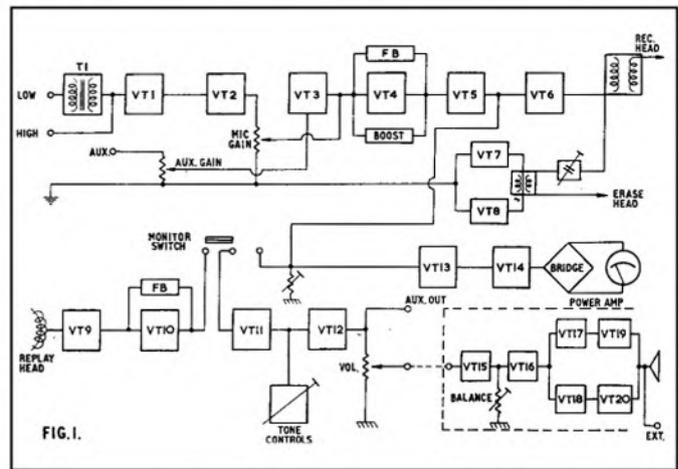
One method of feedback that is of interest is the inclusion of an OC81 in the collector load of VT16. In the circuit this might appear to have little significance, being simply connected as a diode, but its

physical position is important. It is mounted near one of the OC35 output transistors, and as the power output changes so does the junction temperature and conduction of the OC81, stabilising the operating conditions.

The one particular snag when servicing the power amplifier of this machine is that anything at all which affects the DC conditions will give misleading results on test, as the DC coupling makes the whole circuit voltage-dependent. A special servicing technique is required, with reference to the maker's data.

First, the voltages must be checked, then the transistors tested. Then the first two stages should be isolated and correct operating voltages simulated by replacing the collector lead of VT16 with a 1K potentiometer, the slider being taken to the base of VT18 and the other two ends being taken to the negative rail and to chassis. Then the slider is adjusted for a base voltage of 13.4V. If the voltages in the following stages are correct, the fault must lie earlier. Similar test methods to isolate stages may suggest themselves to readers, and no doubt our keen amplifier constructors may have something to say on the subject.

Some servicing points that need noting are the correct bias settings and certain modifications to allow for special conditions. I have been accused of placing too much emphasis on bias—and, to be sure, with many of the cheaper machines, all one is concerned about is whether



the bias is present. But high quality recordings cannot be obtained unless the bias, waveform is pure, the amplitude correct, and the constancy of the bias, under varying load conditions, within close limits. On the machine under consideration, very good results are obtainable, if maintenance and correct adjustment are properly done. The maker's advice is as follows:

Set the deck to RECORD, adjust the bias trimmer at the rear of the oscillator section to give a valve-voltmeter reading at the record head of 33V (using VVM with diode probe). Feed in 1 Kc/s at 20mV to the AUX. IN socket. Using the monitor facility, record this tone on the tape and, while recording, set the azimuth for maximum output at

(continued on page 40)

OUR SUGGESTION that readers might care to submit their specifications for an 'Ideal Tape Recorder' seems to have aroused considerable enthusiasm—we are delighted at the response. The following pages are devoted to some of these letters as we believe they serve the double purpose of showing the facilities which readers would like on their equipment (though they are an optimistic lot when it comes to paying for them) as well as illustrating the features of many present machines that could well be eliminated. The letters tend to show, however, that their writers are rather biased towards expensive equipment (10in. spools seem to be coming back into fashion). Though our correspondents might be able to afford pricey machines, they would be completely out of reach of the average amateur recordist. We know from various manufacturers that Mr. Taylor's "plastic shells with pretty gold trims" are an important factor contributory to quick sales of domestic equipment. Few professional recorders have a particularly neat and natty appearance (though some of the modern *Studer*, *Philips* and *Leavers-Rich* machines might be so labelled), but ugliness is in no way a virtue and may reflect badly-made internal mechanism. Two of the most reliable recorders in the semi-professional category, the *Tandbergs* 6 and 7, have a very 'pretty' layout indeed. This should not bias the future purchaser in favour of sprawling bulkiness.

But we must let the future purchasers speak for themselves . . .

NOT PERFECT BUT DESIRABLE

From: J. S. C. Gadrey, 181 Orchard Way, Beckenham, Kent.

DEAR SIR, As asked for in your Editorial of November, here are some ideas for an, if not perfect, at least desirable tape recorder.

I will assume such things as good frequency response and dynamic range, quiet motor with good speed stability (number of motors does not matter) and good fast-wind, preferably not using belts, or using ones not yet developed which do not slip and will last twenty years and upwards!

