

CINEMA TELEVISION PROBLEMS

# Television

and *SHORT-WAVE WORLD*

AUGUST 1939

No. 138 Vol. XII.

THE DOUBLE-BEAM  
OSCILLO-  
GRAPH

A TWO-SPEED  
ELECTRON  
SYSTEM

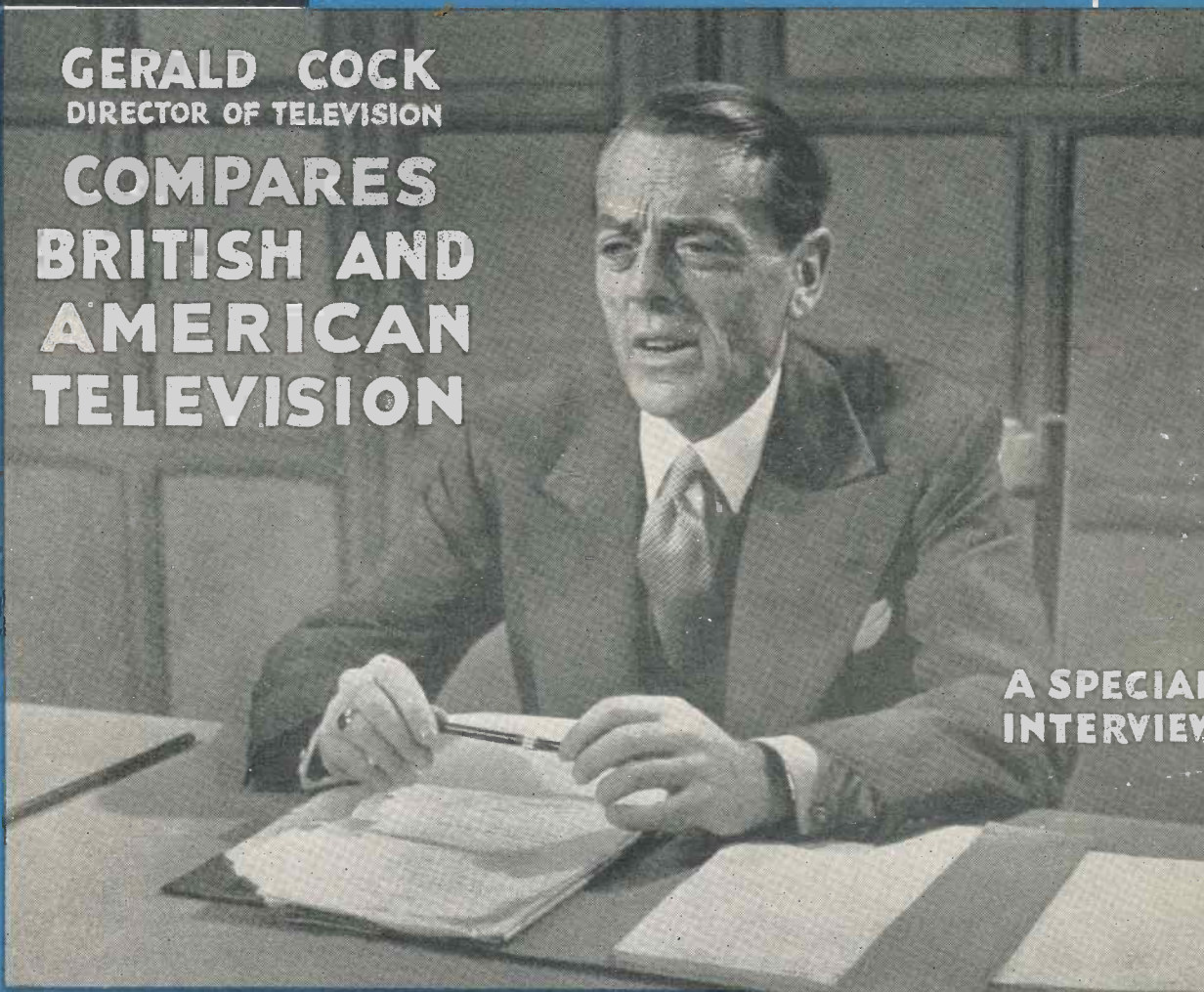
TELE-  
CAMERAS  
COMPARED

SHORT  
WAVES

5-METRE CRYSTAL CONTROLLED TX  
CONVERTOR FOR 28-70 MC.  
LOW-COST MODULATOR

GERALD COCK  
DIRECTOR OF TELEVISION

COMPARES  
BRITISH AND  
AMERICAN  
TELEVISION



A SPECIAL  
INTERVIEW

BERNARD JONES PUBLICATIONS LTD,  
CHANSITOR HOUSE, CHANCERY LANE  
LONDON W.C.2.

THE FIRST TELEVISION JOURNAL IN THE WORLD

*A lamb takes an interest in the television camera at the Zoo.*



# TELEVISION

and

## SHORT-WAVE WORLD

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Baird colour television system. As it was impossible in the time available to give full details we have reserved the information until next month when the system will be fully described. An interesting feature is that a cathode-ray tube is used in the receiver and not a mechanical device as in previous systems.

## Comment of the Month

### The Birmingham Station

Although the recommendations of the Television Advisory Committee regarding the extension of television to the provinces are known only to an official few, it is safe to regard Mr. Ogilvie's recent statement that the first "jump" will be to Birmingham as indicating that this recommendation has definitely been made. It may, therefore, be expected, perhaps before these notes are in print, but in any case very soon, that an official announcement will be made. The last word, of course, rests with the Treasury, but it is very improbable that the recommendation will be vetoed for the necessity of maintaining the lead in television which we now have is generally recognised and this will only be possible if there is no slackening in the effort to make it nation wide.

### Receiver Designations

We are glad to note a move on the part of some manufacturers of television receivers to apply designations or type numbers which at least convey some information of the type of receiver to which they refer instead of being a mere serial number, which has no meaning outside

the works. Valve makers have already adopted such a system and, generally speaking, the type designation does convey all the information necessary to make the initial selection of a particular valve, whatever the make, a reasonably simple matter. It might not be possible to work out so complete a scheme in the case of television receivers without using somewhat elaborate designations, but quite a useful amount of information can be conveyed in a simple manner. Of course, as in the case of valves, agreement would have to be reached between the manufacturers so that a standard system could be adopted.

### Baird Colour Television Development

Shortly before going to press with this issue we received some particulars of a new development of the

### A Separate Licence

The question of whether an additional licence should be made compulsory for viewers is being discussed in television circles and it is supposed that there is some suggestion regarding this in the Advisory Committee's report which is now in the hands of the Postmaster-General. Ordinary broadcast listeners who do not own, and for the present do not see much hope of owning television receivers, naturally feel that in part they are contributing for other people's entertainment who are perhaps more fortunately placed. It is, however, chiefly among actual viewers that the difference of opinion regarding a special licence exists and the matter came into some prominence in the informal discussion which followed the recent B.B.C. television tea

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party. The impression produced by that discussion was that although at a later date a special licence should be made compulsory it is a somewhat premature suggestion at the present time and likely to retard sales of receivers. The amount which the imposition of a separate licence would produce at the present time is relatively small and in our opinion it would be better to defer any such scheme until television is really on its feet.

### *Technicalities at Radiolympia*

It is gratifying to learn that the organisers of the Radiolympia Exhibition this year intend to cater for the visitor who takes an interest in wireless as such, as distinct from the

entertainment side. Plans are not yet complete, but it is proposed to hold a series of four conventions of a more or less technical character to which admittance will be made by ticket, for which application must be made.

The present suggestions for these conventions are that four should be held during the second week and the subjects proposed are general technicalities, quality, short waves and television. In each case there would be a reception and speeches by well-known authorities on the particular subjects followed by informal discussions on the part of those attending.

This series of conventions is entirely distinct from the dealers' conventions which have already been arranged, and they will be open to any person who is interested and makes application for a ticket.

we have been able to show are the news reels and Mickey Mouse cartoons.

"We have been forced to use foreign films. I hope that in due time the film industry will take a sensible view, realise that they cannot stop television and so co-operate with us."

One viewer said that in the case of plays, a more intimate type of entertainment was required, with only a few characters. Court scenes were instanced as being ideal from this point of view.

Mr. Cock said that as yet the B.B.C. could not afford to have anything written especially for the television screen.

Viewers strongly supported the suggestion of earlier evening programmes, but Mr. Cock said that it was physically impossible, with their present resources, to get through the necessary rehearsals between the end of the afternoon transmission and any time earlier than 9 p.m.

Other points made by viewers were that more glamour is needed in the programmes; announcers should be seen more, more plays are desirable, and "Picture Page," the topical magazine, is "rushed" too much by the interviewer.

Unfortunately, almost every suggestion made by viewers was, according to the answer returned, impracticable.

## Viewers' Views

*as revealed at the B.B.C. Television Tea-party*

A REPRESENTATIVE section of viewers had an opportunity last month of discussing the television service in general with members of the staff of Alexandra Palace, including the director of television, Mr. Gerald Cock. The occasion was an informal tea party organised by the B.B.C., and held in the concert hall at Broadcasting House. Actually 150 viewers were present, who had been chosen by drawing lots from about 700 who had responded to the invitation. Sir Stephen Talents, B.B.C. Controller of Public Relations, was in the chair. After an informal tea Mr. Gerald Cock gave an outline of the development of the service, introduced impersonally some of the more prominent members of the staff and gave brief descriptions of their activities.

During the informal discussion that followed many suggestions were put forward and criticisms made by viewers, and it was Mr. Cock's task to reply to these, in many cases explaining that they were impracticable for some reason or another.

An early criticism concerned the film which is used for the test transmissions in the morning and there was general agreement that it was high time it should be replaced. This film, however, it was explained by Mr. Cock, cost £3,000 to make, and

as it was not intended for entertainment purposes there was little hope of its replacement.

Other points made by speakers were: A special licence of, say, £1 per annum should be paid by owners of television receivers and that some contribution to the cost of the programmes should be made by manufacturers of receivers. There was some opposition to this view on the grounds that a hint of extra cost would have the effect of restricting sales at a time when it was very desirable that the number of viewers should be increased.

That a special children's programme should be given regularly at a suitable time. In respect of this the B.B.C. admitted that the children had been neglected and promised steps would be taken to cater for them in the future.

### *Use of Films*

Increased use of films was advocated and the selection of films at present used was criticised.

In reply to these points, Mr. Cock said that the film industry had banned television. "They will not in any way co-operate with us," he declared; "they consider that we are an opposition entertainment. The only films

### *"Good and Bad Picture Areas"*

In last month's issue we published a map compiled by the R.M.A. from information supplied by television receiver manufacturers showing the effective radius of the Alexandra Palace transmitter and certain areas where reception conditions vary. We stated in the explanatory text that within the inner shaded portion reception is usually satisfactory, but difficulties may be experienced due to local conditions. The title, however, which was placed on this map, namely, "Good and Bad Picture Areas" may in some cases have created the impression that reception in certain districts is definitely bad. This is not the case and good reception is easily possible within the entire area shown, but local conditions are not so good in some areas as in others. In such cases, however, it is a simple matter to offset any such trivial disadvantage.

