Nerve centre of broadcasting in Britain—Broadcasting House, London, W.1

Your RADIO and TELEVISION

How to make the most of them

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When a play is broadcast, the cast gather round a microphone in the studio, within sight of the producer and senior programme engineer—in this case seated in the control room visible through the window.

How to listen and look

ELKAN ALLAN

HOW to listen and look! Wouldn't any advice on this subject be superfluous? Surely you just use your ears and eyes.

But it is not as simple as that. Listening and looking are active occupations: if they degenerate to the passive counterparts of hearing and seeing—as they often do in the case of radio, and sometimes of television—the value of the entertainment is greatly reduced.

Because radio is now so familiar, it is no longer treated with respect. Familiarity has never more easily bred contempt than in this case. Instead of being excited and gratified by the very sound of music, we are today so used to having comedians, plays, orchestras and solo performances at the flick of the wrist that we rarely take the trouble to pay them proper attention.

The result is that the sound of radio has more and more become just another background in our life: like the noise of traffic or the wind in the trees. That sense of relief which is so often felt when the radio is turned off betrays the fact that the "listeners" had merely tolerated this noise, and would have been happier if the radio had never been on.

To turn on the radio is a compulsive action on the part of so many people: they do it immediately they enter a room, almost as though they feared to be without the reassurance of its noise. What is being broadcast matters little. As programmes change, jazz becomes speech, and speech becomes a symphony, and the symphony becomes a play. They let it drone on and on without listening to any of it, hearing some, and resisting more.

This is, fortunately, not yet true of television, which still retains the novelty of a new art-form. Yet even here the hypnotic flickering of the square panel is as often seen as looked at.

Café proprietors who leave their sets droning in the background all day and night are among the worst contributors to radio-apathy. And there are families who literally never switch off their radio!

To make the best of a radio programme it is necessary to sit quietly and comfortably ; the other requirement is that one should listen attentively until the programme ends and the receiver is switched off.

They find that it wakes them conveniently in the morning, provides an acceptable background to their daily lives and, when they are out, fools burglars into thinking they are still in.

This sort of attitude towards the radio is ungrateful, to say the least. The wireless, like all other pleasures, is the better for discrimination, but this quality of choice is strangely lacking in its employment.

Because of the shortage of wavelengths in the country, only three services for all the varying tastes are possible. But even if the BBC had fifty wavelengths, it could not provide whole slabs of programmes of high interest, because each of us has individual tastes. It would take 48,000,000 channels to allow the 48,000,000 people in Great Britain the luxury of sitting back and enjoying *everything* that came out of their radio sets.

The same applies to television, but is even more acute there when only one programme is available; this provides no choice at all. So if one doesn't like the television programme that is on, one can only switch off or, assessing it from the description in the *Radio Times*, just not switch on. But we know from the statistical evidence that the majority of people with television sets tend to sit and watch whatever is given them.

With sound-only radio the choice is fairly wide and is not restricted merely to British programmes, so the sensible way to listen is to exercise that freedom of choice. This is not so easy to do, as the inertia which overcomes a person in the same room as a radio is surprisingly great, and it is often very difficult to summon up the will to turn the knob which will produce a different programme, or that which will ensure silence. But too many people are like those owners of large dogs who begin by taking their dogs for a walk and finish up with the dogs taking them! It does need some effort to master the radio, but extreme efforts are worth while to counter the insidious power of the machine.

The originators of the programmes make their contribution, and it is necessary for those at the receiving end to make a corresponding effort. Perhaps the best way is to adopt a rigid procedure, which, while it may never be kept completely, provides a basis for real radio appreciation, and it is very well worth doing.

Television is usually followed more attentively than a sound-only programme, if only because most viewers prefer to darken the room. And if the screen is to be watched it is necessary to sit still. There should not be any light falling directly on to the television screen.

It is first necessary, of course, to have as good a radio set as the listener can afford. The difference in tone and clarity between poor receivers and good ones—particularly in the reproduction of music—is almost unbelievable until one compares them in the same room. Money is always an important consideration, but if, before purchasing, more people compared the price of a cinema seat with what they are proposing to spend on each "visit" to their radio, they might find they could afford a very much better set than they realize.

The cost of listening is surprisingly low. The £1 a year which the licence costs breaks down into approximately two-thirds of a penny a day, and if a radio set lasts a minimum of five years, the cost of even the most expensive in the shop is not dear against the 1*s.* 9*d.* or more for a cinema seat, or the 5*s.* to 15*s.* for a seat at the theatre.

Every set needs a good aerial and earth, a fact which can be easily forgotten in the excitement of plugging in a set for the first time and hearing it reproduce words and music. Accurate tuning is extremely important, but it is surprising how many people do not spend the extra second it takes to centre the pointer on the signal; instead, distorted reproduction is tolerated and the volume control is turned up to compensate for the loss of signal strength. Most sets these days also have a knob for tone control, but, except on the rarest

How the studio audience sees Twenty Questions. *Here the team (with a "guest" in Jack Train's place) is on the left of the stage facing Stewart MacPherson. An attendant shows "the next object."*

The four who ask the questions in Twenty Questions: *Jack Train, Daphne Padel, Anona Winn and Richard Dimbleby. With his back to them is the producer, wearing headphones. Note the soundproof curtains.*

occasions, this may well be left at the highest pitch. This does not at first seem to give the most pleasant sound, but many people who think they prefer the mellow sonorousness of the low one are generally missing a great deal of what their receivers are trying to reproduce for them—all the clarity in fact. The problems of receiver installation and manipulation are explained in greater detail in later chapters.

The arrangement of the room in which the receiver is used is important. The ideal would be a properly designed listening room which is sound-proof, has a couple of comfortable arm-chairs and a settee, and a first-class receiver situated in one of the corners. Ideally, the controls should be on the arm of the listener's chair, and there should be a large notice on the door saying: "Do not disturb." Telephones and the front-door bell should be ignored; in fact, the listener should be treated as though he were in the cinema down the road.

This ideal situation is rarely practicable, but every listener should try to get as close to it as possible. In the living-room, if this is where the listening is done, the arm-chair should be next to the receiver, so that the listener does not have to make that almost impossible walk across the room to switch the set on or off or to change the programme. Curtains should be full and capable of absorbing sound without producing echo. The listener should attempt to discipline the people who share his household into keeping quiet during the programme to which he is paying attention, and he in his turn should respect their choice of programme.

The *Radio Times* is the listeners' best friend. The attentive radio owner glances through it when it arrives, makes a note of any outstanding programmes which catch his eye, and makes a date with his radio for that time on that day. He tries to honour this as though he had tickets for the theatre. (Although there are usually a few good plays in the West End, there are many more on the air.)

During breakfast each morning the conscientious listener studies the day's programmes in the *Radio Times*. Checking over the three services, he circles those items he wants to hear, putting two rings round those programmes which he particularly does not want to miss.

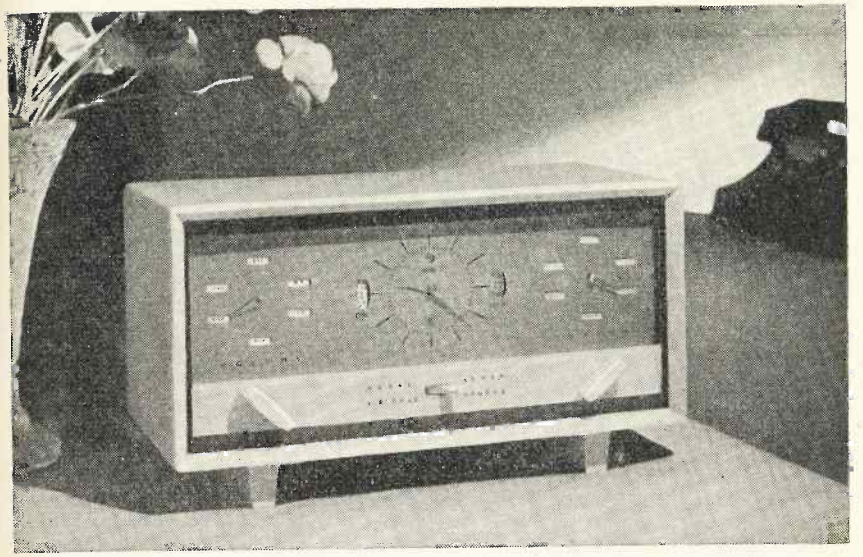
He next turns to a copy of the overseas programmes (before the war *World Radio* used to have them; nowadays, a private paper contains a selection), and notes those European broadcasts he wishes to hear.

When he has heard the end of one of the items marked, he should turn off the radio until the next selected programme is timed to start. Automatic time clocks and automatic receivers now on the market should help him in this; these are pre-set, after which they switch the receiver on—and off—at the desired times.

But it is important not to forget the value of experiment, and sometimes it will be entertaining to ignore the prearranged listening schedule and roam around the dial exploring the unknown.

BBC programme planners plan for listeners who have some discrimination, and while they try to pitch every programme in each of the three services at round about the same intellectual level they do not expect anyone to listen to even a majority of their programmes.

Anyone who has the radio on for more than a few hours daily simply cannot listen attentively to it. Such people should not be called listeners, but hearers. We are all hearers sometimes, but so



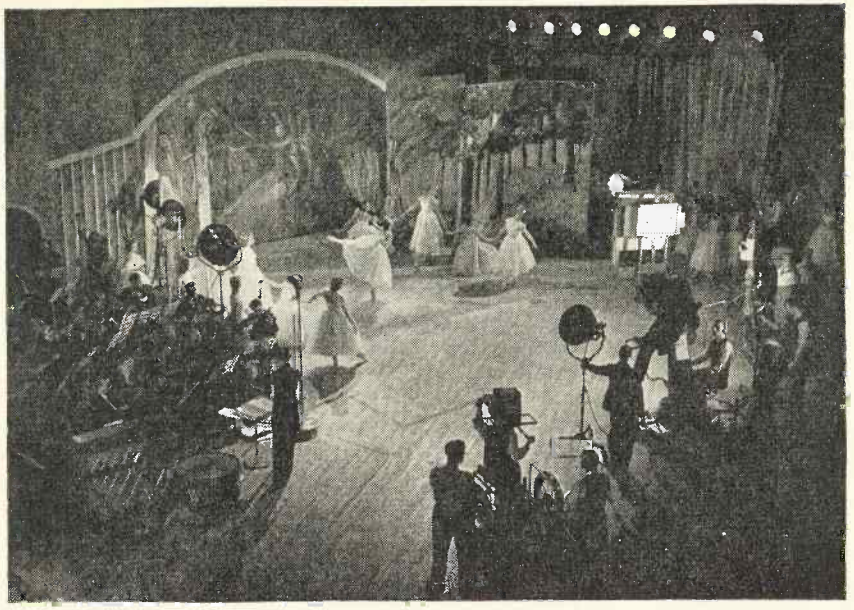
Many listeners spoil their enjoyment of radio by omitting to switch off the set after they have ceased to listen. This little receiver combines the functions of electric clock and radio receiver, and can be so adjusted that it switches itself on, and off, at preselected times.

long as our listening sufficiently outweighs our hearing for us to take an active interest in what our ears are picking up, our listening time is well spent. The hearer who squanders part of his mind on the task of absorbing without digesting is harming his mental equipment.

So, paradoxically, those who get most pleasure from listening to the radio are not those who listen most. For to spend too much time with one's radio is to lose a sense of proportion.

The BBC does all it can to bridge the gap between moods, and the attentive listener will notice how interval music provides a bridge between one programme and the next. Programmes are chosen to be complementary to those which precede and follow them, and in contrast to those on the other Services at the same time.

The BBC, in fact, does its best to help the listener; very few listeners do their best to help the BBC. Considering the size and scope of the BBC, it does a remarkably fine job. It has its faults, but it provides a radio service completely unchallenged by that of any



Television broadcast of Les Sylphides *from a special television studio at Radiolympia. Note the battery of lights, along with television cameras and their operators. The orchestra is out of camera range.*

other country in the world. We have excellent programmes free from advertising matter.

Some of the work of the BBC is explained in the chapters which follow, for a general knowledge of their work will help every listener and viewer to take the utmost advantage of the programmes offered.

It is up to the listener to take full advantage of this service, and the only way he can do so is to recognize his responsibility, choose his listening with skill and care, and give the programmes every opportunity by preparing himself and his surroundings for their best reception.

How radio programmes originate

RICHARD ROWLAND (*Radio Script Writer*)

ALL BBC programmes go on the air only as a result of detailed and careful planning; a multi-sided and extremely complicated business. Basically, it works like this: the production departments—features, drama, talks, variety and so on—put up programmes and suggestions for programmes to the planners. Alternatively, the planners sometimes ask the production departments for programmes of a particular type; perhaps to carry out a certain policy; perhaps to balance the planning schedule in some way.

Planning is thus very much a two-way system. If you think in terms of a pyramid, you have the programme planners at the top—for final decisions as to the inclusion of a programme, although not in detail, rest essentially with them—and along the base of the pyramid you have the many BBC departments. There are separate planners for the Home Service, for the Third and the Light programmes, and for the Overseas services.

Planning is not confined entirely to planners; there is a good deal of it in the actual production of a programme, whether it be drama, talk, variety or a symphony concert. This is the producers' job and it can, in its own way, be as intricate as that on a larger scale.

The programme planners' task is concerned largely, although by no means entirely, with long-range planning. This means that the plans for, say, the programmes to be broadcast in the last three months of the year are completed as to the main ideas by about the end of July. This leaves many gaps for possible, probable and emergency programmes.

About two months before the programmes are due on the air the detailed schedule for the Home Service for any one week is already worked out. This means that there are frequent discussions between the Home Service planner and the heads of the production departments. There is also a regular interchange of ideas and information between the Home Service planner and the Regional services; and it

Before a programme goes on the air there are many production details to be carefully considered. In this picture, producer Martyn C. Webster is seen discussing with the programme engineers the arrangements for broadcasting an instalment of a "Paul Temple" mystery serial.

is by this means that Regional programmes of more than purely regional interest are included in the Home Service.

As a sort of yardstick to the overall planning of the different services, the Home Service is planned first, the Light and Third programmes being planned afterwards. In this way overlapping, which could otherwise so easily take place, is avoided, and a widely contrasted pattern of drama, music, news and a hundred and one other features, is woven into the weekly schedule.

One of the factors which help the planners in their work is the existence of regular programme features: landmarks stretching pleasantly ahead to provide some fixed point around which a schedule may be built. These are quite a blessing when it is realized that in an average week about 300 programmes go out in the Home Service alone. First of these are the News Bulletins, landmarks

One way of producing sound effects: in this case the sound of a rowing boat. The water tank is in the studio, and the "jeep" operates a paddle while keeping a sharp eye on the script. Recorded effects are more usual, and are explained in the chapter on "Recorded Programmes."

stretching as far into the future as any planner could wish. Then there are the regular features such as *Today in Parliament*, *Saturday Night Theatre*, *Children's Hour*, the Schools programmes (in term time) and the Symphony Concerts and Proms.

Other landmarks are anniversaries, the more important of which can be planned, if necessary, for a year ahead. Less important ones are planned at shorter notice and must be balanced against all the other items which claim a place within the schedule for any one week. Sometimes they have to be fitted in, literally, at the last moment.

Quite the opposite of these regular features are the sudden changes, or sudden inclusions, that have to be made in the already planned schedule when the procession of world or national events demands it. These events make the News Bulletins in the normal way, but they may also be sufficiently important to warrant a pro-

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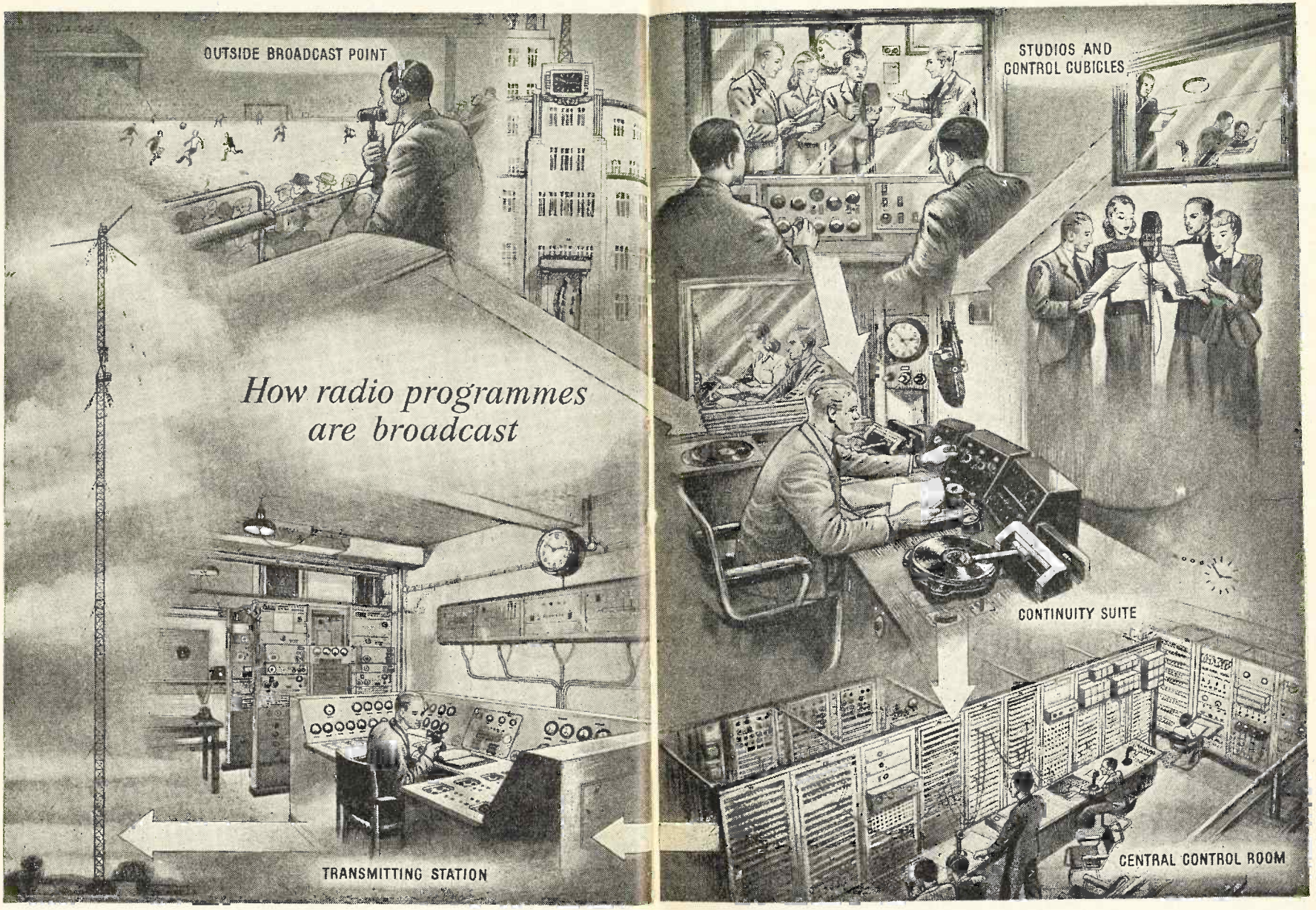

OUTSIDE BROADCAST POINT
How radio programmes are broadcast
TRANSMITTING STATION
STUDIOS AND CONTROL CUBICLES
CONTINUITY SUITE
CENTRAL CONTROL ROOM

Programme rehearsal of an educational-feature broadcast, Plain English, *in Studio 4a at Broadcasting House. At the control panel, seen through the window, is the producer with two programme engineers.*

gramme to themselves. From the dropping of the first atomic bomb to the death of a famous comedian, these things happen and will go on happening, and they cannot really be allowed for in planning. They do not affect the planners alone; the whole intricate machinery of the BBC organization is brought into play to solve the problems presented and give explanation, report, or background details to millions of listeners.

So, gradually, the programme planner fills in the schedule of a week's programmes two months or more ahead. There will still be many hours of broadcasting time to be filled, but at last he can begin to see what the week's schedule looks like. From this point he goes over the hundreds of suggestions put up by the production departments; checking the claims of variety, drama, features, talks, music, outside broadcasting, of sport, national and international events, recorded programmes and religious programmes.

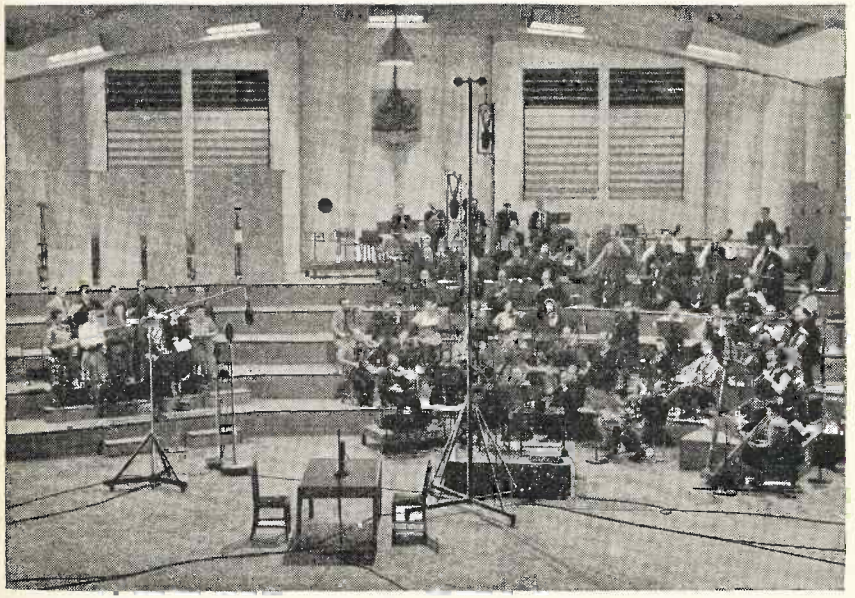
All these must be balanced. Perhaps he finds that there are too many talks and not enough plays, in which case another play must go into the schedule, and it must be one that provides contrast to

those already included. In the same way there may be too little music and too much variety, or too much of a particular type of music. If this is the case, further adjustments are made.

At last the schedule is finished. Copies are sent at once to all the Regional services: Midland, North, Northern Ireland, Scotland, Wales and West (for the Home Service is the basis on which they plan); to all the production departments; to the studio-booking section and, in fact, to all who have anything to do with putting the programme into being at the scheduled time.

There is still some time to go before the scheduled programmes go on the air, and in this time anything may happen. A feature timed for one hour may demand, and merit, an extra quarter of an hour; another may have too generous an allocation of time and have to be cut. Perhaps the reason for the inclusion of a certain feature may change or disappear; or events occur which make it imperative to find time for a previously unscheduled programme. Perhaps copyright difficulties may make impossible the production of a scheduled play. All these changes are the business of the planner, and, where production departments originate suggestions for such changes, they

A complicated battery of microphones is used for the BBC Theatre Orchestra and Theatre Chorus seen here in Studio 1 of the BBC Maida Vale Studios.



must invariably consult him. Thus the planner is not solely concerned with long-range planning; he is up to his eyes in day-to-day stuff as well.

In the arrangement of schedules, programme planners may be said to be looking through a telescope in the normal way; but telescopes can be looked through from both ends. Planning that goes on at the "little" end is the job of the producer of any particular programme, and, as with things seen by looking through a telescope the wrong way, it is not as small as it appears.

Let us assume that it has been decided to broadcast a programme feature on the anniversary of Dunkirk. The original suggestion for this may have come from the top, through the planner to the production head of the department concerned—in this case the Features Department. It may have originated from the producer himself, or it may have been put up by an outside writer (one not employed by the BBC), or by a listener who is not a writer. Wherever the idea came from it is now in the hands of the producer.

He knows the scheduled date; he knows the time; he knows who is going to write the script. If he is a writer-producer he will write it himself and, anyway, he is likely to have a good deal of say in the matter.

So far so good, but it's not very far. If the programme is not entirely actuality—which means, broadly speaking, that people other than professional actors and actresses are taking part, in this case perhaps both, then a suitable cast must be assembled. It might be thought that this was the easiest part of the whole business; after all, one of the producer's jobs is to know how to cast properly, but it is not as simple as it may seem. The producer makes his choice of those whom he thinks will suit the 10, 15 or more parts needed for the complete cast. That done, he sends the list of names to the Feature Booking Department and gets on with something else; and there is plenty more to do!

Booking a studio is the least of these, although he may well find that the one he had hoped for is already booked. This being a programme on Dunkirk, it is as well to have as many people as possible who were connected in any way with that amazing bit of history: either that or else their stories must be obtained. This means planning with a capital P. There are the men who took their motor-launches, their yachts, their barges, even their rowing-boats across the Channel. As many of them belonged to some sailing clubs, probably the best way to begin to trace them is through those clubs.

The stars of Much Binding. *From left to right, they are Maurice Denham, Richard Murdoch, Maureen Riscoe, Kenneth Horne and Sam Costa.*

The producer writes letters by the score; makes personal inquiries by the dozen. The replies from all these may well necessitate days, perhaps weeks, of further work.

Then there are the men of the Navy, the tug skippers, the captains of the seaside paddle-steamers; the men who manned the fire-floats and all the other vessels of that amazing fleet. They, too, must be contacted for their stories. Then again, there are the women of the WVS and the thousands of citizens, men and women, who thronged the railway lines and stations as the trains carrying the survivors came through from the coast. And the children—many of them now grown up—who went along the carriage corridors with sweets and cigarettes. And there are the soldiers themselves, from privates to generals. All this means more letters, more inquiries, more research, more planning.

By this time the producer will have heard from the Feature Book-

ings Department, and it is possible, indeed it happens quite frequently, that some of the actors or actresses he has chosen for the cast have already been booked for another programme at the same time and so are unable to make the date. Although this may happen two or three times it is just one of those things and is accepted by the producer as part of the day's work.

At last, from a vast mass of material, the script emerges as a first draft, but this is by no means the end of the producer's planning. He submits the script to experts, to the BBC Research Section, and probably, in this case, to the War Office and the Admiralty. Conferences with War Office and Admiralty Departments may follow.

If music is to be included as atmosphere or to help the continuity, then the producer must find the type most suitable. This may mean listening to anything from a dozen to a score or more of records. It means, too, marking particular passages on the selected records. He must then obtain written permission from Copyright Department for the use of each record.

Comes the day when the script is finished and finally approved; but still there is planning to be done. A conference must be held between the producer and the programme engineer to decide on how many mikes are required, what effects—if any—are needed, and how they are to be obtained. Some effects may be recorded, and if so must be obtained from the Gramophone Department, while some may be "spot" effects—effects produced on the spot, such as the closing of doors or the clinking of glasses.

After this come rehearsals, for which studios must be booked and the cast notified well ahead of time of the date, time and place. If the programme is to be recorded as it is broadcast, or if it is to be recorded for broadcast later, the Recorded Programmes Department will have to be contacted and arrangements made for them to receive it. At length, on schedule and as planned many weeks before, the programme goes on the air. But already the planners will be working on schedules for months ahead, while the producer is, perhaps, thinking of his next show, which may be in a day or two, possibly a fortnight away.