Now for the other features: Two tracks with space for extra heads to accommodate, at a date after purchase, such features as $\frac{1}{2}$ -track recording, off-the-tape monitoring and echo. Speeds: $7\frac{1}{2}$ and $3\frac{3}{4}$ i/s. Spool size: 7in. (yes, spools, *not* cassettes or cartridges). Also, calibrated volume and tone controls with separate bass and treble controls, 4W output, perhaps 5W. Facilities for 'add-on' mixing and 'all-on' stereo when one's Premium Bonds pay off. One good speaker with, of course, output for external speakers or headphones.

Sockets should be both three-pin DIN and British Jack, so that nearly all equipment of the right impedance could be used. These sockets should be mounted side-by-side. Modulation indicator should be a good magic eye or PPM.

The deck should be push-button operated with light controls, easy access to heads for cleaning, editing, etc. It should be a two-way deck if possible within my price range of up to £50 which I might with a push manage.

Yours faithfully.

TO WEIGH LESS THAN 150lb.

From: J. G. D. Pratt, 4 Branstone Road, Kew Gardens, Richmond, Surrey.

DEAR SIR, Your November Editorial calls for specifications for an 'ideal' recorder. When you read mine (set out below) it will perhaps be helpful to consider the background which has influenced me. Firstly, some peculiarity in my hearing rules out any possibility of enjoying stereo; this seems to be now quite settled, after correspondence with John Crabbe and a visit to Mr. J. Enock (an expert on stereophony) of Ealing. Secondly, my own equipment consists of a Revox F.36 together with Quad amplifiers and speakers.

The machine must provide good mono, and must not allow this to be spoiled by facilities for stereo or any attempt to produce a 'universal' recorder capable of doing everything. So— $\frac{1}{2}$ -track mono operation at $7\frac{1}{2}$ and $3\frac{3}{4}$ i/s. Spool diameter of 10 $\frac{1}{2}$ in. Three $\frac{1}{2}$ -track heads. Cathode-follower playback output for external amplifier. Monitor output to headphones of input or recorded signal. Mechanically very quiet (this is an almost universal fault in contemporary machines). Peak programme circuit driving either a meter or a magic eye. Adjustable speed for fast forward and rewind. Either knobs or buttons—no edge controls. A reasonably inaccessible safety switch to make record and erase functions inoperative, so that if anyone else uses the recorder they cannot possibly ruin my precious tapes. Heads and capstan readily accessible without tools for cleaning, and good layout for editing. No possibility of damaging the machine by misuse of the controls (e.g., changing speed on Revox with tape transport running). Weight to be less than 150lb. so that the machine is easily moveable single handed. There is no point in struggling to keep below 100lb.

Price under £250. No built-in loudspeaker, which is useless. No built-in mixing facilities, which are much better provided as a separate unit. No facilities for easy adjustment of bias; it is perfectly easy to stick to one kind of tape.

I suppose the only fair comment on that lot is that I don't want a domestic recorder at all, but a good one!

Yours faithfully.

RUGGED, RELIABLE, BUT NO PLASTIC TRIMMING

From: D. Taylor, 278 Bournemouth Park Road, Southend-on-Sea, Essex.

DEAR SIR, In response to your Editorial in the November issue I have listed 'my' machine if I could buy one. As yet I can't, or at least not with the reliability I require at the price I want to pay.

I do not like the Continental approach to swathing single-motored inadequate works in plastic shells with pretty gold trim (I have only



used one single-motor machine with which I have been satisfied—a delightful machine (at 110 gns), the Tandberg Series 6).

The complicated mixing of electronics and mechanics in some of these Continental recorders is, I think, infuriating—especially if one has to remove valves, as I did with my first tape recorder, to replace a belt. I like to see the amplifier mounted entirely separately from the deck.

I purposely left frequency response out of my list as I feel that far too much importance is attached to this. A response virtually flat to 10 Kc/s is nice, yes, but not if it then peaks and dips its way to 18 Kc/s. It is no good manufacturers quoting a response of x c/s to 18 Kc/s ± 3 dB (if they bother to quote the all-essential limits at all),

since for my part I would sooner do without this rough (probably highly distorted) band between 10 and 18 Kc/s. In this instance I would much prefer a smooth roll-off to 15 Kc/s.

It is interesting to note that, excepting live recordings in which only the minority of the tape recording fraternity indulge, there is little for us to record above 12 Kc/s anyway, unless one treads on the copyright laws!

Finally, with regard to reliability, there is far too much rubbish about, as you say in your Editorial; unfortunately this does not mean that only cheap equipment is troublesome. For instance: A friend of mine bought a high quality machine costing some £90 (which received an excellent review from *Tape Recorder*). Within twenty minutes of switching on, the take-up motor burnt out with much smoke and a large bang. Problem repaired, a little more use and the output valve goes. In a period of less than eighteen months since then, it has been on the work-bench five times, and has truly been out of action for a longer time than it has been working. This was a machine one would expect to work every time—it makes one lose faith in British so-called workmanship.

