

THE COLOUR QUESTION

About 50% of programmes shown on R.T.E. Television at present are in colour. By 1976 R.T.E. will be providing an all-colour service. In this 'R.T.E. Guide' Supplement broadcasters and engineers consider what this will mean to the public and how viewers can benefit from colour reception.

WHY COLOUR?

Louis McRedmond, Head of Information and Publications, RTE, looks at the question of colour television, which provides the best service to the public and adds a further, and truthful, dimension to reception.

WHY COLOUR? As well ask, why television? To be sure, a black-and-white screen may meet your needs. You can live a full and happy life without any screen at all. But RTE is in the business of providing television. It would be a poor provider who neglected to give the best service within his capacity. Visually, the best service today is a colour service.

Technology, which first brought black-and-white television to everybody who wanted it, now offers colour television as well and RTE has no intention of stopping at the half-way stage in the evolution of the medium it exists to provide. To do so would be as ludicrous as if a newspaper refused to use the telephone or the telex.

It is easy to dismiss colour as a mere gimmick, an unnecessary and expensive luxury. Some people even say it is unreal. Usually they have seen colour television in a pub or hotel — where, for some reason I can never fathom, the set is more often than not adjusted wrongly. Green faces and landscapes which always seem always to be on the edge of a forest fire do not, I agree, attract or convince.

True colour, available on every modern set, is a different matter entirely. Not only is it real as the world around us is real but artistically it is part of the story unfolded on the screen. *The Brontës of Haworth, Handel in Dublin*, any sports programme and news event are incomplete in black-and-white. Colour catches mood and atmosphere. Colour sets the scene and sustains it. It is a further dimension, and a truthful one. It is no more a gimmick than a blue mountain, a tartan tie, a rosy cheek.

Thus the case for colour and RTE's reason for "going colour." It is, perhaps, just as well that we are satisfied it is worth doing,



Louis McRedmond

for in fact we have little choice. The rapid development of colour television elsewhere has meant that RTE could no longer hope to find a ready market abroad for its black-and-white productions, nor could it expect at home to retain the loyalty of many of its advertisers who know that colour programmes attract and who want their advertisements in colour. Above all, however, there is the question of equipment.

"The Authority believes that colour should be regarded as a normal development of the television service."

—RTE Annual Report, 1973

Much of the equipment in the Donnybrook studios has reached the end of its working life. After twelve years extensive replacement has become necessary, and most equipment made today is "colour capable." It can broadcast in black-and-white, of course, but not only in black-and-white. RTE therefore must buy colour equipment. It would be a remarkable waste of money to invest in costly installations and then not use them as they are meant to be used.

Outside the studios, re-equipment began as long ago as 1970, when the RTE transmitter network was adapted to carry Eurovision programmes in colour. Technical facilities were installed at Donnybrook so that pre-recorded imported programmes could also be put out in colour and in 1971 an Outside Broadcast Unit was

equipped for colour coverage. The Railway Cup finals that year saw the colour O.B.U. in action for the first time. Within a few weeks RTE was transmitting the *Eurovision Song Contest* live from Dublin.

RTE, therefore, can now offer its viewers live and pre-recorded programmes in colour. It can make its own films and video-recordings in colour. It can cover news and sport in colour — subject only to the limitation that the O.B.U. cannot be in more than one place at a time. What it cannot do yet is present studio productions colour. That is being remedied.

This summer the re-equipment of the studios begins. An elaborate process, it involves wiring and lighting, new cameras and control desks. It will take three months in the case of each of the three major studios. It will involve disruption, since the studios will be out of commission while re-equipment proceeds, but plans are in hand to ensure that the upheaval will not affect production or programme schedules. In short, your viewing will not be disrupted.

In the end, by 1976, RTE will be providing an all-colour service. It will cost the best part of £1½ million. Is it worth it? Yes, if you want the best service. RTE refuses to offer less.



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Hilton Edwards, here with John Franklyn, starred in the RTE colour production Handel in Dublin shown on St. Stephen's Night, 1973.

Irish Television Programme Schedule



Michael Garvey . . . 'Sport and all actuality broadcasting gain immediacy'.



The Six Wives of Henry VIII was one of the popular imported series shown in colour by RTE.



Rugby was one of the sports which gained extra attractiveness in colour coverage on television.