All programmes do not entail so much planning, anyway from the producer's point of view, but most of them have their own peculiar planning problems. A top-line variety show, for instance, with a regular weekly spot in the programme schedule, does not put itself on the air automatically merely because it is a regular feature. Apart from the intensive planning necessary before the first number of the

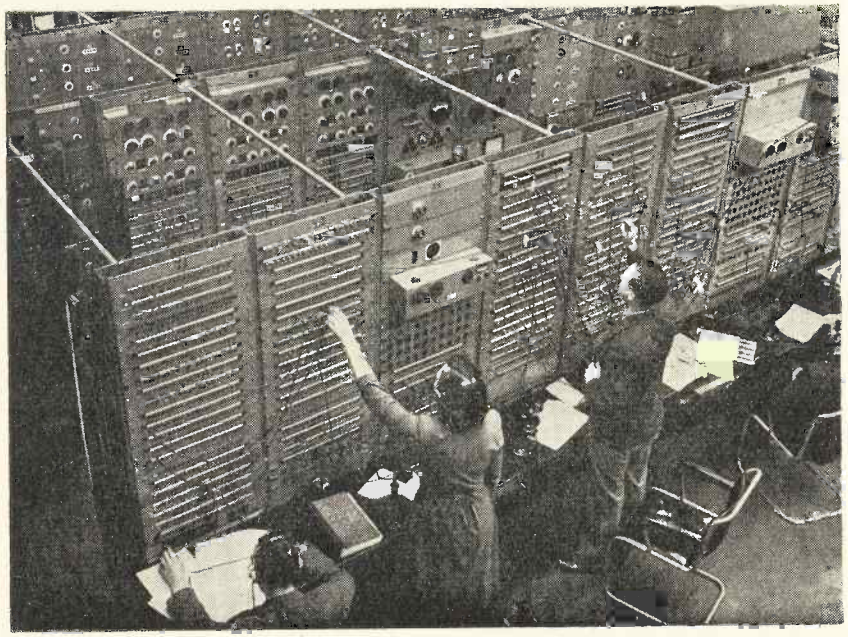
Control engineer in the Light Programme Continuity Suite. He selects the programme items, time signals and announcements in their proper turn. The continuity announcer can be seen through the communicating window.

series takes the air—which may last for weeks or even months, and which nowadays includes a trial recording heard by one audience and afterwards by the programme planners—each weekly number has to be carefully and thoroughly planned.

Small matters, such as a sudden change of rehearsal studio entailing written notification to the cast, the guest star if there is one, the programme engineers and the "jeeps" (junior programme engineers who look after gramophone and spot effects) as well as the members of the orchestra and the writers, are taken as a matter of course. The real planning goes deeper than this.

The producer and the writer, or writers, have a weekly meeting, quite often several meetings, at which the story line for the next week's show is discussed. The various "spots" (a spot is a part of a programme, often self-contained) are worked out. In a show including an orchestra and a singer there will probably be three separate spots or dialogue sequences, linked by a band number and a song.

Central Control Room at Broadcasting House, through which all programmes and outside broadcasts in the London Home Service, Light and Third programmes are switched and routed to the appropriate transmitters.



So the framework consists of a first, or opening, spot—in a show built round two comedians this is often a duologue, their own particular spot; a band number; second spot—when other resident characters make their entrances; and the third, or final spot. This is by no means a set pattern: different writers and producers use different methods, but, in the main, the average variety show is made up of these components in one order or another.

After the first script conference the writers get together to draw up a first draft. This may take hours or it may take days—it depends to some extent on how the ideas flow. While this is under way the producer doesn't sit back and look idly at the pictures on the office walls; there is plenty to do.

The song to be sung in between spots, and the number to be played by the band have to be decided upon. Not only have the anti-plugging rules of the BBC to be observed, but both song and band number must be cleared in writing by the Copyright Department. If the star, or stars, is to sing new words to an old number, the producer has to check that the music publishers who hold the song rights in question have no objection to this being done.

On occasion some of the variety shows go to army camps, RAF airfields, or visit the Royal Navy, giving their show in a garrison theatre or local hall. For this, transport for the cast, the band and all concerned must be arranged. Sometimes, and especially during the height of the holiday season, this is by no means as easy as it sounds. Many a variety producer's secretary has spent a whole day—and sometimes her "free" Saturday afternoon—with telephone directories in front of her, desperately ringing up hire firm after hire firm. Then, if the show is to be recorded, as are many of them, Recorded Programmes Department must be notified.

Some days before the programme is due on the air—on unforgettable occasions sometimes only hours—the writers meet the producer again with their first draft of the script. It may be a full script or it may be only part of one, consisting perhaps of a few sheets of pencilled suggestions with blanks labelled "topical gags" in the hope that some event on the day of recording or of broadcast can be twisted or referred to for a laugh.

Traditionally the producer has the last word in the matter to be included, although, quite frequently, a good comedian will come out with some spontaneous gag, inspired patter or slick rejoinder which was never in the script. Eventually, perhaps after argument, almost always after discussion, the final draft of the script is agreed upon.

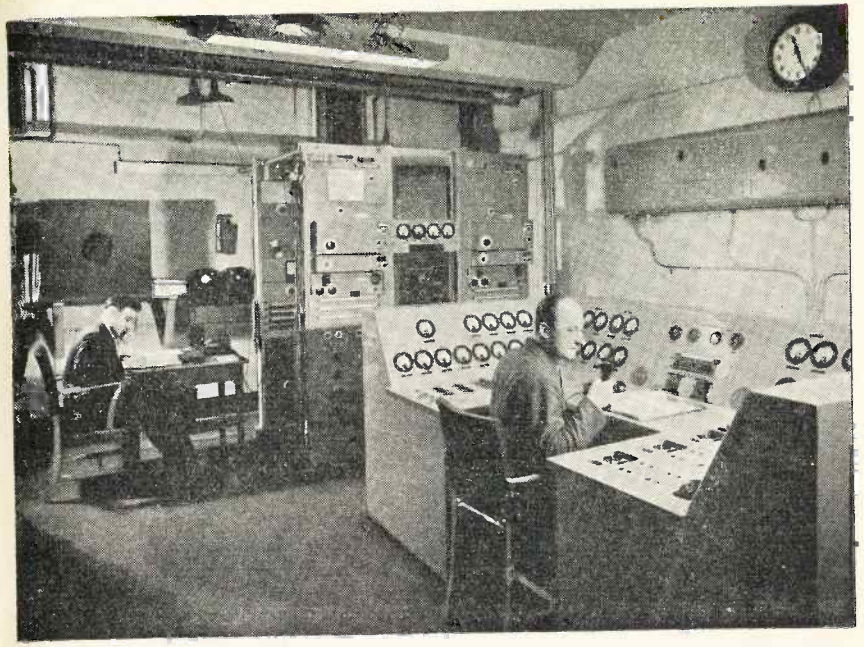
Writers and producer heave a sigh of relief and begin to think of next week's show; but, for the producer, all is not finished. The rehearsal itself must be planned, and the show fitted exactly into the time allotted for it.

The experienced writer finds no difficulty in writing the correct amount of material for any given time at an average rate of delivery; but every line can be said quickly or slowly; responses can be delayed or immediate. Then time must be allowed for opening and closing announcements, for laughter and for applause, for the band number and so on. In his control box, listening carefully to the first run-through, the producer has to decide which parts need speeding up, which achieve greater effect by being taken slowly, or sometimes which would be better cut out altogether. His secretary, with a large stop-watch, will be checking the seconds, for, as in all radio programmes, timing is vital. But to call a producer a stop-watch king is to use a really insulting term. Any producer worth his salt has his own ideas about how lines should be produced; which words or sentences should be stressed; as well as on matters such as whether the instruments of the orchestra are coming through correctly balanced; or whether a mike needs moving in order to bring up, say, the tenor saxes to a better level.

The show that the variety audience see is the finished product; usually the producer is not even in the control box. The cast have rehearsed; the jeeps know their effects cues, the orchestra conductor knows when to come in and exactly how many bars to play. All that remains is for the applause to be kept within bounds and for the cast to stick to the rehearsal times for each spot, so that the programme does not overrun its scheduled time; and, finally, if the show is being recorded for a future broadcast date, to get the O.K. by phone from the recording engineers.

The last is the reason why audiences at recorded variety shows are asked to wait for a minute or two at the end of the performance for the O.K. to come through. If something has gone wrong—one of those technical hitches—with the recording apparatus or with the line, the whole show, or the unsatisfactory part of it, must be gone through again. Fortunately this happens but rarely, for, although the audience get an hour's free show instead of half an hour's, they are expected to laugh with the same spontaneity at gags they have heard only a short time ago.

So much for the planning behind the programme, but the show has to get from the studio in which it was performed to the trans-



Central Control Room of the BBC transmitting station at Ottringham. Four 200-kilowatt transmitters are remotely controlled from this desk.

mitting station, and from there out into space and so to the receiver.

To begin at something like the beginning, a studio may have from one to as many as seven or eight microphones. There is also one for a news studio, while in a variety studio or theatre there will be one or two for the cast, one for effects, one or sometimes two for audience reaction, and as many as three for the orchestra, although two is the usual maximum for best results. The mikes pick up the voice of the speaker, the song of the singer, the sounds of the orchestra, and transform the sound waves into electric waves. From the mikes the electric waves go first to the studio control room, where the programme engineer, acting with the producer, mixes the outputs from the various microphones so that they blend to a balanced whole.

In the studio control room, separated from the studio itself by a sound-proof glass window, are two, four or six gramophone turntables which are used for reproducing recorded effects additional to

those done on the spot, messages or other contributions to the programme. There is also a control panel and a loud-speaker.

Amplifiers step-up the small current from the microphones before it reaches the control panel, and it is then fed to what are called pots or faders, one for each microphone. A fader is much the same as the volume control on an ordinary radio receiver: by turning it the programme engineer can increase (fade-up) or decrease (fade-down) the volume from each mike. The result, being the total output from the mikes, and from the gramophones if they are used, goes through a main fader to the loud-speaker. In the case of a live show this reproduces exactly what goes out on the air. The disks of a programme that is recorded can be dubbed or edited; that is, bits can be taken out or even added, before the programme is broadcast.

In the control room, where the producer sits behind his sound-proof window, there is another microphone, popularly known as a talk-back mike, which is connected to a loud-speaker in the studio. By pressing a switch the producer can talk to the artistes, telling them, during rehearsal, just how he wants the various lines put over.

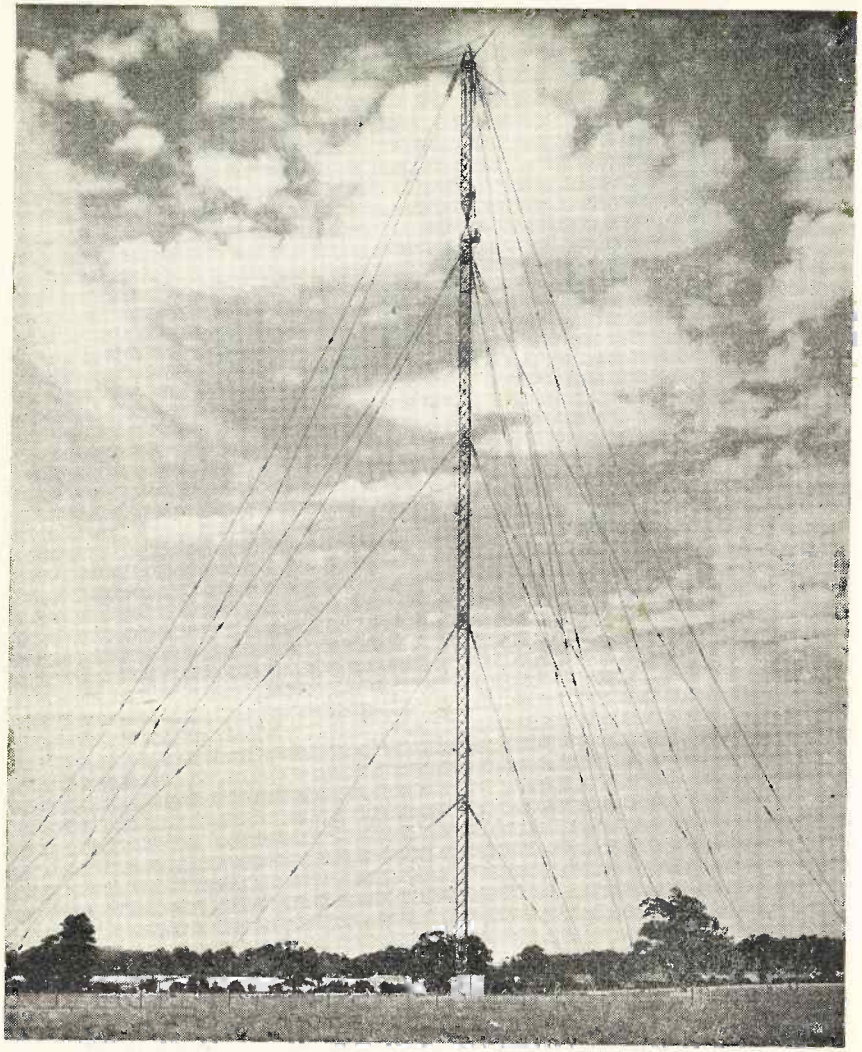
The programme from the studio, except when it is being recorded for future use, then goes by landline to a department known as Continuity. To this department come all the programmes which, together, make up the day's broadcasting for a particular service: Home, Light or Third. They come from studios, from the news rooms, from outside sports commentaries, from gramophone records and recorded programmes and so on.

In the continuity studio there is an announcer and a presentation assistant. The voice that says, for instance, "This is the Light Programme," belongs to the continuity announcer; while that which follows with, say, "Much Binding takes the air!" comes from the announcer in the studio where the show is being performed. All announcements made between programmes come from this studio, as do the gramophone records which are played when a feature ends before its scheduled time, or when a technical hitch occurs.

To make an announcement—such as a gale warning—when a programme is actually on the air, the continuity announcer turns a fader to fade up his own microphone, and fades it out when he has finished.

In a room next to the continuity studio, and again separated from it by a sound-proof window, sits a continuity engineer. He has in front of him, on a control panel similar to the one in a studio control room, four faders. To each of these he can connect an incoming

A dramatic view of part of a transmitting station. The large piece of equipment near the corner of the hall is a transformer for one of the mercury-arc rectifiers which provide a high-tension supply at 20,000 *volts.*



The 500-ft. mast radiator (aerial) of the BBC transmitting station at Brookman's Park, Hertfordshire. It radiates the London Home Service.

programme—that is, one on its way from a studio to the wide-open spaces of the air—and by means of them he controls the volume. As one programme finishes he operates the fader to fade it out, then turns up the fader to which the succeeding programme is connected. He keeps in touch by telephone with the programme engineer in the studio from which any item is coming, and signals by a red light the actual second at which to go ahead.

The Central Control Room is really the next point in the journey of a programme. Rather like a complicated railway junction, it is the meeting place for the mass of landlines that carry both incoming and outgoing programmes. Here the programme coming from the continuity studio is connected by the engineers to the landlines that stretch to the transmitting station.

At the transmitting station what is called a carrier wave is generated. This wave must be of the correct frequency—that is, 877 kc/s for the London Home Service, or 1,149 kc/s for the medium-wave Light Programme—and is amplified up to the strength for which the particular station is licensed.

The electric waves of the programme which is about to be broadcast coming from the microphone to studio control panel, to continuity studio, to central control room, to transmitting station are now fed in so that their shape is impressed upon the carrier wave; or, more accurately, made to modulate it. The carrier wave—which carries the programme, hence its name—now goes along a transmission line to the aerials and so out into space. Merely the flip of a switch or the twist of a knob on a radio receiver will conjure it back again.

Wynford Vaughan Thomas makes a recorded commentary on an outside event for Children's Hour*; hence the recording van and, on the right, "Uncle Mac." Holding the microphone is a Recorded Programmes assistant.*

Outside broadcasts

WYNFORD VAUGHAN THOMAS (*BBC Commentator*)

FOR many listeners some of the most rewarding moments in broadcasting occur when the calm, unhurried voice of the announcer invites them to leave the studio and "join our commentator," whoever or wherever he may be. They know that in a few moments they will be taken maybe to the ringside at a big fight, out into the streets of London on a royal occasion, or backstage for an important theatrical first night.

Into their homes will come those exciting sounds that are the real stuff of radio, from the thrilling clangour of the trumpets echoing in Westminster Abbey to the cheers of a Cup-tie crowd. When the commentator adds his own contribution, you get an effect which only broadcasting can produce—a feeling of shared experience, of being given a front seat at important events which may be taking place hundreds of miles away.

The department of the BBC which takes charge of the microphone on most of the occasions when it leaves Broadcasting House is known to the Corporation as O.B.'s, short for Outside Broadcasts. It is one of the smallest departments in the BBC, but it is also one of the busiest. Its members feel themselves to be part of a compact broadcasting task force, ready to tackle any operation from the maiden voyage of the *Queen Elizabeth* to the Olympic Games. The department's job has three main aspects.

First of all, O.B.'s have to decide where the microphone is to go when it leaves the studio. In other words, what makes a good Outside Broadcast?

Not every event lends itself to commentary. Experience has shown that to make a good Outside Broadcast an event must have action, colour and suspense interest. Sport, for example, fulfils all three requirements. Boxing, football and ice-hockey are grand stuff to broadcast, with an intrinsic drama that helps the commentator. Great processions and ceremonies also have the colour that makes them "commentary-worthy." Street interviews, feature visits to

places of interest, even factory tours, can be made into exciting Outside Broadcasts, provided the listener is convinced that he is being taken to a spot where something new, unusual and unexpected may happen.

These, then, are the sort of places to which the O.B. microphone goes. Now comes the problem of getting it there. This is a technical job which involves a great many people, from the BBC's own engineers to the technicians of the Post Office. In this country, nearly all our Outside Broadcasts are carried over Post Office lines. We are lucky in Britain, for there is hardly a town or village in the more populous parts of our islands to which a Post Office line of some sort does not go.

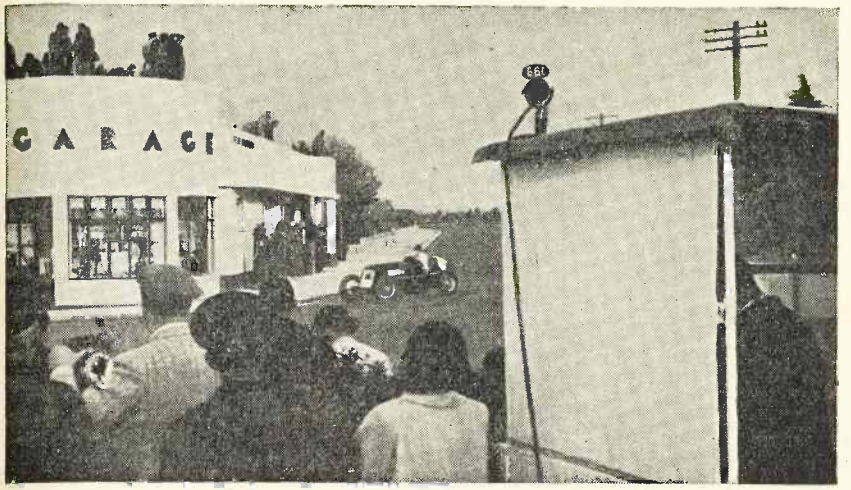
The BBC hires these lines from the point at which the broadcast is originated, back to Broadcasting House itself or to the various Regional Headquarters. Some days before the show, the lines are carefully tested to eliminate all outside interference and faults. On the spot, the O.B. engineers then set up their own Control Point with duplicate batteries, amplifiers and fade-units. Usually this is situated in a spare room, away from the actual scene of the action. If only a few microphones are to be used, the Control Point can be quite a simple affair. But in the case of big events, like a Royal Wedding or the Olympic Games, it becomes much more elaborate: almost a miniature Broadcasting House.

But, simple or elaborate, the Control Point is the nerve-centre of the O.B. From it the microphones radiate. Here the O.B. engineers sit at their controls, making certain that, come what may, the broadcast goes through. No front seats for them! They are the real back-room boys of Outside Broadcasts. Some of them have attended the Derby for years and never seen the race.

But even back-room boys have their adventures. The O.B. engineers still remember that moment before the war when they were engaged on their annual chase of the nightingale through the Surrey woodlands.

Now the nightingale is an elusive bird, who doesn't always sing to contract. Consequently, the engineers had festooned the woods with their microphones to make certain of catching this popular songster. When the trap was set, they retired to their Control Point.

A few minutes before the announcement was due they made a final test of the microphones. They turned up the most distant one and heard to their horror a passionate declaration of love which would have beaten the nightingale hollow if it had been allowed to



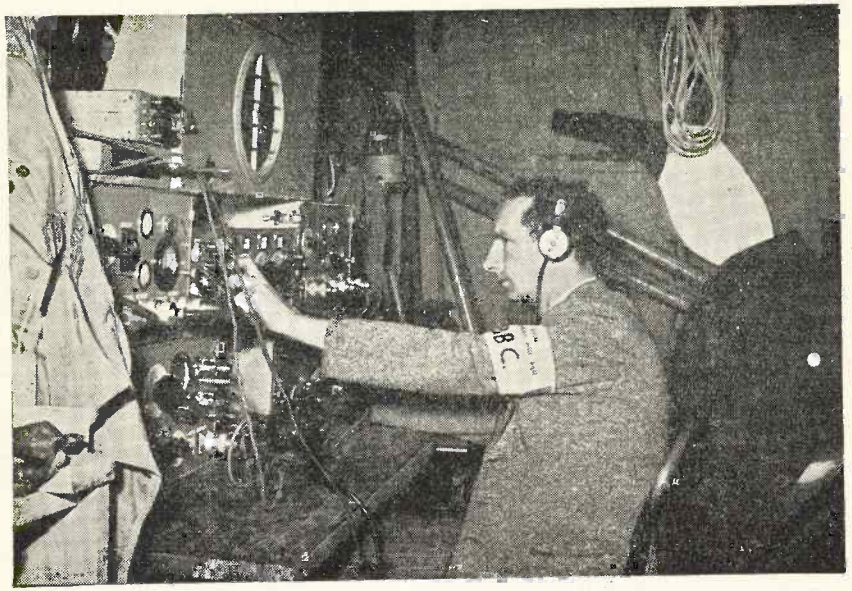
BBC outside broadcast of the Jersey International Road Race for cars. The commentator's box shown is at Le Marquand's corner. A microphone mounted on top of the box is used to pick up the sounds of competing cars.

go out on the air! They hurried down to the lonely glade only to be confronted by an indignant gentleman complaining bitterly that he didn't know what the country was coming to when a chap couldn't even sit down and make love to his fiancée without being overheard by the BBC. But such incidents are all in the day's work for the O.B. engineers.

Sometimes, of course, it is impossible to get a line to the exact point from which you wish to broadcast. In this case, O.B.'s use a mobile transmitter. The mobile transmitter is carried on the BBC's launch at the Boat Race, working to a pick-up point on the roof of Harrod's Depository near Hammersmith Bridge. It comes into its own in broadcasts from aircraft or from ships at sea, and it appears in most of the big processions, with the engineers who work it disguised as anything from Red Cross workers to Royal Marines!

For short-range work—amongst crowds or following golf matches, for instance—the BBC is now developing a pack transmitter. This is carried on the commentator's back and is a modified version of the walkie-talkie familiar to our soldiers during the war.

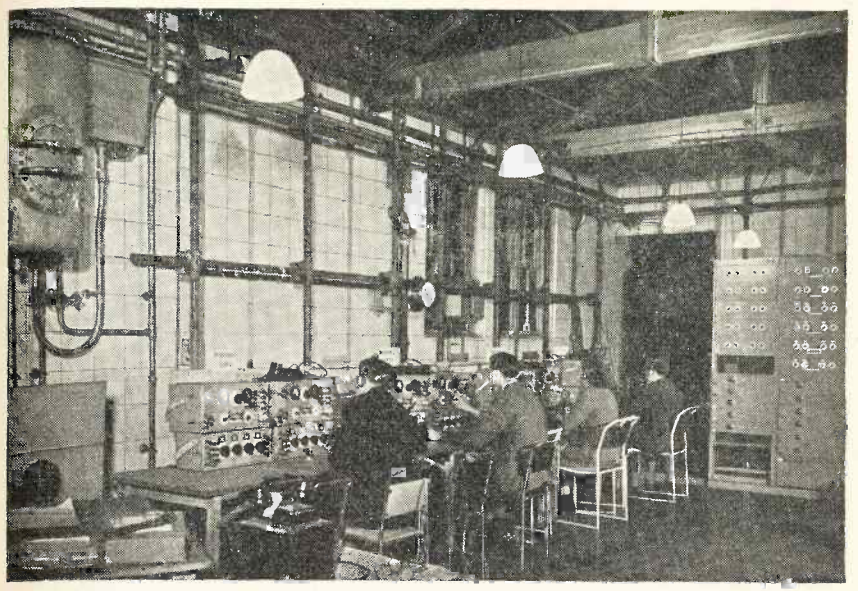
Another important piece of equipment is the lip-microphone,



Outside broadcasting from another aspect. Here a BBC engineer is seen with the control equipment, temporarily installed in a garage at Le Marquand's corner, for the commentary on the Jersey International Road Race. A view of the race and of the commentator's box is given on page 35.

which is specially designed to cut out extraneous sounds when held close to the lips. When Raymond Glendenning attends the Derby, or Stewart MacPherson reports a championship fight from the ringside, they use the lip-mike. This cuts out the yells and shouts of the crowd around, which might otherwise drown the voice of the commentator. But no matter what mike is used, or how the transmission is effected, the O.B. engineers have never failed to get the mike "on the spot."

Now who uses the microphone when it's on the spot? This is the point where the most glamorized member of the BBC's Outside Broadcasts team comes in—the commentator. He is the man who occupies the ringside seat purchased by the BBC on the listener's behalf. His job is to translate into words the action that goes on before him. He must make the listener sitting at home feel he is really at the event being described. This is by no means an easy job.



This control room was specially set up in the Y.M.C.A. building at Westminster to deal with commentaries on the processions and the marriage service itself, on the occasion of the world-wide BBC broadcasts of the wedding of H.R.H. Princess Elizabeth and the Duke of Edinburgh.

What are the qualities that go to make a good commentator? First, I would put an interesting voice, the sort of voice that will make people feel its owner is obviously pleased to be at the event he is describing—a voice which suits the occasion. A voice like that of Howard Marshall is almost perfect for a warm summer day's cricket at Lord's. You can almost hear the click of ball against bat in the first words that Howard speaks. Similarly, Stewart MacPherson's salty tang and Canadian accent give you the punch and zip of a big fight. Neither of these voices is an orthodox radio voice, but both have character. As one listener put it: "I like my commentator to sound a friendly chap over the air, not a man with a dress-tie on his larynx!"

But a good clear voice is not enough. It must be coupled with a capacity for fluent speech. The combination is not so common as you might expect. Any number of people have pleasant voices. But you

could count on one hand the people who can use those pleasant voices to talk in an interesting manner entirely off script.

If you think it is easy, try to time yourself with a stop-watch and talk for five minutes without pausing, describing the scene outside your window! You'll find, unless you are a very practised speaker, that you are soon in trouble. The commentator, however, dare not "dry up." The essence of a running commentary is that it keeps on running!

Somehow or other, come what may, the commentator must continue to talk. He must talk under conditions that would drive most people to fury. He may be shut up in a little box perched on top of a grandstand, or he may be in the middle of a mob of excited soccer fans all yelling their heads off. He will have a microphone in one hand and his cue switch in the other. As likely as not, he will be wearing headphones that send a crackle of effects into both ears.

In the middle of his commentary he may be passed an urgent note asking him to include some new point or a last-minute piece of news. In fact, the whole world may seem as if it is conspiring to stop him. And still he must continue! No wonder that most commentators develop an almost limitless self-confidence on the air, even though they may be privately feeling the torments of the damned.

But even when the commentator succeeds in overcoming the ever-present physical difficulties that surround him, he has still to learn many other tricks of the trade. He must tackle the intricate business of cross-referencing, as the O.B. Department calls it. This is the art of imposing a pattern on the event being described, of continually reminding the listener of the point reached by the action. A good commentator never forgets that, in sound broadcasting, the listener cannot see the event and is relying entirely on the commentator's word. Words are quickly forgotten, for the ear is notoriously the most uncertain of the sense organs. So the commentator spends a great deal of his time reminding the listener of what has gone on before and of the associations of whoever is taking part in the action at any given moment.