Suggested specification: Speeds: $7\frac{1}{2}$ and $3\frac{3}{4}$ i/s only. Spool capacity 7in. with lid closed. Wow and flutter: 0.15% peak-to-peak at $7\frac{1}{2}$ i/s. Signal-to-noise ratio: —50dB. Manual gain independently acting on microphone and gram inputs (internal mixer). Sensibly damped level meter. Fast rewind time of sixty seconds for 1,200ft. reel. Accurate four-digit counter. Choice of polished wood (furniture) or Rexine covered (portable) cases. Plug-in head sockets pre-wired to external sockets for easy conversion to stereo. All parts separated by easy plug-in connections (à la Brenell). Push-pull output of not less than 6W from transistorised amplifier (transformerless). High standard of reliability. Price: £60-£70.

Yours faithfully.

CHEAP AT THE (SUGGESTED) PRICE

From: E. W. Walker, 58 The Brambles, London Road, Salisbury, Wilts.

DEAR SIR, My ideal tape recorder! It is seven years and four recorders since I made my first purchase and I know exactly what sort of instrument I require. It should not be difficult to construct, because almost everything in it is already in production and incorporated in some recorder or another. The problem would be getting a firm to assemble all the best parts and incorporate all the best techniques into one near-perfect machine.

The recorder should be available either as a table or suitcase model. There would be a choice of two kinds of wood for the table model; and the hinged lid of both models would be so designed that it could be removed without dragging the recorder into the middle of the room. The carrying handle on the suitcase model would be at the side, not the front, when the recorder was operated.

I have owned only one $\frac{1}{2}$ -track recorder and I am now an inveterate $\frac{1}{2}$ -track man! From experience of speeds varying from $\frac{1}{8}$ i/s to 15 i/s, I will be content with $3\frac{3}{4}$ and $7\frac{1}{2}$ i/s; at anything less than $3\frac{3}{4}$ i/s the restricted frequency range renders music hopeless and speech flat, and 15 i/s is a luxury speed I cannot afford—and wouldn't, even if I were a millionaire; it has so little to offer.

To keep down costs I would be satisfied with only one motor—but only the best. I would insist on idlers to drive the spools—the only

in fast winding where the tape looks like a squashed concertina.

On one of my recorders (it cost nearly £80) there are ten obstructions—perhaps I should call them obstacles!—to negotiate when threading the tape. If it is necessary to turn over the spools before reaching the end of the tape, it is almost impossible to do so without damaging the tape: it gets looped around or under the pressure pads, fouls the tape guides, slides over the top of the record playback head—I repeat there are ten obstacles. I have a Sony recorder where there are no obstructions: as soon as the function knob is turned to OFF everything in front of the heads is folded down so that the tape is quite clear. I would have this particular layout for my ideal recorder.

I do not require facilities for echo, superimposition, etc., but I would want the tape drive so designed that when the pause control is used, stop and start are instantaneous. Control knobs would be man size, not these three-quarter inch finger-breaking monstrosities. And I would expect them to have soft metal set-screws so that they would remain fast to the spindle and not have to be screwed up every few hours.

The head covers should be of the clip-on variety, to enable the heads to be cleaned—an elementary requirement, but one missing from many quality recorders. And the plastic material should be durable, scratch resistant and so coloured that it does not always look grubby. The tape deck itself should be covered with washable plastic material; I am against metal decks, as they nearly always appear scratched, dusty and fly-blown.

With the single exception of the microphone plug, I would want all inputs and outputs grouped at the back of the recorder. I dislike the front of the instrument festooned with wires. And I would stipulate plugs of the Continental DIN design; I object to ordinary jack plugs where positive points contact earth points every time the plug is inserted or removed. I should expect the suitcase model to have a decent internal loudspeaker system. But I would only ask for a simple monitoring loudspeaker in the table model. The latter should also have an output transformer covering 3, 7 and 15 ohm extension speakers. I should also like facilities for internal three-channel mixing of high level input signals.

As I am not an electronics expert, I have avoided any mention of this side of a recorder. But as all four of the instruments I have owned have, from the electronics point of view, been excellent, there is little I could say. In my humble view, it is the mechanical side of the recorder which invites criticism—and a very great deal of it. But if some manufacturer—or perhaps 'assembler'—will turn out a recorder which is more or less in line with my ideal, I will be his first customer. The price? Shall we say £85? (with microphone and tape).

Yours faithfully.

BASED ON THE BRENNEL

From: Geoffrey R. Cunliffe, 16 Beach Avenue, Fairhaven, Lytham St. Annes, Lancashire.