IT'S A COLOURFUL WORLD

Michael Garvey, Controller of Programmes, R.T.E. Television, feels that colour will bring viewers 'all their experiences without the need of black-and-white translation' and indicates some of the problems facing the programme-makers.

IN SPRING, 'tis said, that a young man's fancy turns to thoughts of love. Householders, this time of the year, bend in another direction; their thoughts tend towards colour charts and pots of paint. Spring-cleaning suffices, most years, to make presentable the homes in which we live but, on occasion, there comes a time when water and elbow grease will not be enough and paint brushes are called into service. Despite the mess and inconvenience, do-it-yourself addicts and the rest of us make the judgement that the inconvenience is worth the price. A reward, even if only a temporary one, is a whole new look and feel; the familiar undergoes a change and, if we have chosen wisely, a whole new environment is ours for our efforts.

Television in colour has much the same effect. David Attenborough once referred to colour television as hi-fidelity broadcasting and, indeed, he was right. One is inclined, through habit, to accept black-and-white pictures as a true record of the world in which we live. Through the years of practice one accepts the convention of a monochrome world, although we are surrounded by colour in our homes, in our towns and in the countryside. We read, without difficulty, records of these familiar scenes when translated into black-and-white pictures. The revelation of coloured television is that it brings to viewers all their experiences without the need of black-and-white translation.

Certain elements of broadcasting benefit immensely by this return to normal perception. Sport and all actuality broadcasting gain immediacy whilst, viewing in black-and-white, it is easy to forget the information value of colour. Football teams, uniforms, all too frequently look alike in monochrome; traffic lights give their information through their position rather than their colour

and weather conditions lose their monotony of different shades of grey. As soon as the novelty of colour television has worn off one becomes aware of the amount of extra data one has about the scenes shown. One becomes aware of the deprivation to which one has grown accustomed in monochrome transmissions.

There are other areas of broadcasting that benefit immensely by the introduction of colour and high amongst these are the Drama and Light Entertainment programmes. It is impossible to generalise about plays but one could say that they break conveniently into two compartments; those dealing with dramatised documentaries, soap-operas, cops and robbers and situation comedies on the one hand, and, on the other, those of a less contemporary kind. A programme such as *The Rior-dans* belongs in the first category and although it is not at present being prepared or broadcast in colour it will set us some serious problems when it is. Contemporary drama requires the most meticulous observation of naturalistic colour. But inside the confines of the television screen a misplaced natural object can distract attention from the dramatic point of a scene. Glasses of orange can dominate a pub scene and tomatoes distract our whole attention from dramatic happenings in the Rior-dan's kitchen.

In the other field of drama the atmosphere of period pieces is greatly enhanced by colour. One has only to remember *The Six Wives of Henry VIII* and *Elizabeth R* to realise what advantages accrue from a full use of the designer's palette.

Music programmes, be they light or classical, variety and programmes featuring dancing, can be most exciting when seen in colour. For those making them, they present the greatest challenge since there is an element of stylization and formality in their prepara-

tion, which allows the creative artist maximum scope. In the field of News, Current Affairs and other studio programmes where real people are the essence of the display, colour returns all the participants to the real, familiar world and the programmes gain by this added verisimilitude. At times this very mirroring of reality in colour can be quite horrifying. Film reports of battle-fields, fires and disasters can be affecting in a way no black-and-white report ever is. Maps, diagrams and graphics of all kinds greatly benefit from colour, as, once again, the information content can be made more dense.

Although colour television means returning to normal perception for viewers and those making the broadcast, there are difficulties involved. From the viewer's standpoint it is essential that the set be properly adjusted so that the skill, care, time and energy which have gone into the creation of a programme can be appreciated by the audiences at home. For the programme makers, colour sets a challenge. Although we all perceive in colour, making pictures in colour for others to view requires a sensitive awareness of the artistic problems involved and a detailed knowledge of one's own limitations.

At the moment RTE is broadcasting some 50% of its output in colour and this will increase as each of our studios is re-equipped for colour. The amount broadcast in black-and-white will diminish.

Virtually all programmes from abroad are made in colour and we broadcast them in colour if we have the necessary machinery available. Most of us in broadcasting would look forward to a full colour television service in the not-too-distant future. I would hope, for those making the broadcasts and those viewing them, that this return to normal vision would be a happy experience.