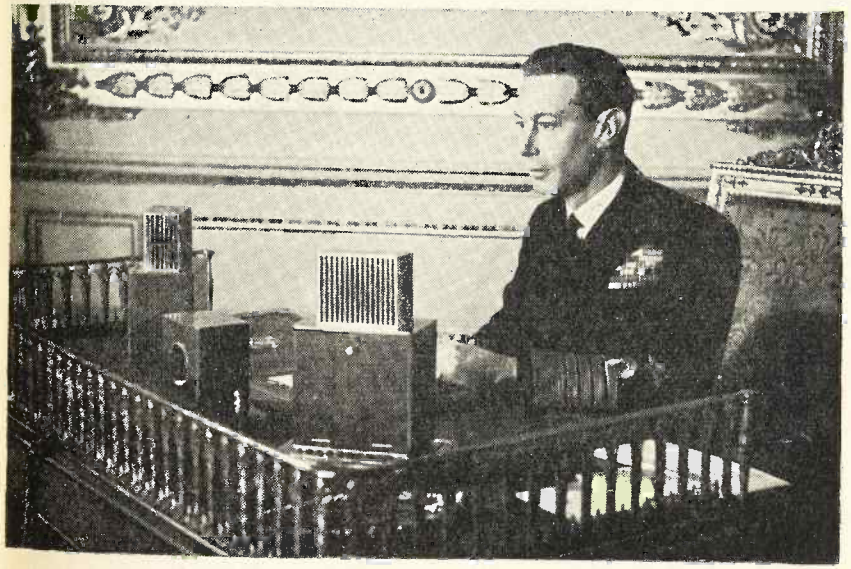
Thus, Rex Alston at a Rugby match doesn't simply say: "Rees passes to Jones, who side-steps, and the ball goes wide to Smith." He reports: "Rees, the Muddlecome centre-half, has the ball. He passes it to Jones, on the wing, just outside the twenty-five on the far side of the field. Jones fumbles and the ball goes wide to Smith, the Dingley Dell forward, who gathers it just on the edge of the touch-line, ten yards from the half-way line."

Elementary, you may say. But this cross-referencing must be done at high speed. Then it becomes one of the commentator's major problems. If he solves it, the listener should be able to follow accurately the course of the ball in a match. It renders obsolete the old and irritating habit of having a second man chanting "square four" at monotonous intervals.

Cross-referencing is the basic trick of the commentator, but it isn't enough in itself to make for good commentary. The commentator must also master the business of using associative material. This, again, is an O.B. term for that mass of information that a good commentator keeps up his sleeve, ready to pour out at any pause in the action.

When Raymond Glendenning notices the ball bursting in the 1947 Cup Final and the game comes to a sudden stop, he immediately recalls that a similar incident happened in the 1946 Final, and he gives the mathematical odds against such a thing happening next year. So the listener hardly notices that there is a delay while a new ball is being produced, for the commentator has filled the gap with interesting facts that have a bearing on the commentary.

The most popular—and the most famous—of outside broadcasts is that made by H.M. the King, who speaks to his peoples throughout the world on Christmas Day. H.M. King George VI is seated in his study.



One of the most intimate series of outside broadcasts is Have a Go ! *in which Wilfred Pickles, seen here with one of his "victims," has visited towns and villages throughout almost the whole of Great Britain.*

Of course, this detail must be accurate. Woe betide the commentator who makes mistakes! The correspondence next day soon shows him the error of his ways. The listener has a right to expect that the man who represents him, and who is acting as his eyes and ears, should know what he is talking about.

He also expects that the commentator's talk should be vivid and not a mechanical flow of words. The good commentator must possess the gift of the vivid phrase. Gone are the days when commentators used to behave like two well-dined club men, who chatted cheerfully to each other in a collection of banal clichés. You probably remember them and their music-hall talk: "It's a really lovely day here. I must say . . . although I can't quite see from here!" "Why can't he see?" murmurs the irritated listener, "it's his job to see what's going on. Is this what I've paid (or should have paid) my licence fee for?"

Any number of O.B.'s in the early period of radio contained this commentator's confession of failure. But today, "I can't quite see from here" is one of the forbidden phrases. When Stewart MacPherson at the Baksi–Woodcock fight finds his view suddenly obstructed by referee Moss Deyoung, he doesn't dream of falling back on this cliché. He simply interrupts his commentary with: "Move over, Deyoung, quick!" Immediately the scene comes to life. Again, Stewart doesn't just report that "Baksi's landed a heavy punch on Woodcock." He observes: "That one went in—right up to the elbow." Straight away, listeners feel the full extent of Bruce's suffering.

While the commentator is busy employing the vivid phrase, he is also constantly on the look-out for any unexpected incident that will help him liven his description. When Richard Dimbleby noticed a policeman cautioning the little King of Iraq, who had got in the way of the other Royal guests leaving Westminster Abbey, he made the solemn pageantry human and comprehensible for millions of listeners.

This deliberate side-tracking of the main theme can be dangerous, of course. I remember having a close shave at an important religious ceremony when trying to employ this particular trick. There came a pause in the proceedings, and I decided to ease it by describing the feelings of the angelic little choirboy who had been singing away all through the service, in front of my commentary box. Here, obviously, was someone who was absorbed in the solemn celebrations. He had been singing from his book as if his whole heart was in his music. I was just about to start my "aside" when my angel-faced

choirboy put down his music. Was it the anthem that he had been scanning so eagerly? Not a bit of it. Neatly concealed in the pages was a penny dreadful entitled *Smoky, The Terror of the Rockies.* Needless to say, I hurriedly switched to an innocuous description of the church ornaments!

If asides of this sort can lead the commentator into trouble, there is one type of interruption that he eagerly welcomes. This is the interruption of "effects." Good effects are an enormous help towards good commentary. Nothing "sells" an exciting football match better than the roar of a huge crowd. And effects need not be very loud to convey the mood to a sensitive listener.

I sometimes think that the most moving of all the sounds we broadcast come on Remembrance Day, as the silence settles over London and the little everyday commonplace sounds of the shuffling of feet, the police-horse champing at its bit, the rustle of the wind through the leafless branches of the trees, become stronger and clearer, and gain a poignancy by their very familiarity. They make the Silence!

A good commentator will always let such effects speak for themselves. He will refrain from talking over them. And if he knows they are coming, he will try to prepare the listener for them. If the commentator is caught by the effects, if he has mistimed them or they reach him unexpectedly, he had better pause, let the effects sound and then explain them as soon as possible. Listeners hate unexplained effects, especially if they are loud and persistent ones. Nothing is more irritating than the commentator who insists on giving you the names of the team when you can hear the huge soccer crowd cheering madly in the background. The art of that persistent talker, the commentator, sometimes consists in knowing when to shut up.

Even with all these tricks of the trade at his command, the commentator still needs continuous help if he is to do a good job. On most big occasions he has a "No. 2" standing at his side to help him with his gear and to warn him when he goes off the rails. In racing, this reserve performs the important function of reading the race for the commentator, helping to make certain that the commentator has got the right horse out in front. Occasionally you can pick up the race-reader's voice, in spite of the use of the lip microphone.

The commentator can also refresh his memory with notes, although the fewer notes he has written down the better. Events have a nasty habit of departing from script, and the commentator who

Outside commentators must be prepared to go anywhere at any time. Here Godfrey Baseley, of the BBC Midland Region, takes a microphone among the miners working at a coal-face at Snibston Colliery, Leicestershire.

attempts to rely on the written word had best give up quickly. He'll never get anywhere! Far better to master your facts beforehand and produce them spontaneously.

The whole charm of commentary for listeners lies in its being impromptu—an instantaneous translation of action into vivid words. In the process of this translation, every commentator is bound to make mistakes. If he does, he should correct them as soon as his attention is drawn to them by his second. There's no shame in making them, for, however good you may be, you occasionally have a slip of the tongue or a sudden lapse of memory that can lead you into some curious situations.

A well-known racing commentator once got the names of the horses so confused in his mind that he called home a horse that had been dead for a year. There is no record that the bookies paid out on that race! Again, another commentator at Queen Juliana's Inaugura-

tion described the Royal procession as moving past the "fire-screen" of the church. As his second on that occasion only spoke Dutch, he went on in blissful ignorance of the effect he was creating!

These mistakes are usually forgiven by the listener. They make the commentator sound a little more human. Only, he mustn't make too many of them, and they must be slips of the tongue rather than careless or serious mistakes of fact. For the latter there is still no forgiveness.

There is little tolerance, either, for the commentator who fakes excitement or who acts his commentary. The commentator's object should be an honest, unbiased report of the scene before him. But the commentator has a special difficulty in doing this. He has to make his report immediately, without any chance of checking it and mulling it over in his mind.

Fights that seem exciting at the time can be dull and uninspired in retrospect. But the commentator is talking while the fight is going on. Obviously, he goes off the rails occasionally. But, by and large, the BBC commentator aims at an honest, unbiased description without undue colour. If the two boxers in the ring are sleeping gently in each other's arms, let him say so by all means—provided he stays inside the limits imposed by the law of libel and well out of range of the heavyweights' managers!

Here then is the commentator—honest, fluent, confident, a master of the vivid phrase and gifted with a voice that can compel people to listen; or perhaps I should say the ideal commentator, because most of the BBC's performers, past and present, will readily admit that they fall far short of the ideal depicted here.

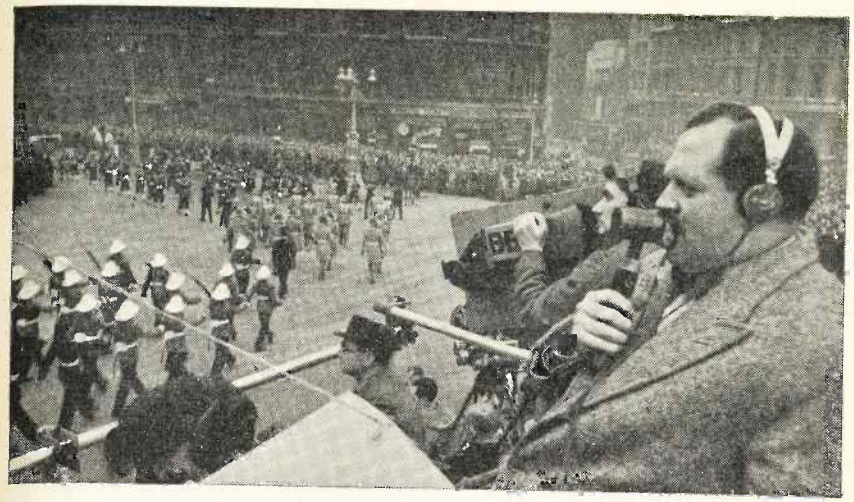
Perhaps the future will bring us newer and better methods. Certainly television will revolutionize the sound commentator's art. But whatever the future has in store, all intelligent broadcasters hope that in one respect it will improve on the present. They would wish to see women given a far bigger role in O.B.'s.

Long ago Shakespeare defined the ideal woman commentator when he wrote in *King Lear*:

Her voice was ever soft,
Gentle and low, an excellent thing in woman.

Maybe our present-day microphones are unkind to the female voice; but with one or two prominent exceptions, many women on the air sound completely unfeminine, almost as if they were lady missionaries trying to convert a particularly stubborn savage tribe.

But women are desperately needed for certain O.B.'s. Dress is a



Richard Dimbleby, using lip microphone, gives a running commentary on the Lord Mayor's Show from his elevated position over Trafalgar Square.

continual nightmare for the male commentator, and on a Royal occasion, for example, it is of vital importance that the public should know exactly what the Queen or the Princesses are wearing. How often have you not heard the unhappy gentleman at the microphone stumbling along, describing a smart, modish outfit as ". . . a nice dress of black," to the fury of all women listeners, who clamour for details of "off-the-face hats" and everything else in the feminine armoury. And dress is only one of the things—and a minor one at that—which need a woman's touch on the air.

But if you are thinking of applying immediately to the BBC for a job as a female commentator—or a male one for that matter—you had better heed a word of warning. There is an enormous waiting-list of would-be commentators. In addition, the present tendency is to discard the subject expert and to trust to the man or woman who has already earned his or her spurs in other fields of broadcasting. This does not mean that no commentators are recruited from outside, but it suggests that before you make an application you should have thoroughly tested yourself under the most rigorous conditions. Only then should you write that long-meditated letter to the Outside Broadcasts Department of the BBC.

Recorded programmes

BRIAN GEORGE (*Head of the BBC Recorded Programmes Department*)

TO some listeners it may seem unreasonable to be told at the end of an enjoyable programme that they have been listening to a "canned" version of the real thing. They may feel that they have been cheated —that the BBC's job is to broadcast direct from the microphone and not through an intermediate stage which makes it possible to delay the broadcast.

Fortunately, the number of listeners so affected is extremely small: BBC Listener Research surveys reveal that only a very small proportion of the listening public is conscious of any diminution in their enjoyment of a broadcast which they know to be a recording. This minority might almost cease to exist if it knew and appreciated the vast problems which the BBC would have to face in attempting to broadcast all its programmes "live," and if it were made aware of the advantages which accrue to the listener through the use of recording as a broadcasting medium. Nevertheless, it is the BBC's policy to broadcast "live" where possible and to use recording, not as a convenience for its artistes or staff, but for the benefit of the listener.

I am often asked to define "BBC recording" and "recorded programme." One definition of the word recording, in accordance with BBC usage, is "The process of registering sound for subsequent reproduction." The BBC engineers use three separate systems of recording—disk, magnetic tape and film; the disk, tape or film on which the sound has been registered is itself called a recording (as distinct from the gramophone record as bought in a shop). By extension, the sound or programme material registered is also known as a recording or a recorded programme.

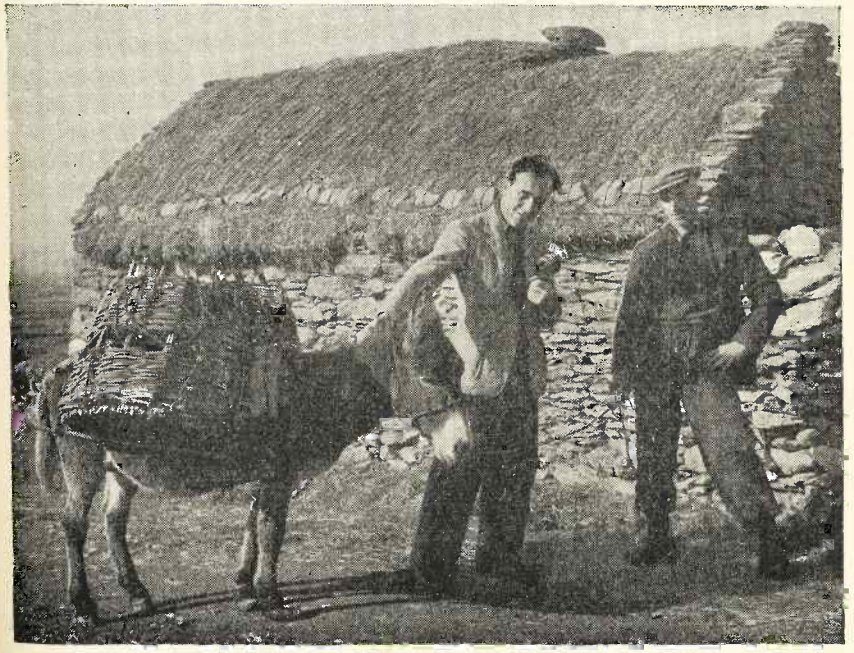
The past ten years or so have seen considerable advance in the field of technical recording; but of the three systems, disk recording (used by the BBC since the earliest days) remains the most popular. One reason for this is that, unlike tape or film, the disks can be

played back immediately after recording—an important factor when dealing with urgent programme material.

Two types of disk are used, one which revolves at 78 revolutions per minute (the normal speed of a commercial gramophone record) and another which revolves at a much lower speed (33⅓ r.p.m.). The latter is not suitable for editing purposes and is therefore used to record complete programmes which are later reproduced in their entirety.

Tapes and films have to be physically cut and rejoined in order to delete an unwanted passage, but with 78-r.p.m. disks the same results can be achieved quickly and accurately without in any way altering the structure of the original recording. The specially designed reproducing disks used by the BBC are equipped with groove-locating units which enable the operator to pre-select any groove he wants on the disk, and an unwanted passage can be deleted by lifting the

Apart from being Head of the BBC Recorded Programmes Department, Brian George has often been "the man on the spot." He is seen interviewing a smallholder—and his donkey—on the Dingle Peninsula, Eire.



reproducing needle at the appropriate moment and lowering it again on another part of the record. It is thus possible to present extracts from or a condensed version of, say, a football commentary previously broadcast in full in another service and to retain the complete original commentary on record.

Let us take a typical example. Recorded Programmes Department has been commissioned to produce a 15-minute "actuality" on the Cup Final for broadcast at various times throughout the day and night to reach listeners in different parts of the world. The first step is to select a number of extracts from the full 90-minute recorded commentary to illustrate the exciting moments of the game. These extracts are carefully timed and their beginning and end cues are marked on the disks with a yellow wax pencil; when this is applied lightly to the surface while the disk is revolving it leaves a thin yellow line on the groove. Lines so made indicate roughly the points at which the reproducing needle will be raised or lowered as the case may be, but finer adjustment is provided for on the apparatus itself.

Preparation of schedules of Recorded Programmes bookings is no mean task. It is simplified by the unusual contrivance shown here; it consists of a huge wooden roller to which large booking sheets are attached. They are read off by the typist who is drawing up a daily schedule.

One of the interesting tasks of BBC Recorded Programmes Department is the recording of Radio Newsreel, *broadcast daily in the Light Service; six editions are also sent out daily in the BBC Overseas Services. The narrator is in the foreground; behind the window are secretary, Recorded Programmes assistant, programme engineer, scriptwriter (standing) and producer.*

The programme will probably call for descriptive linking narration to bridge the gaps between each recorded extract and to preserve the continuity, and when these links have been written we are ready to go into production.

Imagine a suite of three medium-sized rooms grouped together and visually connected by large sound-proof windows. The first is the studio with, of course, a microphone as its principal fitting. The second room contains a bank of six reproducing turntables with associated control apparatus, and the third houses a set of recording equipment. The combination is known as a Recorded Programmes Production Suite. For our Cup Final programme there will be a narrator in the studio to read the linking material and a Recorded Programmes assistant in Room No. 2 to produce the programme and

to play the recorded extracts on the six turntables. Also in Room No. 2 will be an engineer to control the volume of the programme and to make any necessary adjustments to compensate for variations in level between the voice of the studio narrator and the recorded voice of the commentator. In the third room there will be another engineer to make a recording of the complete programme.

The programme may open with the recorded cheers of the Wembley crowd as the teams come on the field, together with the commentator's description of the scene. The narrator in the studio may then read a brief summary of the game, leading perhaps into the recorded commentary as the first goal was scored. And so the production is under way, disk-insert alternating with live narration until at the end of 15 minutes a complete composite programme is on record and ready for immediate broadcast. This is only one example of the type of programme made possible by the use of recording. Others will be mentioned later.

There are four main objects in recording, all closely interwoven, all contributing to an increased use of the medium, and all made possible by improvements in the technical field. (I say "objects" because to my mind the object in using recording and the reason for doing so are synonymous.) The first object is a question of time, the second of place, the third of production technique and the fourth of history. To put it in other words: the first object is to record the things which happen when the listener is asleep or at work and to play the recording back when he is awake and at leisure.

The need to "beat the clock" is more evident in the BBC's broadcasting service to overseas listeners, where the varying times throughout the world have to be considered, but it is also an important consideration for those who plan and arrange programmes for the home audience. Factories, offices and workshops cannot close down because an important event takes place in the morning or afternoon, but the BBC can and does record such events so that they can be reproduced at convenient listening times. Similarly in these days of staggered hours and shift work it is necessary to repeat many of the popular entertainment programmes at different times and on different days so that the majority of listeners will have a reasonable opportunity of hearing them.

To artistes as well as listeners time is often an important factor. Many are engaged in stage or film work and find it difficult to come to the studio for a live broadcast at a peak listening time—usually between seven and ten o'clock in the evening.

BBC disk-recording machine, of which the turntable, control panel, recording and reproducing head and the traversing-gear housing can be seen. The vertical handle at the back is used to select the turntable speed (78 or 33⅓ revolutions per minute) and the curved pipe is used to suck away the swarf left by the artificial sapphire which is used to cut the groove.

Ten years ago the situation was not so difficult, as there were fewer variety programmes, but changes in programme policy based on demands for more light entertainment created additional demands on the services of variety artistes and actors. They also created additional demands on the limited studio space available—demands which it is not yet possible to meet, bearing in mind that many shows require at least a full day's rehearsal. The solution to the problem is to pre-record the programme at a time when the artistes are free and when a studio is available, and to reproduce the recording at a time when it is convenient for the listener to hear it.

I have said that the four main objects in using recording in broad-

cast programmes are closely interwoven. This applies particularly to those concerned with place and production technique. The development of mobile recording has opened up a wide field and has enabled us to bring to the listener many interesting sounds and voices which previously lay beyond the reach of the studio microphone. It is true that the live outside broadcasting microphone can and does reach out to places far remote from the studio. It has the advantage of being able to bring the listener into immediate contact with the broadcaster, be he a Highland shepherd, a lonely lighthouse keeper, a folk singer in Norfolk or one of the other interesting people to be found in remote parts.

Mobile recording, on the other hand, can often produce a more satisfactory broadcast when it is a question of waiting for things to happen or when it is necessary to bring people and events widely separated by time and space within the scope of one short programme. A good example of this type of broadcast is *Radio Newsreel*, which often includes in one edition recordings made at different

Close-up of a 78-r.p.m. disk-reproducing turntable, showing the special groove-locating device used to select any required groove on the disk.

times in many parts of the world. In programmes of this kind the BBC uses recording as a production technique—a technique which is applied in various forms, from the preparation of a sound picture of a place or event to the presentation in edited form of highlights from an important political conference which lasted perhaps several days.

World War II brought about a vast increase in the use of mobile recording. Programme and technical staff were accredited as War Correspondents, and they sent back by courier plane or field transmitter not only their recorded dispatches, but also the authentic sounds of battle and the stories of the men who fought and of the people who were liberated. These recordings were used in the daily *War Report* and other programmes, but they have now become a chapter in the story of Britain's struggle. In time they will find a place in history. Shakespeare has told us what Henry V said to his troops before the Battle of Agincourt, but are we really certain that the famous words were ever in fact uttered? We do know, however, what General Montgomery said when he addressed his officers before the Battle of Alamein: the General himself made a recording of the actual speech.

Many of the recordings made for current broadcasts are preserved in the Recorded Programmes Library at Broadcasting House. Other items are specially recorded with a view to reproduction in, say, five, ten or even fifty years' time. This is the historical aspect of the work, and in some respects it is the most important justification for the use of recording in broadcast programmes.

The BBC began to make recordings on a very small scale in 1931 to help meet the needs of a broadcasting service which even then had begun to expand. During the next five years, however, it became clear that recording was destined to play a much more important part in broadcasts of the future. From this evolved the idea of collecting and preserving items and programmes of historical interest. Technical resources were limited, but by 1939 the Recorded Programmes Library held a collection of over 2,000 separate items, ranging from the Jubilee celebrations of Their Majesties King George V and Queen Mary in 1935 to the recorded voices of G. K. Chesterton, H. G. Wells, Sir Oliver Lodge and other eminent men and women of that period. By 1949 the number had increased to nearly 20,000, and every day new records are added to this unique collection.

You should now have a fair impression of a BBC recording as such and of the reasons for using the medium in broadcasting. To

In editing a recording the disk is marked with a yellow wax pencil to indicate the sections of the recording which are to be broadcast. This picture shows one of the many playing desks used by the BBC.

what extent does the BBC use recording in order to bridge time and space, in order to produce programmes which cannot be produced through any other medium and in order to preserve material for future programme use? Each week about 3,500 separate recordings or reproductions are arranged, representing about 425 weekly transmission hours, or 42 per cent of the BBC's total output. The figures for the Overseas Services are, of course, much higher than those for the domestic wavelengths, which rely on recording for about 15 per cent of their daily output.

The running of the BBC's recording service is the joint responsibility of two departments, the Recording Department and the Recorded Programmes Department. The Recording Department is a technical unit attached to the Engineering Division; it is primarily concerned with the actual making of the records and with the reproduction of complete programmes recorded on magnetic tape, film and $33\frac{1}{3}$-r.p.m. disk. It is also responsible for the maintenance of the recording and reproducing channels installed at BBC centres throughout the country, and of the mobile recording units which are based strategically at various points in the U.K. and on the Continent.

These responsibilities embrace the operation and maintenance of the equipment used, as well as the careful day-to-day examination of the recording materials used to ensure that the highest possible quality standards are achieved. The problem is made more difficult by the fact that a recording made at one centre may be reproduced on any one of several hundred reproducing desks distributed throughout the country.

The Recorded Programmes Department forms part of the Entertainment Division—the main programme-producing division of the BBC—and it is chiefly concerned with the application of recording to broadcasting. Its primary job is to provide a service for other producing departments—variety, features, drama and so forth—but it also finds time to create and produce its own programmes through the medium of recording.

The day-to-day planning and organization of the work is in the hands of a section of the department called the Traffic and Information Unit. This unit acts as a clearing house for the 3,500 weekly requests for recordings and reproductions which pour in from hour to hour and minute to minute from producers and programme planners in the various services.

Each request has to be fully justified before it is accepted. It is then allocated by a bookings clerk to the appropriate recording or

reproducing channel. A note is made in the daily diary, and from this diary a printed schedule is prepared and circulated to all programme and technical staff concerned. The schedule sets out in chronological order the commitments to be covered during the next 24-hour period. From it the Control Room engineer knows, for example, that at 17.00 hrs. (5 p.m.) he must connect Studio 3C to recording channel AK1 (which may be in another building); the recording engineer attached to AK1 knows that he must stand by to record a discussion from 3C and that the disks which he records must be given the title and reference number indicated on the schedule. The Recorded Programmes assistant knows that the recorded discussion will last approximately three-quarters of an hour and that later he will have to reduce it to half an hour for use on the Overseas Services.

When the recording session has been completed the disks are sent to the Traffic and Information Unit, where they are indexed and filed to await transmission. Each week more than 4,000 disks are handled by this unit, and it follows that careful organization is necessary to ensure that the correct recording finds its way into the right transmission at the scheduled time. Programme reporters attached to the unit prepare and circulate reports on all complete programmes recorded for subsequent repeat. These reports enable the announcer, for instance, to decide whether or not the recorded announcements are suitable for the repeat broadcast. If they are unsuitable because a reference is made to the time of day, or for any other reason, instructions are issued to have them deleted from the recording and arrangements are made to substitute live announcements.

I have explained how a short version of the Cup Final commentary is prepared. The same technique is employed for other programmes, such as *Have a Go* and *Down Your Way*, which are based on unrehearsed interviews with homely folk, many of whom have never seen a broadcasting microphone before. By cutting out the irrelevancies, the awkward pauses and the repetitions, it is possible to present a slick and entertaining programme which could not have been achieved without spending many hours on rehearsal. If there had been a rehearsal it is possible that the results would have failed to create the impression of spontaneity, an important factor in programmes of this kind.

The editing and reproduction of programmes recorded on 78-r.p.m. disks is handled by Recorded Programmes assistants attached to the Productions and Operations Section of the department, following the technique already explained. These assistants are also

responsible for the supervision of recording sessions in the studio and for establishing a direct liaison between the studio and the recording engineer. Some of their colleagues in the section are attached to the mobile recording units, and their job is to collect "actuality" material in the field and to assist other departments in collecting recorded items for their programmes.

Other members of the section are engaged on the production and presentation of programmes through the medium of recording—programmes like *Down Your Way*, *On and Off the Record*, *It's on Record*, edited versions of sports and other broadcasts and a weekly actuality item of feminine interest for *Woman's Hour*.

