HOME-BUILT MECHANICAL RECEIVER

Television and SHORT-WAVE WORLD

APRIL 1939
No. 134 Vol. XII.

1/-

BAIRD CINEMA EQUIPMENT

SERVICING TELEVISION RECEIVERS

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THE FIRST TELEVISION JOURNAL IN THE WORLD

No. 134 VOL XII APRIL, 1939

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COMMENT OF THE MONTH

Rediffusion

A GREAT deal of the uncertainty regarding the position of cinemas and television, and indeed any paying audience, has been cleared up by a statement of the B.B.C., which, it says, is given to make its own position clear. This statement should give a real fillip to the installations of receivers in public places, because it clearly indicates that the B.B.C. is agreeable to public showing of televised events in which there is no copyright. The statement says:—

"Much misleading publicity has followed the theatrical reproduction of the B.B.C. television transmission of the Boon-Danahar contest on February 23. The B.B.C., therefore, wishes to makes its own position clear.

"Large screen projection of television programmes is still regarded as experimental, and permission to use B.B.C. transmissions in this way will be subject to certain necessary restrictions. Experience of the results will afford guidance as to future policy, which is still under consideration by the Television Advisory Committee.

"The B.B.C., although primarily concerned with the provision of a home service, does not oppose experiments in large screen rediffusion of its programmes before paying audiences, when the programmes concerned are either of events of national importance and interest, independent of commercial promotion; or when the subject is a sports event, the rights in which are held by a promoter.

"For the present, therefore, the B.B.C. will raise no objection to rediffusion of events in the latter category if agreement as to terms is reached between the rediffuser and the promoter, subject to certain conditions. The conditions include an undertaking that no exclusive rights shall be given to any one group or system, and that all applicants shall be granted rights on equal terms, based approximately on the relative seating capacity of the theatres concerned. Should the promoter object, the B.B.C. will act accordingly and withhold permission to reproduce."

It is obvious that the whole problem of public showing of television programmes is exceedingly complex on account of proprietary rights which exist in a very large number of instances and it would appear almost impossible to obtain any ruling which would cover them all. This gesture on the part of the B.B.C., however, opens up possibilities and will certainly serve to encourage the further development of large screen apparatus. The possibilities are enormous and it is only right that this relatively new branch of television should at the outset be as free from hampering difficulties as possible.

FRENCH PROGRESS IN TELEVISION

AN EXCLUSIVE ACCOUNT OF THE WORK OF THE MONTROUGE EXPERIMENTAL TELEVISION STATION

BY THE DIRECTOR

R. Barthelemy, Ing.E.S.E.

Fig. 3. General view of the Centre Experimental de Television de Montrouge (1937)

THE first images which we presented in France in 1929 were constituted of 10,000 elements per second with the mechanical scanners and receivers, the essentials of which are shown by the photographs Figs. 1 and 2. To-day, 6,000,000 elements per second must be transmitted in the same time in order to achieve a 450-line picture. Electronic processes have been substituted for mechanical processes, and an entirely new technique had to be developed.

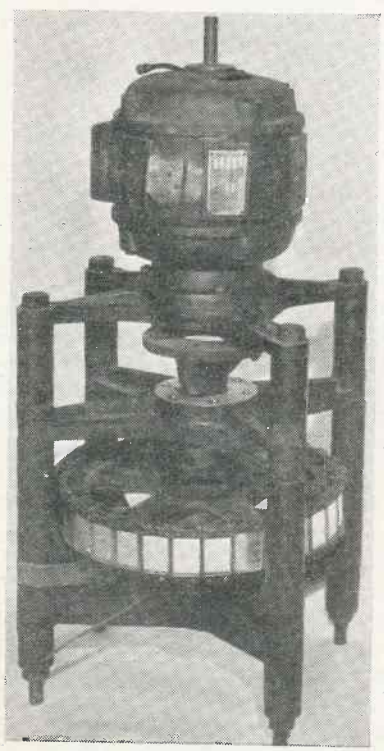


Fig. 1. Mirror-drum scanner (Montrouge 1929)

This was the reason for the creation of the Television Experimental Station of Montrouge, founded by the *Compagnie des Compteurs,* and comprising more than 4,000 square metres of laboratories. This included a transmission station, employing 20 specialist engineers, as many assistants and draughtsmen, and an executive staff of double that number. (Fig. 3).

The main object of this project was to secure autonomous and, therefore, complete production. Agreements had already been reached which, by the simple method of an exchange of patents, procured for us the benefit of foreign technical progres in this sphere. The field of research and the application of known principles was, therefore, no longer limited by industrial restrictions and the initiative and the resources of the research engineers was thus allowed full scope.

As these investigations have clearly defined industrial aims, we have been concerned not only with equipping the laboratories with highly specialised apparatus — particularly for electronic work—but also with testing the models constructed, whether for transmission or reception, under practical conditions.

This has led to the construction of a complete transmitting station with a power of several kilowatts, and also a spacious reception hall equipped for screen projection.

Studio Lighting

The studio is equipped for lighting, sound and signalling, and with movable scenery, and is in every way capable of being put to regular use. The lighting, in particular, reaches an ideal standard and is obtained by a series of racks entirely composed of small lamps of 100 watts, capable of regulation, forming a luminous ceiling of uniform brightness which avoids dazzling. The direct heat radiation of the lamps is reduced by 80 per cent. for wavelengths below 8,000 angstroms by a filter of special glass, which obviates the necessity for any other cooling means, the heat being naturally dissipated into the upper part of the hall which is 7 metres in height. (Fig. 4).

An experimental study of reverberation conditions by oscillographic recording led to the use of acoustic-deadening materials covering the ceiling and a small part of the walls. The periods of reverberation were thus reduced approximately in the ratio of 10:1.

Ten rolling bridges controlled from the side galleries support the lamp racks and the accessories in such a manner that the floor is absolutely

Fig. 2. An early disc receiver

free and can be devoted entirely to the artistic side.

The sound operator's box overlooks the studio, and it is from there that the signals are given to direct the transmissions. The technical arrangement and equipment of this room is, however, equally well suited for studio microphone transmission, for sound accompanying film transmissions, for exterior retransmissions, for the use of records, etc., with the further possibilities of new combinations.

The studio electronic camera is mounted on wheels (Fig. 5), and is movable in any direction; it can be taken also to an adjoining garden and used for the taking of exterior views. The latter are possible even in dull weather; with an illumination of less than 200 lux.

The electronic camera requires a cable with 32 conductors—of which several are coaxial—for its connection with the amplifier units situated in an adjoining room.

A film scanner is another essential part of the transmitting gear (Fig. 6). Here again the electronic method is used and the film to be transmitted is projected directly on to the mosaic screen of the Iconoscope. Special apparatus makes it possible to make use of the integrating quality of the Iconoscope with an ordinary film projector. Scanning is effected at the rate of 50 demi-images per second

Fig. 4. View of the studio showing lighting arrangements

and permits the transmission of 450 interlaced lines according to our method, kwown as *à déphasage interne,* to which we shall have occasion to return.

A synchronising signal generator, presenting a strong mechanical inertia, ensures the production of an exact series of impulses.

Development and research have led to the construction of an apparatus known as a mixer, the function of which it is to transmit to the various controls and to the transmitter one or other of the chosen scenes (direct pick-up or film transmissions) or gradual superposition of the two. In this manner some very interesting transitions can be obtained.

Distribution

The distribution lines, 10 in number, at the output of the mixer, are coaxial cables with an impedance of 150 ohms. One of these goes to the transmitter which is at a distance of about 80 metres (Fig. 7). A special line is reserved for the D.C. component.

Starting at a level of 3 volts, the modulation is amplified while retaining, without appreciable distortion, its amplitude and *phase,* over a frequency band, from 25 to 3,000,000 cycles/second; the amplified signal modulates a push-pull H.F. stage, comprising two water-cooled valves of 3 kW, is working on a quartz-controlled 8-metre wave.

The D.C. high tension (8,000 V.) is furnished by a mercury arc rectifier, and the auxiliary supplies by several groups of rotary generators. The total power consumption reaches 40 kWs, while the maximum power furnished to the feeder is from 6 to 8 kWs. This low efficiency is due to

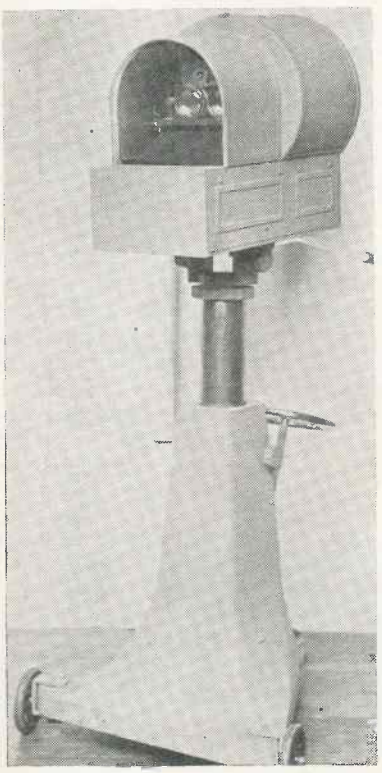


Fig. 5. (Left) Iconoscope camera for studio use.