*In an interview with the Editor of  
"Television and Short-wave World"*

GERALD COCK,  
B.B.C. DIRECTOR OF  
TELEVISION, ON  
MY IMPRESSIONS  
OF  
AMERICAN TELEVISION



This photograph shows Mr. Cock (left) discussing a programme with D. H. Munro.

*Mr. Gerald Cock went to the United States last April to be present at the inauguration of the Television service there. He has accorded us a most interesting interview and we are much obliged to him for the opportunity of presenting his impressions to our readers.*

*You look very fit, Mr. Gerald Cock. Did you have a good time?*

Yes, in every way. I'll say nothing of the social side of my visit for you can guess that they did me very well indeed and that I thoroughly enjoyed myself. I met old friends and made new ones and was given an altogether exceptional insight into the present conditions of American television.

*How long were you away?*

I was actually in the States about four weeks, arriving there towards the end of April. In particular, I went to see the beginning of American television, and to watch the future trend. Naturally, I was hoping I should see many things by which we at the B.B.C. could profit.

*You were not invited, then, in an advisory capacity?*

Oh, no! You remember that D.H. Munro had been lent by us to the Columbia Broadcasting System. He came out later as an advisor and I was able to see a little of him—much to my enjoyment, and, I hope, his. But I can say this of everybody I met concerned in television, whatever their capacity—administrative creative or technical—they all showed me great consideration and spoke with complete frankness. I might indeed have been one of themselves. I cannot speak too warmly of the R.C.A. The G.E.C., the National Broadcasting Company, the Columbia Broadcasting System and the radio

press. They entertained me and gave me every opportunity of examining the television situation from every point of view. I met the makers of apparatus, the programme staff and those charged with the originating of programme policy; I met the press, the public and the dealer.

*The dealer? What did you make of him? Did you find the American public demanding a television service?*

Hardly! Just as it was in England two years ago, I found the demand would have to be created; but as in this country the public appeared to think that television ought already to be available.

*With your experience of British television, had you much to learn?*

There is always a great deal to learn. You probably know the problems in the United States are more difficult even than in this country. Here, the initial transmitting station and the whole of the expense of that station and of the subsequent transmissions were paid by the B.B.C., a public-service, non-profit-making corporation. There can be only one transmitting authority in this country which saves wasteful duplication. But in the United States the broadcast system is not financed by licences; it is financed entirely by advertising of one kind or another, and each system is in strong competition with the others. Though the public may have the feeling that

television ought to be available to everybody there is only private capital with which to provide it, and that has had to come out of profits made in and retained from other activities. Television programmes are very expensive. This explains why we in Great Britain were able to provide a public service long before the U.S.A. found it practicable. In the United States they had to wait until one of the broadcasting companies forced the pace by assuming the heavy financial commitments of a television service.

*Yes, I follow. But what of the technical problems? Were they very different?*

With regard to transmission within New York, that city is far from being an ideal transmitting centre. Think of the steel buildings, their number and enormous size. Remember the famous New York skyline! To receive television in the apartment houses of New York it would be necessary to install expensive centralised relay systems and reception would be subject to electrical interference and to the considerable absorption effect of the steel structures themselves. Psychologically too, the problem is a little more difficult there than here. The New Yorkers are great entertainment goers and as a group the most gregarious in the world. They always have been, and the number of theatres, picture houses and cabarets in greater New York must run into hundreds, and provide more competitive entertainment than can be found in any other

## The Start of a Service in U.S.A.

hundred square miles on the globe. In the circumstances, you can hardly wonder that the problem of a public television service has not been pressed forward more energetically. But do not read into my words more than I intend. Americans, when they do see the way clear in a paying proposition, can be depended upon to build up a new enterprise with great rapidity and energy, and I expect that if it is my good fortune to visit the States again in a few years, I shall find television has become a major industry!

*Were there any services in operation when you were there?*

The Don Lee Company in Los Angeles had been putting out programmes for six days a week for about two years on a lower definition standard. I have not seen any of their programmes, but I believe they weren't very successful in their attempts to sell receivers. But I ought to explain that the Federal Communications Commission—the authority that regulates the broadcasting in the U.S.A.—has issued experimental licences for some seven of the available wavebands in the ultra-short spectrum. All of these are of a standard of 441 lines and 30 frames per second, except in the case of the Don Lee Company which I just mentioned, was working on a somewhat lower standard. I heard talk of the DuMont Company, which is associated with Paramount, starting a service around Hollywood. In many ways that part of the world would introduce fewer problems. Apart from the Don Lee Company, the only actual attempts at a service so far have been made by the National Broadcasting System soon to be followed by the Columbia Broadcasting System. Here we have two powerful interests with vast resources and considerable radio experience and it will be very interesting to see what they do. There are some other organisations engaged in television research and you will find them scattered over the States from the Pacific to the Atlantic Coast.

*There was a special World's Fair service, I believe?*

It would be more correct to say that the National Broadcasting Company's service was arranged to synchronise with the opening of the World's Fair on April 30, although, of course, they had been putting out

test programmes for months before that. Since April they have been running about an hour, on two evenings a week of direct television from their studio in Radio City in New York, and transmitting for several hours a week from the Fair grounds. The rest has been a mixture of feature and short films. Also they have run outside broadcasts from Madison Square Garden, such as bicycle races, and at least one big fight.

*I should have thought the O.B. would have been a big feature in America.*

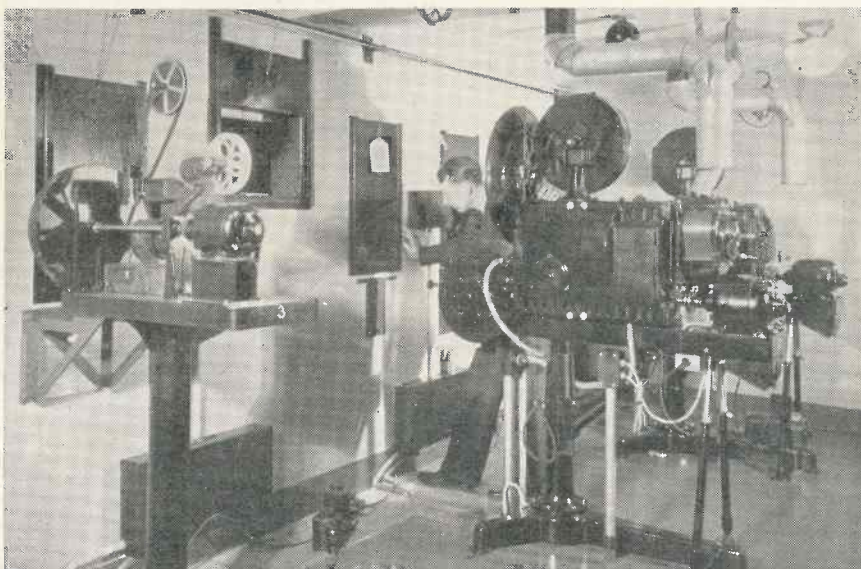
Certainly, but when I was there the

Goldmark, their chief television engineer.

*That telecine apparatus is new, isn't it?*

Yes, it was very interesting. It seemed to me the one piece of apparatus that would compare favourably with its British equivalent. It combines many ingenious gadgets, including a Farnsworth dissector tube, and gives a picture completely free from tilt and bend, needing no light correction during the projection of the film.

*Are you getting one for Alexandra Palace?*



A film scanning unit in the National Broadcasting Company's studio. The Iconoscope is situated on the other side of the partition.

N.B.C. mobile unit had only one studio camera attached to it. It has now been put out of action for another camera channel to be fitted. That was a severe handicap as evident during the televising of the President and other celebrities at the opening of the World's Fair. In the matter of equipment and general facilities they are still well behind us. For example, the N.B.C. has one studio in the R.C.A. building, just about half the size of one of the studios at Alexandra Palace—and our own studios are too small. The cameras are not as light-sensitive as ours. Columbia, which expects to start a service about now (but may possibly be delayed slightly) has taken a huge hall over the main hall of the Grand Central Station in New York, which must be at least ten times the size of one of our studios at Alexandra Palace, but it has only two Iconoscope cameras and one telecine apparatus designed by Dr.

I must plead privilege in not replying to that question just now!

*Will the new Columbia system work seven days a week?*

Not at the start. Probably only an hour on two days a week. Columbia hasn't yet got an outside broadcast unit, so main transmissions will be studio productions and films to start with.

*What was the reception quality like, Mr. Cock? I associate very high performance in a country which gave the Iconoscope to the world.*

There was no noticeable difference in quality between their pictures and ours. By the way, I have it on reliable authority that the American Iconoscope and the British Emitron were developed independently but it was left to us to develop the Super Emitron. America hasn't got one yet. In my opinion, the American cameras are appreciably less sensitive than ours and in consequence their studio lighting has to be much

## American Receivers

heavier—a distinct disadvantage for artists in dramatic productions. I was conscious, too, of the want of a really progressive forward programme policy, but that, of course, will come in due course. Up to a few months ago the television staff felt themselves isolated and nobody's baby, but early in May television was given Vice-Presidential responsibility in the person of Mr. Alfred H. Morton who is well known in Europe and was vice-president of the National Broadcasting Company.

R.C.A. building in New York and at the World's Fair, and my impression was that with encouragement and a progressive programme policy there should be a large potential audience despite the difficulties of reception.

*Did you form any idea as to the number of receivers now in use by the public?*

I am given to understand that very few, not more than 250, were in use late in May, and still fewer in homes. Getting sets distributed in homes is a

less expense and with a long wait before the self-supporting stage arrives? My personal feeling is that the second alternative would damage the future of any system of television—sponsored or otherwise and in the long run cost much more.

*Do the great film interests in the United States fear television?*

Yes. Just as they do here, and with as much reason. All the same I think the American film people will more quickly come to a basis of accommodation.

*Then the film interests would like to absorb television and make it their own?*

I shouldn't be surprised—unless television is developed with real energy by the broadcasting people—to see Hollywood take a hand, starting on the West Coast where the conditions are relatively simple, and acquire an early and consequently a firm hold. But, of course, some new organisation, detached altogether from sound broadcasting, with television alone as its objective, may enter the field for what it will eventually be able to get out of it. Undoubtedly, America will have an adequate service or services, but it is a matter of time. I have never believed the legend that television will "find its own feet." On the contrary, it will take all the energy, imagination and intelligence that can be put into it to make it a success in U.S.A. or anywhere else.