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COLOUR—GREAT FOR SPORT

Fred Cogley, Head of Sport, R.T.E., says: "With the almost third-dimensional quality that colour adds to sports coverage, the spectacle becomes vividly alive."

IT HAS been an interesting fact that as more and more viewers in Ireland join the "colour brigade" the reaction to general sports coverage on RTE has become more and more enthusiastic. Initially, the novelty of being able to see major events without leaving the comfort of one's drawing-room was an attraction in itself but it was not until the advent of colour that the armchair enthusiast realised what he or she had been missing. With the almost third-dimensional quality that colour adds to sports coverage, the spectacle becomes vividly alive and I have known even the most unaddicted viewer of sport — my wife — to have been captivated by a variety of different sports, simply because of colour.

In certain sports, of course, colour adds an important element for the aficionado, notably racing. The jockeys' silks can be distinguished so clearly that it's a wonder the bookmakers haven't been pleading for mercy! No one should be shy on form any more.

And, in a game like snooker, black-and-white coverage makes it difficult for the viewer to follow what's happening. But those who have seen RTE's coverage in colour of the recent amateur international between Ireland and Wales, and the special professional matches, agree that it makes fascinating television. The same is true of handball which has enjoyed a great revival in popularity because of the exposure it got in colour this year. An interesting side benefit here was that an experiment in using a red ball for television proved so popular with the players, who felt they could see it better in play, that it has now been incorporated as the official standard.

The colour and spectacle of All-Ireland Final Day is undoubtedly one of the year's highlights but one of the interesting aspects of colour coverage is how clearly the referee stands out among the players. Somehow, he seems more prominent on the screen than he would to the spectator on the ground. The same applies in Rugby, I have noticed but, more particularly, it is fascinating how easy it is to spot the position of the ball in a loose maul when you're watching it in colour. In monochrome the ball seems to disappear in the greys of legs, arms and shorts... not so in living colour!

Of course, almost all major events now get the full treatment and, in addition to the main Gaelic Games, horse-racing fixtures, Rugby internationals, golf tournaments and soccer matches in Ireland, events from abroad are now always in colour. The recent Figure Skating Championships were something of a new experience for Irish audiences, made all the more attractive in colour. Later in the year the extensive coverage of the World Cup Soccer in Germany (June 13 to July 7) and the European Athletics Championships

in Rome (September 2-8) will certainly have us all dazzled.

The coming months will be among the busiest ever for the RTE Sports Department and they will undoubtedly be colourful. But it will take some time before we can look forward to everything being shown in colour. New equipment costs a lot but it

surprises me that RTE can manage to relay so much already and I know that it won't be very long before we will have forgotten what black-and-white sport looked like!

And, having said that, how can I tell her ladyship to return the colour telly we had "on appro"? Colour is here to stay!



Fred Cogley... 'The extensive coverage of the World Cup Soccer and the European Athletics Championships will certainly have us all dazzled'.

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Alpho O'Reilly 'the designer must consider and design for the many and varied camera angles and the equally varying lens widths which will be used.'



Alpho O'Reilly's design for the 1971 Eurovision Song Contest, staged in Dublin by RTE and relayed throughout Europe in colour, was based on motifs of old Irish silver. Above, Ireland's Dana, the previous year's winner, congratulates Severine of Monaco as pressmen rush on-stage.

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COLOUR— A CHALLENGE

Alpho O'Reilly, Director of Design, RTE welcomes the advent of colour television and discusses some of the problems it poses for people in his field.

LET ME start by saying that I have the greatest admiration for the tremendous accomplishments in the field of colour television which the engineers and technical designers have made over such a short period of development. We take so much for granted but, to me, it is still a kind of magic that colour pictures of a fine quality can now be transmitted and received almost at will.

The advent of colour production in RTE television is one which must be welcomed with pleasure by designers — whilst, at the same time, presenting them with a whole new set of problems.

One might ask "Why bother with colour television at all — isn't black-and-white television quite satisfactory and sufficient?" The simple answer is that colour is natural and, therefore, more valid. A child recognises colour before he identifies people or objects. Nature colours everything around us (and, indeed, all of us) superbly, and we, in turn, use artificial colour to add beauty to our homes and other possessions.