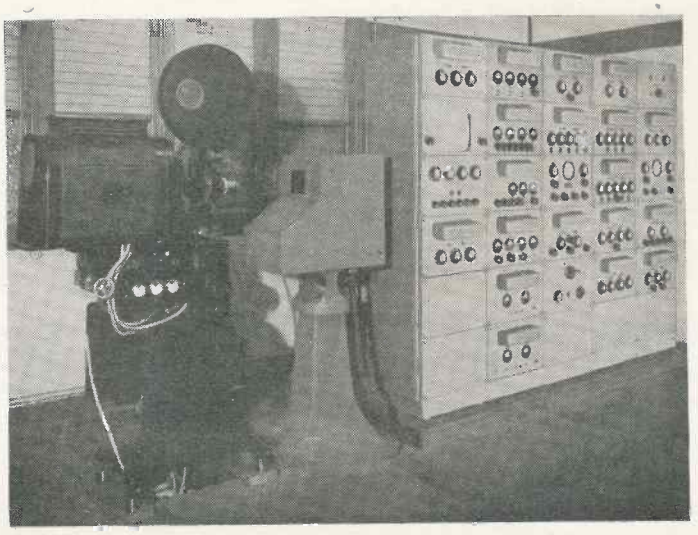


Fig 6. (Right) Film scanner and amplifier

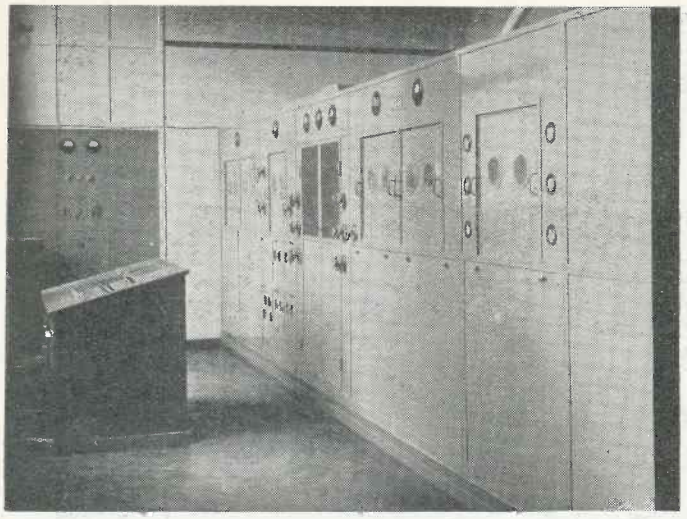


Fig. 7. (left) The 6-kilowatt transmitter.

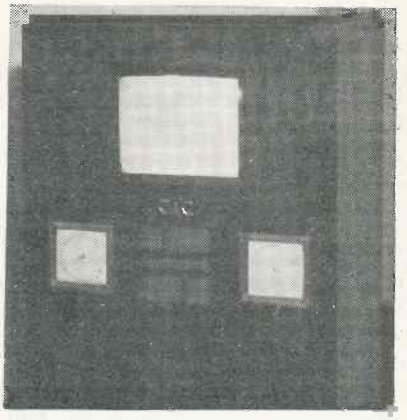


Fig. 9. Experimental receiver with 360 mm. tube.

the size of the frequency band to be transmitted.

The aerial, which is at a height of 50 metres, is fed by a coaxial cable and has a form required for the transmission of such a wide band.

The field strength of this transmitter is sufficient for the satisfactory reception of the Experimental Station at a distance of 20 kilometres, which is quite sufficient for the experiments we have in view.

Parallel with the studio, there is a large reception hall furnished and equipped like a cinema. It is provided with a high-voltage cathode-ray tube (at present 40,000 V. and in the near future 60,000). The image, relatively small (100 by 80 mm.) formed on the flat bottom of this tube, is projected by a large objective (aperture $\frac{1}{1.4}$) on a ground glass screen.

I am only repeating the words of the majority of the spectators when I say that the results obtained are up to the standard of a good amateur cinema projection, both as regards light and definition. The quality of transmission and reception together has been recorded by photographs, of which Fig. 8, which has not been retouched, is an example.

Research Laboratories

The research laboratories, which are set out on two floors, comprise on the first the scanning technique department, the reception research department, the optics laboratory and the recording department. In the latter apparatus is prepared, which is not specifically destined for television but for associated technique, for instance, the first portable recording oscillographs to be constructed in France, and which are now in general use, were developed here.

Fig. 8. Untouched photograph of 450-line picture.

Oscillographs sensitive enough to allow recording with writing speeds higher than 100 Km/second have also been devised in very simplified forms. Signal generators producing all kinds of wave forms (rectangular, saw-toothed) and of all frequencies have been developed and are in constant use in the two adjoining reception and scanning laboratories.

There are already three distinct types in the range of receivers: a small model with a tube of 180 mm.; a medium-sized standard model, with a tube of 360 mm. (Fig. 9), and a receiver with screen projection.

Our present aim constitutes research into possible simplifications with a view to reaching a reasonable low price. There is, therefore, no longer pure research but industrial study.

The cathode-ray tube department occupies the whole of the second floor, with its testing rooms, pump and drying rooms, glass blowing workship and chemical laboratory. The first task was the making of recording tubes with electrostatic deflection and focusing; following that the television tube of 36 cm. diameter and only 45 cm. in total length, was taken to its highest pitch. This gives a very brilliant image (80 lux in the white parts) with a voltage of 6,000. It has electromagnetic deflection and focusing.

Tubes for projection (Fig. 10) with flat bottoms, operating at from 20,000 to 60,000 volts, were recently constructed and experimented with.

The study of photo-electric cells and secondary emission cells and finally the Iconoscope (Fig. 11) required special apparatus. The making of photo-sensitive mosaics has been brought to a high degree of perfection; in fact, the coefficient of

(*Continued at foot of next page*)

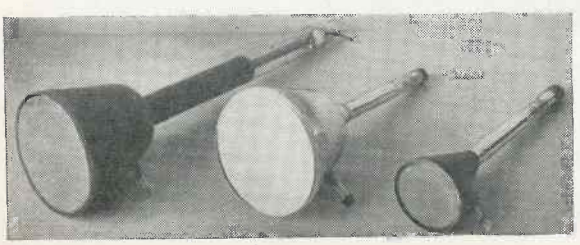
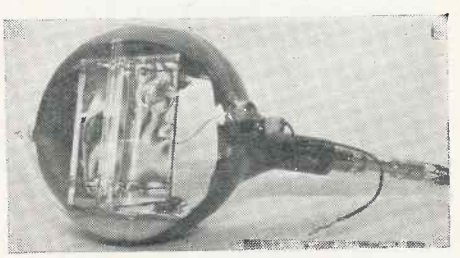


Fig. 10. (left) Three experimental projection tubes (20,000 v. 40,000 v. and 60,000 v.)

Fig. 11. (right) Camera pick-up tube.



BAIRD CINEMA EQUIPMENT

GREAT PROGRESS: 15ft. x 12ft.: 400 M/A BEAM CURRENT

FOR a considerable time Baird Television, Limited, have been active in the development of big screen television equipment, and during the course of the past twelve months have given many demonstrations at the Tatler Cinema, Charing Cross Road, where television pictures were projected on to a screen 8 ft. by 6 ft. 6 in. It has always been realised, however, that for very large audiences it would be necessary to increase both the size of the screen and the brightness of the picture. The material step forward in this connection has now taken place.

The latest form of apparatus gives a picture size of 15 ft. by 12 ft., and the picture brilliancy in the high lights is comparable to that obtained by ordinary cinema film projection. This equipment has been installed in the Marble Arch Pavilion and was used for showing the Boon-Danahar boxing match on February 23. This is the *first time in the world* that a public paying audience has seen an outside television broadcast of this nature in a cinema on a screen of these dimensions.

At the same time the Tatler cinema, Charing Cross Road, featured the same event using similar apparatus with a screen size of 12 ft. 6 in. by 10 ft. 0 in.

Intensive research into all the problems associated with projection-type cathode-ray tubes has enabled the Baird Company to manufacture this new form of equipment. The projection cathode-ray tubes have a diameter of approximately 16 in., but the intensely bright picture is built up on a fluorescent screen 5.5 in. by 4.4 in.

The new projection type tubes have a screen which is mounted inside in such a manner that its front face is scanned obliquely by the electron beam. Keystone distortion is corrected electrically and the resultant intensely bright picture is front-projected on to a silver surfaced screen that rises into position through a trap door on the stage. At the Marble Arch Pavilion the lens employed is a 14 in. f/1.8 type and at the Tatler a 10 in. f/1.6 type. The projector is accommodated in the centre of the stalls several feet away from the screen, the metal housing containing all the controls and meters to enable the operator to make any adjustments that may be required during the course of the actual transmission.