The building up of the historical and permanent library is in the hands of a group of trained assistants, whose interests may vary from folk-lore to current affairs, or from scientific pursuits to sport. It is their job to exercise critical judgment on each of the 4,000-odd recordings which find their way into the Current Library every week and to select for permanent retention those which have historical value and are suitable for future programme use. Many of the current recordings are, of course, purely ephemeral in character and

A studio assistant awaits his cue from the producer to introduce a recorded effect. This is the gramophone studio of the BBC in Northern Ireland.

can be destroyed as soon as they have completed their scheduled cycle of reproduction. Others have to be carefully considered in relation to existing material of a similar nature already on the library shelves or in relation to their general contribution to the aims of the library.

The library aims primarily to be a storehouse of recordings which have potential value for future programme use, but in carrying out this function it is building up a collection which has historical value on a wider basis. These two aspects are in no way opposed, as experience has shown that recordings of genuine historical interest provide excellent material for reminiscent programmes such as *Scrapbook* and *On and Off the Record*.

In making their selections, the library assistants must consider copyright, contractual and other problems, and decide whether or not the item is of sufficient importance to justify preservation despite any restrictions on its future use. They must also decide whether the recording should be preserved in full or whether brief extracts will be sufficient for future programme use. It is unlikely, for instance, that in ten years' time any listener would want to hear a re-broadcast of the whole 90-minute commentary on this year's Cup Final. He might, however, find pleasure in recalling one or two highlights in the game.

When a programme or item is selected for permanent retention, the original recording is passed to the library Processing Unit with editing, label-printing and other instructions. The necessary editing and dubbing is carried out, and copies of the recording are dispatched to the processing factories. From the disks a copper matrix is derived, and this in turn serves as a master from which an unlimited number of pressings or gramophone records can be made.

The greatest merit of historical records is their authenticity, and every effort is made to preserve this feature in the BBC's collection. This applies not only to recordings of famous voices, outstanding events, ancient customs and the like, but also to the ordinary sounds which characterize our life and times. The listener is no longer satisfied with noises-off manufactured in the studio—drum rolls for thunder, and drum beats for rifle fire. The Effects Section of the Permanent Library contains at least 8,000 separate recorded sounds ranging from the atmosphere in a village pub to the bursting of a V2 bomb. These recordings are not merely noises-off—they are as much a part of contemporary history as the voices of Winston Churchill or Harry S. Truman. In years to come our children will not only read about the first jet-propelled plane or the bombing of British cities; they will also be able to listen to the actual sounds recorded at the time.

The news bulletins

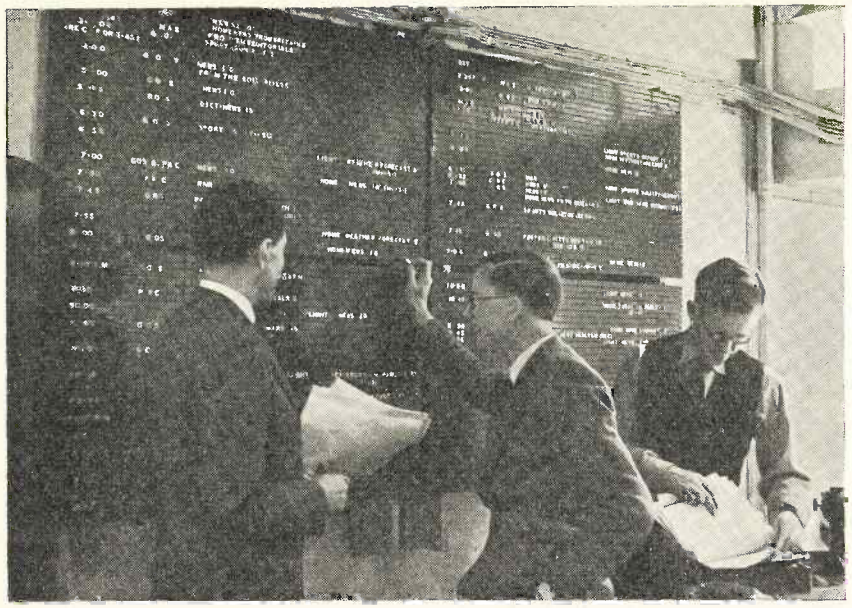
KENNETH DICK (*Assistant to Head of News Output, BBC*)

TWICE every day, morning and evening, one may find a group of men sitting at a long table in a room at the top of a building next to Broadcasting House. At the head of the table sits the Editor of the BBC's News Division. On each side are his senior assistants: the men in charge of the news bulletins and the radio newsreels, the chief reporter, the man responsible for the work of the foreign correspondents, perhaps the diplomatic correspondent and the parliamentary correspondent.

In the rooms around and below them work nearly 300 men and women. The lights in their offices never go out. Day and night, seven days a week, teleprinters and typewriters chatter and telephones ring. Red lights glow outside studio doors as men whose voices are known wherever English is understood broadcast the results of their work to the corners of the earth. This is the headquarters of the BBC's News Division.

An average regular listener to one Home Service news bulletin a day might well ask at this point: "However can they find work for 300 people?" The answer lies in the large schedule of programmes for which the News Division is responsible. News Division does not prepare only the ten news bulletins and summaries that are heard in the Home Service and Light Programme. In every twenty-four hours it prepares fourteen bulletins for broadcasting overseas.

In addition to the radio newsreel broadcast each evening at seven o'clock in the Light Programme it prepares six editions every day for the BBC's overseas services. It is responsible every day for three news analyses, short explanations of the day's events by leading newspaper journalists. It prepares *Today in Parliament*, a 15-minute summary of what has happened in both Houses of Parliament, on every day on which Parliament sits. It prepares bulletins of sports news for enthusiasts at home and overseas; it gives overseas listeners a daily bulletin of world news read at dictation speed so that it can be taken down in longhand; and, three

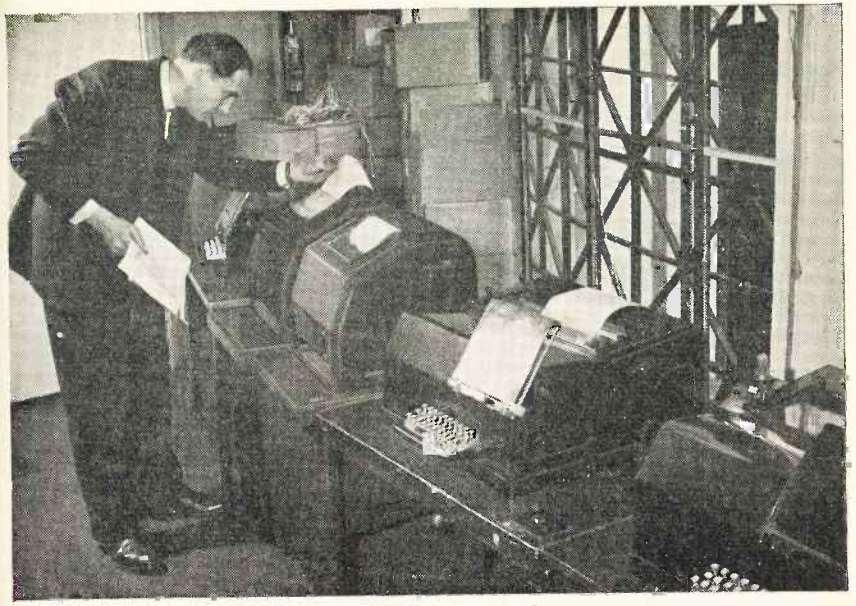


This large board, which gives the daily schedule of news bulletins, is in the BBC Newsroom. Kenneth Dick, Assistant to the Head of News Output (back to camera). discusses the schedule with the Duty Editor, while a chief sub-editor looks through some of the previous night's bulletins.

times a day, a review of the leading articles in the London and provincial newspapers.

The BBC's News Division is the largest news unit of its kind in the world. Unlike a newspaper office, in which work can cease once the paper has been "put to bed," the BBC's newsroom is never off duty. No sooner is one news bulletin safely on the air than work must begin on the next. When most people are on their way to work in the morning the night-shift newsmen are thinking of going to bed.

An hour or two before listeners in Great Britain hear the first of their morning news bulletins at seven o'clock the well-known words, "This is London calling. Here is the news," have been heard in Australia and New Zealand, where it is evening. Shortly before that listeners in the Indian continent will have heard an early-morning bulletin and those in North and South America a late-night one.



Much of the news material comes into the "tape room" by teleprinter. From there the tape is passed to the newsroom, where it is decided which news items shall or shall not be used. Those to be used are passed to a sub-editor who paraphrases and dictates them to a typist.

These bulletins which flow so fast upon each other are not all the same. It is not just a case of repeating for listeners in South Africa the bulletin that has been heard in Britain, or of giving the home audience the bulletin that has just been broadcast to the West Indies. The facts are the same, but their presentation may be different.

It was laid down in the White Paper on "Broadcasting Policy" that: "The Corporation's reputation for telling the truth must be maintained, and the treatment of an item in an Overseas News bulletin must not differ in any material respect from its treatment in current news bulletins for domestic listeners." But within this rigid framework there is scope for intelligent variation, for taking into account the anticipated reaction of a particular audience to a particular item of news which is to be broadcast.

A Budget Speech, for example, would be given an over-all summary in all news bulletins. But whereas the most interesting item for the home audience might be a reduction in income tax or an extra threepence on a packet of cigarettes, the emphasis for South African listeners might be on the Chancellor of the Exchequer's remarks about the price of gold. For North America the most interesting passage might be one about the European Recovery Programme, and for Western Europe a reference to the maintenance of coal deliveries.

At the same time, in all versions, the basic facts must be the same and the same standard of objectivity must be maintained. BBC news has a reputation for sobriety and soundness.

The BBC works under a Royal Charter. This means that the King and Parliament have given the BBC the exclusive right to broadcast news, and all other programmes, in this country. The Government can, in theory, order the BBC to report an item of news. If such an order were given, and, in fact, it never has been given, the BBC would have the right to say that the broadcast was put out on official instructions. Listeners, therefore, need never be in doubt whether what they hear is simply and solely what the BBC believes to be rightly included in the news or whether it is something imposed from outside the Corporation.

Every news bulletin is, from first to last, the responsibility of the BBC's Editor and his staff. Requests will always come from all sorts of interests to put this into the news and to leave out that. There is hardly a section of the community that does not, at some time or another, honestly believe that it would be better if some particular item of quite accurate information were suppressed. Such pleas are never regarded as commands. The choice of what does or does not go into the news is made entirely on the judgment of the BBC. That is the one and only answer to the questions: Who controls the news? Who decides what is to be left in or left out?

Look into the BBC newsroom at any hour of the day or night and you will find the desks and tables littered with the raw material that goes to make up the bulletins—the messages from the BBC's own correspondents and from the news agencies. Steadily throughout the day the teleprinters and tape machines spill out their copy. And one of the main problems continually to be faced is the selection of just that small proportion for which there is time from all the many thousands of words available.

Few people realize that the number of words in the 10- or 15-minute news bulletins they hear would fill less than a couple of

columns of a newspaper. Any item of news competing for inclusion in a news bulletin must therefore pass a number of tests. One of the first of these tests is: Is it true? This is not always easy to decide.

A "flash" might be received saying that in Washington or in Rome there had been a surprising or important decision or happening. So far as the newsroom is concerned there is only one source of the story—the brief six inches of paper tape lying on the news desk. Does it mean that an enterprising correspondent has got ahead of his competitors? Or does it mean that some rumour without foundation has been started on its travels round the world? Either answer may be the right one. Correspondents do get scoops. Baseless gossip does circulate as news. Often such an item will be held over from a bulletin so that it can be well and truly rung upon the counter to test whether it is true or false.

Two other tests that every story has to pass before it is included in a bulletin are: Is it important? and: Is it interesting? Offhand it might be said that if a thing is important it is obviously interesting.

BBC Special Correspondent Richard Williams, with a recording van in Jerusalem, gives an on-the-spot account of current events. This is just one aspect of a news reporter's interesting and far-reaching job.

Morse listening room at the BBC monitoring station at Caversham Park, Reading. Part of the BBC's news-gathering work consists of intercepting telegraph signals in Morse code. The received signals are copied direct on to typewriters. High-speed Morse signals are also received, but these are recorded and afterwards slowed down for transcription.

But that is not always true. Important news may be complicated, difficult to follow, and dull unless it is simplified; and simplification may easily lead to distortion. An official statement may be made that is important because it covers new regulations affecting everyday life. But it may have been drafted with an eye to legal exactitude rather than to coming easily off an announcer's tongue.

Some statements of national significance, perhaps international importance, are phrased deliberately to cover the delicate nature of the subject dealt with. A newspaper can serve its readers by printing the statement in full. The readers may try to unravel the meaning for themselves. In a news bulletin the task is more complex. As a long statement cannot be given in full the news staff must produce a summary. While preserving the sense exactly, they must take account of any careful ambiguity, help the listener to understand the imprecise nature of the document and, at the same time, enable him to

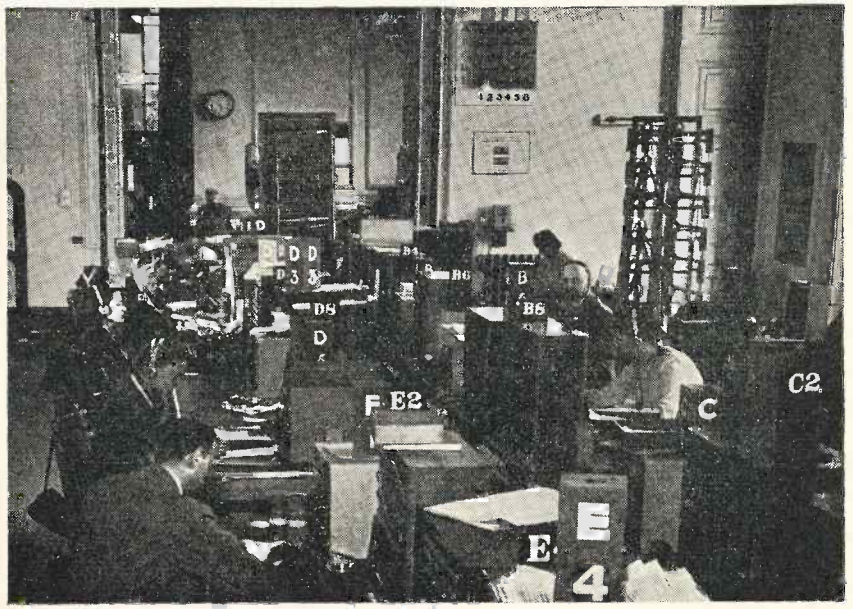
recognize the point at which precision ends and imprecision begins.

The question: "Is it interesting?" carries the implication: is it interesting to enough people? A piece of news may be of interest to one part of Great Britain, or one part of the world, and not to another. Or it may be of interest only to one particular trade or to one class of people. Then there are all the small-change happenings in the world that may be perhaps surprising or amusing to many but which cannot legitimately find a place in the limited space of a news bulletin.

Those who try to compare a news bulletin with a newspaper are trying to do the impossible. For instance, broadcasting has no equivalent to the inside pages and bottoms of columns of a newspaper. Nor can it show its evaluation of the importance of a story by using different sizes of type.

A newspaper can announce in its headlines that a great economic crisis has been surmounted and in the next column report that a

Another view of the BBC monitoring station at Caversham Park. In this room, news broadcasts from all parts of the world are picked up, recorded or transcribed and passed through to the Newsroom in London. The lettered cubes indicate that a recorder is in use.



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Using a standard lip microphone, which cuts out unwanted noises, Audrey Russell, the only woman among eight news reporters of the BBC Home Reporting team, gives a commentary on a fly-past from a London roof.

favourite film star has had a baby. A newspaper reader, skimming the columns, can read first the story that interests him most. The story that doesn't appeal to him he need not read at all. But the listener to a news bulletin must hear the stories in the order in which the newsroom staff have chosen to place them, and may have to sit through several minutes of news in which he has no personal interest before coming to an item that he is keen to hear.

One of the first things a journalist has to learn when he joins the BBC's news staff is to write for the microphone. The best-written newspaper story will not be the best story for radio. The newspaper way is to crowd all the main facts into the first sentence. The effect of that in a news broadcast can be merely confusing. The listener has no headlines to tell him what a story is about before he starts to hear it. He cannot look back and re-read something that he failed to grasp at first sight. He must be told in the first sentence what the story is about, and must then be led from one piece of information to the next so that at the end he is left with a clear picture of what he has been told.

What can be taken in easily by the eye is often hard, sometimes impossible, to follow if heard; and often what can be read aloud well is not attractive in print. It is for this reason that sub-editors in the newsroom dictate their stories to typists; they do not write them. Experience has shown that a sub-editor reading his story aloud in this way is more likely to produce sentences that can be read easily by the newsreader than if he were merely to write them down. A large amount of time and thought is spent on turning important news into "broadcastable" English. Simplicity is essential. Great stylists have found it difficult to achieve simplicity even when trying to set down their own thoughts. To attempt to give a clear meaning to ideas uttered in slipshod, obscure or ambiguous language by someone else is doubly difficult.

The sources of news available to the BBC newsroom are, in the main, the same as those that are available to a newspaper. It receives the services of the principal news agencies and has its teams of reporters and correspondents at home and abroad. One additional source of news it has is the service of rapid and accurate summaries of news broadcasts from radio stations all over the world that is supplied by the BBC's Monitoring Service.

In a large building in the country men and women of all nationalities listen day and night to the millions of words that pour out from overseas broadcasting organizations, and within a few minutes

of the broadcasting of any important or interesting item of news a brief "flash" is received by teleprinter in the newsroom in London. An announcement in Moscow, an earthquake in South America, the death of a prominent European: any such event as this may be known in the BBC newsroom through the medium of a watchful monitor some time before it reaches the newsrooms of Fleet Street.

The BBC's reporters and correspondents have to be not only accurate and objective reporters of what they see and hear; they must be skilled broadcasters as well. Whether they are the specialists —the diplomatic, parliamentary, industrial or air correspondents— whether they belong to the team of reporters in London who are ready to go on an assignment at short notice to anywhere in the United Kingdom or abroad, whether they work in the BBC's regional offices or in one of the principal capitals of the world; whichever they are they must be able to speak their story into a microphone so that it may be heard as an insert in one of the news bulletins or as a normal part of a radio newsreel.

The fitting into a bulletin of a correspondent's dispatch in his own voice can be a worrying task. If the dispatch has been recorded before the bulletin goes on the air the problem is simple. The dispatch is timed, its exact length is known and the recording is taken to the studio and is played on the appropriate cue. The occasions on which the newsroom staff and the newsreaders keep their fingers tightly crossed are when a correspondent is to speak "live" into a news bulletin. Even though every precaution is taken beforehand there are many things that can go wrong at the last moment.

The correspondent may be sitting in a studio in New York, Delhi, Johannesburg or anywhere else. He should be listening to the news bulletin on a pair of headphones, he should hear the previously arranged cue on which he should start to speak, and he should speak for the previously arranged length of time. In the studio in London the newsreader will give the cue, he will listen on headphones while the correspondent tells his story and, when the correspondent has finished, he will resume the bulletin.

That is as it should be. But many listeners will have recollections of occasions on which a newsreader's cue, "And now we take you over to our correspondent," has been followed by an uneasy silence or a surge of atmospherics. There is nothing more maddening for those in News Division than to hear the voice of a correspondent as clearly as could be wished a few minutes before he is due to start speaking to the millions who are listening to the news and then to have it fade

away or be drowned by a noise like a tornado the moment he gets his cue to start his dispatch. And there can be nothing more maddening for a correspondent sitting in a studio on the other side of the world than to hear silence or roaring atmospherics when he knows he should be hearing a voice in London giving him his cue to speak.

Many problems connected with broadcasting the news have to be solved behind the scenes. The disposition of the limited number of correspondents and reporters is one of them; whether listeners will get better value if a correspondent is sent to cover a big meeting at Frankfurt rather than left at his base in Berlin; whether dollars will be well spent on sending a man to report a conference in San Francisco; whether a recording car is likely to get good sound pictures of military manœuvres on Salisbury Plain. These and many other problems to do with news gathering and news reporting are dealt with every day by the small group of men who meet at the long table in a room at the top of the building next to Broadcasting House. And the results of their decisions and of the work of the 300 other men and women in the BBC's News Division are heard many times a day, all over the world, after the words: "Here is the news."

BBC Newsroom, which is in a building close to Broadcasting House. Here the news bulletins are prepared for the Home and Overseas Services.

Frank Phillips reads a news bulletin, watched from the control cubicle by an engineer. As Mr. Phillips says, the large window sometimes gives the announcer "a feeling of kinship with a fish in a glass tank."

"Here is the news . . ."

FRANK PHILLIPS (*BBC Newsreader*)

THE technique of a newsreader is very similar to that of a singer. A reader has to consider voice production, phrasing and breathing, and, above all, like the singer, that he is the mouthpiece of the writer.

May I dwell on this last point for a moment? A news bulletin may be put together with all the ease in the world, but until it has gone out over the air it is a dead thing—just a lot of words on paper.

The newsreader, on the other hand, may have a magnificent voice and superb delivery, but without a bulletin he cannot even start to give you the News. It should also be understood that the bulletin could not go out without the aid of a group of engineers and their equipment.

The important thing to grasp is the co-operation that exists between the writers and readers of bulletins. When looking through the items beforehand, any of us can always discuss a news item with the man who wrote it, or with his Duty Editor; and in that way get a complete understanding of the subject. Indeed, I would say that to understand what a man is writing about is far more important than seeing what he has written. For this reason: a radio news bulletin is written for the ear, not for the eye. And if it were written so that each sentence could have only one possible meaning it would read like a legal document—and heaven knows that can be pretty dull!

Again, there is the time factor: if the News is to be really up to the minute, which it is, one must occasionally expect a typographical error, or some slight fault in punctuation. Hence the old and I have no doubt apocryphal story of a newsreader who launched himself on an unseen item as follows: "We regret to announce the death of Lord R . . . so often" (pause). "I beg your pardon, I'll read that again: We regret to announce the death of Lord R . . . , so often and so rightly called 'The Captain of . . .'," etc.

However, if we can see a news item beforehand, so much the better; and one of the things we look for is what might be called the

vocal snag—the sentence which looks so innocent but which, when read out loud, brings the unwary down "in flames."

One of my wartime colleagues never could say "The American Secretary of State, Mr. Stettinius . . ." with any confidence unless he was allowed to break up the series of explosive sounds by giving Mr. Stettinius's christian name—Edward. Another found his tongue working overtime trying to say "Six Swedish fishing-smacks." Not so difficult when reading just the four words, but hide it innocently in the middle of a sentence, read at about 150 words a minute, and see how you get on! My own particular difficulty arose when I was required to say: "Mr. Justice Humphreys said this should be a Sussex Assize."

Not long ago the weather forecast brought me to a standstill. Unable to find a break in the clouds in the shape of a comma, I more or less ran out of breath as I got to the bottom of a page. Therefore, with fresh breath and a new page, I started what seemed a new sentence—only to realize that I was saying: "The Irish Sea will move slowly eastward!" Switching off the microphone for a moment to regain some sort of dignity, I was reduced to helpless laughter by the appearance of the Duty Editor, who said very mildly: "Pity it isn't westward—save so much bother!"

The spartan nature of a newsreader's non-resonant cubicle is evident from this picture which shows Harry Middleton reading a news bulletin in Studio 36, from which Home Service and Light Programme bulletins are broadcast.

A newsreader checks the pronunciation of foreign names and places mentioned in his script with an assistant who is in charge of the "pronunciation" cabinet. The Duty Editor (right) makes a final check of the script.

Perhaps at this stage you are wondering what the newsreading studio looks like. Very plain, indeed almost spartan; a table with a microphone suspended from the ceiling, a chair or two, a loudspeaker, and, to the casual observer, nothing else.

Look a little closer though, and you will notice perforated panels on the walls to absorb echo. The table is made of perforated metal, covered with a tightly stretched, coarsely woven material, to prevent sound bouncing, as it were, off the table into the microphone.

To one side is a little black box: it is a switch enabling us to cough as loudly as we like without offending millions of listeners, or, as I have just indicated, to have a quiet chuckle between items. There is nothing so awful as not being able to laugh when you want to, is there?

Everything one reads is carefully controlled in terms of volume by a technician next door, in a cubicle with a big glass panel enabling him or her to watch one's every movement. And when he or she is joined by the Duty Editor, and one or two other people interested

in the bulletin, one has a feeling of kinship with a fish in a glass tank.

Another thing I ought to mention is Pronunciation. Some years ago the BBC set up an Advisory Committee on spoken English to guide us on how to deal with proper names, place names and unusual words.

Seven booklets were prepared, each containing roughly two thousand words, with the pronunciations given in phonetic spelling. In September, 1939, the war brought about, among other things, the disbanding of the committee, whose work, nevertheless, was carried on by a smaller Pronunciation Unit, a unit which is still working full time, advising, checking and keeping up to date what is by now an enormous and very valuable index. During the war years alone a further 20,000 words were added.

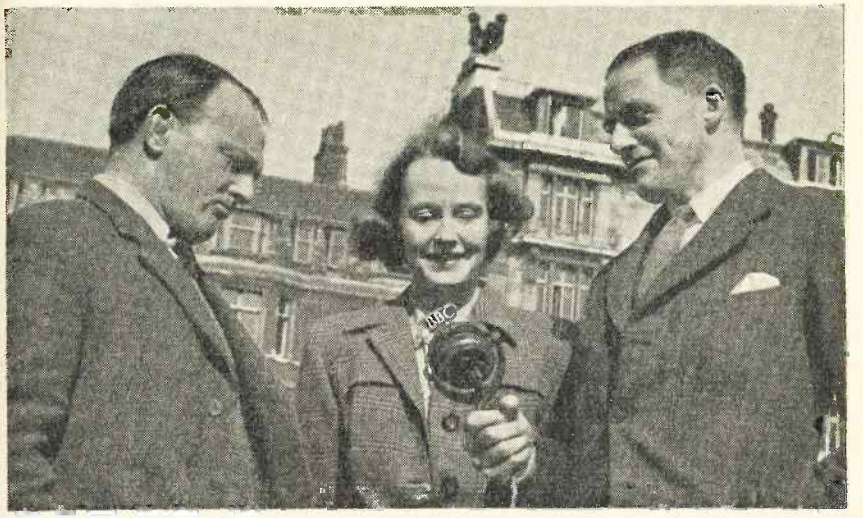
The principles of the unit are quite clear. Proper names are pronounced as the owner would wish (for example, Marjoriebanks and Leveson-Gower). In the case of foreign proper names we do our best to keep to that rule. Place names are, as far as possible, given their national characteristics (for example, "au" in German sounding "ow," becomes ō in French) but the pronunciation may be "bent" a little—that is to say, Anglicized—so that the British listener may pick up his newspaper, look at a map and recognize a place from the sound he has heard, and not, on the other hand, accuse us of being "precious."

Unusual words, when they crop up in a news item on some technical matter, are referred to experts on the subject by our Pronunciation Unit, and an authoritative pronunciation is indexed, together with the source of information.

Common usage is the key to words that authority tells us have more than one pronunciation, and to the names of certain foreign places. Places, for example, where the British Navy has had a headquarters for years, and given its own pronunciation: slang, made from foreign words, and taken into the English language, resulting in sounds that have, as their sole foundation, the fact that the British people have come to say them that way. And on that mixture of courtesy, expert authority and common usage, an index system of over 34,000 words has been built up.

Now, about this business of bias. In case you don't know, let me tell you that when we are accused of bias, which is seldom, the accusations invariably cancel out.