DEAR SIR, I do a fair amount of recording of various types, from weddings to synchronised cine sound tracks, and I have a fairly clear idea of what would be my ideal machine. It is fairly ambitious, but I hope that my suggestions are the sort which you had in mind when you wrote the Editorial in your November issue.

Starting with the deck: Four speeds—15 i/s for quality, $7\frac{1}{2}$ i/s for

SOME READERS' VIEWS AND OPINIONS

belt in my machine would be driving the turns counter. The turns counter would be linked to the capstan and the capstan would have stroboscopic graduations for each speed. Also, it would be possible to make minor adjustments to the speed of the transport system.

I would keep to 7in. spools with threading slits in the flanges, not the cores. I should also keep to spools holding 1,800ft. of tape. If they contain more, too much time and wear is spent in fast winding to find the particular recording required. The spool carrier would have a diameter of not less than $2\frac{1}{4}$ in. to prevent the spool from rocking and giving bad tape wind. The recorder would be expected to fast re-wind an 1,800ft. tape in 90 seconds—and wind it neatly. I am not interested

average domestic, $3\frac{3}{4}$ i/s for the masses, and $1\frac{1}{8}$ i/s for effects for cine sound tracks; $\frac{1}{2}$ -track operation; spools of up to 10 $\frac{1}{2}$ in. diameter with retainers to prevent them falling off when transporting the machine; variable speed on fast spooling, with back tension applied to the feeding spool for even winding; levellers and tensioners at both ends of the head covers; pressure pads which swing *completely* clear of the heads for ease of threading and unthreading; heads arranged so that, with the deck switched off but the amplifier on, manual inching is possible for location in dubbing, for which the head covers need to be easily detachable; an *accurate* footage counter, easy to read; coloured
(continued overleaf)



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indicator lamps on the deck to show whether it is switched to record or play; a monitor head to facilitate A/B monitoring for two sets of headphones; all heads easily connected to external amplifiers (an adaptation on my own Brenell which I find invaluable).

The amplifier itself should be of 10W output and have provision for use as a straight-through amplifier; bass and treble controls should be operative on recording as well as playback; the bias should be variable to allow superimposing; a peak programme meter should be fitted, which should be large and easy to read. There should be a built-in transistorised four-channel mixer with large graduated knobs and high/low impedance changeover switching on each channel; readily accessible pre-amp output for dubbing, facilities for cross-track recording, if necessary through the mixer, small built-in speaker for monitoring only and, finally, an internal working light to illuminate all controls in those infuriating dark corners where there is never a room light. Need I add that I should like manual control over the input level!

Ambitious? No, I don't think so really. The majority of the specification would involve only small changes to something like a Brenell Mark V Series II (I only have three Mark I's!) and if production should be started on a standard machine incorporating these features, it should be possible to sell it for about £120, which I would be very willing to pay.

Yours faithfully.

ADD-ON FOR ECONOMY

From: **John A. C. Peel, 454 Walkden Road, Worsley, Walkden, Near Manchester.**

DEAR SIR, On the subject of the 'ideal' tape recorder I would like to point out that, while the manufacturer may not be producing an 'ideal' machine, members of the public are certainly not co-operating with him by making clear their needs.

A friend of mine recently bought a £40 recorder offering mixing, monitoring, stereo output and inter-track transcription, when all he wanted was a machine to play around with. He now complains that there are too many knobs, buttons and sockets which he does not understand. In a case like this the "add-when-you-can" recorder would be the perfect solution, for he would still have good quality sound, having saved several pounds for the omission of those extras he did not need.

I am an advocate of the 3/4-track system and no amount of arguing could ever persuade me that 1/2-track has any advantage. At 3 3/4 i/s one can make recordings which are satisfactory in every way, providing modulation is carefully set and good tape is used.

Yours faithfully.

DEFINITELY NOT CARTRIDGES

From: **682581 Cpl Harnden, 105 Squadron, RAF Khormaksar, BFPO 69.**

DEAR SIR, I am the owner of an Akai M7 and a Telefunken M.300 portable, both of which, I might add, are, in my opinion, excellent machines. May I make the following suggestions for the facilities I would like to have on my 'ideal' machine:—

Full-track for editing and high quality recording with switched 1/2-track. Spool capacity: 7in. (this I find quite adequate now that double and triple play tapes are plentiful). Four speeds: 15, 7 1/2, 3 3/4 and 1 7/8 i/s. Manual gain. Switched 'source' and 'tape' monitor. Headphone and speaker monitoring. Definitely not cartridges as tape recording is a creative pastime which in itself embraces all fields, editing of which is most important, and this is almost impossible to do with a cartridge. 6W output. Very low wow and flutter level. High-level and microphone input mixing facilities are useful, though I have found in practice that if one requires mixing facilities frequently, it is best to have a separate mixing unit (with pre-amp). Finally, a really fast forward wind and rewind, that is completely controllable.