Each projector unit is of the twin type, that is to say it has two cathode-ray tubes which are kept running continuously. One of these projects the picture on to the screen while the second acts as a standby so that it can be brought into action immediately, should the necessity arise.

400 Micro. amps. Beam Current

Apart from the E.H.T. power supply all the essential apparatus is accommodated in this single container to which an aerial feeder connection is made so that the signals received from the standard television aerial on the roof of the cinema can be fed direct into the vision chassis. Normally, the cathode-ray tubes are operated at a voltage between 40,000 and 45,000 volts while the actual beam current is of the order of 300/400 microamperes. The source of high voltage fed into the projection tubes is derived from a special high-tension rectifier unit which is accommodated in another section of the theatre.

This unit comprises a voltage-doubling circuit employing two valves and is capable of giving a total output of 60 kilovolts at 10 mA. Separate transformers are arranged to heat each of the valve filaments and these transformers together with the main E.H.T. transformer and smoothing chokes, etc., are immersed in a tank filled with insulating oil. A ballast resistance joined across the output supply of the E.H.T. transformer protects the winding against any damage should a short circuit occur.

The whole of the equipment has been designed to meet all L.C.C. requirements for public use and the E.H.T. unit for this purpose is used in a safety cage so that when the door of the cage is open the supply is switched off automatically and the positive E.H.T. terminal earthed. Similarly, of course, it is impossible to restart the equipment unless the door is correctly shut. The total consumption of the whole equipment is only about 2 kilowatts and has been designed to operate from 50-cycle A.C. mains 200/250 volts. The sound installation has an overall frequency response from the aerial to the loud speaker speech coil of plus and minus 4 decibels from between 30 cycles to 20,000 cycles per second.

FRENCH PROGRESS IN TELEVISION

(*Continued from preceding page*)

usable surface has been raised from 25 per cent. at the outset to 66 per cent. with proportionate increased sensitivity.

The establishment of what is now called The Experimental Station of Montrouge has thus brought about, within the national framework, the solution of numerous problems and this courageous effort constitutes the first step in an industry in which is concerned the whole study and technique of electronics.

In my opinion if these studies and investigations continue there should be no reason of a technical nature to justify the delay in the exploitation of television in France. There remain only questions of administration and finance and unfortunately it is not in our power to find solutions in this sphere. . . . From this point of view we warmly congratulate our English colleagues upon their brilliant organisation of the industrial launching of television.

Dipole Measurements

There is considerable variation in the accepted dimensions of commercial dipole aerials, a fact which might lead to the supposition that there is no definite formula. The reason is that as both sound and vision are received upon the same aerial it is necessary to tune it either to one or the other, or alternatively, effect a compromise.

Some makers prefer to tune to sound and others to vision. Formulae for calculation of dimensions that have been generally accepted as correct are as follows:—

$$\text{Aerial in feet} = \frac{477}{\text{Frequency in megacycles}}$$

$$\text{Reflector in feet} = \frac{492}{\text{Frequency in megacycles}}$$

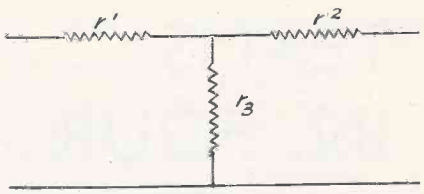
$$\text{Director in feet} = \frac{548}{\text{Frequency in megacycles}}$$

modulation is 400 cps., then eight horizontal bars should occur on the screen. The actual number is unimportant, but the spacing between bars will show whether or not the vertical scan is linear. The line time base requires a pattern of vertical bars, and this can be formed by feeding a signal of approximately 120 kc. into the grid of the video stage or the C.R. tube. A large output from the oscillator is necessary. The spacing between the vertical bars produced on the screen can be used as a check on the linearity of the line scan. The internal modulation of the oscillation must be switched out. An electrostatic or high-resistance voltmeter is necessary to test the 5,000 volt line.

Its use comes not in finding out complete breakdowns in these circuits, when the cause is usually apparent, but in checking the actual voltage in cases where partial failure is suspected.

The high voltage ohmmeter or insulation tester is extremely valuable in testing continuity in high impedance circuits, testing condensers, and locating leaks in insulation. The applied voltage should be of the order of 1,000 v.

The service oscilloscope is an essential item if time is a consideration. Properly handled it can save hours of testing and frequently the only other method available is the laborious one of substitution. The new Mullard



Circuit of alternator network for reduction of input.

The Mullard type G.M. 3155 portable cathode-ray oscillograph employing a three-inch high-vacuum tube.

oscilloscope type GM3155 designed especially for radio and television servicing will be found admirably suited to this work. The most obvious uses to which it can be put in television service work are the following:

1. Location of loss of vision at any point after the video detector.
2. Checking waveform at input and output of synchronising filter.
3. Locating faults in time bases.
4. Locating ripple in H.T. supplies.

The correct functioning of filter circuits can only be satisfactorily determined by visual examination with the oscilloscope.

A few typical oscillograms are shown, and the points in the circuit where they have been taken are indicated.

In conclusion, it may be taken that television servicing is no more difficult than radio servicing, it merely being a matter of getting used to visual rather than aural indications. Since the eye is a far more reliable and accurate indicator than the ear, this fact should present little difficulty. It should be remembered, however, that due to this fact a customer will be more critical of his television receiver than his sound receiver and will be apt to complain of faults which he might not notice in a parallel case in a sound set.

"The Assured Future of Television"

"THE future of the home television service is now assured," said Sir Stephen Tallents, B.B.C. Controller of Public Relations, at a luncheon of the Radio Manufacturers' Association last month.

"The pace of its establishment alone remains in doubt," continued Sir Stephen Tallents. Beyond that, possibilities of great interest are being explored—the possibility in particular of the adoption of television in cinemas. Here the future is not yet clear. A great variety of legitimate interests are involved—the manufacturers of television equipment for places of public entertainment, the promoters of outstanding events, the film producers and distributors, the owners of cinemas, the artists and authors and performers among them.

"The B.B.C. believes that it is taking the wise and public-spirited course in concentrating on the development of that now certain success—home television—and at the same time co-operating, as real and promising opportunities occur, in experiments which may shed light on what is bound for some time yet to be a complex problem.

"At the back of this industry's development are such forces as the Television Advisory Committee, the Post Office and the Government itself. One has heard in these last few weeks of television sets being bought by doctors and dentists, by porters and bus drivers, by mannequins and even agricultural labourers. Everyone in the range of Alexandra Palace who buys a set this year may know that he is procuring a source of great entertainment for himself and his household. He is doing his patriotic bit in the establishment of a new British industry, and the winning for it of a world-wide lead."

B.B.C. Handbook for 1939

THE B.B.C. Handbook for 1939 is a crown octavo volume of 176 pages copiously illustrated with photographs of various broadcasting activities and with several helpful explanatory maps. It contains a diverse mass of comprehensive information.

A section is devoted to the television activities of the B.B.C. in which is explained how throughout 1938 intensive work was put into the improvement of programmes from the Alexandra Palace studios, and better studio equipment, better cameras, improved control systems have been adopted. A brief review of the high lights of the 1938 television programmes is included together with several photographic illustrations.

The B.B.C. Handbook can be obtained on application to the B.B.C. Publications Department, 35 Marylebone High Street, London, W.1, or to any Regional Office. Its price is two shillings, or 2s. 4d. by post.