*Your final impression, Mr. Cock?*

In the United States I am confident that television will proceed in waves—rather irregularly—as various problems (such as regional distribution) are solved. But nothing can be done, there as here, without good programmes, and enterprise in the way they're provided, cheap and efficient home receivers, and an ever-widening coverage area.



Mr. Cock faces the television camera at Alexandra Palace: on the left is a model of the mobile unit.

This looked a distinct step forward. He is now vice-president in charge of television for that concern.

*You tried out their receivers, of course? How do they compare with ours?*

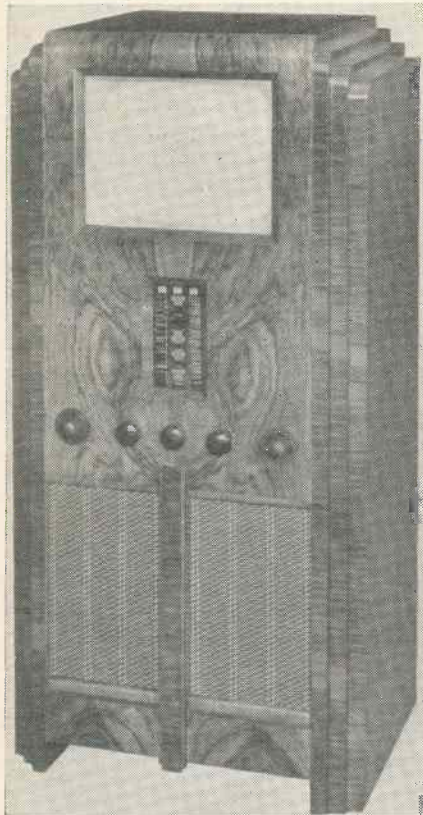
I tried out a few and, as I have said, the picture quality was about the same as ours. As to price, their receivers were dearer, not cheaper. The £120 receiver combined with all-wave radio was more bulky and had a rather smaller effective picture on its 12 in. tube than the equivalent British receiver selling here at between £50 and £60. The public want to have television available. They were visiting department stores which were showing television, the

great problem, just as it was here until recently. Obviously, every effort will have to be made to distribute a great number before sponsoring becomes possible and the programmes pay their way. So the problem can be put like this: is it worth while to make every effort and spend a lot of money to establish a service of such attractiveness that receivers will go into homes quickly, or to organise a mediocre service at

Ensure obtaining "Television and Short-wave World" regularly by placing an order with your newsagent.

## The Buller Dipole

Last month details were given of the Buller Dipole television aerial and it was stated that the small separating insulator between the two aerial members was steatite. Actually this separator is made of "Frequelex," a special low-loss insulator made by Bullers Ltd., and employed where a high degree of insulation and low loss are essential.



The new Baird Model T25 combined television and all-wave radio receiver.

## A New Baird Receiver

THE Baird Company have just produced a new combined television and all-wave radio receiver giving a 10-in. by 8-in. picture at the remarkably low figure of 47 gns.

This is a complete television receiver combined with a very selective and high quality radio set, and a special feature is its exceptionally simple operation, as the television controls have been reduced to one which operates picture contrast. Even this control will only need occasional adjustment.

The cabinet is constructed of richly figured walnut which will harmonise with any furnishing scheme. A special glass plate covers the front of the "Cathovisor" tube. The dimensions are 44½ in. high, 21 in. wide, and 16½ in. deep. The picture is viewed directly on the end of the C.R. tube.

The sound receiver is a modern superheterodyne embracing the television sound waveband and three bands for radio programmes (short:

16-51 metres, medium: 198-500 metres, long 850-2,000 metres). For radio, main stations are calibrated by name, and each waveband by its individually illuminated scale.

The power consumption is 150 watts and the model is designated the T25.

The Baird Company stress the desirability of using a good receiving aerial and paying attention to its careful installation. Within the generally accepted service area of approximately 25 miles, a simple form of aerial may be employed, assuming external interference conditions to be normal for the area. Beyond this service area, however, a more elaborate form of aerial should be used and the elevation of this aerial above ground level is most important. Suitable aerial cable in every case should be determined by the available local signal strength and length of cable run. A good aerial, put up in a workmanlike manner, should have a life of several years.

## Two-way Television with a Single Cathode-ray Tube

A SYSTEM of two-way television communication in which a single cathode-ray tube at each station serves both as pick-up device to produce picture signals for transmission and as a receiver or viewing device to reproduce images transmitted from the remote station is the subject of a patent (No. 2,157,749 U.S.) just granted to the DuMont Laboratories, Inc., of Passaic, N.J., U.S.A.

This system greatly simplifies and reduces the cost of the apparatus in which separate pick-up and viewing tubes must be used at each station. Another advantage is that of simultaneous two-way communication, instead of having to go from one tube to another for the respective transmitting and receiving functions.

The DuMont two-way television communication system is based on the use of a dual-function cathode-ray tube which includes both photo-sensitive screen (pick-up) and fluorescent screen (viewing) side by side, but served by a single or common cathode-ray beam. Thus when the tube is transmitting an image, the cathode-ray beam swings over to the

photo-sensitive screen or photo-electric mosaic, which it scans in the conventional manner, while at the other end the cathode-ray beam swings over to the fluorescent screen which it scans in order to reconstruct the images being transmitted. This

switching of the cathode-ray beams may be accomplished manually or automatically, the invention covering various means of switching, including a revolving switch which alternates the beams from transmitting to receiving positions, for simultaneous two-way television communication.

## Interference from Television Receivers

AS a result of practically continuous investigation into the problems of radio interference Belling and Lee, Ltd., frequently issue bulletins explaining the cause of the trouble and making suggestions for remedies. One of these recently issued, deals with interference arising from vision receivers and the information is therefore of considerable interest.

Trouble is usually most marked on the L.W. range of adjacent broadcast receivers, although a fair amount of annoyance may be met on the medium wave band. The symptoms may be diversely described as whistles, hootings and oscillation and each or all of these terms may be accurate according to circumstance and the

descriptive powers of the observer. It must be taken for granted that attempts to clear this trouble by interference with tuned circuit trimmers can only be productive of new troubles.

In general, it may be assumed that the offender is the line scanning transformer, and that it is guilty of generating a "mechanical whistle" at line frequency of 10,125 cycles per second. Various devices have been adopted to offset the tendency to mechanical response—with varying success; although it is believed that forthcoming recommendations will, if followed, preclude the possibility of these annoyances and drawbacks in the newer vision receivers.

(Continued on page 459)

# Scannings and Reflections

## TELEVISION AND FILMS

**M**ETRO-GOLDWYN-MAYER have announced that they will not allow any of their films, new or old, to be used for television purposes. Metro-Goldwyn-Mayer is the concern with the greatest number of big stars under contract. They operate the Empire and the Ritz in London and do not intend to instal big-screen apparatus.

## ARTIFICIAL EYES

If viewers tune in on the evening of August 8 they may be startled by the sight of what appears to be a human eye filling the whole of the television screen. Actually, it will be a giant glass eye which will be constructed by Steer Wardman, a Nottingham craftsman, to demonstrate how glass eyes are made. The work is so minute and delicate that the shaping and marking of a standard "eye" would be too small to be clearly shown.

The modern glass eye fits the socket so perfectly that it can be controlled by the eye muscles. Viewers will see how the glass is blown and fused, and how, with infinite care, the cornea is grafted over the pupil.

The successful artificial eye must be perfectly shaped and exactly match the real eye of its wearer.

## £50,000 FOR FRENCH TELEVISION

The French Chamber of Deputies Finance Committee has approved a proposal to vote £50,000 to develop television. The money will be diverted from another section of the budget of the Post Office.

## THE BIRMINGHAM TRANSMITTER

According to the *Birmingham Evening Despatch* there is a strong probability that the Birmingham television transmitter is already built.

This paper states that Electric and Musical Industries, Ltd., who designed and built the equipment at Alexandra Palace, have already

designed and manufactured the equipment for the Birmingham station, and that it is now lying at their works at Hayes.

It has been designed as a "private venture," it is suggested, with the co-operation of the B.B.C.

## PROGRAMMES FOR YOUNG VIEWERS

That programmes for younger viewers are much in demand was one of the outstanding discoveries of the recent Television Conference at Broadcasting House. Although it is not yet possible, owing to rehearsal difficulties, to give additional "Children's Hours," every effort is being made to introduce material likely to appeal to the younger generation.

In the near future it is hoped to introduce a children's feature after "Picture Page" on Thursday afternoons and a Saturday afternoon show for young viewers from time to time.

## G.E.C. FIT TELEVISION SUPPRESSORS

The General Electric Co., Ltd., has arranged for television suppressor equipment to be fitted on all G.E.C. vehicles operating within the television area. Not only are all vans and lorries, as well as the fleet of sales cars, being so equipped, but the same procedure has been made available, free of charge, to all private cars belonging to members of the staff.

## "LE PATRIOTE" FILM

Maurice Tourneur's great film "Le Patriote" is to be televised from Alexandra Palace on August 4. Harry Baur plays the part of the Czar Paul I, and Pierre Renoir that of Pahlen (The Patriot) in this historical drama of intrigue in the Russian court at the end of the eighteenth century. Suzy Prim is seen as Anna Ostermann.

## TELEVISION ON D.C. MAINS

A device which eliminates the need for motor-generator sets for tele-

vision receivers operated in districts where only direct current is available, has been produced by the General Electric Co., of U.S.A. It is a new type of vibrator convertor for changing direct into alternating current. Motor-generator sets are rather costly and previous types of vibrators have not been capable of supplying sufficient power for television set operation.

The new type convertor can also be used to provide alternating current for fluorescent lighting, neon sign installations on motor vehicles, and police car short-wave radio sets.

## B.B.C. AND IGNITION SUPPRESSION

The B.B.C. has circularised every member of the staff asking them at their own cost to suppress all electrical interference caused by their cars. The B.B.C. have already fitted suppressors to all motor vehicles they own.

## 1940 GAMES TO BE TELEvised

The 1940 Olympic Games are to be televised for the first time at Helsinki next year by the German Post Office Authorities.

## £100,000 FOR CINEMA TELEVISION

A suggestion has been made that British cinemas contribute a total fee of £100,000 for the right to reproduce B.B.C. television programmes on cinema screens.

Each cinema, it is proposed, would make its contribution on a seating capacity basis. An estimated increase of receipts of £400,000 would result, it is contended by those who put the scheme forward.

## TELEVISION AFLOAT

The Cunard White-Star Liner *Queen Elizabeth*, now fitting out at Clydebank, is to be equipped with television. A local television station is planned for the entertainment of passengers who are confined to their cabins.