These are some of the features I would like to see on my 'ideal' tape recorder and I realise that this machine would not be cheap, but I feel sure that some enterprising manufacturer could market one at somewhere in the region of £100 to £120, a price which would surely not be exorbitant for such an excellent machine.

Yours faithfully.

equipment reviews

TELEFUNKEN M. 300

MANUFACTURER'S SPECIFICATION : Half-track battery portable recorder. **Power supply:** Five leakproof long-life flashlight batteries, Telefunken *dryfil* storage battery, mains re-charger unit, car battery. **Tape speed:** 3½ i/s. **Spool capacity:** 5in. **Record and erase bias frequency:** 63 Kc/s. Ten Telefunken transistors: AC150, 6 AC122, 3 AC117, AEG10 499 rectifier. **Inputs:** 0.15mV at 2K radio and 0.15V phono. 0.15mV at 2K microphone. **Outputs:** 1.5V from 18K (pre-amplifier), 0.4V at 5K (earphones). **External speaker:** 4.5 ohms. **Signal-to-noise:** 50dB. **Wow and flutter:** ±0.2% peak-to-peak. **Output power:** 1W push-pull. **Distortion:** less than 5%. Built-in loudspeaker muting switch. **Fuse:** 1.6A semi-delay. **Dimensions:** 10½ x 3 x 11in. deep. **Weight:** 8lb. less batteries. **Price:** £61 19s. including TD7 microphone. **Distributor:** Welmecc Corporation, Lonsdale Chambers, 27 Chancery Lane, London, W.C.2.



ONE of the main operating features of this machine is that all controls have been grouped near one end of the rigid built-in carrying handle so that if it is held suitcase fashion in the left hand the first finger can reach all the keys and the thumb falls naturally on the pause control on top of the handle. The gain control is under the handle, and this too can be operated by the thumb or index finger whilst the machine is being carried. It is necessary to tilt the recorder to see the meter type record level indicator, but even this can be done from the carrying position by laying the recorder against the raised knee.

Mechanical noise is extremely low and, with the TD7 omnidirectional microphone held in the right hand, no trace of acoustic motor noise could be detected in recordings made in a quiet room.

Electrical motor noise is also extremely low and could just be heard a few inches from the speaker with the gain control fully advanced with no tape passing the heads. Under actual operating conditions, with the gain control between 5 and 7, even the slightest ambient noise picked up on the microphone completely masks it.

With such an introduction, readers will see my enthusiasm for

the erase head is spring loaded and acts to remove small speed imperfections due to the supply reel load.

The playback characteristic was measured by playing a test-tape recorded to the new BSI and CCIR standard of 140µs time-constant. Fig. 2 shows the response to be smooth and free of head-contour effects within limits of ±2½dB from 100 c/s to 7.5 Kc/s and falling to -10dB at the lowest test frequency of 40 c/s.

System noise, with no tape running, was 37dB below test-tape level.

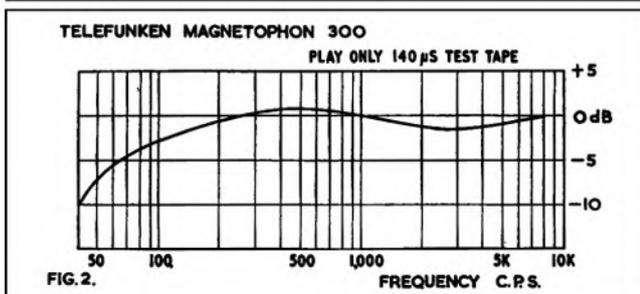
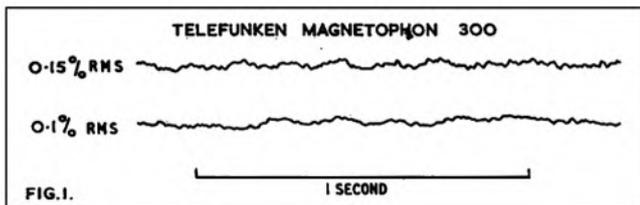
A 500 c/s tone was recorded at various readings of the record level meter, and it was found that a level 12dB above test-tape level was recorded with the needle just entering the red sector of the meter scale. Waveform distortion at this level was negligible, and the reading could be increased by a further 2dB before distortion became obvious. This high-level signal was erased on the machine and the signal/noise ratio found to be 49dB.

Test tones were next recorded at test-tape level to give the response shown in fig. 3. Comparing this with fig. 2 proves that the recording characteristic is to the desired CCIR 140µs time-constant to a high degree of accuracy, and that tapes recorded on this machine will give a level response when played on static installations which are equalised to this characteristic.