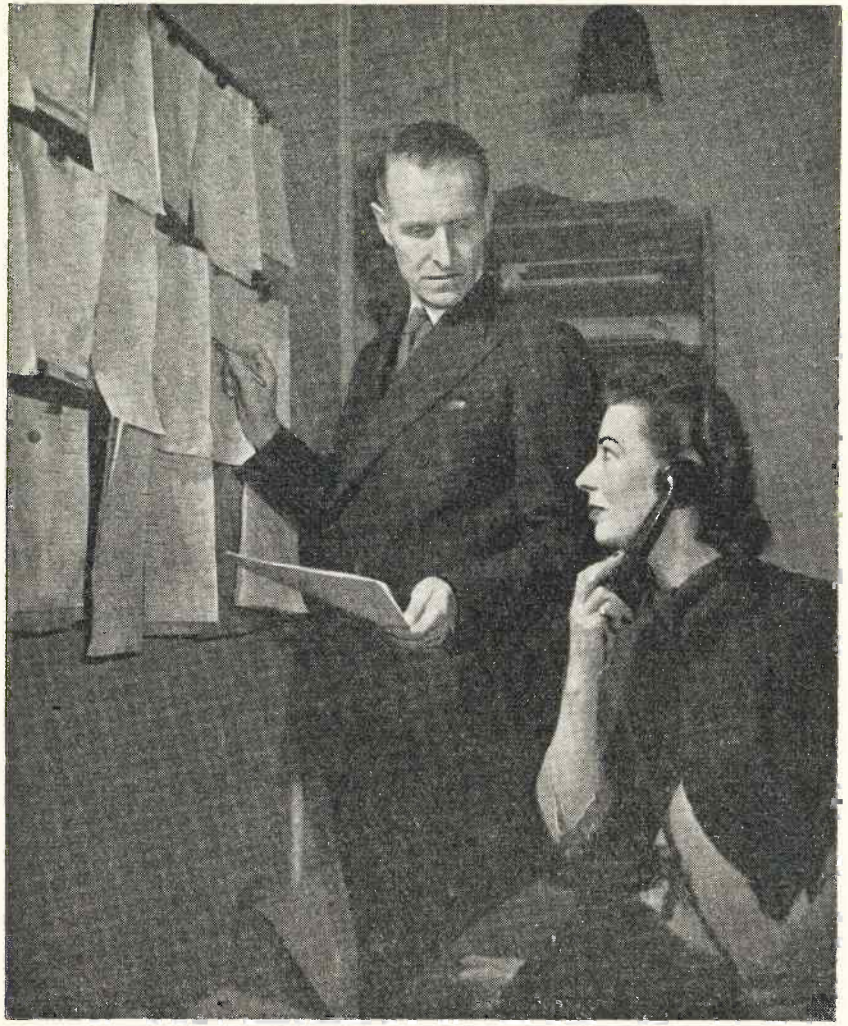
There is a wealth of difference between being unbiased and being lifeless. A bulletin, the moment you start to read it, ceases to be a



Three of the BBC Home News Reporters: Godfrey Talbot, Chief Reporter (holding microphone), is with colleagues Audrey Russell and Richard Sharp.

dead thing in your hand. Things grave and gay are going on around us. People are doing things, saying things, thinking things all over the world, and through the magic of radio—and I still think of it as that—you are able to sit at home and have the world's news brought to you. Not dramatically, though there may be drama there, but sanely, calmly and lucidly.

The News Bulletin is a service, not an entertainment. There is no editorial column to influence your judgment; no strip cartoon to take your mind off matters when the news is bad (though sometimes we make mistakes that are a lot funnier); and no advertisements to distract your attention. It is there for you to listen to: the truth, the whole truth and nothing but the truth. For myself, never a day passes but I get a little thrill to hear—or say—"Here is the news."



Cecil Madden, BBC Television Programme Organizer, with his planning clerk in his office, where programmes are planned and delegated to individual producers. The sheets contain details of future programmes, week by week.

Television

CECIL MADDEN (*Television Programme Organizer, BBC*)

TELEVISION is now a daily service in Britain and America. In every home it is a look-out on life. Owners of the familiar H-shaped aerials instinctively form a kind of vast family who share the daily programme put out for their benefit. Television now reaches the South and the Midlands; in time the industrial North, the West, Wales, Northern Ireland and Scotland will all be part of the "Eye of Britain."

If you own a television set today, what can you see? The Boat Race, Wimbledon tennis, cricket at Lord's, racing at Ascot, great orchestras, famous musicians, popular plays, Shakespeare, variety, revues, musical comedies, topical magazines, fashions, science, athletics, the Zoo, Trooping the Colour, films, newsreels—the list is never-ending.

What is television? The word, part Greek and part Latin, means seeing at a distance. It is a new medium which establishes a contact with the viewer that is both new and unique, when you know that a programme is "live" and happening at the moment.

In Britain, if you have a radio set you are called a listener, if you have a television set you are a viewer. America has added a new term for a television broadcast, telecast, and so it was an easy step to telecaster. There they call the sight side video and the sound audio.

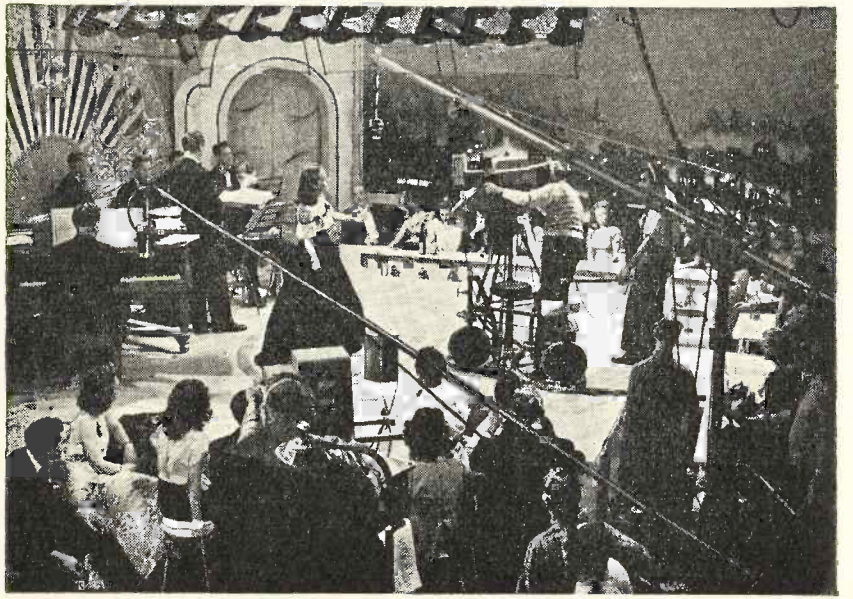
Our normal perception is three-dimensional, stereoscopic. Did you know that of our total sensitivity our sense of seeing amounts to 70 per cent, and of hearing 28 per cent, the remainder being only the very small allowance necessary to cover smell, touch and taste. At present television is only two-dimensional and in monochrome. But colour is round the corner. It has already been demonstrated experimentally, but it is obvious that it will add to the cost, and for the moment people want to buy television sets cheaply.

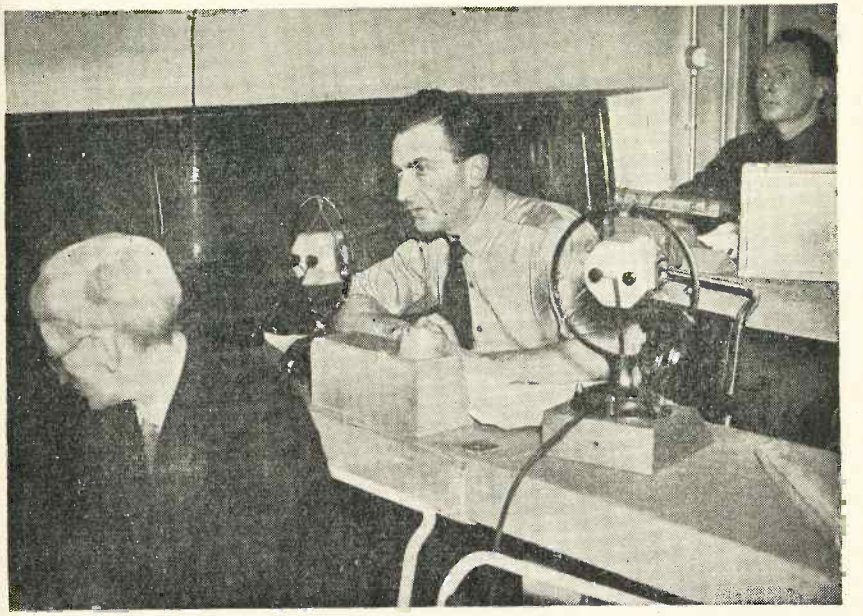
Suppose we take a trip to "Ally Pally" (as Alexandra Palace, the British home of television, is called) and look inside, what can we see? We pass the reception desk, go up two floors in the small lift, a

lift, by the way, which has seen many strange passengers, from a Shetland pony to a sea-lion. We turn left round a corner and a very long passage faces us. All down the right side are dressing-rooms, and at the extreme end the make-up room. The nearest room is the biggest, and might accommodate one day a bevy of chorus girls or another day an entire dance band.

The left of the passage is the business side. First we come to Studio A, beyond lies its Control room, the Telecine room, the Central Control room, ending with Studio B. At the far end is the "Props" room, where the property master can produce, at will, drinking glasses of any period and a selection of weapons from sabres to sawn-off machine-guns, or, say, anything from a warming-pan to a pair of riding spurs. Next to this is a lift up which scenery is brought into the studios from outside. After each show everything is cleared in a matter of minutes, and the new sets and scenes are being prepared for installation and lighting for the next programme.

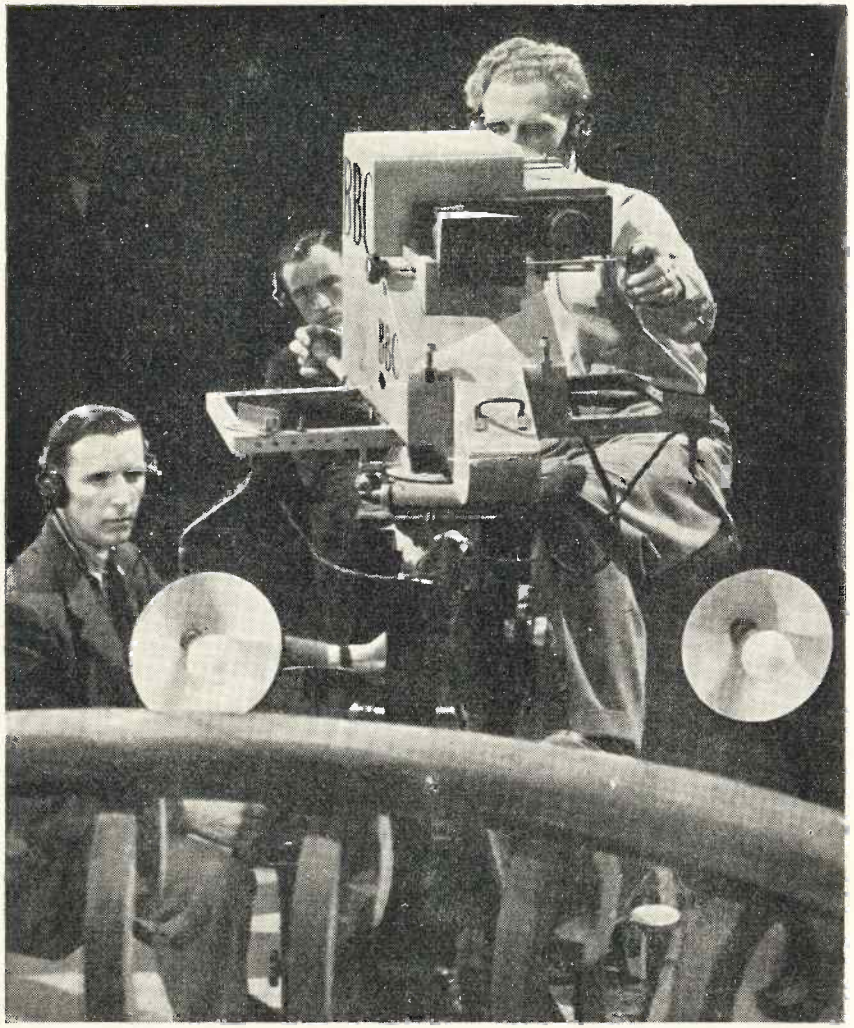
Scene during the television transmission of an act in Rooftop Rendezvous *from Studio A at Alexandra Palace. The camera in use for a close-up is a "crab"; an engineer operates the boom to ensure that the microphone is always in range of the artist and yet out of range of the camera.*





Tense moment for the producer in the control room which overlooks Studio A. He watches "Preview" and "Transmission" monitor and gives instructions, through his microphone, to camera crews and floor staff in the studio.

We beard the studio attendant, show a pass and step into Studio A. A rehearsal is going on. The artistes are working under the battery of lights which are full on. There are four television cameras operating, some manned by a cameraman with a dollyman to push them forward—"tracking"—during the programme as required for close-ups, medium shots or long shots; another who may wind a crane up or down, according to the producer's needs. Massive-looking fixed camera stands of another kind, nicknamed "iron men," are operated by one man only; yet another is called a crab, because it can be moved sideways as well as forwards and backwards. Actually the word camera is a misnomer, as a camera suggests film; in point of fact, the television camera contains an Emitron tube, in which an image of the scene is focused on to a mosaic. Electrical impulses from this are passed along a special cable, through a sequence of technical apparatus in the control room to the vision transmitter,



An Emitron television camera and crew as seen by the artist during a close-up. Perhaps it is not surprising that many experienced stage and radio artistes are inclined to suffer from "television nerves."

where they are greatly amplified and then fed up the mast to the vision-transmitter aerial, and so on to the air. Sound currents from the microphone are dealt with in a similar manner and are fed to a separate transmitter aerial via the sound transmitter. It is the combination of both, caught on your home aerial, that will build up the same picture and sounds in the receiver in your home.

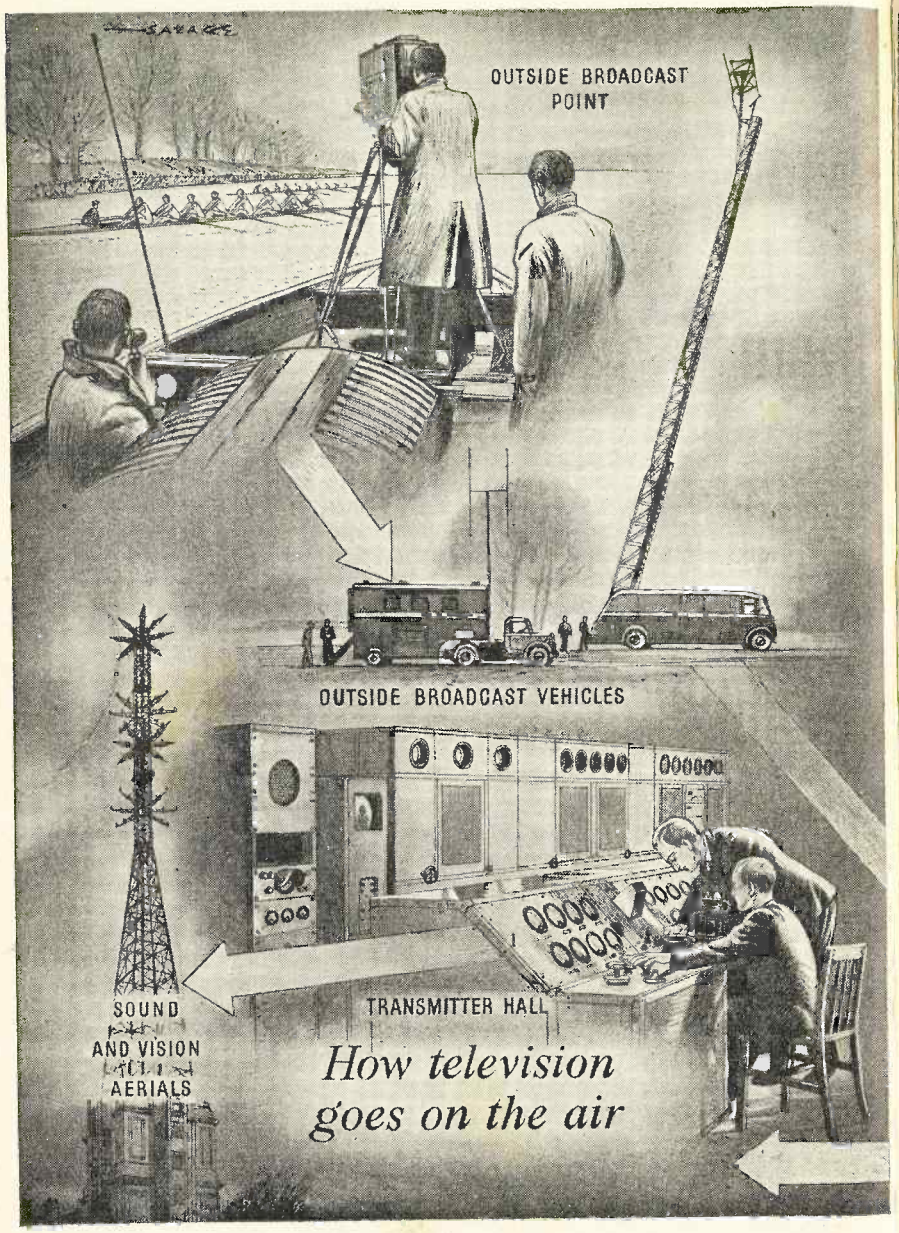
To return to the studio: at one end is a cyclorama, or curved backcloth, light, grey and quite plain. It is sometimes used as it is with lighting effects, or ignored and buried behind roomfuls of scenery. This scenery may be of several period rooms in a house, set at different ends of the studio, with small inset scenes, known as grottoes, down the sides. Alternatively, it may be a composite set, consisting of a number of rooms opening into each other.

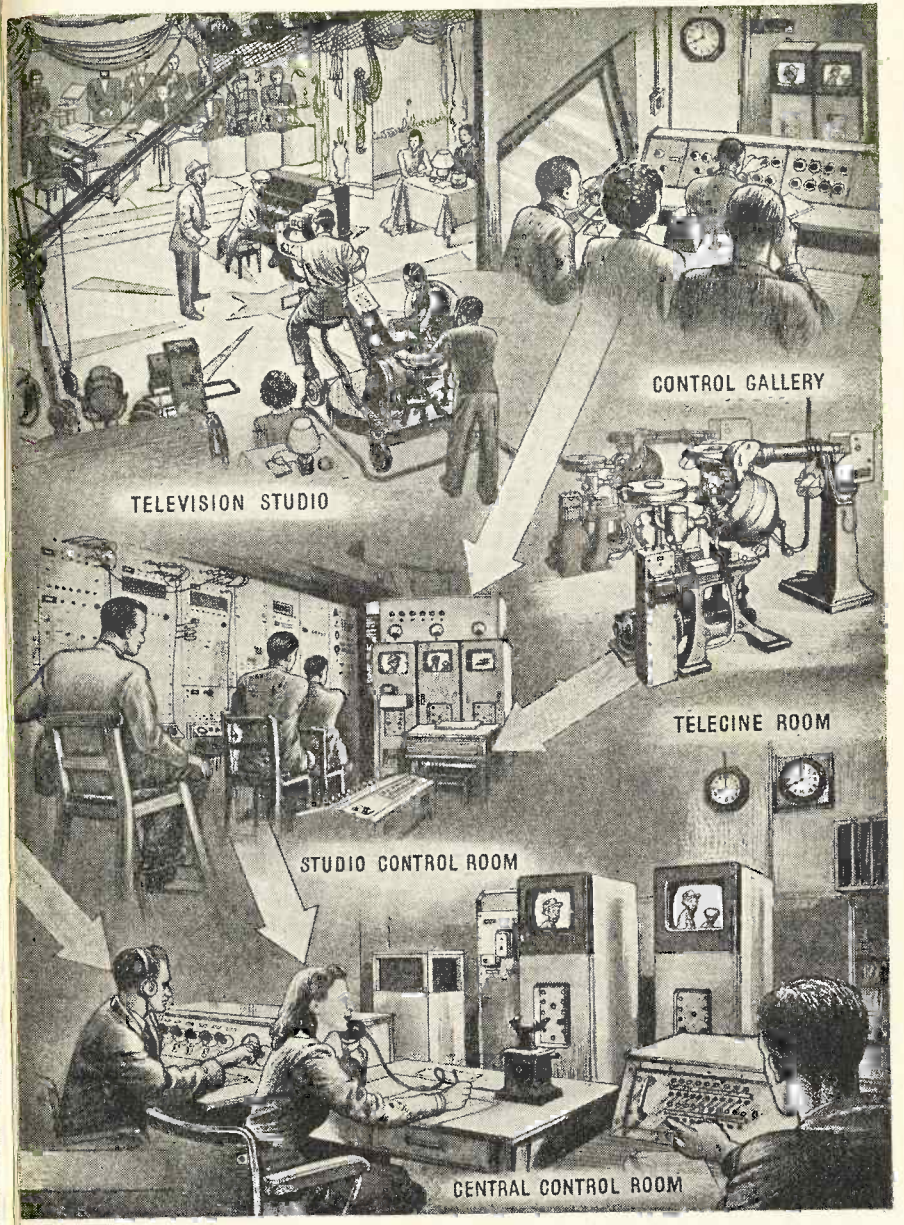
For any kind of musical show, an orchestra will be placed somewhere between the main sets, the conductor raised up on a rostrum, with a monitor beside him. This monitor is really a television set connected to the main circuit, so that the conductor is in touch at the same time with the producer by headphone, with the artistes by his baton, and with what the public is seeing as well. This, incidentally, might not be the studio scene which his music is accompanying, but inserted film or captions, all of which will be part of the production.

On the studio floor the studio manager is in charge. He is in touch with the producer through headphones which he wears, as does almost everyone else, or through a form of walkie-talkie. The sound dialogue is picked up by a microphone hung on a boom or long pole; there may be other microphones on stands or concealed in desks, according to the action.

Although the result is seen in black and white, the scenery and costumes are often in colour. This gives a much brighter effect to artistes, and the designers know exactly what gradations of tone the colours will produce. As to costumes: certain colours, such as jet black and shiny white, are to be avoided if possible, as they might darken the screen or produce a surge of white. Greys, yellows or pinks will show up more sharply. For this reason men's evening white dress shirts are usually dipped in yellowish dye, which resembles tea. Television wardrobe keeps a stock of such clothing, and whilst it produces an odd effect off-stage it gives the ideal result through the cameras.

The lighting staff by the switchboard and all the technicians are co-ordinated under the senior engineer, who sits close by the producer in the production gallery, which is both above and outside the


OUTSIDE BROADCAST POINT
OUTSIDE BROADCAST VEHICLES
SOUND AND VISION AERIALS
TRANSMITTER HALL
How television goes on the air


TELEVISION STUDIO
CONTROL GALLERY
TELECINE ROOM
STUDIO CONTROL ROOM
CENTRAL CONTROL ROOM

studio, looking down into it through a glass window. Up here are two screens, one labelled TRANSMISSION and the other PREVIEW. On the latter the producer can see what the cameras are looking at ahead of the public and so can change the cameras continually, line up, adjust lighting, study effect and generally work on scenes to come —all while the show is in progress.

There are three desks arranged one behind the other. The first is occupied by the sound mixer, who controls all microphones, gramophones, sound effects and music balance. The producer, his secretary and the senior engineer are at the second desk. Behind them is the vision mixer, a girl who switches the pictures as directed by the producer, who sits remotely from his artistes like a spider at the nerve centre of a giant web; he speaks by personal microphone to everyone below, possibly improving his original ideas at points, essaying new camera angles. He can order a mix, fade, cut or even superimpose several cameras at once.

Under the screens mentioned above, red and green spots of light indicate to him which of the numbered cameras are energized for the air or for previewing. The producer can pre-set a lot of his production in his script, but he has to keep his head for a long stretch, and, speaking from experience, in a musical show the strain is considerable. A different system operates in America, where the producer, there called director as in films, does not call his own shots but has a technical director alongside him doing this.

The tricks of superimposition lend themselves to materializing a ghost in a room by careful placing of the "ghost," photographed by another camera, on another set, and fading it in. Another way of handling an eerie effect, such as the passing of an angel, is to have two identical sets built, and to shoot on to both at once, one with actors, the other without. In *Mary Rose,* when the heroine, sitting on a clump of grass on the enchanted island, vanishes into thin air on hearing the fairy music, two identical scenes were made: the girl was placed on one, but both were televised together. Thus it was an easy matter to fade out the one on which she was sitting, leaving the other, or empty one. It might be magic! This is something in which television scores over the films, as it can be done continuously, in action, at no extra cost, whereas in films it involves a slow and expensive matter of processing.

Below this production gallery is the control-room equipment, permanently in semi-darkness. Here there are similar screens into which engineers are peering, adjusting all the time, perfecting the

quality. Red signs of VISION ON, SOUND ON, flash on and off in the studio itself until the moment when both are steady, indicating that the programme is on the air.

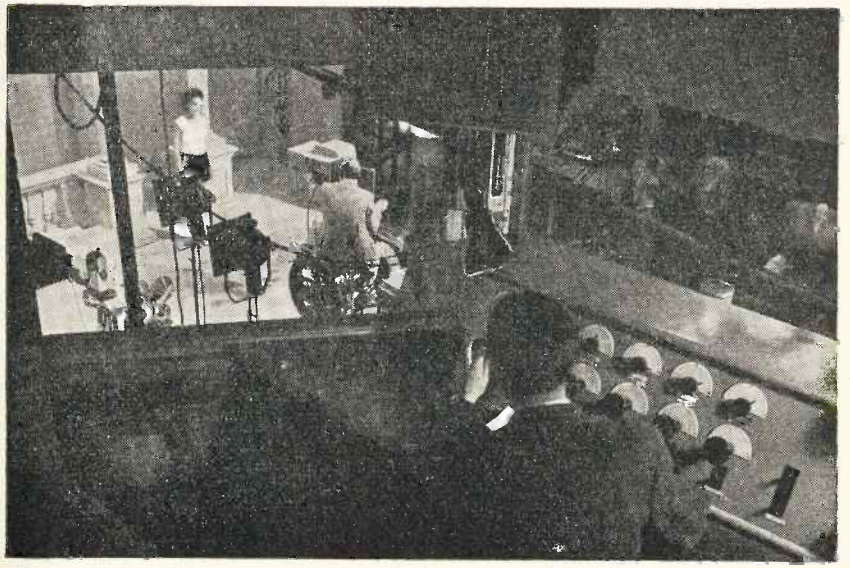
As we move on, next door are the telecine machines, a fusion of television cameras and cinema projectors, through which runs the celluloid film. It may be a complete feature in many reels, or only strips, or a loop such as crashing waves used behind credit titles. Cinema film transmitted by telecine is good programme material whether made specially for television or for other reasons, but inevitably lacks the same impact or personal touch as actuality.