Over the years — through the necessary limitations of print and other methods of reproduction — we have come to accept that the majority of pictures we see in newspapers, magazines, etc. are in black-and-white, so until we meet them in person our politicians, sportsmen and other publicised personalities are seen by us in various tones of grey and it comes as a pleasant surprise to find that they are flesh-and-blood and mostly pink and white, enviably sun-tanned or even deliciously brown.

Colour television brings back this natural validity to our viewing and it is indeed regrettable that, unlike America or Japan, colour television sets in Europe remain so costly.

What does colour add to viewing? Because of our response to the natural and the familiar, it brings the added pleasure of people, places and things looking more interesting, more exciting and, frequently, more beautiful. Because colour widens the range of visual information, it increases the clarity of the picture being viewed. This, of course, in turn can eventually lead to the viewers becoming more critical, and no harm in that.

Modern colour transmission and reception equipment is so sophisticated and so reliable that, given the proper conditions, almost any colour arrangements put in front of the cameras can now be con-

fidently transmitted and received. To a certain degree this places an increased responsibility on the programme originators — the producers, the lighting directors and, above all, the designers.

It should be understood that the first major fact for the designer preparing for a television production is that he must consider and design for the many and varied camera angles, and the equally varying lens widths which will be used. In a major programme hundreds of separate "shots" will be taken from different angles and in different picture sizes — wide-shot, mid-shot, close-up, etc. Each picture will itself be a separate composition to be considered and designed for. Whereas in black-and-white tonal variations play a major part in such composition,

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colour will now play a much more dominant role. For instance, colours which may work splendidly together in a wide shot, may in a close-up jar and be less pleasing — or, worse still, distract from the production intent.

Conversely it must be noted that the black-and-white viewer, likely to be in the majority for some years to come, must not be forgotten — so while planning for colour the designer will at all times have to keep the black-and-white compatibility of that colour in mind, so that successful colour must go hand-in-hand with a continuation of successful black-and-white.

Every item will have to be assessed for its colour and tonal value separately, and in relation to all other items appearing in the same scene. This not alone includes the settings and items used to "dress" the setting — i.e., furnishings, fixtures, carpets, etc. — but also all foreground items — table dressings, lamps, flowers and props, etc. and, most of all, clothes.

Costume in colour becomes a predominant factor. Not alone must the costume be correct in style and tone; now it must be correct in colour and all costumes to be worn in the same scene must work in proper harmony according to the colour scheme and the production intent. The wrong costume colour can not only seriously unbalance the total picture composition; it can seriously affect the authenticity of the character. To give a broad example — an actress playing a shy retiring character could hardly be convincing wearing a brilliant scarlet dress.

In other words, colour in television has to be controlled in a way in which we would not necessarily control it in our daily lives. The colour in an average drawing room would almost certainly be over-stated for a television production. This is mainly because whilst the camera lens sees all and presents all, the human eye is selective, discriminating and more kindly; but presented with the total picture of such an over-coloured room on the small screen, the human eye cannot help seeing all and finding it much too "busy" with colour to be pleasing.

For graphic designers colour, of course, will be a joy — but they, too, must keep black-and-white viewing of their colour work constantly in mind. Gentle pastel graphics — elegant in colour — could result in dull, illegible, grey tones.

Make-up becomes more exacting — more precise — and it, too, must work for double results in colour and black-and-white.

The Wardrobe Department comes into its own — reflecting the costume designer's exacting concern for colour matching, harmony and more precise detailing.

So the designer must select and control, seeking a pleasing result which will, as often as possible, work effectively in the many and varied compositions required of his work throughout the production.

In large centres, such as London or New York, where there are many firms specialising in hiring costumes, furniture, properties, etc., this is a comparatively easy problem to resolve. In Dublin, where such services are either minimal or non-existent, it will be a major and on-going problem for the RTE Design staff, but it will be one which I have no doubt they will take in their stride and resolve effectively.

I know that all of us in Design look forward to playing a major role in bringing a rainbow of delight to the Irish Television colour screens.