The sound quality had sounded slightly 'tubby' on male speech and so the overall electro-acoustic response was taken with the lid open, and with it closed, by recording twenty-five one-third-octave bands of filtered white noise and measuring the sound levels on the speaker axis under these two conditions. Fig. 4 shows the resultant responses. It will be seen that the 6dB peak at 500 c/s accounts for the coloration with the lid closed. With it open, the response falls sharply below 500 c/s, but the response above this frequency is more level. The broad peak at 6-8 Kc/s gives 'wetness' to the recorded sound without exaggerating the sibilant response. It must be remembered that the internal speaker will generally only be used for judging the balance and content of a recording, and that the wide-range low-distortion electrical response can be fed to a high fidelity amplifier and speaker, without disgracing itself, for critical assessment of the recorded quality.

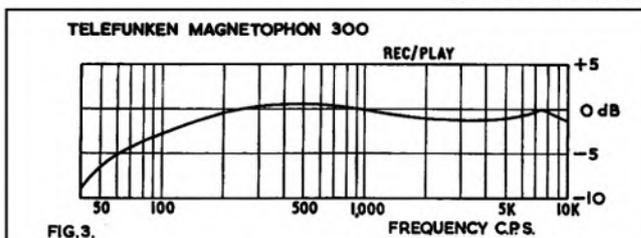
The microphone supplied with this recorder was the TD7 moving coil omnidirectional stick microphone. The response was measured in a white noise sound field and is shown in fig. 5. The response is level from 300 c/s to 7 Kc/s within ±2dB, and falls off gently to 10 Kc/s and more sharply below 160 c/s. This characteristic is very suitable

(continued on page 37)



this little machine beginning to 'show through', and will be wondering if further tests uncovered any outstanding fault which modified my initial impression. I can assure them straight away that my measurements only served to confirm my opinion. Seldom have I tested a recorder where things were so 'right'.

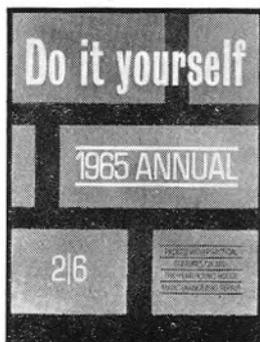
The fluttergrams of fig. 1 show that, under the worst conditions, where the record and replay flutters are in step, only a slight suspicion of a 6 c/s capstan flutter can be detected. On the lower trace some cancellation is evident. RMS readings were 0.15% and 0.1% respectively. Tape flutter is extremely low as friction has been reduced to a minimum by placing a rotating roller between the erase and playback heads and by eliminating pressure pads by using metal pins to wrap the tape around the faces of the heads. The pin following



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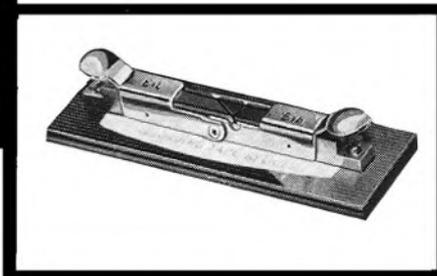


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CHNS 13

for wide-range speech recording with some suppression of low frequency room effects. For music and certain sound effects a ribbon or dynamic microphone with an extended bass response would be more suitable if the tapes are to be played through wide-range equipment. It is obvious from fig. 4 that the difference in frequency response would not be audible on the recorder's internal speaker, but variations in the polar or directional responses would still be audible as changes in reverberation content.

This was one of the few recorders reviewed recently which was provided with a circuit diagram, and very interesting it proved to be. A straightforward fully temperature-stabilised pre-amplifier stage is fed through the gain control to an amplifier/emitter-follower/amplifier configuration with direct coupling between stages. Frequency-selective negative feedback is applied around this circuit to provide recording and playback equalisation. The playback push-pull output stage is divided into a single-ended bias and erase oscillator, and a record level meter amplifier, during record.

A further transistor is used to stabilise, and smooth, the HT voltage on the first two stages. The use of a transistor at this point reduces considerably any ripple or noise from the main HT line, with considerable economy in smoothing capacitors.