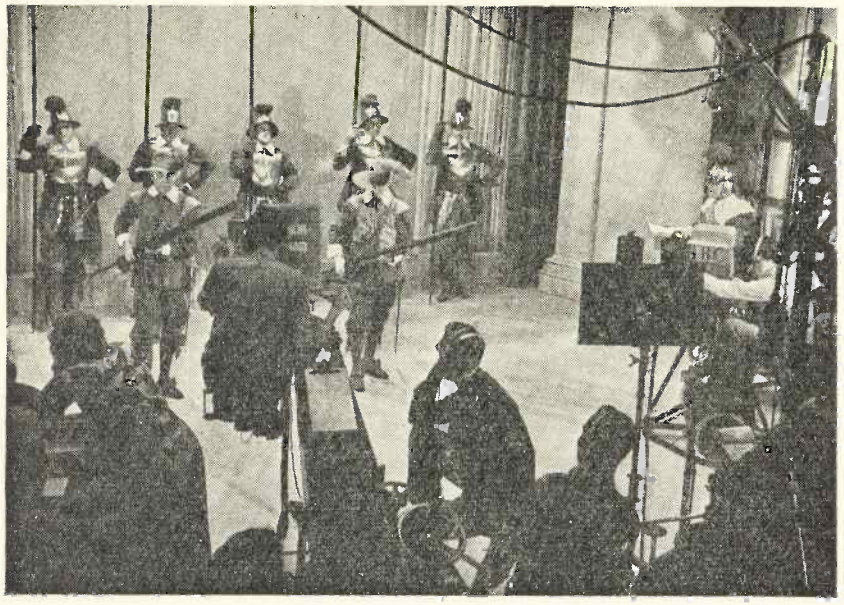
Next we come to the central control room in which sit the presentation assistant on duty and the technical staff. Here the output of the two studios is co-ordinated in big musical shows like *Jill Darling*, the two being linked together with scenes alternating back and forth. Lastly we come to Studio B, the same size as its companion, 70 by 30 feet, by 30 feet high, but with its control room set in the centre.

The make-up used in television is not unlike that for the films, but less like that used for the stage; it is handled by a staff of experts.

There are male and female dressers and a fine wardrobe depart-

Studio B at Alexandra Palace, from the control gallery. The sound mixer engineer is seen at his controls, but also in the gallery are the vision mixer and the producer; they are not shown here.





In Picture Page, *pikemen and musketeers of the Honourable Artillery Company demonstrate their ceremonial drill before the television cameras.*

ment, where many of the clothes are specially made for each production to original designs. The rest are drawn from stock or hired. Also inside the studios are portable booths where an artiste can make a quick change, as is often necessary in revue, or in a play where the producer wants to make the action follow right on, as in a film. It is unlike the theatre, where there would be intervals to change and alter make-up at leisure.

Downstairs on the ground floor are two canteens, film-projection rooms, a television-viewing room, the sound-transmitting room and the vision-transmitter hall, where what strikes one first is a vivid lilac light flashing in a mercury-arc rectifier.

Over in another part of the building, which is a vast rambling baroque edifice, is the old Alexandra Palace theatre, now used for storing scenery. The stage is used for the construction of sets, the old dressing-rooms are the producers' offices, while alongside are the carpenters' shops, paint frame and scenic artists at work.

To present an outside television broadcast at, say, a boxing match, a fleet of mobile vans cruise to the spot; these are the aerial vehicle, transmitter van, generator and scanner vans.

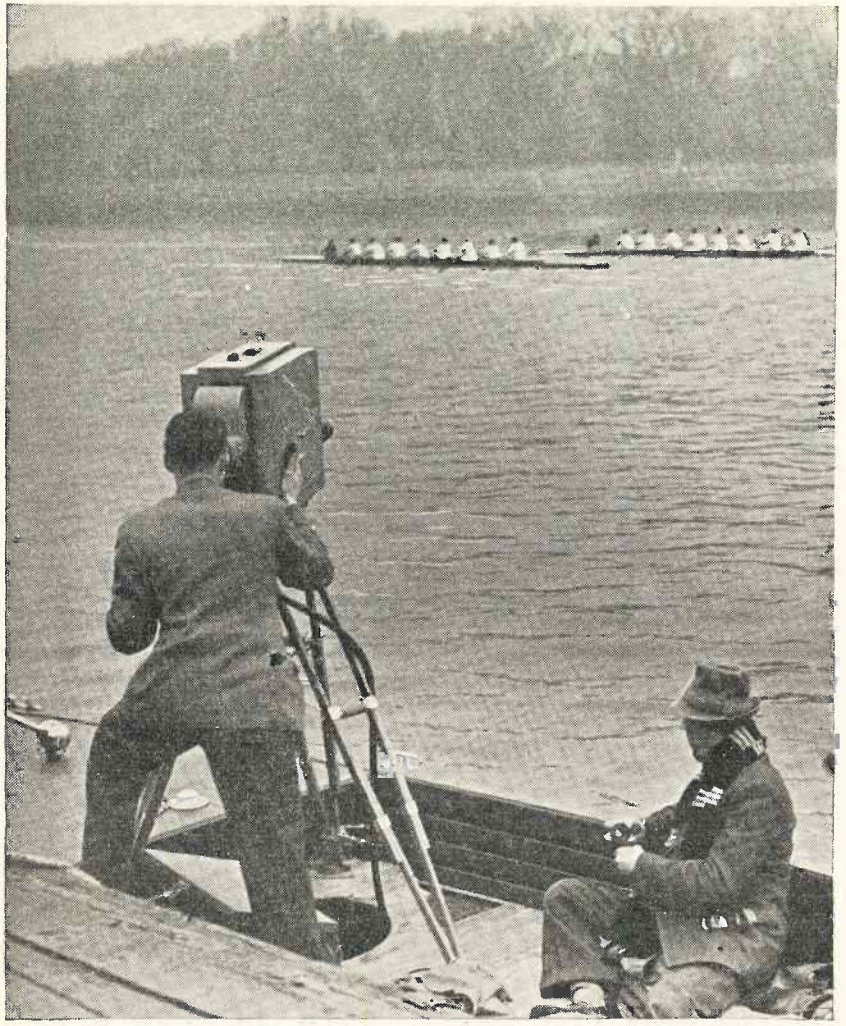
Three cameras are part of the equipment, and the control room is on wheels. From here the producer arranges to switch from one camera to another a long way from the commentators, who are usually set in raised seats commanding a view of the ring with a lip microphone and a monitor. There are, of course, effects microphones dotted about the hall to pick up effects and crowd noises, hand microphones for interviews and so on. The commentator in television has to consider an altogether different technique from his counterpart in sound broadcasting, because the viewer can see exactly what he, the commentator, is seeing. His role is therefore to add to the interest of the occasion rather than to describe it.

Television offers unlimited opportunities for entertainment and drama, but it offers great scope, too, for education and current affairs. One of the troubles the world has suffered from is lack of visual contact, lack of knowledge of each other's way of life. The film has given Britain a great insight into the American scene; but for many reasons America has not had the same glimpse into the British home. When television becomes international, many of our world problems may right themselves by ceasing to be queries. When the average citizen is allowed to see that fundamentally we are the same, that childbirth, cooking and recreation are common to all, though varied by customs and climate, television may do much to establish itself as a world leveller.

Television may not be an art, but it is a new art-form requiring great study by all concerned in its welfare. It uses and blends all we know of drama, cinema, music, news and education, plus all the allied arts and crafts. But, on top, television has something all its own, an excitement, a lack of horizons that will make new reputations for artistes, authors and producers.

Where is television drama going? Is it a photographed stage play, a sort of film, or an illustrated broadcast? Many answer this as it affects them, as an advertising medium for the stage, a film in the home, as photographed news, as an educational instrument, as dramatized radio. It is inclined to be any of these forms of adaptation, but should be something more, something special, and this will be the opportunity for the imaginative writer.

For this reason there is probably the greatest future in the documentary, drawing on life itself for its inspiration. Interesting



The Boat Race is televised. Camera crews and commentators follow the race in launches and are connected by radio with a mobile control room, drawn up on the river bank which is connected by cable to Alexandra Palace.

examples have been *I Want to be a Doctor*, a title which explains itself, and *It's Your Money They're After*, which reconstructed the different forms that the confidence trick can take, and police methods of fighting them.

Theatre and cinema promoters hold the attention of the public by calculated reactions in the mass. Television has one essential difference—its audience. Television is watched either alone or in small groups, in one's own home, in the most intimate fusion with what the "electric eye" of the telecamera shows you. It works through a lens and is therefore selective. The producer unfolds his method of presenting his story in an intricate mixture of pictures, sounds, dialogues, captions, montages. He can provide for effects impossible on the stage, unknown in the cinema, beyond newsreels, new to education, untouched by broadcasting. Shakespeare had to use the soliloquy, but by television alchemy, called tricks, the producer can virtually show a man's conscience driving him, or literally show the room going round when an office clerk is driven to the point of killing his boss, as in *The Adding Machine*.

A producer likes to give several performances so as to perfect his production. Only in television is so much effort by so many people expended for a single performance. In radio a single performance to a mass public is practical, even economical: in television it is highly uneconomical. The concentrated effort of actors, authors, producer, technicians, designers, scenic artists, carpenters and studio staff would in the cinema end in a film which might be shown for years all over the world, or in the theatre in a possible run: only in television is it used up in one throw. That is, until the day, not too far off, when television recordings become general, either on film or by other means.

In the U.S.A. cinema-projection booths are fitted with television film-recording apparatus, so that if an event is happening while a feature film is showing, the "kinescoped" telefilm can be run soon after for the audience, and then repeated for subsequent showings.

Any recordings involve matters of copyright; but, rights aside, it is interesting to note that the cinema has only recorded edited film, and radio, radio. But television will eventually be able to record not only television, but also, for the sentimental, theatre. Then it will be possible to retain for posterity, together with their audiences, great stage shows like *Oklahoma!*

A stage play first-night is often the worst. Actors may be uncertain of their lines, but they have ways of turning and covering defects on a

wide stage under subdued lighting. Everything in television is the opposite. The actor goes on for the only performance of a long, sustained script, under powerful lights, at intimate, close quarters. Yet television is finding its own artistes, and viewers will want more of them. The television star of the future may not be a vaudeville performer at all, but a gardener, a cook, or even a puppet, like Muffin the Mule.

If television visits a theatre you can do so much more than see the show; you can be in on the back-stage thrill. You can see the curtain going up from the wings and the front of the house within a second. You can talk to the stars in their dressing-rooms in the intervals, interview the composer, even people in the audience. It will invade privacy further and add a new terror to a celebrity's existence, but modern life has become so exhibitionist that taste today has to be judged by a fresh set of standards.

Television's great affinity to broadcasting is its intimacy. Broadcasters who talk to one person get the best results. The platform manner is a lost cause. And it is intimacy, too, which gets over best on a small screen—the speaker talking to you personally, the solo artiste singing for you. Most people nowadays have small homes, and a small piece of furniture is often an advantage. Even so, the ratio of the size of the screen to the distance from the eye to the screen is not so very different from that applicable in a cinema.

One thing television cannot fail to destroy is the "background" music of radio. Broadcasting has for too long enjoyed the joke that three old men, possibly unshaven, can profitably play light music at crack of dawn, in shirt sleeves, for half an hour. This is known as background music for the housewife to wash up by and is very easy on the ear. Television demands a quickening of tempo, dressing-up, make-up, presentation, scenery, lighting, production, artistic camera angles, and even then a maximum possibility of ten minutes at most without becoming boring. A variety act, shorn of its applause, its crossing and recrossing of a big stage, concentration of its "business" and loss of curtain calls, may shrink as much as a third of its compressed normal timing.

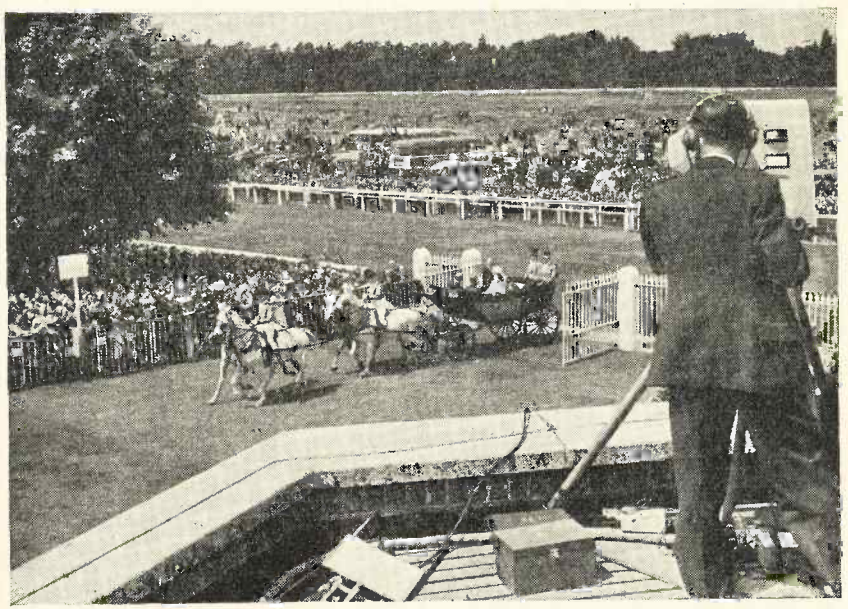
Television consumes material at a terrifying pace. Unlike radio, where repetition builds a reputation, in television a face can soon tire. It is indeed a programme planner's despair. Sustained viewing is also apt to weary at long stretches (not because of eye strain), and a stage play running two and a half hours in a playhouse can usually profitably be cut to 90 minutes, the approximate basic length of an

ordinary feature film. This shrinking process, a very proper feeling that nothing should be dragged, nothing should run longer than it is worth, raises the big problems for the future of television programming. Do not think there is not plenty of material in the world. There is, but it will need more and more studios and more and more mobile units to put them out to the public if it eventually wants television on tap in the way it has become accustomed to use radio today.

Pure television sees things as they are really happening, not presented and edited in simplified form as in the films. When in America General Eisenhower laid a wreath and this was missed by the Press photographers, the General was asked if he would repeat it for their benefit. He complied and so the viewer saw him do it twice. It is this spirit of being in on a sudden happening that gives television its immediacy.

Cinema screens relaying television shows will mean more problems for the harassed producer. Producing a play for a small home

Television at Royal Ascot. The scene being televised shows Their Majesties as they drive into the Royal Enclosure from the course. The principal races are both televised and broadcast with running commentaries.



screen with a succession of close-ups will not answer on a big one, designed to be seen in mass company. Again the large screen shows up defects, and places them in terms of movies, that is, larger than life.

Planning is done quarter by quarter, and in detail ten weeks in advance. The weekly ingredients are collated from outside broadcasts, drama, light entertainment, films, talks, documentaries, music.

The pattern of evening planning, which has not varied much since 1947, is based on a play on Sunday night, another play during the week, a topical programme in the middle of the week, variety on Saturday night. Parents often let children stay up on Friday nights, so a general magazine with quizzes, "The Memory Man," a crime serial with an inspector to unravel the clues, and other ingredients, such as the recent *Kaleidoscope*, is a popular ingredient. There used to be more mixed evenings of short programmes; they have given way to one long offering, and some plays are now repeated in evenings.

Interior of one of the mobile vans used as control rooms for outside television broadcasts. Sound and vision signals are received from the microphones and cameras, and passed by cable or radio link to the Central Control Room at Alexandra Palace.

Suppose we build a typical week in this skeleton form:

Sunday afternoon	Children's hour.
Sunday evening	Play (serious), possibly costume.
Monday afternoon	Fashions. Travel films.
Monday evening	Newsreel. Documentary programme. Star musician.
Tuesday afternoon	Racing.
Tuesday evening	Play (light comedy).
Wednesday afternoon	Racing.
Wednesday evening	Novelty production. Topical magazine. Newsreel.
Thursday afternoon	Housewife. Films.
Thursday evening	Current play. Art film.
Friday afternoon	Women's interests. Films.
Friday evening	Newsreel. Scenes from operas. Newsmap.
Saturday afternoon	Sport and gardening.
Saturday evening	Variety. Story. Newsreel.

Now let us add some actual titles and we have a result like this:

Sunday afternoon	For Children: Annette Mills, the Hogarth Puppets and visit to a farm.
Sunday evening	*Nurse Cavell* (the well-known play).
Monday afternoon	*Your Wardrobe*. Films of Switzerland.
Monday evening	Newsreel. *London after Dark*. Pouishnoff.
Tuesday afternoon	Racing at Ascot.
Tuesday evening	*George and Margaret* (popular comedy).
Wednesday afternoon	Racing at Ascot.
Wednesday evening	A Teen-age Show. *Picture Page*. Newsreel.
Thursday afternoon	Cookery for the Housewife. *Rex and Rinty* (serial film).
Thursday evening	*The Chiltern Hundreds*. *Van Gogh* (a continental film).
Friday afternoon	*Designed for Women*.
Friday evening	Newsreel. *Stars in Your Eyes*, including opera and ballet dancing. Foreign Correspondent (Copenhagen).
Saturday afternoon	Cricket Test Match, England *v.* New Zealand. *In Your Garden*.
Saturday evening	*Television Music-hall*. Algernon Blackwood. Newsreel.

If the studios are ever vacant, the opportunity is seized to try experiments, to run auditions.

The moment a programme is practical, that is to say, past the mists of finance, authors' copyright, music performing rights, design, costuming, set construction and rehearsals, the producer is all-powerful. And television's interpreters know that any moment may bring disaster; even a "fluffed" line by an actor can indelibly mar the whole. The fact that accidents are averted so often is due to team work, the feeling that everyone has a vital part to play in the pattern of the whole, the excitement of new creation. Every performance is a first-night and every one has a difference.

Radio variety bases its weekly "book" successes on personalities, mostly comedians. In television it is the location that provides the continuity, as witness such well-known night spots as the Anglo-American *Rooftop Rendezvous*, the Latin-American *Casa D'Esalta*, or the *Café Continental*. It is the setting that is the thing, the *Alpine Hut* or *Gipsy Trail*, even the *Cabaret Cruise* deck of MV. *Sunshine*.

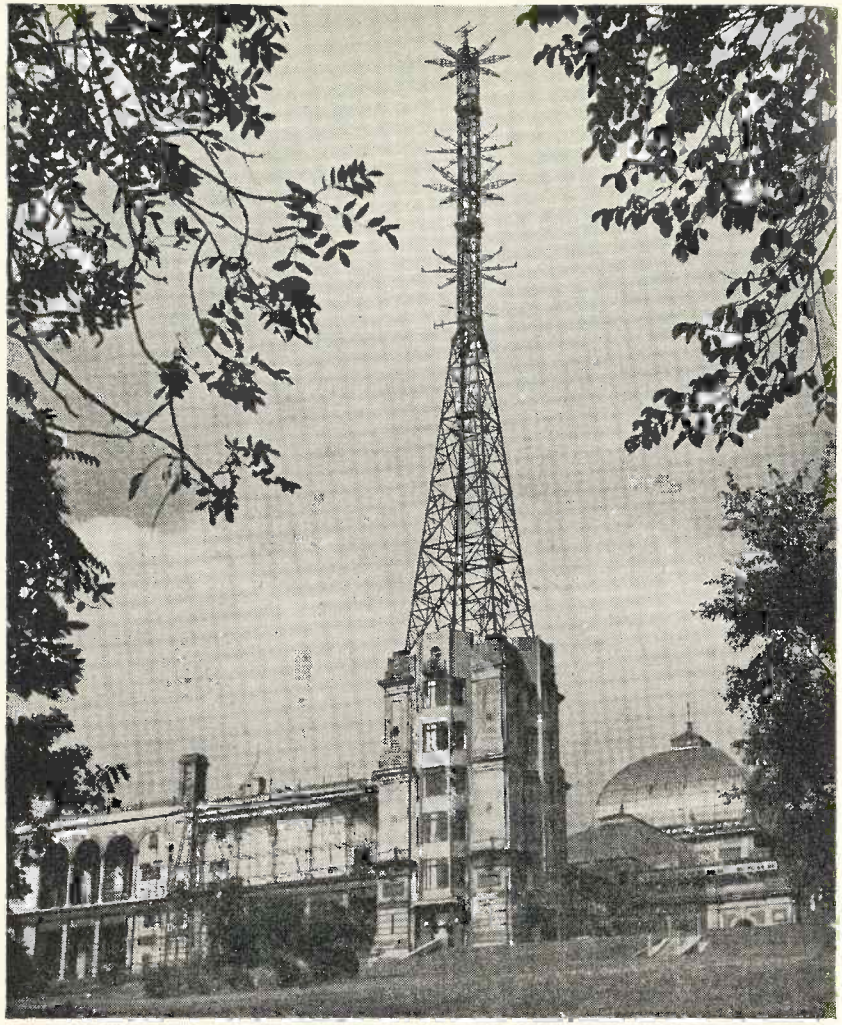
A word to illusionists. They need not fear that television will give away their tricks; the quickness of the hand can still deceive the eye, no matter how close the camera goes to the magician's face as he pulls out of his mouth razor blades, threaded together, that we have seen going in one by one.

In the bad old days, shall we say the *East Lynne* period, talent could lie hidden under a bushel. One wonders what of?—presumably skirts. Nowadays this is patently impossible. Radio first changed all that. A young girl with that "extra something" called personality cannot fail to be discovered, though there is no denying that a break at the right time has helped many a clever artiste to become an attraction and top the nation's bills on the halls. Television has provided many such breaks, and will no doubt continue to do so.

Television is likely to have modern applications in film studios. Methods of independent frame, or still photographs, projected from behind on to a ground-glass screen are used now to take the place of elaborate sets. A television camera can be attached to a film camera to enable the director to see exactly what the camera is seeing at the moment of shooting, and as a step further a number of television cameras could take the scenes direct with continuous action. A film could be televised from a central studio into a number of cinemas simultaneously, thus cutting out a number of prints. All these refinements will take time and will have to prove their worth to the film industry as it exists today.

Some of the telecine equipment at Alexandra Palace, used for the addition of film sequences to studio productions. A special film projector is used in conjunction with the modified television camera which can be seen on the right.

High-definition television programmes, as they are now, transmitted on 405 lines, started at Alexandra Palace in north London in August, 1936. I had the honour of producing that very first show, staged for Radiolympia, and called the half-hour variety presentation, *Here's Looking at You!* It is now part of television history, for it was transmitted on alternate days on two totally differing systems, Baird and EMI. I followed this with *Picture Page*, a topical magazine created round a telephone switchboard girl played by Joan Miller, the Canadian actress. It ran for 262 editions in the three years of television pre-war. It was the last night programme transmitted before war clouds darkened every British screen. Revived in June, 1946, it still runs on today with Joan Gilbert as hostess. The novelty shows, *Cabaret Cartoons*, were created by me, and the all-American series, 100 *Per Cent Broadway*, with beautiful transatlantic showgirls and stars from Manhattan.



Last link in the chain of television transmission: the complicated aerial array mounted on a huge lattice mast on the North Tower of Alexandra Palace. Both sound and vision transmissions are radiated from it.

Such great artistes as Ruth Draper, Sophie Tucker, Argentinita, Laurence Olivier, Ralph Richardson, Vera Zorina, Tyrone Power, Danilova and Danny Kaye all appeared in British pre-war television. The first full-length play was *Marigold*, the first opera *Mr. Pickwick*, the first ballet *The Mercury*. The most unforgettable highlight was the Coronation. One recalls such vivid personalities as Leslie Howard, Axel Munthe, Amy Johnson, Thurber, the Aga Khan, Greer Garson's acting in *Hassan*, Bernard Shaw's remarkable afternoon visit, Hanna Rovina with the Habimah theatre from Tel Aviv. War put a sudden stop to all this progressive activity in September, 1939. But in time it did come back. The service resumed in June, 1946, with the Victory Parade. Later came the Royal Wedding, the 1948 Olympic Games and the visit of the Commonwealth Prime Ministers to Number 10 Downing Street.

Everything has a place in programmes, from *Play the Game* to Darts. Current affairs can be seen in J. F. Horrabin's *Newsmaps*, famous pictures in the *Eye of the Artist*. Sunday afternoons are given up to children; they are to have a daily programme. Musical shows like *Balalaika*, *Under the Counter* and *Yes, Madam!* have been televised with some of their creators. Classics like *Hamlet*, *King Lear* and *Saint Joan* have been played in full, and plays like *Ten Minute Alibi*, *The Good Companions* and *Fools Rush In* have a wide appeal. Women's interests are catered for, and you have a chance to show your own ingenuity in *Inventors' Club*. To provide viewers with a thrill a commentator has been through fire, and another submerged in water at the bottom of a submarine tank.

The announcing trio consists of two female announcers and one male, their names household words to regular viewers—Sylvia Peters, Mary Malcolm and MacDonald Hobley.

A list of television stars reads like an entertainment *Who's Who*—Margaret Lockwood, Gracie Fields, Kieron Moore, Alastair Sim, Yvonne Arnaud, Binnie Hale, Bobby Howes, Leslie Henson, Michael Denison, Annabella, Dulcie Gray, Nancy Price, Dorothy Squires, Frank Lawton, Sir Malcolm Sargent, Cicely Courtneidge, Paul Robeson, Harold Warrender, Martha Raye . . . the flow of talent is endless. Yes, television is your window on the world.

Small portable receivers. (1) *Ekco "Princess" all-dry portable.* (2) *Pye model 75B, four-valve battery superhet.* (3) *"Double Decca" A.C./D.C. or battery receiver.* (4) *Philips model 209U A.C./D.C. transportable.*

Choosing a receiver

ROBERT WALTON

BEFORE choosing a receiver one must decide whether a mains- or battery-operated type will be more suitable. If mains are available it is generally wise to use a receiver which will take the whole of its power from them. On the other hand, however, a battery-set may have the advantage of being completely portable. When a mains model is to be bought it is necessary to find whether the supply is direct or alternating current. Most houses have an A.C. supply, and this is suitable for operating either A.C. or so-called universal or A.C./D.C. receivers; in districts where only D.C. mains are available a universal receiver must be used—sets for use on D.C. only are not now made.

The smallest mains receivers are usually universal; that is, they operate equally well from A.C. and D.C. mains. Often they have internal frame aerials and require no external connexions except that to the mains. This, together with their small size, makes them easily portable.

In spite of the compactness, their performance is astonishingly good; they provide good reception of a number of signals on their internal aerials. But, of course, they have their limitations. To economize in space, a very small loud-speaker must be used; for this reason, and also because the tiny cabinet is not a good sound baffle, the quality of reproduction is necessarily inferior to that of larger sets.

Moreover, midget receivers are not generally provided with sockets for the connexion of external loud-speakers or gramophone pick-ups. Although this omission helps to make the receivers slightly cheaper, there are also technical reasons why these facilities are not provided.

Midget receivers generally have three or four amplifying valves and operate on the superheterodyne principle. This means that they are sensitive enough to receive a large number of signals and selective enough to separate them with ease. The cheapest types of midget

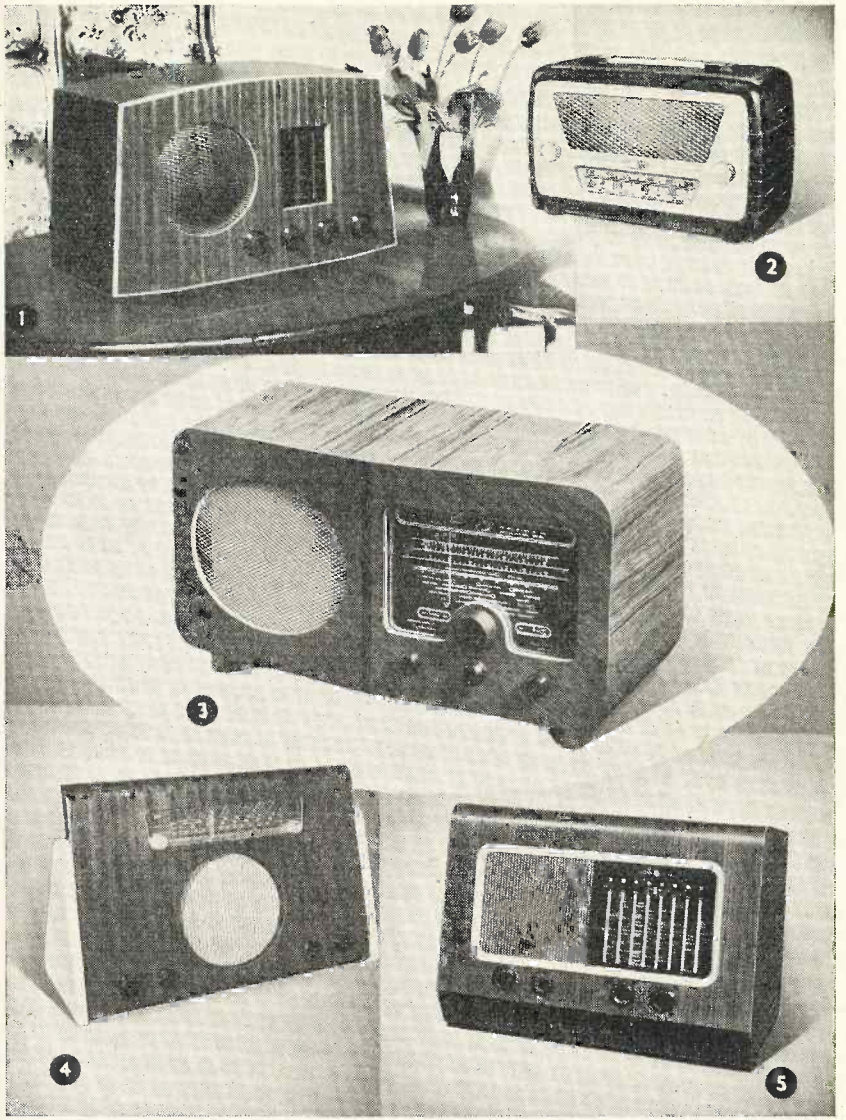
receiver are not superheterodynes and are less sensitive and less selective. Superheterodyne receivers usually have a medium and a long waveband, but some have medium waves only, and others have short waves in addition. For successful short-wave reception a fairly elaborate receiver is necessary, and a short-wave band on a cheap midget receiver is often little more than a selling point.