**MORE SCANNINGS**

**TEST MATCH TELEVISION**

The Oval authorities are constructing a new gate near the West Stand at the Oval because none of the other gates is big enough to admit the television van. Last year 1,000 ft. of cable had to be used and this was not very satisfactory.

The B.B.C. are to televise the last Test Match between the M.C.C. and the West Indies on August 19.

**GERMAN TELEVISION IN SOUTH AMERICA**

A series of demonstrations of German television in South American cities was started at the Buenos Aires Postal Conference in May. Demonstrations have been given in Rio de Janeiro, Guatemala and Santiago de Chili. Mobile equipment is used.

**DANCE BAND BROADCASTS**

In the opinion of N.B.C., the drummer of a dance band will "steal" the show in television. This is because the drummer has a monopoly on action and movement and is able to give visual as well as aural entertainment. Sound broadcasts of long drum passages make very boring listening. On the other hand, seeing the man at work can be very stimulating because the sight of the man at his job adds visual appreciation. Hence, television can be expected to enhance drum music.

**A NEW PHOTO-ELEMENT**

The discovery of a photo-element twenty times as sensitive as those at present in use is claimed to have been made by the research staff of the Leningrad Physico-Technical Institute. No confirmation of this claim has as yet been obtained.

**N.B.C. INCREASE PROGRAMME TIME**

A new television programme schedule more than doubling the number of programme hours offered to home viewers by the National Broadcasting Company over station W2XBS has been announced.

Under the plan, evening studio transmissions from Radio City are to be increased from two to three a week and there will be four noonday transmissions a week from the television studios at Radio City.

Films will play a very minor rôle under the new plan. No motion pic-

tures will be transmitted in the evening studio programmes; at least eight of the ten programme hours weekly will be presented by live talent.

**MORE LIGHT ENTERTAINMENT**

The recent Television Questionnaire clearly showed the popularity of light entertainment (the figure was roughly 90 per cent. of viewers' votes) and in consequence the B.B.C. is not forgetting the lighter side in forthcoming television programmes.

A large number of programmes that are in course of preparation are being designed to take cognisance of this desire of viewers. Drama is also to occupy increased programme time and the latest plans for television drama at Alexandra Palace have reached the point when viewers can expect almost "a play a day."

**"THE DAY IS GONE"**

A Keats' poem has given the title to the eerie play by W. Chetham-Strode, which will have a repeat presentation on the afternoon of August 4. With the scene laid in a small South Coast town, the play concerns Stanley Thatcher, a chemist with a nagging wife, Mabel. Rose Spiller is in love with Thatcher, and he with her, and when she wins a large prize in a Derby Sweepstake and Mabel conveniently dies, they marry. But Mabel's brother, Inspector Webb, also wanted to marry Rosie and, becoming suspicious about his sister's death, stirs up trouble.

With Olga Lindo as Mabel, and Valerie Tudor as Rosie, the cast also includes Torin Thatcher and Arthur Wontner.

**LICENCE INCREASE**

The Post Office issued 349,546 wireless receiving licences during June, 1939. This figure represents a nett increase of 26,667 in the number of licence holders during the month after making allowance for expired licences and renewals.

The approximate total number of licences in force at the end of June, 1939, was 9,009,750 as compared with 8,638,091 at the end of June, 1938, an increase during the year of 371,659.

**NOVA PILBEAM IN TELEVISION**

Nova Pilbeam made her television debut as Suzanne in Peggy Barwell's

special adaptation of "Prison Without Bars," a tragi-comedy of youth, on the evening of July 29. The cast also included Jill Esmond, Sebastian Shaw and Margaret Yarde.

This play, which occupied the whole of the evening programme on July 29, is to be repeated in the afternoon of August 8.

Although "Prison Without Bars" has been filmed both in France and England, the television version contains new scenes and dialogue, so that viewers who have already seen the films will be able to tune in to an entirely new production, for only the basic plot remains the same.

**TELEVISION IN ITALY**

Italy's first public demonstration of high-definition television will be given in Rome at the beginning of this month. The transmitting station on the Monte Mario just outside Rome is now completed and it is expected that the station will be similar to Alexandra Palace inasmuch as it should have a service area of about 50 miles.

Several manufacturers in Italy are going ahead with the design of domestic receivers and from designs to hand, they appear to be very similar to the average British receiver.

**SOCIAL PROGRESS EXHIBITION**

French technicians are highly delighted that they have at last obtained a provincial television station which will be open in the Louis Pasteur Palace at the exhibition of Social Progress at Lille.

It is not intended that this station shall have a wide radius, but so far transmissions have been satisfactory between Lille and Roubaix, about 7 miles. The station was opened by M. Jules Julien, Minister of Posts, Telegraphs and Telephones.

**GERMAN TELEVISION**

Television receivers will be on sale to the German public for the first time during the forthcoming radio exhibition in Berlin, but as the price will be in the region of £80, it is not likely that the sales will be high; this price is likely to be prohibitive to the average German.

The German Post Ministry have announced that television centres will be established in Berlin, Leipzig, Nuremberg, Frankfurt, Munich, Hamburg and Vienna, from which

## AND MORE REFLECTIONS

programmes will be regularly broadcast.

In view of the high price of the receivers it is more than likely that public viewing rooms will be established, but it is hoped that a standard television set may be produced on the lines of the popular Peoples' receiver and if this plan materialises it will be sold at approximately 670 marks, which is roughly £33 10s.

### TELEVISION-SCANNED EXPOSURE METER

The use of television scanning principles in an exposure meter is embodied in a meter called the Multiscope just produced in America. In the Multiscope the image is focused upon a ground glass screen which is scanned by a disc, and the light on various sections of the picture are picked up by a photo cell. The sensitivity of the cell extends into the infra-red and ultra-violet, so filters may be necessary to correct the reading.

### AMERICAN FILM TRADE TELEVISION

American film producers are taking the same attitude to television as the British film trade inasmuch as they consider television to be a competitor which will ultimately cause a loss in revenue. They are also very strongly opposed to the transmission of films by television even if they are of an old and obsolete type. Big-screen television, the U.S. film trade contend, is a matter of the future and is of little importance at the present time.

### WORLD'S FAIR TELEVISION

At a point, approximately 1,600 ft. high in the Helderberg Hills, about 12 miles from Schenactady, a group of 20 farmers from New Scotland and Altamont saw the King and Queen as they inspected the New York World's Fair better than 99 per cent. of the million or more people who were actually present at the fair. Literally speaking they had ringside seats, for the images of both Their Majesties were flashed instantly and clearly by television over the 130-mile distance between New York and the television receiving equipment installed by General Electric engineers on top of this hill.

Contrary to the theory that tele-

vision can be picked up but 40 or 50 miles from the point of origin and at no spot beyond the horizon as seen from the transmitter antenna, General Electric engineers received the complete two and one-quarter hour programme of the King and Queen's visit to the Fair as telecast from the Empire State building. Even though the transmission originated at about 1,300 feet elevation in New York and was received on top of a 1,600-foot hill, the "line of sight" was still 8,000 feet above the receiving aerial.

### MISS ELIZABETH COWELL

Miss Elizabeth Cowell, the television announcer was concerned in rather an unexpected yachting accident during her vacation last month.

From the details at present available, Miss Cowell was swept into the sea and held down by one of the sails. However, she was rescued none the worse for her adventure.

### NOISE SUPPRESSION

Owing to the difficulty in obtaining legislation to stop interference to television, and the general opposition from those who would have to spend a considerable amount of money on suppression gear, the radio manufacturers are taking the matter into their own hands. Many of this year's receivers will have complete noise suppression circuits built in for both sound and vision. This refinement which is very desirable will not increase the total cost of the receivers, but it is considered that it will do quite a lot to increase sales in districts where at present reception is marred by interference.

### DEALERS' CONVENTIONS AT RADIOLYMPIA

As last year, a dealers' television convention is to be held on Thursday, August 24, between 3.30 and 5.30 p.m. In addition, there will be a series of other conventions of first-rate importance to dealers. On Wednesday, August 30, and Thursday, August 31, a dealers' convention will take place in the Convention Hall between 3.30 and 5.30 p.m.

Many well-known speakers, each of whom, like Sir Noel Ashbridge, is an expert on his particular subject, will be present to talk to the dealers and answer their problems. Details of the speakers will be issued later.

A "Listeners' Convention," along

the lines of the recent B.B.C. television tea party is also proposed.

Admission to the Exhibition for these conventions is covered by the special cheap dealers' tickets, price 9d. each. The R.M.A. are also issuing special dealers' season tickets at the price of 2s. 6d. each, which admit the bearer to Radiolympia every day during the run of the exhibition. These tickets will be forwarded in any quantity to dealers only by the Secretary, Radio Manufacturers' Association, 59 Russell Square, London, W.C.1.

### "A TWO-SPEED ELECTRON SYSTEM"

(Continued from page 460)

to a focus a second time at the fluorescent screen.

There is, therefore, produced on the screen an inverted image of good definition and great brilliancy. This image is projected by a suitable lens system on to a distant external screen.

### Some Advantages

The advantages claimed for this system are that it is possible to use very high accelerating potentials in the electron lens section of the tube, without the necessity for high deflection potentials and/or high modulation potentials. Also, instead of attempting to secure highest possible electron beam current and maximum electron density in a given size of scanning spot at the fluorescent screen for obtaining the desired brightness, electron beam current of comparatively low value is employed, and advantage taken of the fact that the effective mass of the electron increases tremendously at high velocities.

As a direct result of this high velocity and increased mass, the effect of the electrons on the fluorescent screen is, it is claimed, greatly increased. Even if a saturation condition exists, so that the beam current is limited to only a few microamperes, regardless of how much the final anode potential is increased, it is still possible to produce a greater surface brightness at the fluorescent screen, for a given power expenditure, by employing extremely high velocities at this low beam current than by employing high values of beam current at lower velocities.

Fixed-focus Cathode-ray Tube

# SIMPLIFYING RECEIVER CONTROLS

By E. S. Lancaster

*An article describing how by the use of a modified type of cathode-ray tube simplification of control is possible.*

**F**URTHER simplification of the controls of a television receiver is no simple task. Experiments, however, have been conducted in America in an endeavour to eliminate at least one control by employing a fixed focus electron gun for the cathode-ray tube. Not only does this simplify operation, but it enables the design of the power unit to be slightly modified.

Consider the diagram of the representative type of cathode-ray tube illustrated in Fig. 1. In this case the electrons emitted from the cathode are accelerated by the electrostatic fields of the anodes. Crossing the axis of the gun, a short distance from the cathode, the electrons move forward and passing No. 1 anode they enter the field of No. 2 anode.

The strength of the electrostatic focusing field can be adjusted and the electrons are focused by being made to converge to a point on the fluorescent screen.

The focusing of the beam is normally controlled by connecting No. 1 anode to a potentiometer, which is across the main anode supply.