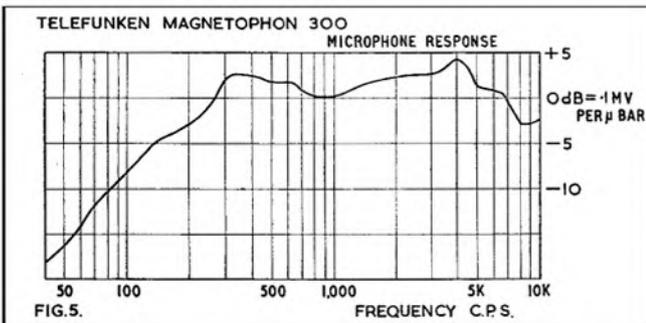
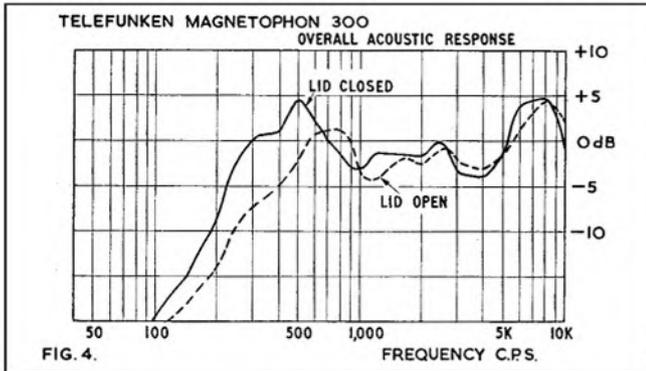
Finally the motor governor operates through the now popular high frequency control circuit described in earlier reviews. The governor contact periodically short-circuits a winding in a high frequency oscillator to reduce the amplitude of the high frequency signal. This HF signal is rectified by a second transistor to provide a slowly changing bias on a power emitter-follower which feeds the main motor winding. Needless to say, the motor is thoroughly screened and filtered at LF and radio frequencies.

COMMENT

This is a thoroughly workman-like job, which does exactly what it is designed to do, without fuss and with an apparent simplicity which is very deceptive.

I can do no more than thoroughly recommend it to anyone looking for a fixed-speed portable recorder, free of gimmicks and gadgets, which will produce tapes worth playing on semi-professional fixed installations, having due regard for the known limitations imposed by the chosen tape speed of 3 3/4 i/s. I am sure that such tapes would be an eye-opener to those who base their estimate of 3 3/4 i/s quality on mass-produced tape records or the output of inferior machines.

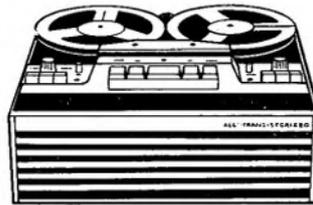
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Readers encountering trouble with their tape equipment are invited to write to the editorial office for advice, marking their envelopes "Readers' Problems—Tape". Replies will be sent by post and items of general interest may also be published in this column at a later date. This service does not, however, include requests for information about manufacturers' products when this is obviously obtainable from the makers themselves. Queries must be reasonably short and to the point, limited to one subject whenever possible. In no circumstances should such letters be confused with references to matters requiring attention from other departments at this address. We cannot undertake to answer readers' queries by telephone.

CONNECTING A PROJECTOR

Dear Sir, I have experienced some difficulty when trying to connect a Philips EL3541 tape recorder to the microphone input of a Bell & Howell cine projector (Model 631). The output from the recorder pre-amp is 2V at 50 K, and the projector's microphone input is about 40mV. When I advance the volume control a little, the noise produced is overwhelming, even in a large room. Could you please suggest some means of attenuating the input?

Yours faithfully, J.L.H., York.

The problem of reducing the output of a Philips EL3541 to match the input requirements of your projector is largely one of attenuation. Matching problems should not be very great.

You mention that you are connecting to the microphone input of the projector, but surely you need to inject your signal at the high-impedance input (relatively high, that is, 100K).

You could use a 50K or 100K potentiometer, with the EL3541 connected to the outer tags, and the projector tapped, via a 100K resistor, from the common or centre tag (slider). Then play your recording at the normal level and attenuate by altering the slider.

DEFINITIONS

Dear Sir, I read with interest your article "Towards Better Taping", but am always puzzled by the expression 'Domestic Recorder'. What is a domestic recorder? I use a Ferrograph 5A playing back into a 10in. Golden Wharfedale in W.B. Prelude cabinet. Is this such a set-up, and if so where does one draw the line?

Yours faithfully, K.S.P., Cambridge.

Defining the domestic tape recorder is rather like trying to describe the family car. In the words of our late celebrated friend Dr. Joad, "It all depends . . ."

Generally, a domestic recorder is one produced for the competitive commercial market, as opposed to the more ambitious machine, with closer tolerances, made in smaller quantities.

Year books and catalogues are generally divided into lists of domestic, semi-professional, and professional machines. The last are highly specialised and rather pricey. Your particular equipment would come more into the semi-professional class, although it should be said that the growing interest in tape recording has made the manufacturers turn out much higher quality machines at reasonable prices, so that many 'domestic' set-ups now incorporate equipment that only a year or two ago would have been regarded as of professional standard.

DAMAGING TAPE RECORDS

Dear Sir, On pre-recorded tapes that I have purchased I always find a few very short gaps in the recording, sometimes occurring close together; this spoils otherwise perfect reproduction. I do get the same fault on my own tapes but much less frequently. Could the fault be in the tapes or due to my recorder (Cossor 1604, 1-track), or due to metallic objects being placed near the tapes?