TELEVISION TERMS IN FOUR LANGUAGES

A USEFUL REFERENCE

ENGLISH.	FRENCH.	GERMAN.	ITALIAN.
Scanning	Analyse, exploration, balayage	Bildzerlegung, Bildfeldzelregung, Abtastung, Bildabtastung	Analisi
Electronic scanning	Analyse, exploration balayage, électronique	Bildfeldzerlegung mit Kathodenstrahlröhren, Kathodenstrahl-Abtastung	Analisi Elettronica
Mechanical scanning	Analyse, mécanique	mechanische bildfeldzerlegung-Abtastung	Analisi Meccanica
Interlaced	Analyse, à lignes entrelacées	Zeilensprungverfahren	Analisi a Linee alternate
Scanning, interlaced	Exploration interlignée		
Scanner, picture analyser	Analyseur	Bildfeldzerleger, Bildzerleger, Bildabtaster	Analizzatore
Lens drum scanner	Analyseur, à couronne de lentilles	Linsenkranzabtaster	Analizzatore a Corona di Lenti
Mobile television van	Installation mobile de Télévision	Ferseh-aufnahmewagen	Autocarro televisivo
Electron camera	Caméra électronique (de prises de vues)	(Aufnahme) Elektronenkamera, Bildfängerröhre	Camera elettronica (di presa)
Coaxial cable, Cable for television work	Câble coaxial, pour télévision, à haute fréquence	Breitbandkabel, Fernsehkabel	Cavo, coassiale
Supersonic cell	Cellule ultra-sonore	Ultraschallzelle	Cella ad ultrasuoni
Kinescope	Kinescope	Kineskop	Cinescopio
Definition	Définition	Auflösung	Definizione (di un'immagine)
Saw-tooth	Dents de scie	Sägezahn	Denti di sega
Nipkow Disc	Disque de Nipkow	Nipkowscheibe; Spiralloch-scheibe	Disco di Nipkow
Lens Disc	Disque à lentilles	Linsenscheibe	Disco di lenti
Farnsworth's Dissector Multiplier	Analyseur Farnsworth	Farnsworth-Röhre	Dissettore
Control Electrode	Electrode-de contrôle	Steuerelektrode	Elettrodo di controllo
Secondary emission	Emission secondaire	Sekundäremission	Emissione secondaria
Cathode beam, electron beam	Faisceau cathodique, électronique	Kathodenstrahl, Elektronenstrahl	Fascio catodico
Photo cathode	Photocathode-cathode photoélectrique	Fotokathode	Fotocatodo
Photocell, photo-electric cell (vacuum cell, photo-conducting cell)	Photocelle, Cellule Photo-électrique (A vide poussé, á effet interne, à couche d'arrêt)	Fotozelle, Lichtelektrische zelle (Hochvakuum Fotozelle; Sperrschicht-fotozelle)	Fotocella
Photo-electrons	Photoélectrons	Fotoelektronen	Fotoelettroni
Photo-telegraphy, Picture transmission	Photoélégraphie, Transmission des images	Bildtelegraphie	Fototelegrafia
Frame frequency		Rasterfrequenz	Frequenza di Campo
Picture frequency	Fréquence d'image	Bildfrequenz - Bildwechselzahl	Frequenza D'immagine
Line frequency	Fréquence de ligne	Zeilenfrequenz	Frequenza di linea
Flicker frequency	Fréquence de scintillement —papillotement	Flimmernfrequenz	Frequenza di Scintillio

Synchronising Signal Generator	Générateur de synchronisme	Gleichlauferzeuger	Generatore di sincronismo
Iconoscope	Iconoscope	Ikonoskop	Iconoscopio
Electron Lens	Lentille électronique	Elektronenlins	Lente Elettronica
Light spot—Fluorescent Spot	Spot fluorescent	Fluoreszenzfleck, Leuchtfleck	Macchia fluorescente
Electron Microscope	Microscope électronique	Elektronen-Mikroskop	Microscopio Elettronico
Electron Multiplier	Multiplicateur d'électrons; électronique	Elektronenvervielfacher	Moltiplicatore elettronico
Electron Optics	Optique électronique	Elektronenoptik	Ottica elettronica
Persistence of Vision	Persistance de la vision	Trägheit (Nachwirkung) der Netzhautreaktion	Persistenza della visione
Resolving Power	Pouvoir séparateur	Auflösungsgrenze	Potere Risolutivo
Direct Pickup, Image Pickup	Prise de vues directe	Direktes Fernsehen	Presa Diretta
Electron Gun, Electron Jet	Canon électronique	Strahlerzeugungs-System	Proiettore Elettronica
Cathode Ray	Rayon cathodique	Kathodenstrahl	Raggio Catodico
Phonic Wheel	Roue phonique	Zahnradmotor, La Courssches Rad	Ruota Fonica
Fluorescent Screen	Ecran fluorescent	Fluoreszenzschirm, Leuchtschirm	Schermo Fluorescente
Flicker	Scintillement, Papillotement	Flimmern	Sfarfallio
Synchronism	Synchronisme	Gleichlauf	Sincronismo
Synchronising	Synchronisation	Synchronisierung	Sincronizzazione
Intermediate Film System	Système à film intermédiaire	Zwischenfilmverfahren	Sistema (di televisione) a film intermediario
Mirrorscrew	Vis à miroirs	Spiegelschraube	Specchio elicoidale
Lens Drum	Tambour à lentilles	Linsentrommel	Tamburo di lenti
Mirror Drum	Tambour a miroirs	Weillersche Trommel, Spiegelrad	Tamburo do specchi
Television	Télévision	Fernsehen	Televisione
Colour Television	Télévision en couleurs	Farbenfernsehen	Televisione a colori
Stereoscopic Television	Télévision stéréoscopique	Plastisches Fernsehen	Televisione Stereoscopica
Television Transmitter	Emetteur de télévision	Fernsehsender	Trasmettitore Televisivo
Television Broadcasting	Emission visuelle, Radiodiffusion visuelle	Fernsehsendung, Fernsehrundfunk	Trasmissione Televisiva
Television-Telephony	Visiotéléphonie	Gegensehen - Fernsehsprechverkehr	Visiotelefonia

Theory and Applications of Electron Tubes. By H. J. Reich (McGraw-Hill Co., London. 30s. net.) 631 pp. and appendix 494 figs. in text.

Dr. Reich, who is Professor of Electrical Engineering at the University of Illinois, is already known to radio workers through his articles in the technical press of America. This book, which has just been issued by McGraw-Hill, embodies the notes which have been used in his lecture course to students during the past five years and covers the whole field of electron tube theory and application in a remarkably thorough and clear style.

Dealing first with the physical concepts underlying the electron and the emission phenomena, two chapters are then devoted to thermionic valves and their theory. The applications include modulation, detection, and the various types of amplification. A long chapter on the analysis of voltage and current amplifiers is followed by a section dealing with gas triodes, glow and arc-discharge tubes and finally photo-electric devices.

The greater portion of the book is devoted to amplifier theory and the student could not wish for a better or more complete covering of the subject. Each chapter is followed by a bibliography giving the more important references to the subject matter, and it is pleasant to note that due prominence is given to British writers.

The illustrations in the text are lavish—nearly one per page, and each page is accompanied by footnotes of further references. Altogether this is a first-class textbook, of which it would be difficult to speak too highly, and in conjunction with Terman's "Radio Engineering" provides the student and research worker with a complete radio library! We understand that the text book is obtainable on deferred payment terms through the Phoenix Book Co. of Chandos Street.

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SIMPLE OPERATION : The sets once installed require little or no attention. Minor adjustments can be made confidently by the owner without technical knowledge.

EXCELLENCE OF PICTURE DETAIL : This includes clear facial expression in "close-ups," the ability to recognise small objects as easily as though they were before viewers—identification of gestures, pattern of material, etc.

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SIMPLIFIED DESIGN : In order to arrive at the simplest possible operation, intricate mechanism has been eliminated as far as possible. The lowest number of valves are used compatible with the required performance, and in order to achieve the greatest economy in current consumption.

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Scannings and Reflections

TELEVISION IN JAPAN

JOAK will start broadcasting television from its laboratory at Kamatacho, Setagaya-ku, Tokyo, in April. The programmes will be received at many of the department stores and other places of prominence in the capital city. The receiving sets which are now being manufactured have a viewing screen 23 centimetres square. Twenty-five pictures per second will be transmitted. A 100-metre high steel tower for the aerial is being erected at the Kamatacho laboratory compound.

The Radio Broadcasting Corporation of Japan will also operate four mobile vans for outdoor programmes. Both the transmitting and receiving systems were evolved by Kenjiro Takayanagi, formerly Professor in the Hanamatsu Technical College.

Test broadcasts were made in February between the temporary studio and a point nearby. Broadcasts for general subscribers are not expected to begin for some considerable time. If the result of the test in April is satisfactory experiments will be made in addition at Osaka and Nagoya.

CHARLIE CHAPLIN " CLASSICS " TO BE TELEVISED

Television will pay tribute to Charlie Chaplin on April 16, the film star's fiftieth birthday. A selection of early " Charlie " classics, including " The Champion " and " The Bank " will be presented with a commentary, and to build up the atmosphere of the pre-war " biograph " theatre, a pianoforte will be played " emotionally " to suit the situations on the screen. Besides Charlie Chaplin, these early films show the pioneer efforts of such stars as Marie Dressler, and Norma Talmadge.

An important feature in this transmission will be the projection of the films at their normal speed of sixteen pictures a second. In modern cinema " revivals " of early films, the action is usually speeded up, with unfair results, because the cinema projector of to-day runs films at the rate of twenty-four pictures a second.

BRITISH FILM TELEVISION

Another British film, the third, has been booked by the B.B.C. for television, and will be broadcast on the afternoon of April 1st. This is " The Edge of the World." Previous British films broadcast from Alexandra Palace were " Aunt Sally " and " Jack Ahoy," during Radiolympia.

TELEVISION QUESTIONNAIRE

The demand for questionnaire forms has considerably exceeded 4,000 up to the present and more are coming in each day. It is too early as yet to state the result of this plebiscite, but outside broadcasts are the subject of most requests. There is also a demand for a children's hour.