If the anode voltage varies, due to fluctuation in the power supply (or intentionally) the beam has to be refocused. In television this focusing may be lost owing to varying loads on the power supply; especially if the regulation of the power supply unit is not satisfactory.

Any alteration in the ratio between the anode voltages will cause a variation in the relationship between the relative speed of the electrons and the focus deflecting them.

An experimental tube with a modified gun has been developed in which the focus has been kept substantially constant at any voltage between 750 and 2,500 volts, a single anode voltage being used.

This result has been achieved chiefly by alteration to the design of the electron gun; first of all by the use of electrostatic focusing fields between electrodes at cathode potential and electrodes at a common anode potential, and secondly, by the choice of the electrode dimensions and

position so that the beam is focused at the desired place.

We can now examine the modifications in greater detail.

### Fixed-focus Electron Gun

A glance at Fig. 2 will reveal that an additional electrode has been introduced and that anodes Nos. 1 and 2 are now at a common potential while the electron lens is maintained at cathode potential.

The electrons are controlled and accelerated in the same manner as in the conventional cathode-ray tube shown in Fig. 1. The electrostatic fields, between the focusing electrodes and the section of the anodes, impart to the outside electrons of the stream a greater velocity towards the axis than is given to the electrons within the stream. As an analogy they may be likened to a bottle neck in an arterial road; all traffic on it proceeding in one direction. The cars on the outer sides of the traffic stream accelerating and rushing forward in an endeavour to reach and pass through the bottle neck first.

The length of the focusing electrode or its diameter have an important effect upon the focusing of the

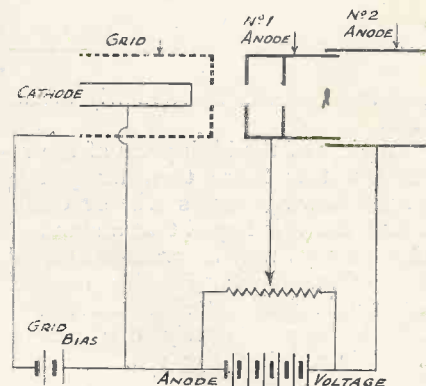


Fig. 1. Typical electrode arrangement of cathode-ray tube.

stream. If the length is relatively great or its diameter relatively small, the beam will be brought to a focus near the end of the electron gun, because the radial component of velocity given to the electrons is large.

By choosing an appropriate length and diameter for the focusing electrodes, the radial velocity can be made just sufficient to bring the stream to a focus at the desired point.

Once this dimension has been fixed, the electron focusing field deflects the electrons in the beam so that they all meet at one point. The focusing now remains fixed regardless of the anode voltage applied.

In order to deflect a stream of electrons past a fixed angle, the electrostatic field necessary will be proportional to the anode voltage through which the electron stream will be accelerated.

The focusing field is arranged between electrons at anode and at cathode potential so that any increase in the anode voltage will cause an increase in the field. As this increase is linear the path of the electron moving in this field will be unaffected and therefore the focusing will remain unaltered.

An experimental tube has verified this analysis. The dimensions of the cathode, grid and anode structures were decided experimentally and arranged so that their characteristics were satisfactory for this particular purpose.

Next the focusing electrode was added between the two parts of the anode as shown in Fig. 2.

The distance L had to be adjusted carefully when the focusing electrode was at cathode potential as the overlap position determines the voltage to be applied to it, i.e., whether negative or positive.

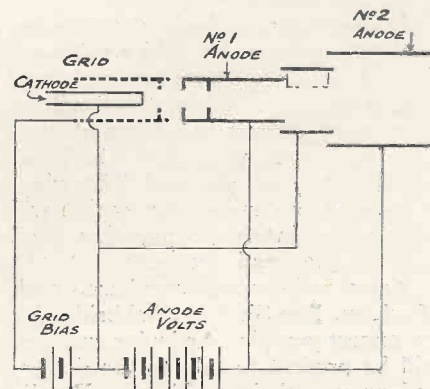


Fig. 2. Diagram of fixed-focus electron gun.

(Continued at foot of page 466)

## A Meeting Place for Television Enthusiasts



This is No. 17 Featherstone Buildings—the new premises of the Television Society.

IT is with great pleasure that we note an important step forward in the activities of the Television Society which reflects the keenness of those responsible for the conduct of its affairs.

The Council have announced that they have secured the lease of premises in Holborn for use as a library and viewing room to encourage the social side of the Society's work, and that the rooms will be available for inspection by members after August 1st.

Some time ago, Captain Randolph Wilson, a long-standing member of the Society, generously offered a contribution towards the cost of establishing a centre where members could meet in a less formal atmosphere than that of the lecture theatre and the Council started their search for a suitable location which would conform to certain agreed requirements.

Among these were: Central position with car park facilities, ease of access to the premises, quiet neighbourhood, A.C. power supply (it is surprising how many districts in London lack this amenity!), and as a controlling factor, reasonable rental.

After examination of several sites which fell short of the requirements in one or more respects, the premises

NEW PREMISES FOR  
THE TELEVISION SOCIETY

at 17 Featherstone Buildings were decided upon and the necessary steps were taken to lease the ground floor and basement from the Prudential Assurance Company on a three-year agreement.

Featherstone Buildings is a quiet backwater off High Holborn, sufficiently removed from the noise of traffic but easily accessible to the members by tube or bus. The houses in it date from early 18th century and have nearly all been converted to business premises, while retaining their characteristic solid appearance and ornamental doorways.

The photograph of No. 17 shows the fine ornamental workmanship associated with the period. Next door, in the area is a finely preserved lead water tank bearing the date 1726!

*Particulars  
of the Rooms*

The ground floor entrance is in the front hall, as shown in the plan, and separate doors cut the room off from the rest of the premises. The room has been fitted as a lounge and library with a small annexe as an office and writing room. The photo-

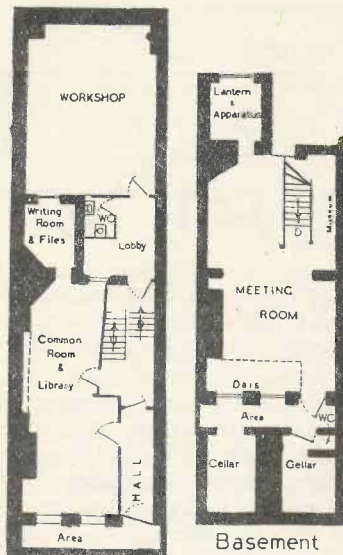
graph is taken from the window looking down the length of the room, and shows the fine built-in bookcase of the period.

At the back of the entrance hall, down a few steps is another annexe which has been let by the Society as an experimental workshop. The occupier, Mr. J. Salter, has been engaged on experimental work in television and radio for many years and has kindly offered to act as hon. curator for the rooms during working hours.

Below the ground floor room, and reached by a flight of stairs is a large basement lit from the street, marked "meeting room" on the plan. This has been re-decorated throughout and has been fitted up as a viewing room with accommodation for 30 visitors. At one end is a small lecture dais with blackboard, power supplies, and lantern screen to enable informal lectures to be given on special aspects of the science. At the back of the meeting room is a small lobby serving as a dark-room and projection room for films. The body of the room is occupied by cinema tip-up seats, but at the side is an area allocated to museum specimens and diagrams.



This photograph shows the library and lounge.



Plans of ground floor and basement.



When the meeting room is completed it will have seating accommodation for about thirty persons.

### Museum

Generous support has already been forthcoming for the museum, and it is the intention of the Council to make it a unique collection illustrating the history and development of television.

Mr. J. L. Baird has given a replica of the first "ventriloquist's dummy" apparatus with which he carried out his early experiments (the original being in the Science Museum) and donations have been received of early apparatus and photographs.

The Lecture Secretary, Mr. G. Parr, who is supervising the fitting out of the rooms, will be pleased to hear from any television enthusiasts who have mementoes of early work or apparatus.

### Official Opening

While the premises are open to inspection to members during August, the official opening will not take place until September, when it is hoped that Sir Ambrose Fleming, the President of the Society, will be able to be present.

The formal meetings of the Society will continue to be held at the Univer-

sity College as the accommodation at Holborn is insufficient for the number of members and visitors who attend the lectures.

### Classes of Membership

For the benefit of those readers who are not members of the society, the following information is given:—

The Television Society was founded in 1927 for the furtherance of the interests of television and allied matters. It is a scientific society with no commercial interests and prides itself on being non-partisan and encouraging expressions of opinion from all viewpoints.

In 1936 the advent of high definition television gave a fresh impetus to the Society's activities and it now numbers among its Fellows some of the best-known names in television in this country and abroad.

Membership is at present divided into three classes:—

*Fellows*, who must be proposed from personal knowledge by two existing Fellows and who must be actively engaged in the profession.

*Associate Members*, who are elected at the discretion of the Council, and who show their interest in television whether from an amateur or professional standpoint.

*Students*, engaged in the television or radio professions, under 21 years of age.

There is no examination, and the entrance fees are moderate.

The Council are always willing to consider applications for membership which automatically secures the privileges of attending the monthly meetings, the use of the rooms, and the issues of the Society's Journal.

We have seen a great deal of the Society's activities during the past few years and cordially recommend all readers who are interested in the future of television to apply for membership. Full particulars can be obtained from the Hon. Secretary, Mr. J. J. Denton, of 17 Anerley Station Road, S.E., or from the Hon. Lecture Secretary, Mr. G. Parr, 68 Compton Road, N.21. It is hoped that Local Centres will shortly be established in the Midlands and in Yorkshire.

### "SIMPLIFYING RECEIVER CONTROL"

(Continued from page 464)

When the overlap distance was too great, a positive voltage (with respect to the cathode) on the focusing electrode was required for the best focus of the beam; when the overlap distance was too small, a negative voltage was needed.

Operation of the fixed focus

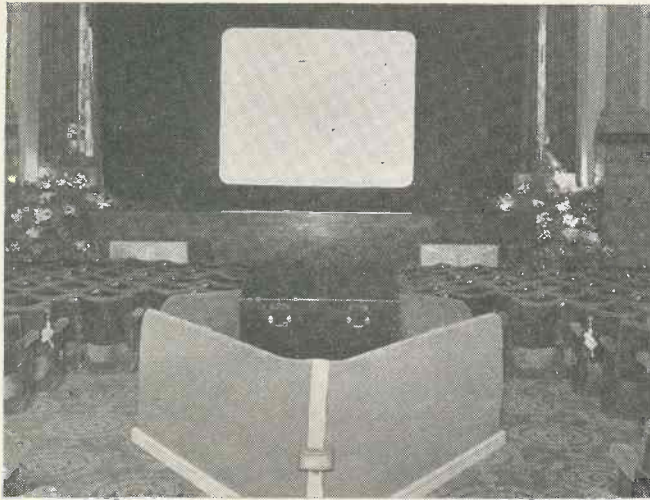
arrangement was tested by connecting focusing electrodes to the cathode of the electron gun and varying the anode voltage. The line width of the deflected spot was measured at zero

Mention of "Television and Short-wave World" when corresponding with advertisers will ensure prompt attention.

bias with various anode voltages, and it was found to be substantially independent of anode voltage. Other tests showed that a structure which would bring the beam to a focus at zero bias would likewise focus at other values of grid bias.