It should be clear from what has been said that a small universal receiver is not ideally suited to be the principal receiver in a house; its proper function is that of a second receiver for use in a kitchen, at a bedside or as a portable receiver to be carried from room to room.

The main receiver in most homes is usually an A.C. mains table model in the middle-price range, with four or five amplifying valves and covering two, three or four wavebands (some have a number of short-wave bands). These receivers give better quality than the midget types because of the larger loud-speaker that can be used and the greater baffle area provided by the cabinet. They are also capable of good reception from a greater number of stations. Table models usually have refinements too expensive to include in midget receivers. These include, according to the make and model: flywheel tuning, band-spread tuning, automatic frequency control, push-button controls, magic-eye tuning indicators, external speaker and gramophone pick-up sockets.

Flywheel tuning was introduced to simplify the movement of the tuning control over a considerable part of its total travel. By reducing friction in the tuning drive and fitting it with a heavy flywheel, a drive can be produced in which one flick of the tuning control is all that is necessary to move from one end of the tuning range to the other. Tuning can thus be altered in a matter of seconds; this is a great convenience if two favourite stations happen to be at opposite ends of a wave-band, especially on a long, well-spaced scale.

Some representative table-model receivers: (1) *Stylish table receiver, Ferranti* 248, *covers three wavebands and has a system of pre-set tuning on medium waves.* (2) *Weighing only* 11 *lb. the Ultra "Twin" is portable and can be operated from self-contained dry batteries or from any mains supply.* (3) *A battery-operated table model, McMichael* 484, *which covers four wavebands and is designed to give good-quality reproduction.* (4) *The Murphy A*124 *AC receiver is built on a mahogany baffle. Edge-lighting is provided for the Perspex tuning scale.* (5) *With eight wavebands, the Pye model* 19*D has flywheel tuning and bandspread on the six short-wave bands.*



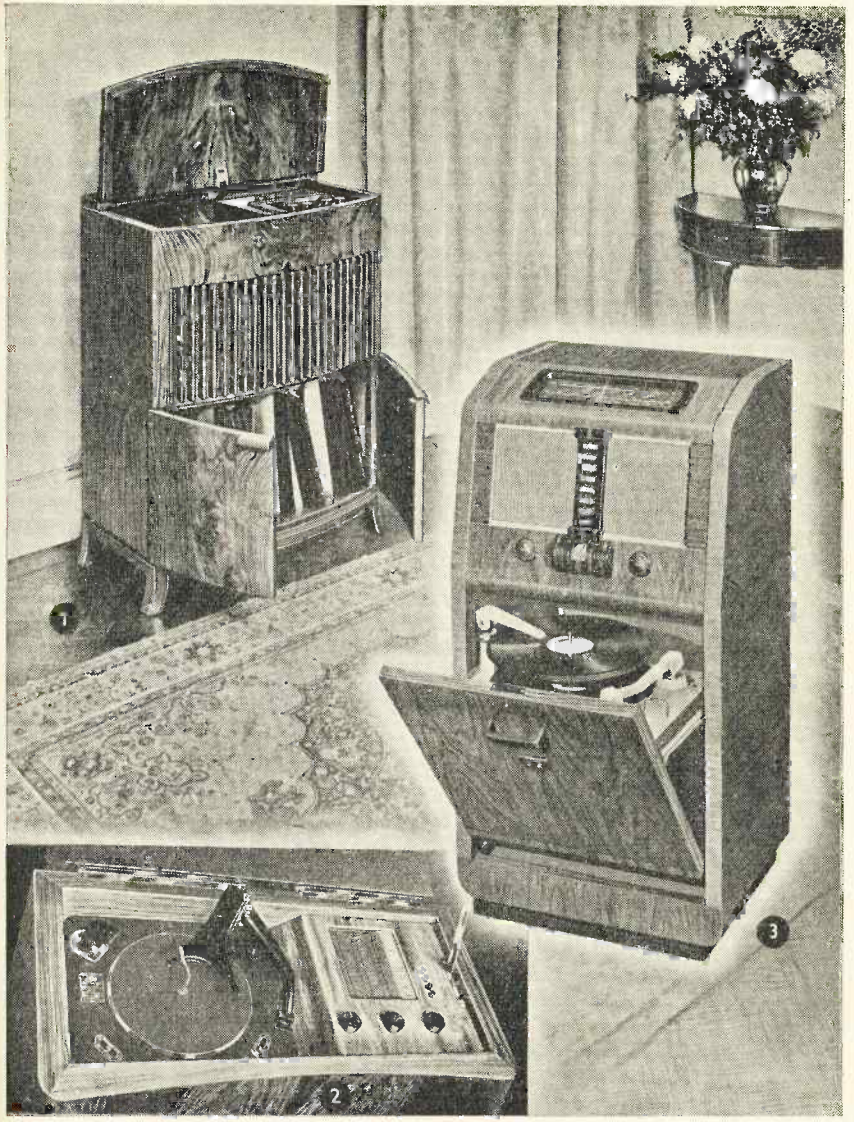
Another method of quick station selection is by equipping a receiver with a series of tuned circuits which can be pre-set by the user or dealer to favourite stations. Any desired station can then be selected by pressing the appropriate push-button. In some systems of pre-selection, a device known as automatic frequency control is added to ensure that the receiver is always tuned accurately.

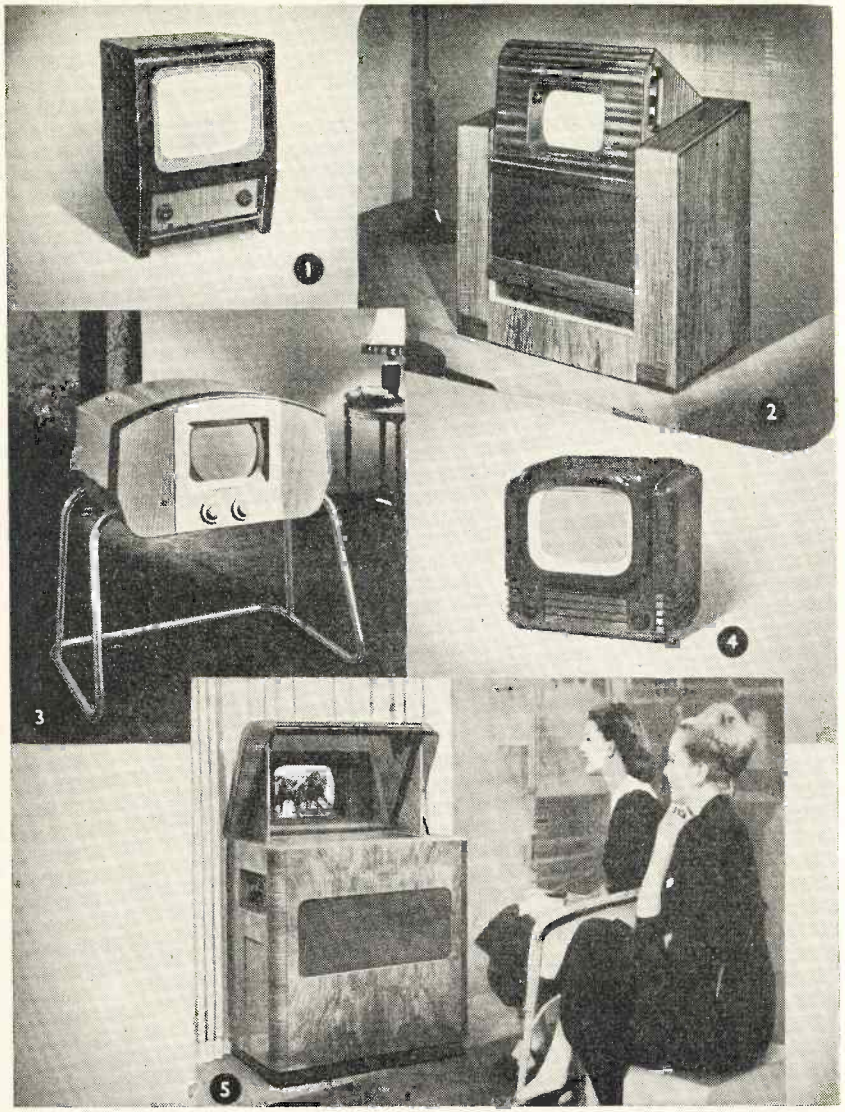
Modern receivers must necessarily be very selective to cope with the closely packed signals and thus tuning calls for a certain amount of skill on the part of the user. Accuracy in tuning is very necessary, because even a small degree of mistuning produces very bad distortion. Accurate tuning is facilitated by a slow-motion tuning drive, and this is a standard fitting on almost every receiver, but even with this help it is sometimes difficult to tune with absolute precision; in fact, tuning "by ear" is not at all easy. Some form of visual tuning indicator is very desirable and is provided on the majority of the middle-priced mains receivers; there are technical reasons why this is not always possible on battery receivers. The usual type of indicator on current models is the so-called magic eye. This is a miniature cathode-ray tube in which one or more sectors of green light open or shut to indicate the correct tuning point.

In the more expensive receivers accuracy in tuning is sometimes assured by automatic frequency control (A.F.C.). In this case there is a circuit arrangement which automatically corrects small errors in tuning and ensures that tuning is always exact. A visual tuning indicator is not then necessary or desirable.

The difficulty of exact tuning is most acute on short waves, and on these bands the most successful method of facilitating tuning is by an electrical method of "spreading out" a small wavelength range so that it occupies the whole sweep of the tuning scale. This is known as bandspreading and is particularly useful on the short waves, because short-wave broadcasting stations are confined to small wavelength ranges known as the 13-, 17-, 19-, 25-, 31-, 42- and 49-metre bands.

Three radio-gramophones. (1) *High-fidelity reproduction and tasteful cabinet characterize the "Beau-Decca" radiogram. It has three matched speakers mounted on a curved baffle.* (2) *Stylishly conventional is the Cossor* 489 *RG automatic radio-gramophone. The receiver tunes over three wavebands and has four push-buttons for automatic station selection.* (3) *H.M.V. model* 1608 *is of compact and original design. An automatic record changer, twin speakers and optional push-button tuning are provided.*





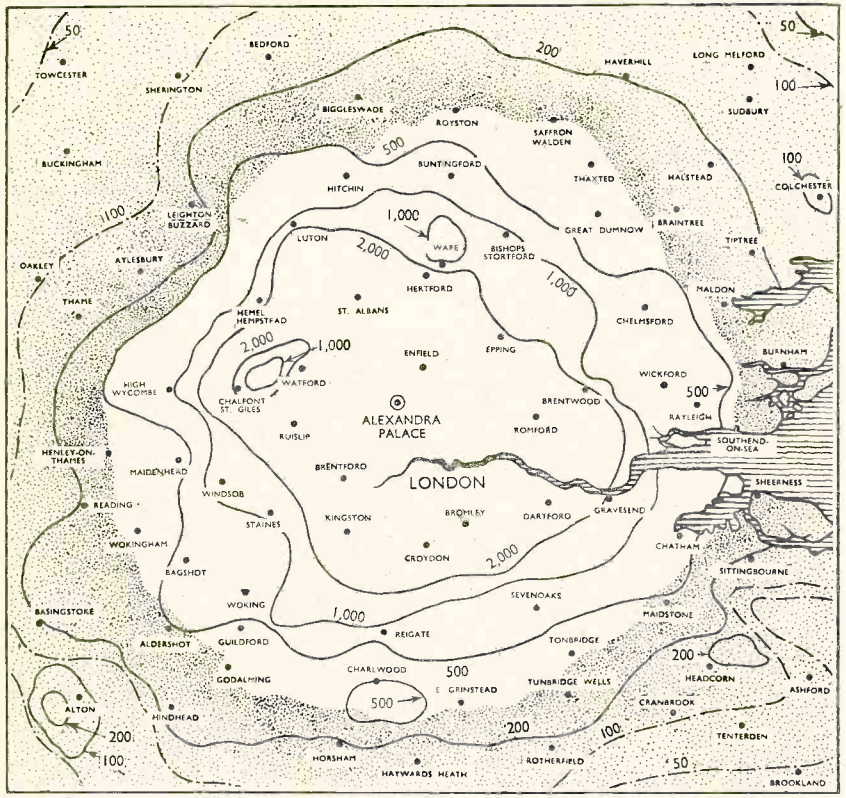
Console receivers are more expensive than table models, but have the advantage, often overlooked but quite important, that they do not require a table! They usually have the same chassis as one of the table models, but, because more space is available, a large speaker is often fitted, and this, in conjunction with the large baffle area, gives better quality than is obtained from the corresponding table model. In some cases a multiple-speaker system or so-called diffuser is fitted to ensure approximately uniform response over the whole of the musical scale. Such receivers appeal most to those interested in high-quality reproduction.

Much of what has just been said about the console model applies equally to the radio-gramophone. The most expensive of these have automatic record changers and can play eight or ten records without attention. In some cases all records must be of the same size (10- or 12-inch), but other models are designed to deal with records of mixed sizes.

Where no mains supply is available, battery-operated receivers must be used, and there is a smaller range of these from which to choose; for example, battery-driven receivers are usually either table or portable models, although there are a few console receivers and some radio-gramophones, with a spring-type gramophone motor.

Table models and consoles generally require a dry battery to supply high tension (H.T.) and an accumulator to supply low tension (L.T.). Accumulators have a limited capacity and must be recharged when exhausted; H.T. batteries must be replaced every few months. To minimize running costs the current drawn from H.T. and L.T. supplies must be kept low, and the design of battery-operated receivers is dominated by the need for economy in H.T. and L.T. consumption. Their performance is consequently somewhat inferior to that of mains receivers. The difference in performance is, however, less marked than might be supposed, and modern battery-

A small selection of television receivers. (1) *H.M.V. model* 1807 *is an inexpensive table model with* 10*-inch tube and simplified controls.* (2) *Large Philco console-type television receiver in attractive cabinet of mahogany and walnut.* (3) *Unusual and stylish, the Ferranti model T.*1246 *floor model is mounted on a tubular anodized stand.* (4) *Bush TV*12 *is a compact table model in an all-plastics cabinet. Screen size is* $7\frac{1}{2} \times 6$ *in.* (5) *The picture from a* 12*-inch tube is viewed through a special mirror in the lid of the "Ekco-vision" console model TSC*48.



This map gives an impression of the signal strength to be expected at various points over an area around the Alexandra Palace television transmitter. The "contour" lines join points of similar signal strength and the figures given against them refer to the approximate field strength in units known as microvolts per metre. When BBC engineers made the measurements on which this map is based they chose, whenever possible, places in open country where no nearby hills or buildings could cause reflections which might give misleading results. The figures given are approximately correct for an aerial 30 ft. above ground level. It was found that signal strength was somewhat less in towns than in the surrounding country. More or less serious fading was found to occur within the area which is shown shaded.

operated superheterodynes are remarkably efficient. Nevertheless, the upkeep of a battery set is greater than that of a mains-driven set, even though the first cost may sometimes be less.

Battery-operated portable receivers are extremely popular, and not only where such sets must be used because there is no mains supply. The introduction of valves with 1·4-volt filaments, taking a remarkably small current, has led to the development of so-called "all-dry" receivers which obtain both H.T. and L.T. supplies from a composite dry battery. Though this battery has naturally to be replaced when exhausted, its life is considerably longer than that of an accumulator.

All-dry receivers are usually small superheterodyne types with internal frame-aerials, and are completely self-contained. They can be carried from room to room or used outdoors. When they are used occasionally as portables the battery life is several months and running costs are low. An all-dry receiver is sometimes used as the principal receiver in a house, but it is doubtful whether it is as economical as a receiver using an accumulator and an H.T. battery.

Some all-dry receivers include mains equipment and can be operated from A.C. or D.C. mains or from the battery; these can truly be called universal types.

Receivers for sound reproduction only have been discussed so far. As the United Kingdom is, on the whole, well served by broadcasting transmitters, these receivers will give good results almost anywhere. This does not apply, however, to the television service. At present television reception is only consistently worth while within, roughly, 40 miles of Alexandra Palace and a rather greater radius of Birmingham. Other transmitters are projected so that, in time, most of the population of the country will be able to enjoy television reception.

The approximate service area of the London television station is indicated in the accompanying map. The contours or lines link together places of equal signal strength; they show, for example, that the signal strength at Staines is the same as that at Bishop's Stortford. In general, signal strength falls as distance from Alexandra Palace increases; for example, the signal strength falls from 2,000 at Epping to 200 at Haverhill (the figures given are in microvolts per metre, which is a unit used by technicians to denote signal strength). There are, however, exceptions, usually due to hills or valleys; at Ware, for example, the signal strength is 1,000 and at Croydon over 2,000, though both places are approximately the same distance from the transmitter.

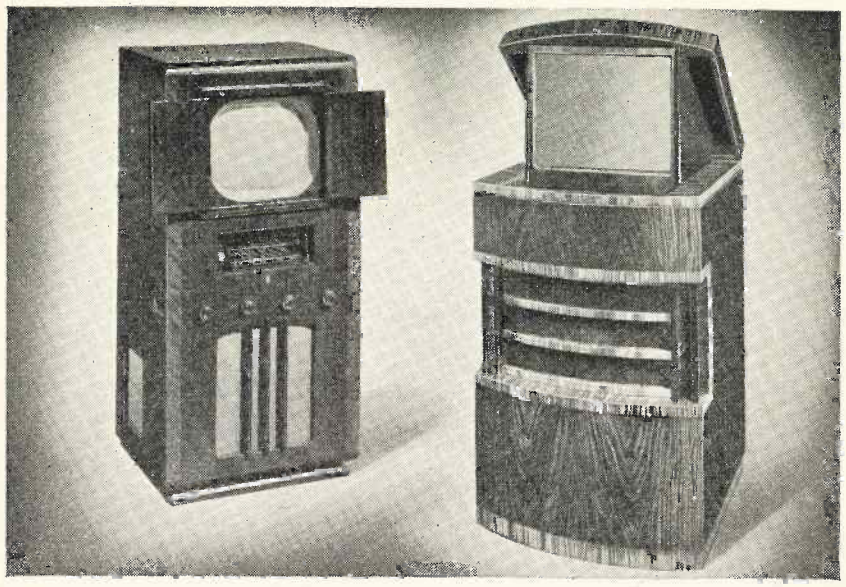
Some of the points discussed for broadcast receivers apply with equal force to the sound sections of television receivers. For example, console television receivers usually have larger loud-speakers than the corresponding table models, and for this reason—and also because the baffle area is larger—they give better sound quality. But in a television receiver the picture claims more attention than the sound accompaniment. In the following brief review television receiver types are described in the order of increasing picture size.

The cheapest television receivers are table models with a 9- or 10-inch-diameter picture tube and equipped for reception of television sound and pictures only. Such receivers give a picture measuring approximately 8 by 6 inches, which is a suitable size for the average living-room.

The smaller console models have 9- or 10-inch tubes. A useful feature of many is that they have wheels or castors and can be moved into the most suitable position in the room for viewing. The more expensive console models have 12-inch or even 14- or 15-inch tubes and give correspondingly larger pictures, which can be viewed from a greater distance than the smaller ones. These receivers are thus particularly suited for use in large rooms or institutions, where there is a large number of viewers.

Among recent developments is a type of television receiver in which the picture from a small cathode-ray tube (usually $2\frac{1}{2}$ inches) is projected on to a screen integral with the receiver. A specially designed magnifying lens and optical system is used, with the result that the viewing image is equivalent in size to that which would normally be obtained by using a tube with a diameter up to, say, 24 inches. A tube of such size would, of course, be prohibitive in a domestic receiver, not only because of the size of cabinet required to house it, but also because of initial and replacement costs. Projection-type television receivers are available at a price comparable with that of some receivers fitted with a 10- or 12-inch tube; replacement expenditure should be appreciably reduced.

Some television receivers include an ordinary broadcast receiver for the additional reception of sound programmes; this is a convenience, because it means that all the radio equipment needed in the home can be included in a single cabinet. These combined receivers, which may be table or console models, are naturally more expensive than those designed to receive television pictures and sound only, but meet the needs of those who need a new broadcast receiver and a television set.



Philips 663A combined all-wave radio and television receiver with 12-inch tube (left). The Ferguson 947T television receiver (right) is of the projection type giving a picture 16 by $12\frac{1}{2}$ inches on the fold-down screen.

A remote vision unit, which may be compared with an extension loud-speaker for radio, is now on the market. This has obvious advantages for those who require to view television in two or more rooms and for flat-dwellers wishing to share a receiver.

Most television receivers are designed for operation from A.C. mains only, but some are universal and work equally well on A.C. or D.C. mains. There are no battery-driven television receivers yet available. Although few receivers are so situated that they are within range of both the London and Birmingham television transmitters, there are now on the market receivers which can be tuned to receive either transmission. This is an obvious advantage for anyone who anticipates a move from the Midlands to the South, or vice versa.

Receiver installation and simple fault-tracing

S. W. AMOS, B.Sc. (Hons.), Grad.I.E.E.
(*Engineering Training Department, BBC*)

BEFORE a new mains receiver is first switched on, the user should confirm that the position of the mains tapping point of the receiver is set to the voltage of the mains supply and, if necessary, the tapping should be adjusted. This adjustment is usually carried out by dealers before the receiver is delivered to the customer, but it is advisable to check it nevertheless. If the supply voltage is not known it can be found from the electricity meter or, failing this, from the electricity authority. The instructional booklet supplied with each new receiver usually gives full details for carrying out this adjustment, and the instructions should be carefully read before the check is made and the receiver switched on.

In choosing a position in a room for a radio receiver there are three main considerations to be taken into account: Is the position one in which the receiver will sound well? Is there a convenient mains socket near by? Can leads from an aerial and earth be easily brought to the receiver and are they short? There are additional questions; for example, are the controls easily accessible, but only the principal points enumerated will be dealt with here.

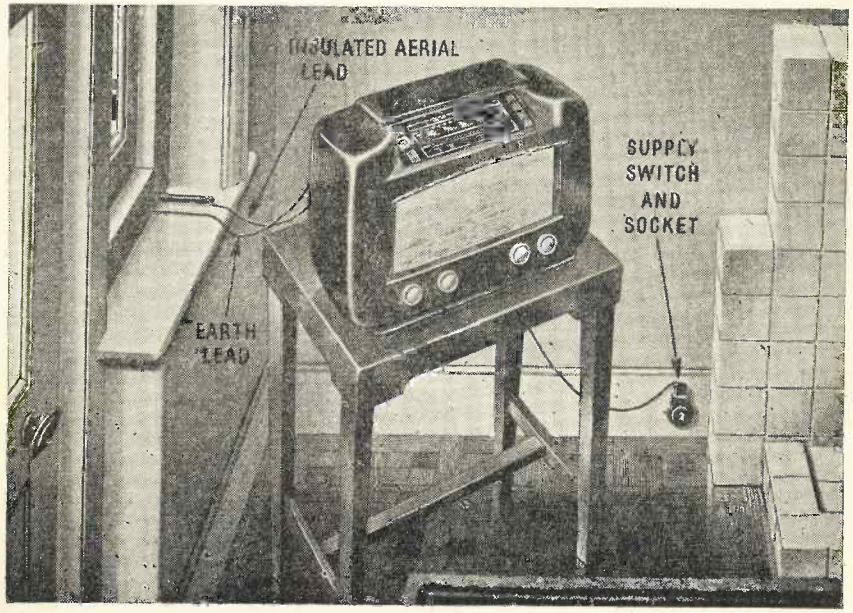
If the receiver is battery-operated no mains socket is required and the choice of a position is correspondingly simplified, and if, in addition, the receiver has a built-in frame aerial, the only consideration of the three which applies is whether the receiver will sound well in the position contemplated. When installing receivers of this type, however, there is a second point to bear in mind, and this does not apply to sets requiring an external aerial. It is this: in certain positions, due to the orientation of the internal aerial, the receiver obtains weak signals and the reproduction is marred by noise. If this occurs in a favoured position, results can usually be improved by

rotating the receiver through a small angle; many receivers of this type are mounted on a turntable to facilitate rotation.

Where all three considerations apply, the choice of a position may well be a difficult task, and it may be desirable to simplify the problem by installing a new mains point; by this means it may be possible to avoid long untidy leads for aerial, earth or mains connexions. The position of the new mains outlet should be chosen with care, and the installation should be carried out by a qualified electrician. A convenient receiver position is illustrated; this shows the receiver on a table across a corner, an arrangement which normally makes for good reproduction. The mains cord is connected to a socket on the skirting board behind the table and the aerial and earth connexions pass through a hole in the woodwork surrounding the near-by window.

A good position for a television receiver is one which is reasonably near a mains point and at which the receiver screen can easily be seen by viewers seated near the fire. If possible, the receiver should not

The receiver is best positioned in a corner of the room, adjacent to the aerial and earth leads and, with a mains receiver, to a suitable electricity supply socket. In any event, a long, trailing mains lead should be avoided.



face any windows, particularly those on the south side of the house, because television images are very difficult to see when the screen is flooded with sunshine or when a reflection of a window is visible on the screen. In addition, strong sunlight shining on to the face of the cathode-ray tube is likely to cause discoloration. It is, however, undesirable to have the receiver so placed that the viewer has strong daylight directed on to his eyes. The receiver need not necessarily be near the aerial lead-in as with sound receivers, because the aerial lead to television receivers is usually in the form of a co-axial or twin-wire feeder which can be of any reasonable length without appreciable effect on the receiver performance.

There are occasions when it is desirable to listen to a certain programme at a point in the house which is some distance from the receiver. Provided that the receiver has the appropriate sockets or terminals, this problem can be solved very neatly by installing an external (or extension) loud-speaker at the distant point. It should be ascertained that the extension speaker is suitable for use with the receiver. There are two main types of speaker, known as high impedance and low impedance; each type is suitable for use with certain receivers. It is current practice, however, to design receivers for use with a low-impedance extension loud-speaker.

Many types of extension loud-speaker are commercially available, and some of them include a control for varying the volume of that loud-speaker independently of the speaker built into the set; at least one manufacturer includes, in addition to this volume control, a second control for switching the receiver on and off from the distant point.

In the early days of radio, long and high aerials and a good earth connexion were necessary to give good results, because transmitters had low power output and receivers—particularly crystal types—low sensitivity. Modern transmitters are so powerful and receivers so sensitive that good volume can be obtained from local stations using only a few feet of wire as an aerial.