THE BOAT RACE

For the first time in the history of the University Boat Race many thousands of people will—on April 1—see both the start and the finish. Two television mobile units are to be in operation. Cameras on a balcony on the Surrey side at Putney will show the crews paddling to the starting point just before 10.30 a.m., and it is hoped, by means of powerful telephoto lenses, to follow the crews till they round the bend at Craven Steps. John Snagge's running commentary on the National wavelengths will keep viewers in touch with the race till the boats reach Barnes Bridge, where they will be picked up by television cameras on the roof of Mortlake Brewery and " held " till the finish, three or four minutes later.

The finish of the University Boat Race was televised for the first time last year, and the occasion was memorable in that the transmission was nearly wrecked by a workman who accidentally cut a telephone cable with his pick. For a time, it will be remembered, the transmitter at Alexandra Palace was cut off from all telephone communication with the television staff at Mortlake, and recourse was had to hand signals and scribbled messages held up before the television camera.

BIGGER AND BETTER RADIOLYMPIA THIS YEAR

Big plans for Radiolympia, 1939, were revealed at the monthly luncheon of the Radio Manufacturers' Association in London on March 9, at which Sir Stephen Tallents, the B.B.C.'s Controller of Public Relations was the guest of honour and the principal speaker.

Emphasising the ambitious nature of the plans for this year's show, which will open on August 23, Sir Stephen said that the B.B.C. was already hard at work, in collaboration with the organisers—the R.M.A.—devising new attractions.

Speaking of the R.M.A.'s plans, Colonel Ozanne (Chairman of the R.M.A. Exhibitions Committee) stressed the diversity of the attractions which would be found at this year's Show. As well as being the focal point of radio interest throughout the country, Radiolympia would have something to interest everybody.

DEPUTY TELEVISION ANNOUNCERS

During the absence on annual leave of two regular announcers, Miss Jasmine Bligh and Miss Elizabeth Cowell, Miss Olga Edwardes and Miss Eileen Bennett have been booked as deputy television announcers. Miss Edwardes, deputising for Miss Cowell, has been

MORE SCANNINGS . . . . . .

booked for dates between March 30 and April 17, and Miss Bennett, deputising for Miss Bligh, from March 24 till April 4.

Miss Edwardes is twenty-two years of age, a brunette and is already well known to viewers as an actress; Miss Bennett, nineteen years of age, is a blonde.

THE G.E.C. (SCHENECTADY) AERIAL

A new type antenna, cubical in shape and radical in design, has been developed by General Electric's radio engineers for use in the company's new 10-kilowatt television station nearing completion in the Helderberg Hills, 12 miles outside of Albany. This consists of eight hollow copper bars, each four inches in diameter and about seven feet, or one-half wave, in length, arranged so as to form a perfect cube. The antenna is designed to radiate a horizontal polarised wave, carrying both picture and voice on the 4½-metre band.

The station has been licensed under the call letters of W2XB, with W2XH assigned to the low-powered 1.9-metre transmitter which will relay the programmes to the main transmitter, a distance of 12 miles.

REAL PUBLICITY

The Boon-Danahar fight undoubtedly did more to publicise television than any previous outside broadcast event, not excluding the Coronation. Amazing scenes took place both inside and outside the three theatres where the televised fight was shown. In Oxford Street the police had to deal with hundreds of people beseiging the box offices. Prices ranging from 2s. 6d. to a guinea were paid and hundreds stood at the back and in the aisles.

The performance at the Marble Arch Pavilion was watched by many influential people including members of the Television Advisory Committee, Mr. F. W. Olgilvie, Director-General of the B.B.C., high officials of the G.P.O., and representatives of film interests.

CINEMA TELEVISION

The Wireless Retail Traders' Association has petitioned the B.B.C. to veto television in cinemas. The association is of the opinion that if this is not done the future of television, both as a new industry and as a home entertainment, will be seriously jeopardised.

TOM WALLS IN TELEVISION

Tom Walls—ex-policeman, theatrical impresario, trainer of a Derby winner, actor, and stage and film director—makes his television début in the evening programme on April 5. Incidentally, "April the Fifth" was the name of his Derby winner. He will appear in Cosmo Gordon Lennox's one-act comedy, "The Van Dyck," with Campbell Gullan and Donald Findlay. The play will be repeated in the afternoon programme on April 15.

TELEVISION COLOURS

In order to improve transmission conditions on the occasion of the Len Harvey and Larry Gains fight a special colour scheme in the ring was adopted. Butter-cup yellow coloured canvas on the floor and a blue-roped ring were used.

O.B. RELAY STATION

The television relay station at Swain's Lane, Highgate, for the reception of O.B. relays from the mobile transmitter is now completed. It is situated 400 ft. above sea level and signals from the mobile transmitters in any part of greater London will be picked up at Swain's Lane and relayed to Alexandra Palace. Transmission from Swain's Lane to Alexandra Palace is by the television cable which extends from Alexandra Palace through the West End.

INTERFERENCE

Sir W. Womersley, Assistant Postmaster-General, replying to a question by Mr. Rostron Duckworth on the subject of interference to radio reception, said inquiries regarding the possible scope and operation of a new Wireless Telegraphy Bill to deal, *inter alia*, with the question of electrical interference with wireless reception were being actively pursued. The problem was, however, one of great complexity, involving consultation with many commercial and other interests which would be affected; he could not give any assurance that it would be possible to introduce a Bill during the current session.

TELEVISION COMMITTEE MEETING

The Television Advisory Committee met on March 14 for the first time under the chairmanship of Lord Cadman. It is understood that provincial and cinema television were discussed by the committee. No official statement regarding the results of the meeting was issued.

MR. BAIRD ON CINEMA TELEVISION

Replying to a toast Mr. Baird at the annual dinner of the London and Home Counties Branch of the Wireless Retailers' Association, in the course of his speech referring to cinema television, said: "The latest development was one which at first sight might not appear to affect the wireless retailer. I am not sure that that might not in its final effect be of great importance to the wireless trade. I am sure if the entertainment industry does take part there will be a tremendous improvement in the programmes," he declared, adding that people who were used to devising programmes in that sphere might, with all respect to the B.B.C., be expected to turn out something much superior to the B.B.C. There was the possibility that such programmes might be sent out on a wavelength which could be received in the home.

SCOPHONY BIG-SCREEN TELEVISION

It is understood that negotiations are now in progress in connection with the installation of Scophony television equipment in the cinemas of Odeon Theatres. It is possible that Odeon Theatres will take a financial interest in Scophony.

CINEMA EXHIBITORS

The Cinema Exhibitors' Association Committee on Television held its first meeting on March 16 to survey the television - cinema situation generally. No important decisions were reached.

NATIONAL BOXING ASSOCIATION AND TELEVISION

The Executive Committee of the National Boxing Association is to oppose any attempt to restrict the televising of professional boxing contests. The view is expressed that television of big fights will create a vast new boxing public which will eventually find its way to the boxing arenas, and it is the intention of the Association that the boxers shall share the profits of this source of revenue.

. . . . . AND MORE REFLECTIONS

TELEVISION SERVICES

In response to a question in the House of Commons, Sir W. Womersley stated that with regard to the extension of the television service to areas outside the range of the Alexandra Palace transmitter, the question involved serious problems, both technical and financial. Research is being undertaken to find out whether it is possible to relay programmes from London to other centres via ultra-high frequency transmitters, but this would involve a considerable period before definite results could be obtained.

CINEMA INSTALLATION IN GLASGOW

Plans have been passed by the Glasgow Dean of Guild Court for a cinema to be erected and equipped for the reception of television. It is the first theatre to be so equipped in Scotland, but how the equipment will be used has not yet been stated.

This cinema is to serve a new housing scheme of over 1,600 houses at a point near Robroyston.

MAKE-UP AND COLOURS

Great progress has been made in make-up since the early days, when blue and yellow make-up gave artists a sickly look. A healthy sun-tan complexion is all that is needed now to enable the cameras to transmit a clear—even flattering—picture of any face. Bald pates, by the way, are apt to be a problem, especially if they have a gleam that reflects the light; the discreet application of a darkish tint of powder solves that little difficulty, however.

To overcome the effect of halation caused by glistening instruments in the television orchestra; they are very rarely polished and, though they are certainly not the smartest instruments in London, they make a nice clean picture on the television screen.

So far as costume is concerned, the cameras have a definite dislike for anything black and a pronounced liking for pastel shades and non-absorbent material. Consequently, evening dress does not televise perfectly, and men who wear it in productions are sometimes provided with yellow collars and shirts and ties, so as to improve the contrast of light and shade—a flash-back to the early days of film production. An attribute of the cameras include their strange ability to see through fog in a way that makes it merely give a particularly beautiful texture to the picture.