In the realms of television the fixed focus cathode-ray tube promises simpler operation, which is a step in the right direction.

## BIG - SCREEN TELEVISION



The Baird cinema equipment as installed in the auditorium.

THE cinema exhibitor wants to know what television means to him as regards accommodating it in his theatre? What it is going to cost him if he decides to put it in? and what monetary benefit he is going to obtain by his decision?

We have, or shall have shortly, available for large screen pictures three equipments, and to take them in their alphabetical order these are known as the Baird, E.M.I., and the Scophony. The first two equipments employ a method of electronic illumination; that is to say, the screen is illuminated by the actual light created in the cathode-ray tube itself. In the Scophony system the screen illumination is provided by means of a conventional type of arc lamp.

An exhibitor desiring to instal television in his theatre on either the Baird or the E.M.I. system, will find that the equipment is contained in a steel cabinet approximately 6 ft. by 5 ft. by 4 ft. high, and situated about 30 ft. from the screen itself. In the theatres which have been installed up to date all that has been necessary has been the removal of a few of the front seats, the fixing of a proper barrier round the equipment, and the provision of the usual gangway to comply with the regulations of the local authorities. If this method and position become general the conventional type of organ lift can be installed, which will accommodate the equipment, and which can be taken out of sight of the audience when it is not in use.

## FACTS AND PROBLEMS FOR THE CINEMA

By Major C. H. Bell, O.B.E.

*Major C. H. Bell, O.B.E., is a consulting engineer and one of the leading authorities on the technical problems of the cinema. The following is an abstract of a paper which he read before the Cinema Exhibitors' Association Conference at Blackpool, and is a most comprehensive survey of television as it affects the cinema.*

It is necessary at present to introduce a different type of screen from that used for the ordinary picture. This screen can be placed either by pushing on, or, in the case of fully equipped theatres, flying, immediately in front of the existing screen. On this point the E.M.I. Company received the suggestion put forward by me that the existing screen and sound equipment may be used to advantage; but up to the present time television companies have not considered it advisable nor necessary to negotiate with sound equipment manufacturers with a view to their using the sound distribution system normally installed in the theatre, though in my opinion there are no technical reasons why this should not be done. This would reduce the cost of equipments.

The amount of electricity consumed by either the Baird or E.M.I. systems does not amount to more than 2,000 watts; that is to say, not more than the electricity consumed by a few lamps in the auditorium.

### Baird Features

With regard to the details of the Baird system, the latest form of apparatus manufactured by this company gives a picture of 15 ft. by 12 ft., which I think everyone will

agree is a size which could be considered to serve very well a theatre up to 1,500 seats or perhaps a little larger. The picture brilliancy compares reasonably with modern screen projection, although in actual intensity the reflected light per unit area is only 4 ft. candles, as against an average of 10 or 12 ft. candles which is considered satisfactory, by many theatres. The picture screen is silver surfaced, and the lens employed in one of the recent installations in London is a 14 ft. F/1.8 type.

In the Baird equipment each projector unit is of the twin type; that is to say, it employs two cathode-ray tubes, which are kept in service continuously when the apparatus is being used, so that in the event of a breakdown of any part of the equipment change-over is instantaneous and the performance not interfered with.

The high tension current, or shall I say the extra high tension current, used in connection with an installation of this kind is in the order of 40,000 volts, but the current consumed at this high voltage is only in the order of 300 to 440 micro-amperes. This high tension current is produced by special transformers which are situated in an entirely separate part of the theatre, and the current is brought to the apparatus

## Big-screen Television

by means of specially screened high-tension cables. Special circuits are introduced to comply with the requirements of the Home Office and other authorities. In addition, the equipment is so arranged that it is housed inside a safety cage, the opening of which automatically cuts off the current and the positive high tension terminal is earthed.

The sound part of the equipment has an overall frequency response from the aerial to the loud speaker speech coil of plus and minus 4 decibels at between 30 cycles to 20,000 cycles per second. Therefore there is no reason why the sound part of the equipment should not be in every respect as good as, if not better than, the ordinary installation.

To sum up: The Baird equipment comprises the aerial fixed in a suitable position on the roof of the theatre; the equipment which I have referred to, which is situated in the front stalls about 30 ft. from the

is one fundamental difference between this system and the Baird, and that is that the E.M.I. Company have decided to exclude from the auditorium everything but the essential operating equipment, the current supply and vision and sound radio receivers being situated in a position reasonably near to the auditorium, which may be at the side of the stage or under the stage, according to the facilities available. A 14 in. F/1.8 lens is employed for the majority of installations. This equipment provides for a picture of 15 ft. by 12 ft.

The radio receiver is situated remotely from the projector, and its output signals are brought into the cinema through a small feeder. On the main framework of the projector a control panel is fixed, from which the equipment is operated, and the projectionist stationed at this panel has complete control over all picture adjustment, sound volume and supplies of electricity remotely operated.

them; both systems employ at the moment a special screen and special speakers.

### Scophony

The third equipment, Scophony, is different from others in that it utilises optical mechanical methods as does the ordinary cinema projector.

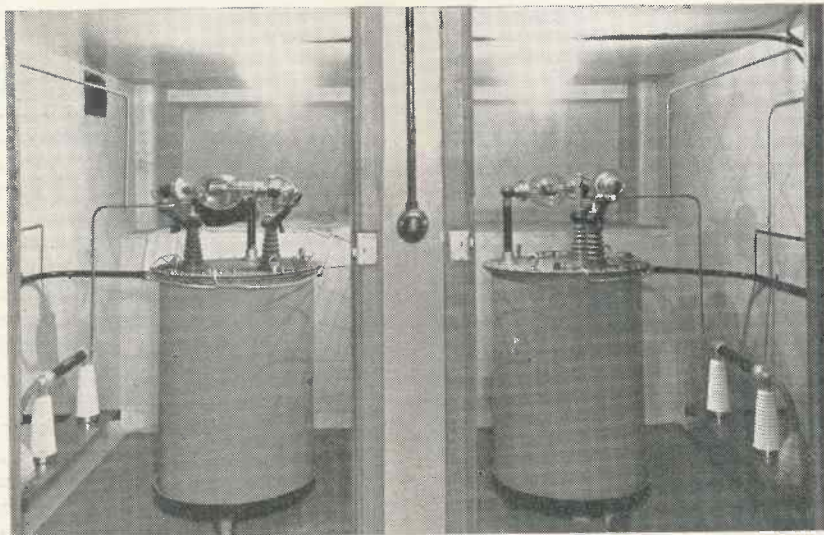
The apparatus is so designed that a short throw of about 20 ft. only is required. This makes it possible to employ rear projection, the apparatus being situated on the stage. This does not in any way interfere with the seating of the auditorium, and the apparatus is entirely out of view of the audience at all times. Against this we have the question of dealing with many stages which are less than 20 ft. in depth, and the installation may occasion structural alterations.

The electrical equipment consists of a total of 49 valves of the ordinary receiving set type, and the voltage employed does not exceed 400-500 volts.

The apparatus is completely self-contained, so that only one or at the most two operators are required.

The actual screen illumination in this case differs from the electronic systems, and is provided by means of a high intensity arc of the Hall and Connelly type, with rotating positive carbon requiring a current of about 120 amperes. This is not a new piece of apparatus, but something which is thoroughly understood by all operators. So far as the current consumption is concerned, the arc lamp employed would not require more current than is generally provided for the projection room, and inasmuch as the standard projectors would not be in use when the television equipment was being used there would be no additional cost to the exhibitor.

To sum up the facts: For many years we had a picture, and later we introduced sound into that picture. The broadcasting of sound has become common—as common as the motion picture in everyday life; and this new development of television is the introduction of the picture to the sound—the reverse process. I firmly believe that within a few years from now the nine million wireless sets in operation in Great Britain will automatically, as television spreads, become viewing receivers; but I do



The Baird extra-high tension unit installed at the Marble Arch Pavilion. A duplicate installation is provided to obviate possibility of breakdown.

screen; the installation of the high tension current transformers, either on the stage or underneath the stage, but somewhere not too far away from the equipment; and the provision of a power supply of a very small character. In addition, the special screen.

### E.M.I.

The E.M.I. equipment, as previously stated, employs the electronic beam system. The projector is situated in the auditorium, and its dimensions are 6 ft. by 2 ft. by 4 ft. There

As in the case of the Baird equipment, the extra high tension supply is provided through specially designed transformers fixed within safety guards with interlocking switches so as to provide safety and comply with the regulations.

To sum up the E.M.I. equipment: From the exhibitor's point of view we have a situation which is similar with two different makes of sound equipment. Both operate from the same position in the theatre; both systems require about the same amount of electricity to operate



The 12½-in. projection lens used in the Baird system. The lens is made by Taylor, Taylor, & Hobson.

not feel any particular apprehension about this. The public have always in the past preferred to go out for their entertainment, and I believe that they will be attracted to the cinema just the same as they have been in the past, but, at the same time, I do believe it is necessary that the cinema should keep alive and awake to the possibilities which television will offer in the improvement of programmes and the showing of events as they take place. If advantage is not taken of this opportunity I believe the public will be inclined to stay at home to see these interesting items on their own receivers.

### The Financial Aspect

I know that many of you are wondering in what sort of form you will be able to deal with this question of television from a commercial and financial point of view. Cinema proprietors throughout the country are not, in my opinion, prepared—or I may say able—to put up large sums of money to make this new medium available to their public; and I found from discussion that the manufacturers were really looking to the trade for a lead as to the form in which it would best suit them to deal. The patent situation may be difficult, and it is possible that something in the nature of a lease rental or purchase rental scheme will have to be instituted.

I have endeavoured to find out what a first-class television installation will cost the exhibitor, and as near as I can come to this, I believe an installation such as I have outlined will cost in the region of £1,250 to £2,000.

## Cinema Television Finance

One of the most important items in a decision as regards the type of television set to be purchased will be the amount of service which the company selling the set is able to offer to the exhibitor. It is the exhibitor who should demand a first-class service, because this will be very necessary in the early stages; and here again I am of opinion that service charges will be something in line with the present service charges made for sound equipment.

In other words, so far as I can see from the information which I have been able to gather, the introduction of television into a theatre is very much on a par with the introduction of a second sound system, both as regards price and service.