Yours faithfully, C.R., South Woodford.

Most firms supplying tape records provide a 'Return Clause' in their purchase form. If the tape seems faulty you should give details, either referring to the part of the tape by giving details of the recorded passage, or by the digital indicator position. Unfortunately, such are the diffi-

(continued overleaf)

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READERS' PROBLEMS CONTINUED

culties of mass tape copying, that 'drop-out' does often seem to be on the pre-recorded tapes themselves. But first, make sure it really is the tape. If the fault always appears at the same passage of music—to the last flick of a baton, so to speak—the tape must be at fault. The tape recorder does not react quite so exactly to physical discrepancies as to identify an inch of tape in 1,200 ft., unless you select the spot, say at the near commencement or near end of the tape; it may be due to incorrect drive, excessive clutch tension, etc. Unlikely, but possible. The Cossor 1604 is unlikely to be guilty in this respect—and if it is, precisely the same symptoms would occur on TRACK 3 as TRACK 1.

Tapes stored in one position for too long can give trouble such as you describe. It is a wise precaution to run the tapes through now and again, even if this means only fast winding and rewind. Print-through is prevented and a fault due to stickiness—something that may occur in the best regulated circles—can be obviated. Metallic objects should not be placed near tapes. Even a slight regular movement or knock on a metallic object can impart some magnetic direction to it.

TAPE RECORDER SERVICE CONTINUED

the highest speed, as measured at the output of the replay amplifier.

Next, record bands of frequencies at 1 Kc/s, 5 Kc/s, 10 Kc/s and 15 Kc/s at an input of 8mV. Play back these recorded bands and note that none should give an output at the AUX. OUT socket more than 3dB above or below that of the 1 Kc/s band. If the response is found to be outside these limits at the upper end, it may be necessary to replace the 0.002μF feedback capacitor (from speed-change switch to base of VT4) with a 0.001, or even dispense with it altogether, depending on whether the response matches the particular tape to be used.

The bias voltage should be between 25 and 40V. If better high frequency response is needed when using the 3½ i/s speed only, it is possible to decrease the bias voltage slightly, but 22V is the lower limit for effective work. An increase in HF response at 3½ i/s can also be effected by increasing the other feedback capacitor to the base of VT4, at present 0.0015μF, to 0.005μF.

A modification that has been brought to my notice while preparing this article is the addition of extra capacity across the zener diode which is part of the series stabilisation circuit of the power supply. There have been cases of the stabilising transistors failing due to excessive potential between base and emitter before the charge condenser reaches full working value. Something like 64 or 100μF across the zener diode, observing correct polarity, should be fitted.

Observant readers may have noticed one strange omission. No mention has been made of the record level indicator or its circuit. This is because, in answer to several queries, it was decided to deal with it separately. The circuit of the meter and an interesting amplifier used to feed it with the signal from the collector of VT5, are shown in fig. 2. The output at this point is fed to a potential divider, the bottom leg of which is the preset adjuster and coupled to the base of VT13, an OC71 in grounded-emitter mode. The output from the collector is taken to the second amplifier, VT14, an OC84, and thence to the bridge rectifier. The meter thus receives a DC output proportional to the signal. The two 0.01 μF capacitors act as decouplers, preventing bias signals from causing false readings.

As a final note, it should be remembered that this type of meter does not register every small peak, but 'builds up' to a level reading. A 60% recording level is needed.

HIRE PURCHASE CONTINUED

monthly intervals, on average, only half the total amount will be outstanding. Although there are formulae for calculating the true rate of interest, it is near enough for all practical purposes to double the rate quoted. Certainly this is the procedure which should be adopted if the rate is to be compared with a rate from a bank. Besides which, in the latter case, the interest charged is allowable in full for relief of income tax.

In view of this, it can be seen that, when considering credit of any kind, a good maxim is not to obtain as much credit as possible, but, instead, as little as one really needs.

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Advertisements for this section must be pre-paid. The rate is 6d. per word (private), minimum 7s. 6d. Box Nos. 1s. 6d. extra; trade rates 9d. per word, minimum 12s. Box Nos. 2s. extra. Copy and remittance for advertisements in **MARCH 1955** issue must reach these offices by **21st JANUARY** addressed to: The Advertisement Manager, Tape Recorder, Link House, Dingwall Avenue, Croydon, Surrey.

Replies to Box Nos. should be addressed to the Advertisement Manager, Tape Recorder, Link House, Dingwall Avenue, Croydon, Surrey, and the box no. quoted on the outside of the envelope. The district after box no. indicates its locality.

PERSONAL

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Grundig TK 25 Tape Recorder, 1960 model but almost unused. Cost £65. Price £35. Phone Liphook 2014.

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