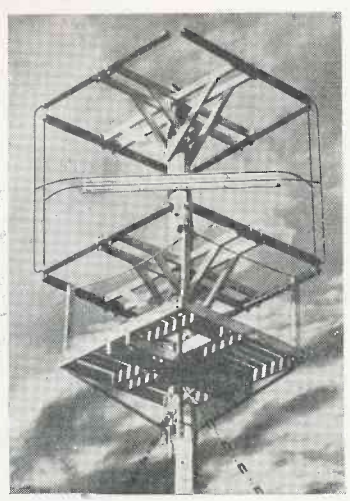
At rehearsals the make-up girl sits before the screen of a " monitor " set which shows her what sort of a picture would be going out to viewers if the show were being televised. She can, in fact, see both the real people and their images as television recreates them and, scribbling pad and pencil in hand, she notes flaws in make-up, to be corrected or modified before transmission time.

B.B.C. TELEVISION OFFICIAL FOR U.S.A.

Mr. D. H. Munro, Television Productions Manager at Alexandra Palace, is to be released temporarily to the Columbia Broadcasting System of America for work in connection with the opening of the C.B.S. television service. He will sail for the United States of America on May 4 and expects to be away from London for at least six weeks.

Mr. Munro joined the B.B.C. in 1926 as an announcer at the Aberdeen station, came to London in 1929 as Production Assistant at Savoy Hill, and was intimately concerned with developments in multi-studio presentation involving the use of the then new dramatic control panel. As the operator of an advanced type of control panel, Mr. Munro was responsible for co-ordinating the " Round the Empire " broadcast of 1932 in which King George V gave the first of his memorable series of Christmas messages to the world.

When Mr. Gerald Cock was appointed Director of Television, in 1935, he chose Mr. Munro as Productions Manager. The appointment brought with it an entirely new set of problems, as no precedent existed for the organisation of a high-definition television service. Since the start of the service in the Autumn of 1936, Mr. Munro has been responsible for studio organisation and general routine.



The cubical aerial of the G.E.C (Schenectady, U.S.A.) television transmitter. A note regarding this appears on the preceding page.

TELEVISION IN THE NORTH OF ENGLAND

An energetic campaign is being sponsored by Allied Newspapers in Manchester in order to push forward the installation of a television transmitter to cover a good part of the North of England.

It is claimed that a television transmitter in Manchester would cover an area in which there are already 2,000,000 receiving licences.

THE A.R.R.L. CONTEST

During March the annual C.W. and telephony contest between American amateurs and amateurs in other parts of the world was held. If anything this year, there appeared to be more than the usual number of stations participating.

It does seem that amateurs are taking a lot more trouble with their installations, particularly from the aerial end, for a considerable number of British stations were using narrow angle rotatable beams, and in this way, despite their very low power were able to put up a good show, as compared with the Americans who can use up to 1 kilowatt input.

Unfortunately, most of the central European stations were absent so that the number of countries it was possible to work was still further reduced.

TELEVISION RECEIVER SALES

It is becoming rather difficult to purchase a television receiver without there being some delay, for manufacturers are now working to capacity. One particular maker is over 350 receivers behind delivery, despite the fact that the manufacturing quota is 30 per day. In this way, the sales in the service area will very shortly reach a high figure, particularly should there be some more interesting broadcasts, such as the Boon-Danahar fight.

Figs. 3 and 4. These photographs depict similar effects to that of Fig. 2.

TELEVISION PICTURE FAULTS AND THEIR REMEDIES—V

By S. West

This is the fifth article in a series that has treated the various faults likely to be encountered in vision receiving apparatus, both from the theoretical and practical viewpoints. Photographs illustrating these faults have accompanied the text and the complete series comprises a concise and lucid treatment on vision unit design and faults location.

LAST month the vision frequency output amplifying stage was treated from the point of view of its low-frequency response requirements. It is necessary now to consider the question of the high-frequency response, from which is assumed the response to frequencies from some 10,000 cycles to 2 or 2.5 mcs. Although there are various circuits for achieving this end, by far the simplest way to ensure linear gain at such high frequencies is to include a correcting inductance in series with the anode coupling resistance of the V.F. valve.

Actually linear response can be secured with a drastic reduction in value of the load resistance, indeed, with certain types of resistance, e.g., wirewound types having some inherent inductance, with a sufficiently low value of load resistance the response can well be linear to 5 mcs. The gain secured from the stage, however, is very low as is apparent from the fact that the gain from such a stage, wherein a pentode valve is employed, is given accurately by the relation: Gain = mutual conductance (mA. per volt) × coupling resistance (ohms).

The usual procedure is to employ an inductance having such a value that in conjunction with the associated valve and circuit capacities a resonant circuit is secured, the frequency of resonance being somewhat higher than the highest frequency the stage is to handle.

It is not proposed to deal with the question of phase shift for it is considered that no difficulties will be encountered in this respect as, in general, if the response is linear up to the highest frequency desired then the phase shift will be of such degree that it can be ignored. There are, however, two pitfalls likely to be encountered whilst striving for this stringent frequency response requirement. First, the ratio of in-

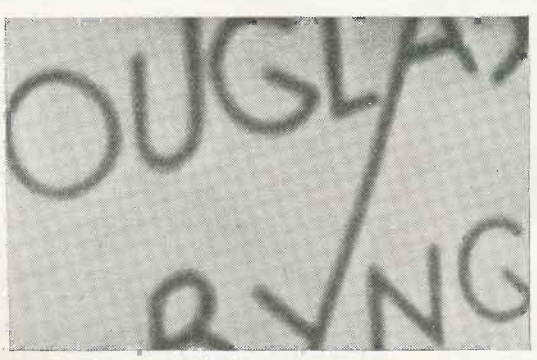


Fig. 1. The effect of incorrect damping in the V.F. stage is clearly revealed in the above photograph.

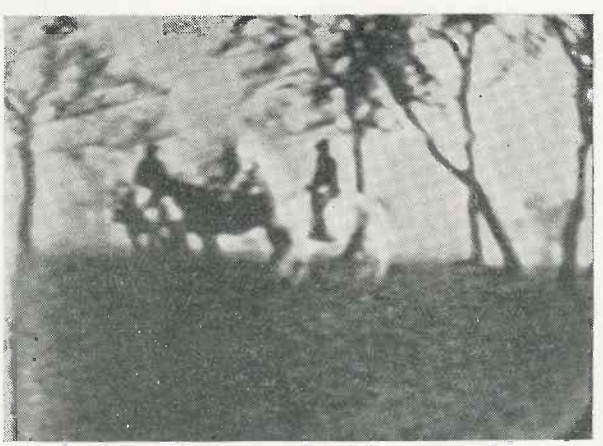


Fig. 2. The curious effect resulting when the oscillator is incorrectly tuned, coupled with an inadequate frequency response in the I.F. circuits.

TRANSITION EFFECTS

ductance to resistance must be low, for the circuit damping is critical if transient distortion is to be avoided. If the resistance is too high in value the abrupt transitions are lost due to the roundings of the corners of the transient wave, if too low there is a possibility of ringing occurring in the circuit; this will distort the wave shape giving rise to effects similar to those depicted in the photograph Fig. 1.

It is seen in this photograph that the transition from

Fig. 5. With poor overall frequency response considerable loss of definition will result as is apparent from the above photograph.

the black edge of the lettering to the uniform background is not correctly rendered, the effect being as though a white border follows the lettering. With a white letter the reverse effect would, of course, be obtained. This effect is due to the fact that the wave shape rises abruptly from the black edge of the letter then oscillates momentarily; it is a damped oscillation, before assuming the correct illumination level.

Secondly, the question of determining what value the stray capacity has is not without difficulties. So much will depend upon the form of sync. filter employed and also, largely, upon the length of the modulating lead to the grid of the C.R. tube. Also, if the C.R. tube E.H.T. potential has its positive earthed the capacity to earth of the grid blocking condenser (which will necessarily be a large high-voltage affair) will be appreciable.

Fig. 6. The uneven background illumination in the above photograph is due to the loss of or inaccurate restoration of the D.C. component.

There is a method for accurately assessing this total capacitance, including that due to the input capacity of the C.R. tube and valves, but this method implies a certain accuracy in calibration of the apparatus employed and is therefore not easily applicable.

It is probably reasonably safe to assume that this output capacity, including that due to the valve, is in the region of 35-40 uuFds., with an indirect tube connection, and approximately 25-30 uuFds. when a direct connection is employed.

Suitable values for both the inductance and the resistance to ensure a correct L/R ratio and to permit the response to be maintained to over 2 mcs. can then be obtained from the curves given on p. 662 of the November, 1938, issue of this journal. Alternatively, it will be found that a load resistance of 3,500 ohms and an inductance consisting of 89 turns of 38 D.S.C. instrument wire close wound on a $\frac{5}{8}$ in. diameter coil form will satisfy most requirements.