### Problems To Be Faced

What of the problems which confront the industry? Television is here; that is the slogan of the television people—a slogan which cannot be denied. So far as the cinematograph industry is concerned, it is in London.

But do not let us imagine that the development of this medium throughout the country is going to be as slow as the step between London and Birmingham has been. Television has got to the point of being a practical service and a public demand, and extreme pressure is being brought to bear on the Postmaster-General to proceed immediately with the erection of rediffusion stations throughout the country. It is anticipated that it will take about seven such stations to cover Great Britain, and as fast as these stations are opened so will the change-over of the ordinary wireless set to the television receiver come about.

### B.B.C. Policy

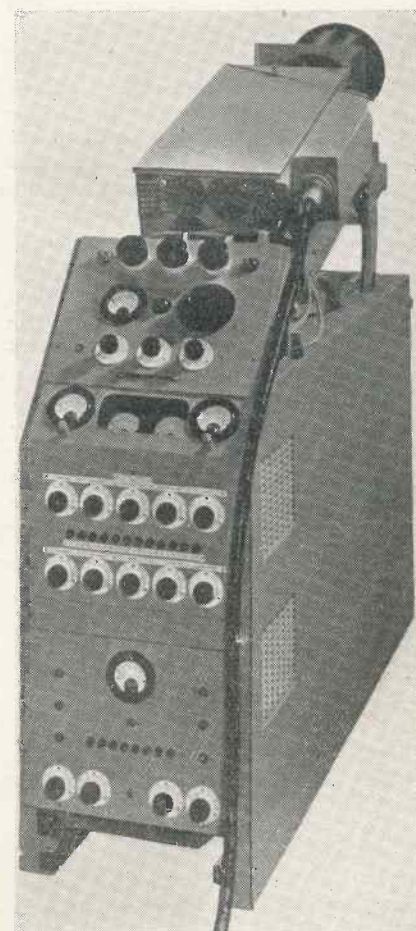
The B.B.C. are desirous of providing the finest form of entertainment that they can for the home receivers, in the same way as they do at the present time for ordinary broadcasting of sound, and I believe they see that the introduction of large screen television in the cinemas may be a means by which they can obtain for a nominal sum important programme items for the home receivers, actually paid for by this industry.

To explain this, the present procedure which is adopted is that the

B.B.C. negotiate for an outside broadcast of an important event, such as a fight or the Derby, with the promoters, and limit their fee for such to the payment of £75, but at the same time they say to that promoter: "We are quite willing to give you permission to negotiate with the proprietors of cinemas who have large screen television for rights for such cinemas to show this event." The exhibitor is then faced with negotiating with this promoter, and fees in the neighbourhood of £250 per cinema have been charged for these rights. Can you imagine a cinema with 300 seats paying a fee of £250 for the right to rediffuse and show an item of public interest which may possibly last three minutes?

Television in the cinema will become just an added attraction to the ordinary programme, and the public will demand to see this added attrac-

(Continued on page 479)



A rear view of the E.M.I. projector which is provided with remote control of accessory apparatus.



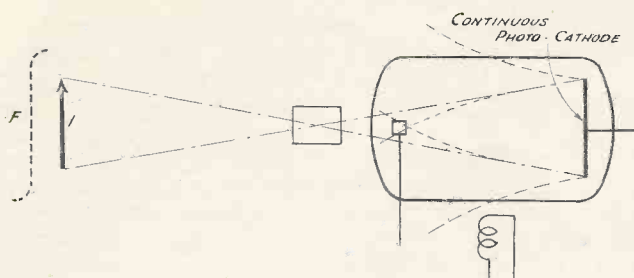


Fig. 1. The Farnsworth dissector tube.

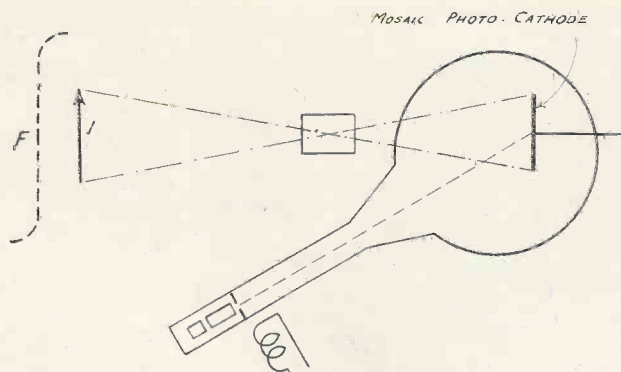


Fig. 2. Zworykin's Iconoscope.

## TELECAMERAS COMPARED

By *A. CASTELLANI*—THE INVENTOR OF THE TELEPANTOSCOPE

**E**LECTRONIC analysers, which consist of a cathode-ray tube and of one or more photo cathodes enclosed in a single bulb, can be characterised mainly by the photo cathode part which is that most recently developed and more susceptible to further improvement.

The first positive results in this direction were obtained in 1933 in America in the work of P. Farnsworth (Farnsworth Co.), who, in his dissector tube (see Fig. 1) succeeded in producing an efficient plane cathode, electrically continuous with uniform emission (continuous photo cathode), while V. K. Zworykin (R.C.A.) in his Iconoscope (Fig. 2) made use of a plane cathode electrically and geometrically discontinuous in all directions (mosaic photo cathode), also with uniform emission.

Omitting the first European repetitions of these two prototypes, there is a third type of original photo cathode, produced in Italy by the

writer in his "Telepantoscope" (see Fig. 3) (1933), a type that is also planar, but electrically and geometrically discontinuous in a single direction ("strip photo cathode") and with uniform emission.

In the last few years there has been a considerable development in photo cathodes derived from the original types above mentioned and later improved by others as the result of independent experimental research and new technological procedure.

We can now examine the various types of telecamera, with regard to the most essential part—the photo-cathode—and to its use in various practical applications.

The first table and Figs. 1, 2, 3 and 4 represent the most important telecameras having regard to their use and principal features.

### *Analysers for Telecine Use*

All the above-mentioned types of

photo cathode can be used in the analyser for telecine, the choice depending on individual characteristics, which can be summed up as follows:—

(a) *Mosaic Photo Cathodes.*—Maximum primary sensitivity due to the accumulation of electrons on the picture element, the result of persistence of illumination. This lasts as long as the picture period.

(b) *Strip Photo Cathodes.*—Medium sensitivity due to the accumulation of electrons as a result of the persistence of illumination of a duration corresponding to the line-frequency.

(c) *Plane Photo Cathodes.*—Primary minimum sensitivity, due to the electrical continuity of the photo cathode, which does not permit of accumulation of electrons.

While in the telecamera, with the first system it is necessary to project on to the mosaic an optical image which engenders considerable reduc-

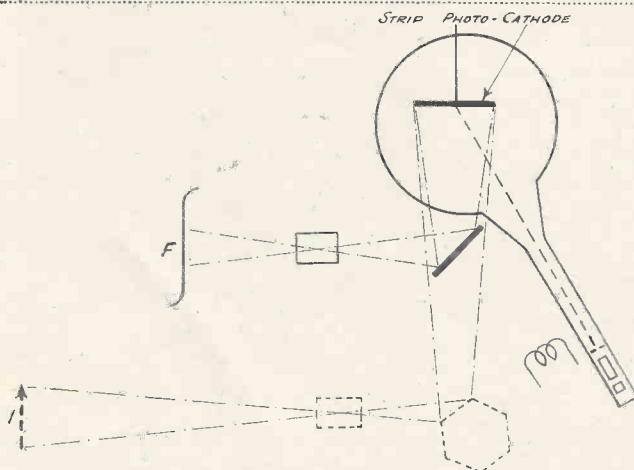


Fig. 3. The Telepantoscope.

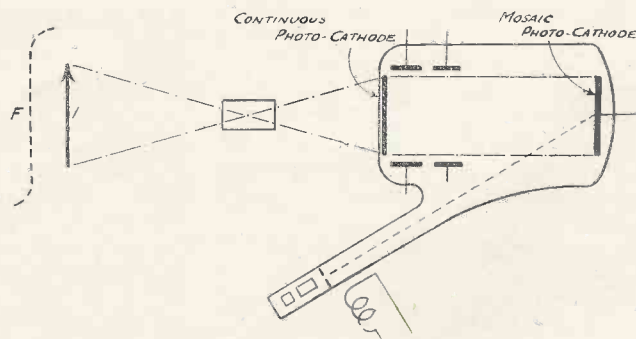


Fig. 4.

## Telepantoscope Claims

tion in the efficiency of the signal, with the second system there is the possibility of projecting on the strip continuous moving pictures, and in consequence the losses in luminosity are reduced to a minimum. In both

sary to provide a neutralising device as in the mosaic photo cathode.

(c) The analysis being effected in one direction, the deflection system is simplified.

(d) The life of the photo cathode

types was electrostatic, is now in recent types electromagnetic for reasons of standardisation with other types of tube.

The modern procedure for the preparation of strip photo cathodes

TABLE I.  
TYPES OF TELECAMERAS.

Name.	Type of Photocathode.	Maker.	Principal Application.	
Iconoscope	Mosaic	R.C.A. Telefunken-Philips	Internal-External	Telecinema
Emitron I	Mosaic	E.M.I.	Internal-External	Telecinema
Iconoscope	Mosaic	Fernseh A.G.	Internal-External	Telecinema
Telepantoscope (B)	Mosaic	Loewe A.G.		
Dissector	Continuous	Safar	Internal-External	Telecinema
		Farnsworth, Baird	Telecinema	Internal-External
		Fernseh, A.G.		
Telepantoscope (A)	Strip	Safar	Telecinema	Internal-External
Emitron II	Mosaic	E.M.I.	Internal-External	Telecinema

cases a signal of a value practically utilisable up to about 500 lines analysis is obtained.

In the third system to the inconveniences of the first must be added low sensitivity, resulting in a signal of greatly reduced efficiency.

Considering, therefore, that effects of the signal efficiency are the same in the two first systems, there remains the fact that both the first and third types require the use of projectors which are very much more complex and costly than those needed in the second type where a simple projector with continuous transfer is sufficient.

Taking into account, therefore, that the first type adapts itself with difficulty to electronic multiplication, and that to obtain from the third type the same primary sensitivity as the first there are needed at least seven electronic multiplications, while with the second type three suffice, therefore the greater capacity of strip photo cathodes in telecameras is evident.

Other factors in favour of the use of strip photo cathodes in the telecamera have been found by experience, such as:—

(a) Trapezium distortion of the pictures in the tube is practically excluded, which obviates the necessity of the compensator system required in the mosaic photo cathodes.

(b) Distortions due to discontinuous loads along the strip are practically absent, due to the electrical continuity of the strip in one direction. It is therefore unneces-

ary to provide a neutralising device as in the mosaic photo cathode. An appreciable economy in the cost of operation is the result.