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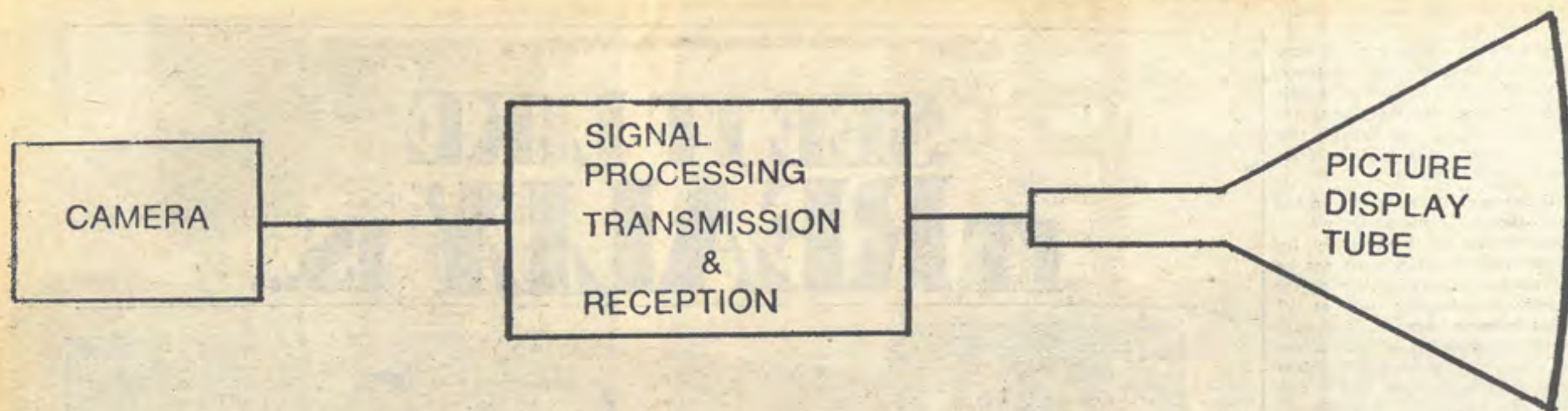


FIG. 1—THE TELEVISION SYSTEM

HOW COLOUR TELEVISION WORKS

Ted Crowley, Duty Engineer, R.T.E., describes how colour television works and remarks that some of the principles on which our present systems depend were known during the nineteenth century.

SINCE THE 1930s, the development of colour television has been rapid. Yet some of the principles on which our present systems depend were known during the nineteenth century.

Figure 1 gives an outline of the path the TV signal takes after originating in the camera.

The picture tube is the part the viewer watches, and even though it is located at the end of the signal path, we will commence by describing it. Firstly, though, a brief word on colour mixing.

It is a common experience that when tins of paint are mixed together a colour other than the originals will appear. Similarly, when coloured lights are beamed on to a screen and super-imposed to produce a single patch of light, the patch will differ in colour from the individual lights producing it. Incidentally, if you have a mind to put this to the test, a white wall will serve as a screen, and something, such as coloured translucent sweet wrappers, may oblige and act as filters to colour light from electric torches.

Super-imposing the beams on a screen has the effect of mixing the light. Red and green light together will produce yellow, red and blue will produce purple, and so on. Of course, the colour of the mixture will depend on the colour of each light and their relative brightnesses. In practice, three coloured lights and some means of varying their intensities will produce an enormous range of colours.

In colour television the "primary" colours are a particular red, green and blue, and every colour on the colour television screen is the result of a unique mixture of these three only. White is displayed when all three are on simultaneously and black when they are extinguished.

To produce the colour picture, three pictures are superimposed, one totally in red, another green, and a third blue. If a magnifying glass is used to examine a colour TV screen, while the set is switched on, it will reveal myriads of tiny coloured dots. (The dots

are replaced with thin stripes on a recently developed colour display tube.) The dots are carefully laid specks of three different chemicals chosen to produce the three coloured pictures when bombarded with electrical particles (electrons). The electrons arrive at the screen as three high-velocity beams. Behind the screen a metal mask, with one hole to every three dots, ensures that the dots are of a particular chemical composition are excited by one beam only. The amount of light from a dot depends on the intensity of the electron beam striking it, and this is readily controlled by the

signal being received.

Figure 2 shows a single hole in the metal mask and the three dots of light emitting chemical associated with it. The beams are absorbed by the solid parts of the mask while going from one set of dots to the next.

It follows, then, that the colour tube needs three continuous streams of colour information so that the correct mixture of red, green and blue light is produced at every point on the screen.