Some slight experimental adjustment of the turns number may be required, but it will be preferable to endeavour to reduce the capacity due to the C.R. tube feed arrangements before resorting to this measure. If it proves necessary to remove a substantial number of turns then the load resistance should also be reduced in value. It is a simple matter to check that the gain

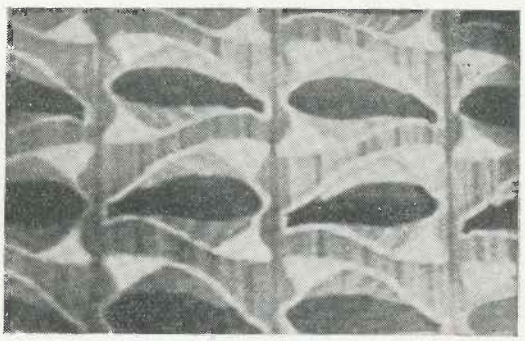


Fig. 7. The above photograph shows the good definition and uniform illumination rendered by a correctly adjusted receiver.

is substantially maintained to the upper high-frequency limits by applying the output of a signal generator to the grid of the V.F. valve.

The procedure is as follows: With the generator connected as above, it is set to produce a signal at about 1.5 mcs. (200 metres) the output being adjusted so that the C.R. tube screen is reasonably illuminated. With careful adjustment of the sync. controls this frequency will produce a large number of vertical white lines. The frequency is then slowly increased to a little over 2 mcs., the individual lines, now increased in number, should still be plainly rendered at an approximately equal illumination level, although even if there is an appreciable change in the illumination level it can be disregarded; it is the ability of the system to render this large number of lines plainly that is the real test. Close examination of the screen will be required for there will be approximately 200 lines, though it is not suggested this figure be checked. If this large number of lines is secured with good definition it can be safely assumed that the high-frequency

GHOST IMAGES

response of the V.F. stage and associated circuits is excellent.

Transient Distortion

It is not such a simple matter to determine the amount of transient distortion present unless a square wave generator is employed. This entails construction of such an instrument, however, as it is an item not usually available. It is simpler to determine the performance by examining closely suitable scenes.

Now it is an unfortunate fact that similar transient distortions can occur in the intermediate frequency stages of a super-heterodyne vision receiver and, moreover, if both effects are present at the same time or if an attempt to make good a response deficiency, due to the I.F. amplifier, by overcorrecting the V.F. stage is made, very unpleasant picture distortions will result. (See Fig. 2.) This photograph gives some idea of what to expect, but actually the effect is manifest by a

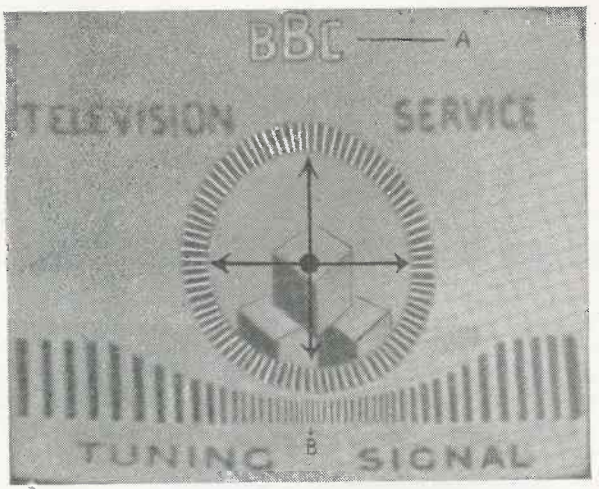


Fig. 8. The caption photographed above furnishes an excellent indication of the correct picture proportions and frequency response to aim at. The small serrations at A should be plainly visible and the centre pattern should be a true circle.

large variety of such distortions. In general, it can be assumed that where it is possible to eradicate this fault by tuning the oscillator for maximum sensitivity, then it is likely, though not necessarily so, that the I.F. pass band is inadequate or non-linear.

Figs. 3 and 4 depict similar effects. In each case where pictures such as these are secured, either the I.F.'s pass band characteristic, or the setting of the oscillator tuning, should be suspect. Fig. 3 actually is taken from a receiver whose I.F. amplifier had a very marked tendency to "ring." Such a condition is mainly engendered by a non-linear response within the I.F.'s pass band and suitable re-adjustment or an increase in the circuit damping will invariably effect a cure.

Ghost Images

Two somewhat similar effects, not illustrated here, are worthy of mention. The first is a picture in which the subject matter appears as though in relief; such a fault is invariably due to incorrect oscillator tuning and is caused by an over accentuation of the higher modulation frequencies in relation to the low. It is conceivable that such an effect could occur due to a coupling condenser in the V.F. stage becoming open circuited and it is perhaps as well to check such components.

The second effect is very similar to that depicted in Fig. 3, but, in this case, the subject matter is broken up into a number of such ghost images as are shown in this photograph. Generally speaking, this trouble is more usually experienced in single sideband amplifiers where the requirements in regard to phase shift and linearity are very much more stringent than are those for a double sideband amplifier.

Whilst referring to Fig. 3 it can be added that a precisely similar effect as is depicted obtains when the aerial termination is not correctly matched either at the receiver or to the aerial. The severity of this effect is largely determined by the length of the aerial feeder, for the fault is due to reflections occurring in this; that is to say, due to the mismatch, reflections occur in the feeder and thereby give rise to secondary images delayed according to the distance they have travelled, this will result in the production on the screen of ghost images rendered later than the true image.

Inadequate Frequency Response

To give an idea of the effect in the received picture due to an inadequate overall frequency response characteristic, the photograph Fig. 5 is reproduced, though it is hardly necessary to show what constitutes a poor picture. However, the lack of definition can be noted, due in large measure to the fact that unless the high-frequency response is adequate, sudden transitions cannot be truly rendered and rapidly repetitive transients not at all.

The photograph Fig. 6 shows the big improvement in definition resulting when the response at high frequencies is reasonably good, although this photograph is mainly included as it depicts a fault which is quite common. Examination will reveal that the background illumination is very uneven, the white lettering being followed by dark areas. This effect is common in receivers where the D.C. component is lost as far as the tube modulation is concerned, but it can occur, though not so readily, in receivers employing a direct tube connection.

Upon a cursory examination of a circuit wherein the tube is connected directly to the V.F. valve's anode, which is in turn D.C. coupled to the demodulating diode, one is tempted to think that the D.C. component is accurately preserved, but it is necessary to take into account the time constant as a whole or in part of the H.T. supply circuit which can influence the D.C. level. The effect of these circuits can be largely removed, but there exist a number of reasons why a direct tube connection, to a V.F. stage, should not be employed, and in the writer's view it is preferable and simpler to employ some form of D.C. restorer, especially as such a device is invariably necessary for most types of sync. pulse separators.

Even where a D.C. restorer is employed, however, care in the choice of the circuit constants is necessary for, unless the time constant of the restorer is high, it will be unable to maintain the D.C. level throughout

(*Continued on page 220.*)

Telegossip

A Causerie of Fact, Comment and Criticism

By L. Marsland Gander

THERE are signs that the question of a provincial television transmitter has become an exceedingly live issue again. The television group among the radio manufacturers is growing restless at the delay in deciding between the relative merits of ultra short wave radio and cable links. I heard Mr. C. O. Stanley publicly indicate his views in the presence of Sir Stephen Tallents, Public Relations Controller of the B.B.C.

Incidentally, Mr. Stanley also made a sly allusion to the "hen houses" which the B.B.C. are using as studios at Alexandra Palace. The implicit inquiry was: Why no progress with the theatre conversion at Alexandra Palace?

Provincial Television

This question of a provincial transmitter, together with other current problems, was thrashed out at a meeting of the Television Advisory Committee—the first presided over by Lord Cadman. Three members of the committee were absent, namely, Sir Frank Smith, who is in Iran, and Sir Noel Ashbridge and Col. Angwin, of the Post Office, who are at the wavelength conference in Montreux. The B.B.C. was represented by Mr. H. Bishop, the assistant chief engineer, and the Post Office by Mr. A. J. Gill.

Mr. Gerald Cock, B.B.C. Television Director ("Dee Tel") attended and explained his point of view at length, not only on the question of a provincial transmitter, but also on that of big screen television in cinemas which is, at the moment equally urgent. As usual the meeting was held *in camera* and no statement was issued.

I deduce from this silence that while the Post Office have been instructed to push on as rapidly as possible with their radio link experiments nothing definite has yet been decided. And "as quickly as possible" means when they have the necessary equipment. The last definite information I had was that the apparatus had not been delivered, since when, for a matter of weeks, the whole subject has been shrouded in mystery.