Finally, the cost of the tube is less in comparison with the mosaic types.

The first types of tube with strip photo cathode (Telepantoscope A) were produced with positive results in 1934 and after successive improvements reached the standard type, which is a simple strip that has electronic multiplication up to three stages.

This last type is more convenient for use, since it permits of the utilisation of relatively low illumination, as well as the use of a minimum number of pre-amplification stages of video frequency.

In regard to the more salient features of the tubes, it is interesting to note that for the cathode-ray part it has been possible to obtain cathodic spots no larger than 0.2 m.m. in diameter characterised by great depth of focus and freedom from halo. Very accurate electron-optical equipments have been produced, mounted in a single tube of ceramic material. The necessary focal depth is obtained with an electrostatic objective with a very long focus, fed with a parallel beam originating from a point cathode, and a special electron-optical system. The parallel beam and the successive apertures in the objective are specially designed to eliminate any secondary emission and consequently any effect of halo.

The deflection, which in the early

results in practically perfect uniformity and constancy of emission.

The procedure used in the manufacture of photo cathodes can be summarised in the following operations:—

(a) Preparation of the support of the strip, generally composed of a sheet of pure mica of uniform thickness not greater than 0.05 mm.

(b) Metallisation under vacuum of the support electrically continuous on one side and on the other by strips.

(c) Treatment under vacuum of the strip as a preliminary to activation.

(d) Mounting of the strip on the collector plate, complete mounting of the tube, and the standard process of exhaustion.

(e) Formation and activation of the strip. In regard to the application of the Telepantoscope A to telecine equipment, Fig. 5 represents an experimental system which has given good results, confirming the advantages already pointed out of the strip photo cathode in comparison with other types.

### Analysers for Interior and Exterior Use

For these types of analyser as distinct from telecine, the type of photo cathode most recommended is the mosaic used either by itself or in combination with a plane photo cathode for electronic multiplication.

Used by itself, a good mosaic photo cathode gives an excellent per-

## The Telepantoscope in use

formance, even under unfavourable lighting conditions, which is the reason for its use either inside or outside. The combination of a plane photo cathode with a mosaic one appears to give surprising results even under most unfavourable lighting conditions, and on those occasions where not even a cine camera is successful.

This new combination is, however, still in the experimental stage, owing to the fact that at present the tubes and associated apparatus are of a rather complex nature and difficult of manufacture.

The Telepantoscope B makes use of a single mosaic photo cathode constructed according to the procedure already given for the Telepantoscope A and produced after a long series of experiments.

The deflection is of the electromagnetic type for both directions of scan, while the focusing is of the electrostatic type, utilising the same type of equipment as the Telepantoscope A already described.

The necessity for using electromagnetic deflection in the tubes with the mosaic photo cathodes is well known; this necessity does not exist in tubes with the strip photo cathodes. The reason is rather complex, but depends a great deal on the fact that part of the electrons emanating from the mosaic are influenced by the deflector plate, especially during the

intervals between the deflecting signals. This results in considerable loss of the picture signal efficiency of the principal anode, which in tubes with mosaic photo cathodes is placed

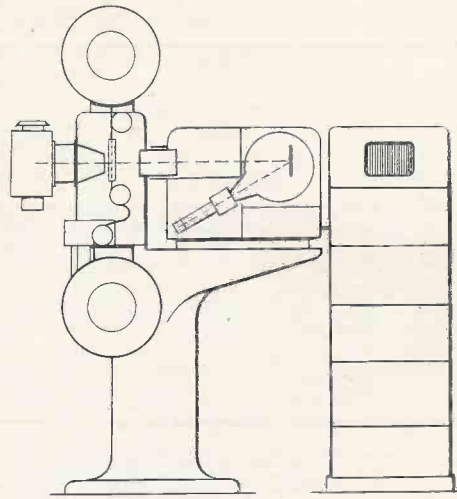


Fig. 5. Schematic diagram of telecine equipment employing the Telepantoscope.

immediately at the neck of the tube in front of the mosaic.

In Telepantoscope B the photo cathode as well as the cathode tube are of such dimensions as to permit of interior scanning beyond 600 lines.

For exact control of the Telepantoscope B in Safar telecameras, for inside and outside work, an experimental telecamera has been produced to secure maximum mobility,

mechanical, optical, or electrical, for the rapid passage from one scanning speed to another and from one optical plane to another.

As regards mechanical and optical mobility, the telecamera is attached to the rest of the apparatus by a single light and flexible multiple cable, while a single control at the side allows for the focusing and inclination in any direction.

For the above reasons, in order to obtain as rapid a change as possible from one analysis to another, the auxiliary apparatus is mounted on the camera.

The final deflecting circuits for three different speeds of scan—441, 567 and 675 lines—are arranged at the base of the apparatus, as well as the various final compensating circuits for the photoelectronic errors of the Telepantoscope.

In addition, in the telecamera is mounted the two first stages of amplification of video frequency, as well as the controls for the scanning circuits.

With regard to the remaining apparatus auxiliary to the telecamera, a synchronising signal generator is used synchronised from the mains frequency.

Table II shows the sequence of demultiplication of the various generators for the three scanning speeds obtainable from the apparatus—441, 567 and 675 lines.

TABLE II

Lines.	Mains frequency	Picture frequency	Generator frequency	Demultiplication					
441	42	21	15,822	{ 9,261 6,174	2,858	294	42	21	
	45	22.5	19,845	{ 9,922.5 6,615	2,205	315	45	22.5	
	50	25	22,050	{ 11,025 7,350	2,450	350	50	25	
567	42	21	23,824	{ 11,907 7,938	2,646	882	294	42	21
	45	22.5	25,515	{ 12,757.5 8,505	2,835	945	315	45	21
	50	25	28,350	{ 14,175 9,450	3,150	1,050	350	50	25
675	42	21	28,350	{ 14,175 9,450	3,150	1,050	210	42	21
	45	22.5	30,375	{ 15,187.5 10,125	3,375	1,125	225	45	22.5
	50	25	33,750	{ 16,875 11,250	3,750	1,250	250	50	25

# Telegossip

I HAVE a theory that the Postmaster-General is reserving an announcement about the Birmingham transmitter as a special tonic for Radiolympia.

What other explanation can there be of Mr. F. W. Ogilvie's speech in Wales the other day when he took the whole thing for granted. Anticipation of a Governmental announcement in this way was distinctly odd and un-B.B.C. like. And it was most refreshing to hear the D.G.'s view that the more hullabaloo Manchester could make about it the better the B.B.C. would be pleased. In Mr. Ogilvie we plainly have a television fan; he is in at the beginning and filled with a fierce proselytising zeal.

## Radiolympia Arrangements

I have obtained exclusive advance particulars of the B.B.C. television arrangements at Olympia. There will be a double attraction. A small studio is to be built there for the purpose of televising daily from 11 to 12 the feature "Come and Be Televised," an invitation to the public on the lines of the one extended last year. When I met Jasmine Bligh at Alexandra Palace a few days ago she told me that she and Elizabeth Cowell will do the interviewing, helped occasionally by Olga Edwardes.

But the big feature of Radiolympia will be a revival of the theatre, and the theatre shows will be televised from the stage. Sometimes they will be put on the air, but more frequently they will be fed on to closed circuits for the benefit of the stands. There will be a revolving stage and a super-Emitron camera will be mounted in front on a special rostrum which can itself be moved round to obtain shots from any angle.

Another super-Emitron equipped with a telephoto lens will be trained on to the stage from the back of the theatre. An ingenious innovation which will greatly assist the work of producer Philip Dorté will be a control point permanently established in the theatre itself. There will be no need for him to suffocate in the crowded van, as hitherto. Two monitor panels are being built for use in this control room. One will

By L. Marsland-Gander

show the picture as it is being transmitted to the public; the other will show the next picture "coming up on the lift" ready to be faded in. In addition, of course, the producer will have a direct view of the stage itself, which he could not get from the van.

"I Want to be an Actor" will be one of the stage shows performed regularly. I am half inclined to think this a mistake, for it has been done already at the Theatrical Garden Party and at the Palladium. "I Want to be an Actor" is more successful as a broadcast than as a spectacle. For one thing members of the public are diffident about coming forward.

However, there is no mistake in the choice of stars for Radiolympia—Jessie Matthews and Sonnie Hale. With no disrespect to past shows this is the biggest attraction Radiolympia has ever had. "Picture Page" will be staged there and, as last year, there will be regular transmissions from the Zoo.

By the way, I shall be surprised if there is no example at Olympia of the new flat screen cathode-ray set. Berlin Radio Exhibition will be on when these notes are read, so our manufacturers will at least have an opportunity of seeing one before our own show. A chance for enterprise and invention.

## Threat to the News Reels

More trouble is brewing to add a few lines to Gerald Cock's thoughtful face. There is now a positive threat that the news reels will be withheld from the B.B.C. Small cinema owners have shown growing alarm at the increase in the sales of television sets. They have brought pressure to bear on the Cinematograph Exhibitors' Association, urging that they cannot compete with television if the B.B.C. is permitted to show current news reels identical with those supplied to the cinema.

Accordingly the Television Committee of the Cinematograph Exhibitors' Association held a recent meeting with representatives of the various news reels units. I understand that the news reel companies

## A Causerie of Fact Comment and Criticism

unanimously expressed agreement with the view that action must be taken to protect the small exhibitors. What this action may be has apparently not yet been decided, but the most obvious course is a complete ban on the supply of news reels to the B.B.C.

Should the most drastic course be taken it will be a severe blow to Gerald Cock, who has striven unceasingly to find a basis of co-operation with the film industry. He admitted with a gesture of despair at the Television tea-party that the film magnates simply would not play. Television, to them, is a deadly rival.

## A Refusal

One of the chief reasons for Mr. Cock's visit to America was an effort to induce Hollywood to provide the B.B.C. with films. He attended a special conference of prominent film personalities in New York—and met with a blank refusal. Hollywood will not even part up with its old successes like "The Birth of a Nation," or "One Night of Love."

Yet the cinema industry cannot stop television. It can resist it in an ineffectual sort of way, ignore it (still less effectual) or it can trade upon it. I should have thought the third course most profitable, that is to use television as a publicity medium to whet the public appetite.

I looked into the Coliseum the other night just before the last of the series of television transmissions from there, and was rewarded by seeing the first try-out of a most ingenious gadget. An electronic viewfinder was attached to one of the cameras. This, incorporating a miniature cathode-ray tube, showed the camera man a small picture identical with the one being received on home sets. Hitherto the camera man has been dependent on a shadowy upside down image for general direction, but during transmission has been dependent on instructions received through the headphones.

Two B.B.C. engineers worked out this improvement between them, namely, Mr. W. Macnamara and Mr. P. A. T. Bevan. If judged successful it will be fitted to all cameras as standard.