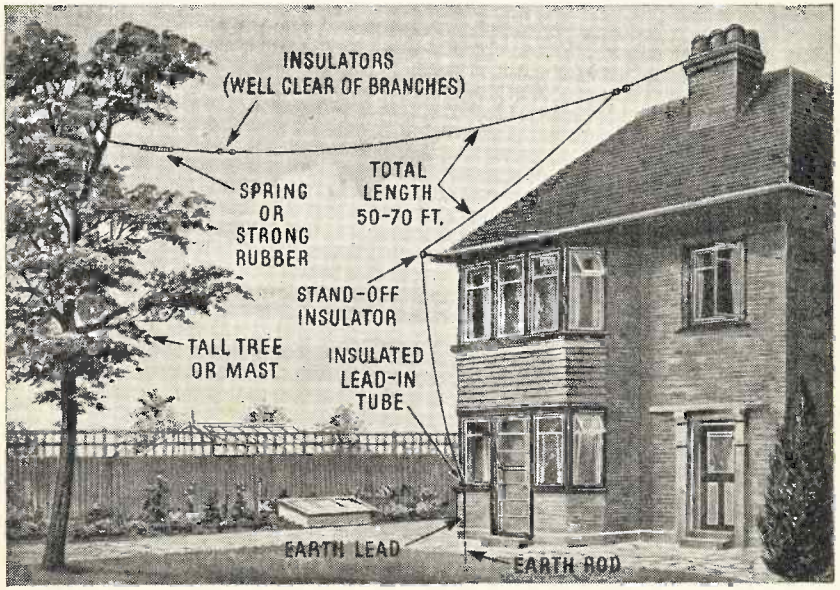
Thus, it is perhaps not surprising that little attention is usually paid to the efficiency of aerials and earth connexions; but these are just as important as ever they were, though for a different reason. When an efficient aerial is substituted for a very poor one it is noticed that reception of weak signals is enormously improved, volume being better and the background noise decreased. The effect on local-station reception is less striking, for it is possible that the change of aerial may scarcely affect the volume; again, however, there is a great

reduction in background noise. A quiet background enhances enjoyment of radio programmes considerably, and it is well worth while paying some attention to the aerial-and-earth system to obtain it.

It is instructive to consider the reason for the noise obtained with a poor aerial. The principal sources of noise are electrical devices such as trams, trolley-buses, electric trains, lifts, refrigerators, vacuum-cleaners and electric signs. But clicking noises can also be caused by bad contacts in electric-light switches, and the receiver itself is responsible for some noise. A small indoor aerial is usually nearer the fields of interference surrounding these sources of noise and thus delivers a larger noise voltage to the receiver than an outdoor aerial. Moreover, the signal voltages induced in an inefficient indoor aerial are small and, to give loud reproduction, the receiver must operate at higher gain than with an outdoor aerial; this causes a further increase in the noise and makes the contrast in performance even more marked.

Where it is impossible to erect a conventional inverted-L type aerial or to mount a vertical rod on a chimney, it is usually possible

An elevated outside aerial is always to be preferred where there is room for its installation. One of the simplest and most convenient types of aerial for broadcast reception can be erected in a small space as shown here.



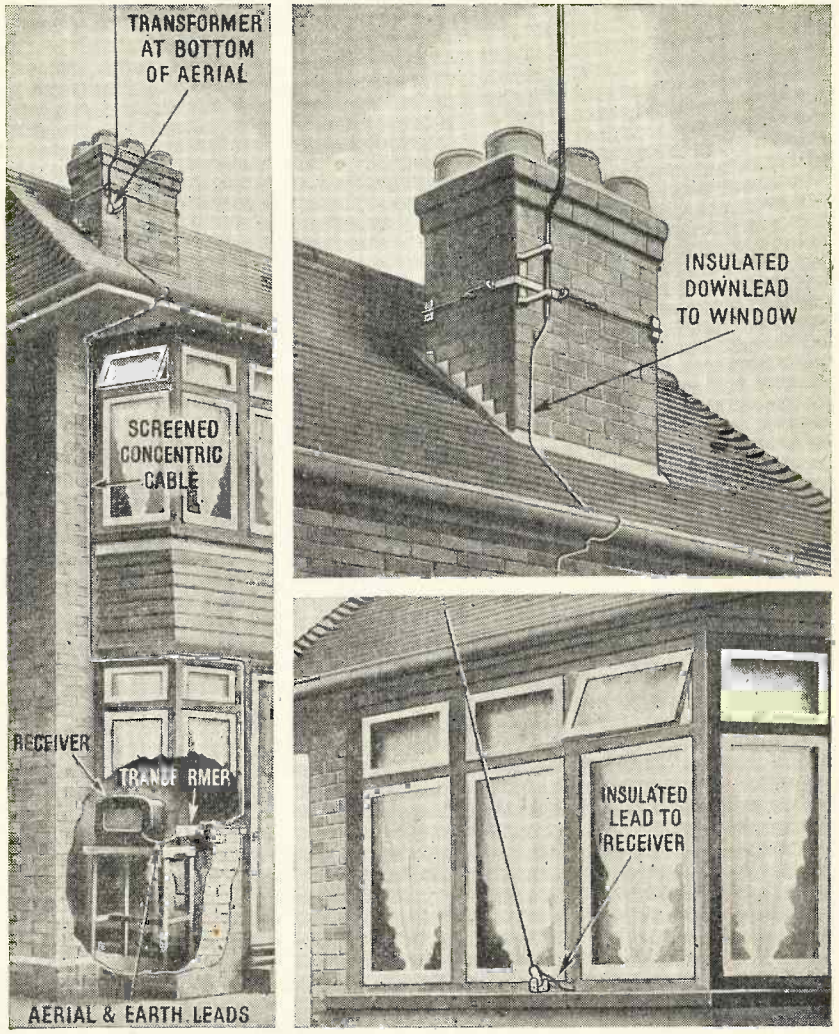
to use an outdoor aerial of the window-rod type. It is well established that a low-resistance contact to a cold-water pipe or to an earth rod driven into moist ground usually provides the best earth connexion, but it is often more convenient simply to connect a wire from the earth terminal of the receiver to the large-diameter (earthed) pin of the three-pin mains plug.

In situations where noise from electrical machinery is severe, the aerial downlead may be responsible for much of the pick-up, particularly if the lead passes near electrical gear. An improvement can often be effected by using a special screened downlead, the outer conducting sheath of which is connected to earth. This prevents induction in the downlead, and signals are picked up only in the aerial proper, which is more remote from the source of noise. The best method of minimizing noise is to employ a special anti-interference installation (similar to that illustrated) in which correctly designed matching transformers are used to connect the aerial and the receiver to the screened downlead.

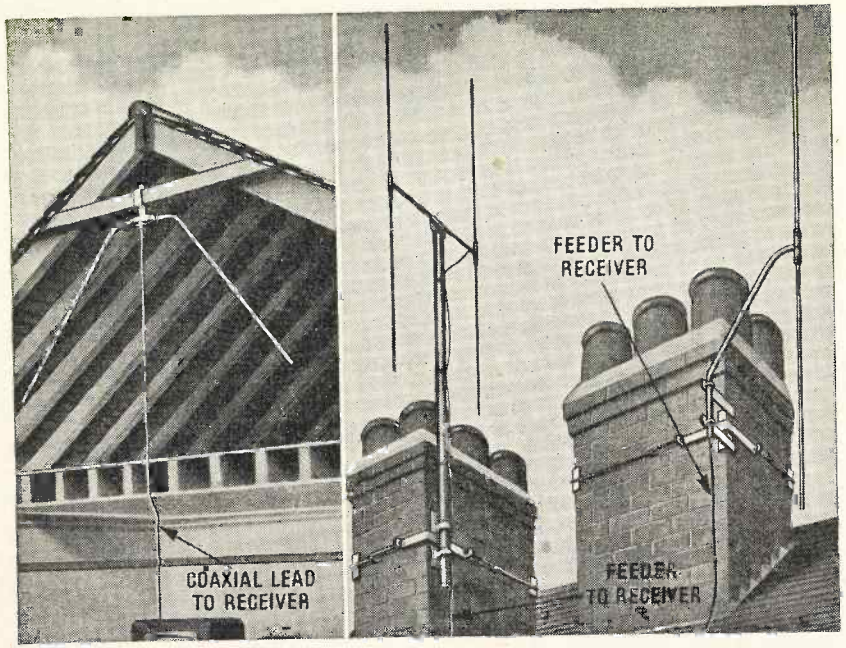
The television service is radiated on a high frequency (or a short wavelength), and a special aerial is necessary to receive it satisfactorily. For reception within roughly ten miles of the transmitter an indoor aerial is generally satisfactory, and a type suitable for mounting in a loft is illustrated. The dimensions of television aerials are critical and are chosen to suit the frequency of a particular transmission; thus an aerial designed for the Alexandra Palace (London) frequency is not suitable for the Sutton Coldfield (Birmingham) frequency. These aerials must also be correctly positioned in the loft, as they are directional; the type illustrated should lie in the vertical plane containing the receiving and transmitting sites.

At distances greater than ten miles from the television transmitter an outdoor aerial is desirable, if not essential, for really good reception. This is mounted on a high point such as a chimney, and is sometimes fitted with a reflector to give the familiar H-shape. The reflector is useful in two ways: first, if placed behind the aerial so that the reflector, aerial and transmitter are in line it approximately doubles the strength of the received signal; secondly, by screening the aerial it makes the receiver unresponsive to interfering signals arriving from a direction opposite to that of the wanted signal.

In locations near main roads interference from car-ignition systems is often particularly bad, giving a snowstorm effect on the receiver screen. Provided that the wanted and interfering signals are not arriving from the same direction the reflector can be used to good



Three types of rod aerial for radio reception. That on the left has a special interference-free downlead. A convenient chimney mounting is shown top right. The window-sill aerial is very convenient for flat-dwellers.



Three representative television aerials. That shown on the left is one of various types of indoor aerial suitable for use within, say, ten miles of the transmitter. The H-*type aerial is the most sensitive and is also useful in reducing interference caused by motor-cars. The dipole shown on the right is completely satisfactory at distances up to about* 25 *miles from the TV transmitter, particularly when it is not used near to a main road.*

effect by placing it between the aerial and the source of interference. In this position the reflector may give no increase in wanted signal, although giving better reception by eliminating the interference.

Television reception is sometimes marred by a subsidiary "ghost" image displaced by a fraction of an inch from the main image; this is produced by a signal which is reflected from a hill or a large metal structure such as a gasometer and is delayed slightly with respect to the signal arriving by the direct path between transmitter and receiver. Such interference can be reduced or eliminated by placing the reflector between the receiving aerial and the reflecting object. In practice this is usually achieved by rotating the aerial and

reflector about the vertical axis until the interfering image disappears.

Most radio-receiver manufacturers have now had 20 years' experience of designing radio apparatus; as a result the modern receiver is reliable and can be expected to give many years trouble-free service. There are, however, certain small faults which are likely to occur, such as a failure of a valve heater or a broken aerial connexion, which can often be diagnosed and put right without specialized knowledge.

If a fault develops and cannot be traced in a few minutes, the owner is best advised to call in a reliable service agent and should not interfere with the interior of the receiver unless, of course, he is very familiar with radio apparatus; severe electric shocks can be obtained by touching certain parts of most mains receivers whilst they are switched on, but this applies particularly to universal and television receivers.

If a mains receiver fails to work when switched on, the first step in tracing the fault is to confirm that the dial lamps are alight or, if there are no dial lamps, that a slight hum or hiss can be heard on listening closely to the loud-speaker; these are indications that the mains supply is reaching the receiver. If the lamps fail to light, or if there is no sound from the loud-speaker, this suggests a failure of the mains supply and, if convenient, the receiver should be tried at a mains point on a different mains circuit. Alternatively, some other mains-operated device, such as a reading-lamp, should be connected to the receiver mains point to check if power is available there.

If the mains socket is found to be dead, this indicates that one of the house fuses has blown. Fuses sometimes fail through fatigue, but before blown fuses are replaced or repaired an attempt should be made, by examining all the mains apparatus connected to the particular circuit, to discover the reason for the failure of the fuses. If the mains receiver socket is found to be alive, the receiver mains fuses (if any) should be examined to see if they have failed; they should be repaired or replaced if they have blown, but if they fail again immediately the receiver is switched on, this indicates a fault in the receiver which is better dealt with by the service agent.

On the other hand, if the receiver fuses are intact, or if the receiver has no fuses, the mains lead should be examined for breaks (after disconnexion from the supply point), particularly at places where kinks occur and at the end attached to the mains plug; if this end is badly frayed it is a good plan to cut a few inches off the lead and

refix the plug. The receiver mains-tapping adjustment should be examined for obvious disconnexions, but if nothing unusual can be found, the receiver should be examined by a qualified radio mechanic, as the fault may be more serious.

If the receiver is alive but produces no sounds, or very weak ones, it may be that the aerial or earth lead has become disconnected from the receiver socket or has broken. But if the leads appear intact the fault may be due to a valve-heater failure, and it is possible that this can be detected quite easily. In reading this, it should be borne in mind that valves can have faults capable of silencing a receiver, other than those affecting the heater, and thus a normal glow from a valve heater does not necessarily indicate that the valve is operating satisfactorily. On the other hand, the heater of a magic-eye tuning indicator may fail, and this has no effect on the performance of the receiver, although the tuning indication is lost.

To check the valve heaters, the back of the receiver should be removed and the receiver switched on, taking care not to touch any part of the interior. The red glow from the heaters of glass valves is easily seen and, after the receiver has been switched off, any valve with no glow should be removed and replaced by another of the same or equivalent type, after which the receiver should be tried again.

This method is not applicable to valves with metal envelopes, because in these the heater glow cannot be seen, but the warmth from the heater can be used as tell-tale. Any metal valve which fails to become warm after the receiver has been switched on for, say, ten minutes should be replaced. This test can be applied only to A.C. mains receivers, because it is customary in universal receivers to connect valve heaters in series; if one heater fails none of the valves will light up.

This has necessarily been a very brief survey of common faults and methods of detection, but it is hoped that it may prove useful, and, with the information given earlier on aerial installations and earth connexions, enable listeners to obtain better service from their receivers and improved reception of radio programmes.

Radio and television receiver operation

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TO MANY, instructions on receiver operation may seem unnecessary, but there is little doubt that there are occasions when both listeners and viewers could obtain improved performance from their receivers by operating the controls with more care.

Possibly the most abused control of a sound receiver, because it is so often used, is the tuning knob. Receivers must be highly selective to separate the closely spaced signals and, as a result, the signals are confined to a few degrees' rotation of the tuning control. The tuning control must therefore be operated slowly and with care to tune a desired signal correctly. Accuracy in tuning is essential, because even slight errors may result in unpleasant distortion. In so-called straight (non-superhet) receivers this distortion may not be very objectionable, but in superheterodynes it can be very severe, giving a shrill jarring note to the reproduction.

To facilitate station selection, the tuning controls of modern receivers are always fitted with slow-motion drives, but even with this aid care is still needed.

The indications of the tuning scale can be used as a rough guide to the correct tuning point, but should never be taken as accurate. When the wanted signal is found, the tuning control should be operated slowly two or three times to either side of the signal before it is finally set at the correct point.

To show the correct tuning point, some receivers are fitted with an indicator such as a meter, or more commonly a magic eye. Magic eyes contain a sector of green luminescence, the angle of which widens as the correct point is approached. The indicator should be watched whilst tuning, and the control should be left at the setting which gives maximum indication on the device. When tuning receivers fitted with variable selectivity, the selectivity control should

be set to minimum bandwidth (lowest-pitched tone), and the bandwidth should be widened if desired after tuning is completed.

In receivers having no form of tuning indicator the correct tuning point can be obtained by listening critically to the tone of reproduction as the tuning control is operated "through" the wanted signal. The control should be left at the setting which gives the deepest-toned reproduction. As the control is turned away from the correct tuning point reproduction becomes more shrill; this rise in tone can be used as a convenient means of indicating mistuning. If reproduction is too deep-toned at the correct tuning point, the quality should be corrected as far as possible by use of the tone control (or variable-selectivity control if fitted) and not by mistuning; while mistuning may apparently improve the tone, it can also introduce distortion.

It is not unusual for the tuning of a receiver to alter or "creep" slowly while the receiver is in use, and particularly just after switching on. Listeners should therefore develop the habit of checking the tuning at intervals and resetting it if necessary.

When receivers are fitted with push-button tuning it does not follow that tuning is always accurate, and the performance of the push-button mechanism should be checked periodically by tuning in the pre-set stations manually and noting if there is any movement of the tuning indicator or change in the quality of reproduction when the appropriate push-button is operated. If the push-button mechanism is slightly out of adjustment, it should be corrected either by the listener himself (instructions are usually given in the receiver manual) or by the service agent.

Although the above applies to some extent to tuning on all wavebands, there is usually little difficulty in tuning long-wave stations, because each signal occupies a comparatively large portion of the tuning scale. On medium waves tuning is more critical, and there is a greater probability of distortion due either to inaccuracy in tuning or to tuning creep; on short waves tuning is very critical indeed, and to tune with any reasonable degree of accuracy requires a very elaborate drive which could be fitted to only the most expensive receivers, or some form of bandspread tuning which also materially increases the cost of the receiver. To make matters worse, tuning creep is more marked on short-wave bands, and it is not usual for A.F.C. to operate on these bands. Thus, short-wave tuning cannot be expected to be easy except on the more expensive receivers.

Most receivers are fitted with a tone control which, when operated

to one extreme, has the effect of reducing the high-note response of the receiver. The correct setting for this control is largely a matter of personal choice. Some listeners like high-pitched reproduction while others prefer a lower tone; the control can be used to provide what is wanted. But the tone control should not be used to correct the shrillness caused by mistuning, because this results in very distorted and unpleasant reproduction.

If tuning is accurate, the tone control can usually be operated fully to the "high" position without causing unpleasant shrillness, and the receiver should then give clear and distinct reproduction of speech and music. Though some listeners prefer low-pitched quality when listening to music, it is generally advisable to set the tone control to the opposite extreme for listening to speech, for speech is very woolly and difficult to understand when high notes are lacking. A slight reduction in high-note response sometimes improves intelligibility when reception is marred by high-pitched interference.

Television receivers are more complex than sound receivers and have more controls, sometimes as many as twelve, but fortunately most of them can be of the pre-set type which are adjusted when the receiver is installed and do not normally need further attention for a very long time, possibly several years.

In general, the only controls which need be operated regularly by the user are those affecting the picture brightness (with which the mains on–off switch is often combined) and the sound volume. These two control knobs are usually situated at the front of the receiver, where they are convenient to operate.

The remaining pre-set controls can be broadly classified under two headings: those which the viewer may need to operate occasionally and those which only the service engineer should adjust. In the first category are such controls as contrast, focus, line-hold, frame-hold, tuning and interference suppression; these controls are usually placed under a cover plate or on a subsidiary control panel at the side or back of the cabinet. The other controls are generally inside the receiver, and the back must be removed to operate them.

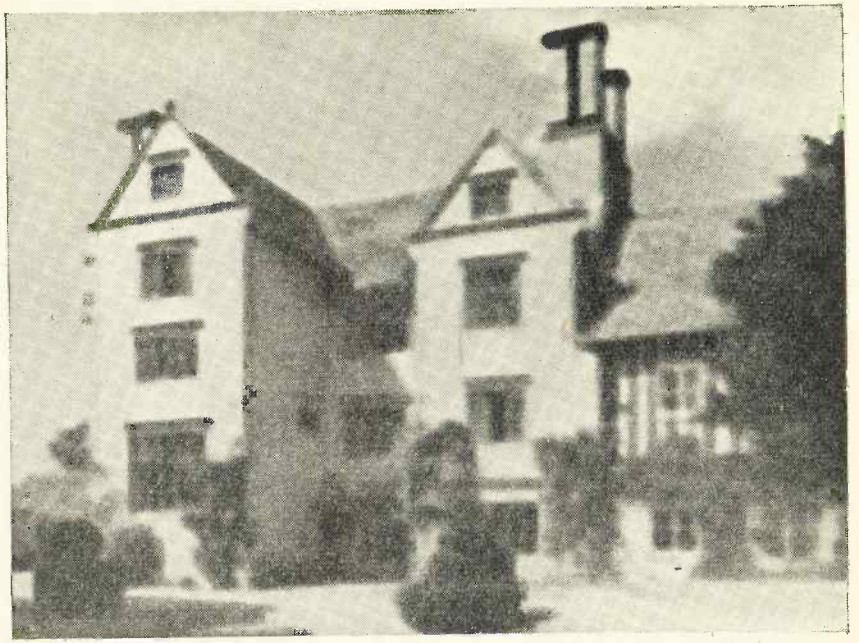
The function and method of operation of the external controls mentioned can now be described.

Contrast. This control affects the gain of the vision section of the receiver, and may be compared with the volume control of a sound receiver. As the name suggests, this control affects the relative contrast between the light and dark parts of the picture. If contrast is set too high, the picture tends to be composed almost entirely of in-

This and the three following illustrations show the results of maladjustments of a television receiver. This picture shows the soot-and-whitewash effect produced by too advanced a setting of the CONTRAST *control.*

tensely white or jet-black parts with few parts of intermediate tone; this soot-and-whitewash effect, as it is called, is illustrated in an accompanying picture. Alternatively, if contrast is set too low the picture becomes very pale and uninteresting.

Adjustment of the contrast control is difficult, because the appearance of the picture is affected very greatly by the brightness control also, and, in fact, contrast and brightness should be operated together to give best results. To help in this adjustment the tuning signal broadcast immediately before each transmission includes a tone wedge consisting of a series of four squares the tone values of which vary from complete black at one extreme to complete white at the other. The contrast and brightness controls should be so adjusted that the squares represent clear and approximately equal steps between full black and full white. Too much contrast or brightness

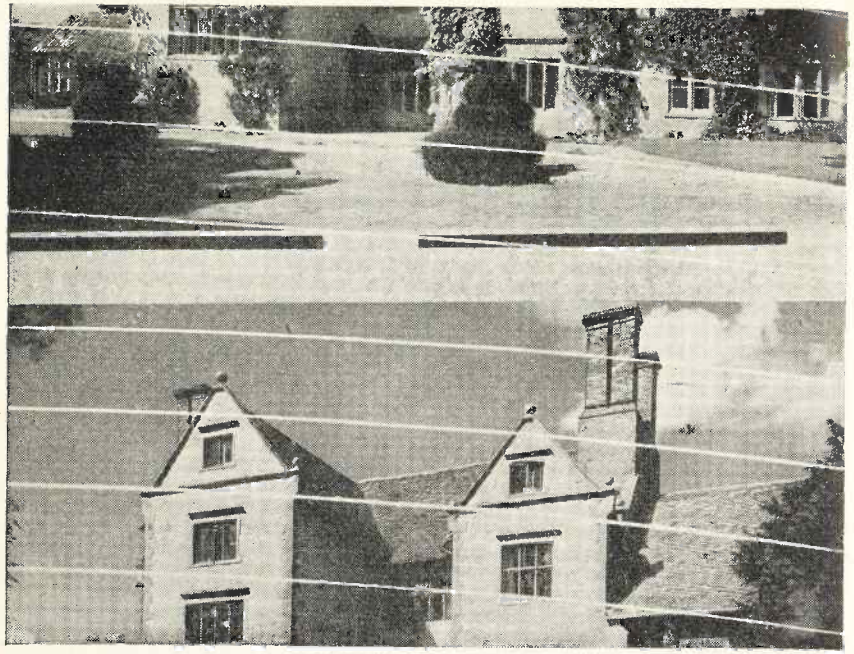


The effect of incorrect adjustment of the FOCUS *control is illustrated here. It may be seen that the image is blurred and ill-defined, as would be a photograph taken with a camera whose lens was out of focus.*

causes the two top squares to become equally white; too little contrast or insufficient brightness causes the two other squares to become equally black. As a general rule, the contrast control should be set at the lowest value that gives a good picture.

Brightness. The function of this control is evident from its name. When it is advanced, all parts of the picture become lighter in tone, and when it is decreased the picture, as a whole, becomes darker. The brightness is a main control and, as it is often combined with the on–off switch, needs adjustment every time the receiver is used.

It is best adjusted in the absence of a signal (for example, before the tuning signal is radiated) in the following way. Immediately after the receiver is switched on, the brightness should be kept at minimum for at least a minute and then advanced until horizontal lines appear on the screen. With them there will also be a few diagonal



Result of incorrect FRAME HOLD *adjustment: the picture is unsteady and slips up or down. White lines also appear across the picture.*

lines known as frame flyback lines. Brightness should then be reduced until all the lines just disappear.

When the transmission begins, the contrast control should be slowly advanced from its minimum position and the brightness simultaneously decreased until there seems a reasonable balance between white and black in the picture. If the adjustment is correct a slight advance of the brightness will cause the frame flyback lines to become visible in the black parts of the picture.

When a television receiver is in use for a long period the image sometimes becomes gradually darker, and a slight advance of the brightness control may be necessary to preserve a good picture.

Focus. The focus control decides the thickness of the horizontal lines of which the image is composed, and should normally be adjusted until the lines are most clearly defined. The line structure is, of

Horizontal distortion, unsteadiness in a horizontal direction, and a vertical black band resulting from incorrect LINE HOLD *adjustment.*

course, invisible at normal viewing distances, but this setting of the focus control gives the most sharply defined picture. If the picture is viewed from a short distance, the lines may distract attention from the picture, and it is advisable to reset the focus control very slightly until the lines merge. If this adjustment is carefully carried out there is no great loss in definition and enjoyment is much enhanced.

Tuning. Some television receivers are non-superhet types with fixed tuning and have no external tuning control; others are superheterodynes and have a pre-set tuning control. Superheterodyne receivers are designed so that the setting of the tuning control, which is correct for the sound section of the receiver, is automatically correct for the vision section and gives the best picture. This control should therefore be operated without looking at the picture and until the sound programme is heard at maximum volume.

Line-hold. This control determines the relative position of the horizontal lines forming the image; if the control is set too high or too low the lines are incorrectly placed and the picture is a meaningless jumble of white and dark patches. Usually near the centre of the range of the line-hold control the lines take up their correct relative positions and the picture becomes recognizable. Near this setting the control can be moved over an appreciable fraction of its travel without great effect on the picture, although near the limits of this restricted range the top of the picture may be displaced slightly to the left as illustrated. The correct setting for this control is at the centre of the restricted range in which the picture is good.

Frame-hold. The function of this is somewhat similar to that of the line-hold, but affects the position of the lines in the vertical sense. When the control is moved towards one end of its range the picture appears to move bodily upwards, and on operating the control to the opposite extreme it appears to move downwards. When the control is set near the centre of its range the picture locks, or remains stationary. The control can then be moved in either direction over an appreciable fraction of its range before the vertical movement begins. The correct position for the control is in the centre of this particular fraction of the range.

There is no distortion of the picture as the frame-hold control is moved; the picture moves bodily, but, provided the line-hold control is correctly set, all parts of it remain in the correct relative position to each other. It is normal for the frame flyback lines to become visible as the picture begins to slip or move vertically. In fact, the appearance of these bright diagonal lines across the picture is often the first indication that the picture is about to slip.

The picture sometimes locks with the lower half of it occupying the upper half of the screen and separated by a horizontal black line from the upper half of the picture which occupies the lower half of the screen. When this happens, the frame-hold control should be gently displaced until the black line slowly moves up to the top of the screen or down to the bottom; the control should then be quickly restored to its correct position.

The above description of the controls of a television receiver may seem, at first sight, a little bewildering, but prospective viewers can be assured that they will mainly be concerned only with the picture-brightness and sound-volume controls, and that the remaining controls will need little, if any, attention. In fact, a well-adjusted television receiver is quite as easy to operate as a broadcast receiver.

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(Figures in italics refer to illustrations)

ACKNOWLEDGEMENTS

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