The Big Screen

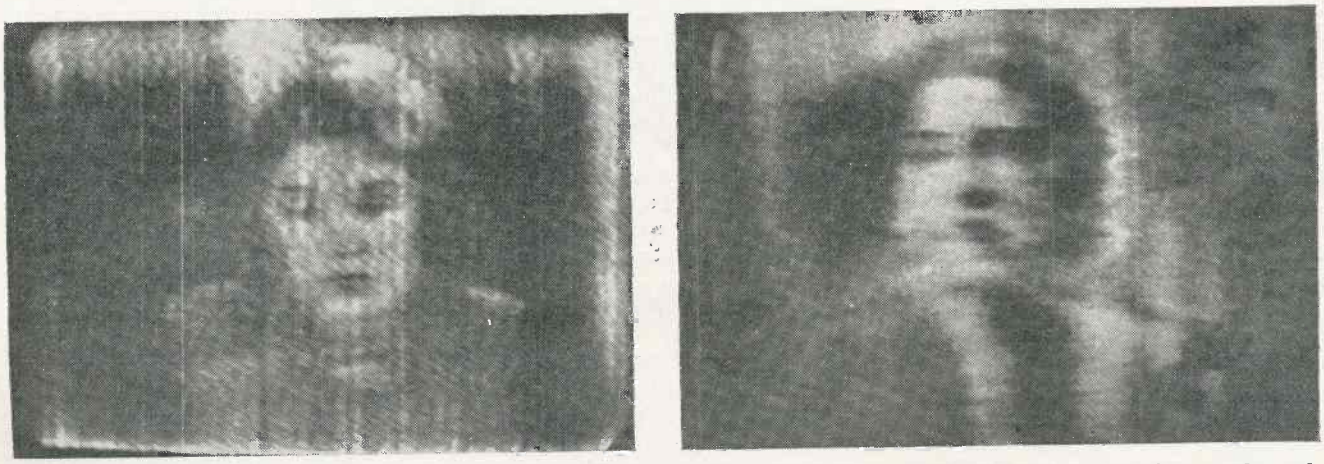
The B.B.C. views on big screen television are fairly well known. They wish to develop television primarily as a home entertainment, and regard big screen television at the present stage as far from perfect and an indifferent advertisement for their programmes. At the same time the Corporation is willing to co-operate with the cinemas in connection with certain types of programmes, such as boxing matches, which they will allow to be exhibited to paying audiences if the interests of all parties are properly safeguarded. I expect that the Advisory Committee will support this point of view, for the time being.

But in the meantime Mr. Isidore Ostrer, of the Gaumont British Corporation, is equipping eight cinemas of the group in London with big screen apparatus, namely, the Dominion, the Tivoli, the New Victoria, the New Gallery, the Gaumont, Chelsea, and three suburban theatres. The size of the screen may be increased for the bigger cinemas to 20 feet by 15.

Mr. Ostrer is still firmly of opinion that the time may come when the cinemas have a transmitting station independent of the B.B.C. One thing is certain, that in fairness neither the B.B.C. nor the Government can obstruct progress with cinema television. By the way, I hear that in the bigger cinemas, Gaumont propose to reduce the audience to 1,500 for television shows.

Before the televising of the Harvey-Gains fight, the B.B.C. issued a warning against unauthorised reproduction in public. I understand that this was done because some restaurants and public houses have made special charges for "television dinners." There are said to be 300 restaurants or public houses in London equipped with receivers, hence the need for clarification of the position.

FIRST PHOTOGRAPHS OF TRANSATLANTIC HIGH-DEFINITION TELEVISION



These remarkable photographs, printed from a frame of motion picture film, show a blurred television image broadcast from London and received at the R.C.A. Communications, Inc., station at Riverhead, Long Island, N.Y. Some detail is lost through the use of motion picture equipment.

It appears that the B.B.C. do not object to the reproducton of programmes to non-paying audiences, but as soon as the element of profit is introduced, then a proper arrangement must be negotiated. In the case of a fight, this means payment to the promoters. The B.B.C. has also stipulated that the promoter must not grant exclusive rights to any one cinema or group of cinemas.

Transatlantic Results

I have received from New York some remarkably interesting photographs taken of the screen of the television receiver which picked up pictures from Alexandra Palace at Riverhead, Long Island. It is true that they look rather like "spirit" photographs, or some of the results produced in the Baird 30-line days, but I fancy I can recognise Elizabeth Cowell, and Jasmine Bligh.

While the theorists are busily finding explanations, imagination leaps ahead to the time when transatlantic television is a commonplace. Yet I heard the other day that for over a year the Pye research engineers at Cambridge have been trying to pick up transmissions from New York and have received nothing. This may be due to the fact that the aerial on the Empire State building is designed to give its maximum field strength in a westerly direction. It will be interesting to see if the new aerial array, recently completed, makes any difference.

By the way, I have heard the explanation that the waves from Alexandra Palace are deflected from the ionosphere down to a point in mid-Atlantic and from there reach New York in another great bound. It is stated that transatlantic reception is particularly good when there is daylight on both sides, and conditions were notably favourable last autumn.

"The Design of Video Amplifiers"

(*Continued from page 223*)

Herold[3] it has the following characteristics: for a given total load-circuit capacitance C_T and prescribed top video frequency f_0, the load resistor which may be used (maintaining constant gain up to f_0) is approximately 80 per cent. greater than in the case of simple shunt peaking. This means, of course, 80 per cent. higher gain per stage, for the gain is $Gm\ R_L$, when the circuit is properly compensated. The departure from constant time delay is roughly equal to that experienced in a simple series-peaking circuit. The disposition of circuit components required to produce the 80 per cent. increase in over-all gain are as follows:

$$m = C_2/C_1 = 2$$

$$L_1 = 0.12\ (C_1+C_2)\ R_L^2$$

$$R_{L0} = \frac{1.8}{\omega_0 (C_1+C_2)}$$

$$L_2 = 0.52\ (C_1+C_2)\ R_L^2$$

To design a stage similar to that shown in Figure 3 the procedure is as follows: (1) Select the top frequency f_0 to be passed with uniform gain; (2) make $m = C_2/C_1$ equal to 2; (3) determine the total load-circuit capacitative reactance at the top frequency; (4) choose a load resistor equal to 1.8 times this total load-circuit reactance at f; (5) calculate L_1 and L_2 from the formulas given above.

A LIGHT AND SIMPLE DIPOLE

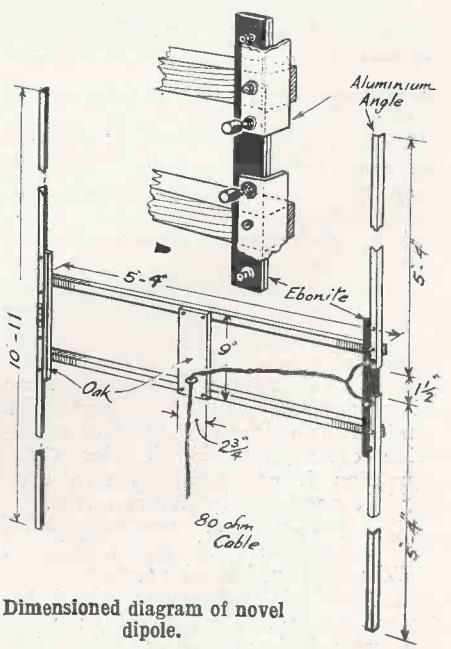
BECAUSE of certain difficulties in the fixing and support of a television aerial of any considerable weight, the prime objective in the construction of the aerial to be described was lightness and minimum resistance to the wind. It was decided, therefore, to use aluminium angle metal supported on a skeleton framework—and the actual weight of the complete aerial is approximately 2 lb. with an almost negligible wind resistance.

The wooden framework consists of two horizontal members each 5 ft. 4 in. of 1-in. square deal separated by a strip of ¼-in. oak 2¾ in. wide and 9 in. long, secured by screws in the centre. Across one end of the frame are two 1-in. 3/16th in. thick strips of ebonite, placed one over the other and screwed to the ends of each horizontal member. These strips of ebonite act as spacers and provide an insulated support for the attachment of the two arms of the dipole which are secured by four 3/16 in. bolts and nuts. The ebonite strips overlap the frame at top and bottom by 1½ in. in each case.

At the other end of the frame is screwed a strip of ¼ in. by 1 in. oak which also acts as a spacer and is for attachment of the reflector. The entire assembly is thus very light and rigid.

The actual aerial and reflector members are ¾-in. aluminium angle, which any ironmonger can order if not in stock, or it can be obtained from J. Smith and Sons (Clerkenwell) Ltd., 50 St. John's Square, E.C.1. Each member of the dipole is cut to a length of 5 ft. 4 in. and mounted spaced 1½ in. apart on top of the ebonite strips secured, as previously mentioned, by 3/16 in. bolts and nuts; two of the bolts also provide for attachment of the 80-ohm cable lead-in.

For convenience in handling, the reflector is in two parts butted one up against the other and secured by screws to the oak distance piece at the opposite end of the frame. A small bridging piece is placed over the joint and held firmly in position by screws. The total length of the reflector is 10 ft. 11 in. Provided all the screws are tight it will be found that the complete assembly is extraordinarily light.



Dimensioned diagram of novel dipole.

In order to preserve the aerial from the effects of the weather, both the wood and metal parts were given a couple of coats of good varnish after attachment of the lead-in; this in fact will be essential if an aerial of this type is used near the coast, otherwise, the aluminium will corrode and soon fracture.