It should be appreciated that the picture is built up pro-

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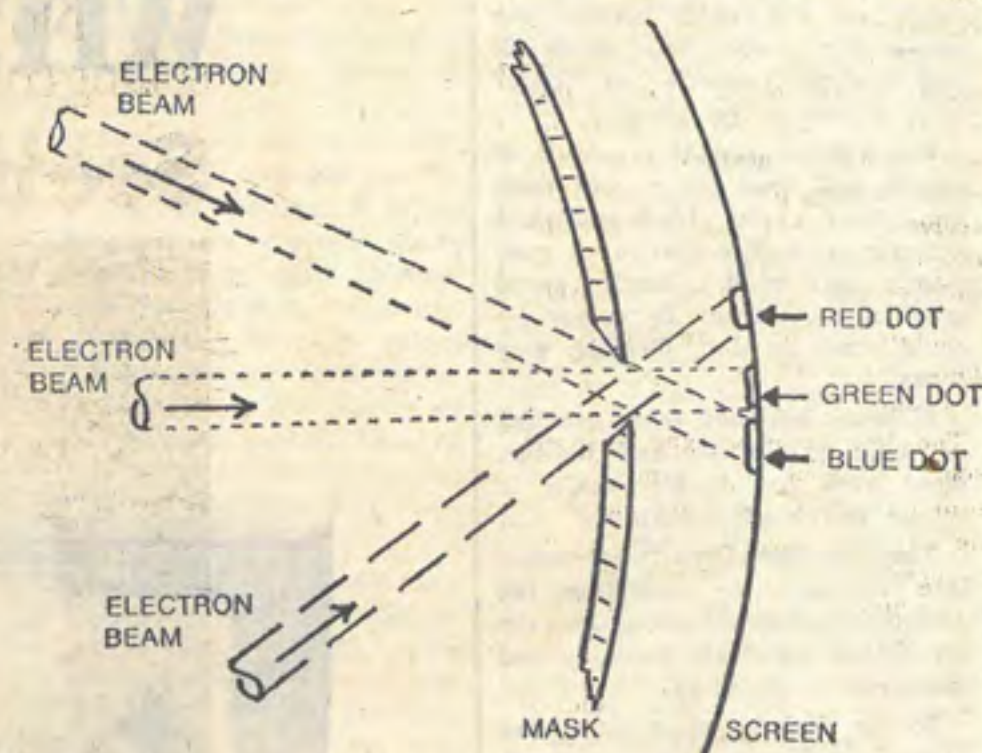


FIG. 2—THE COLOUR DISPLAY TUBE

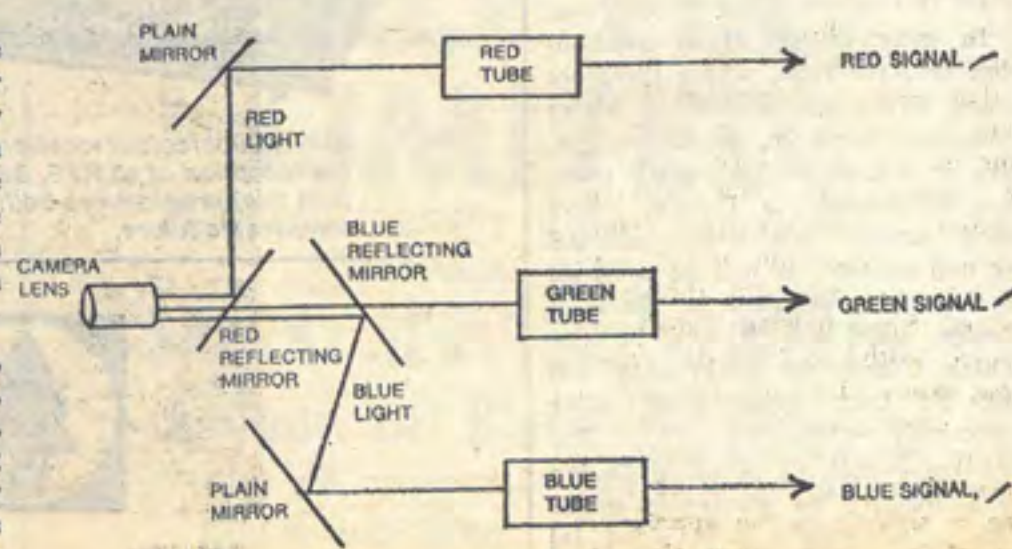
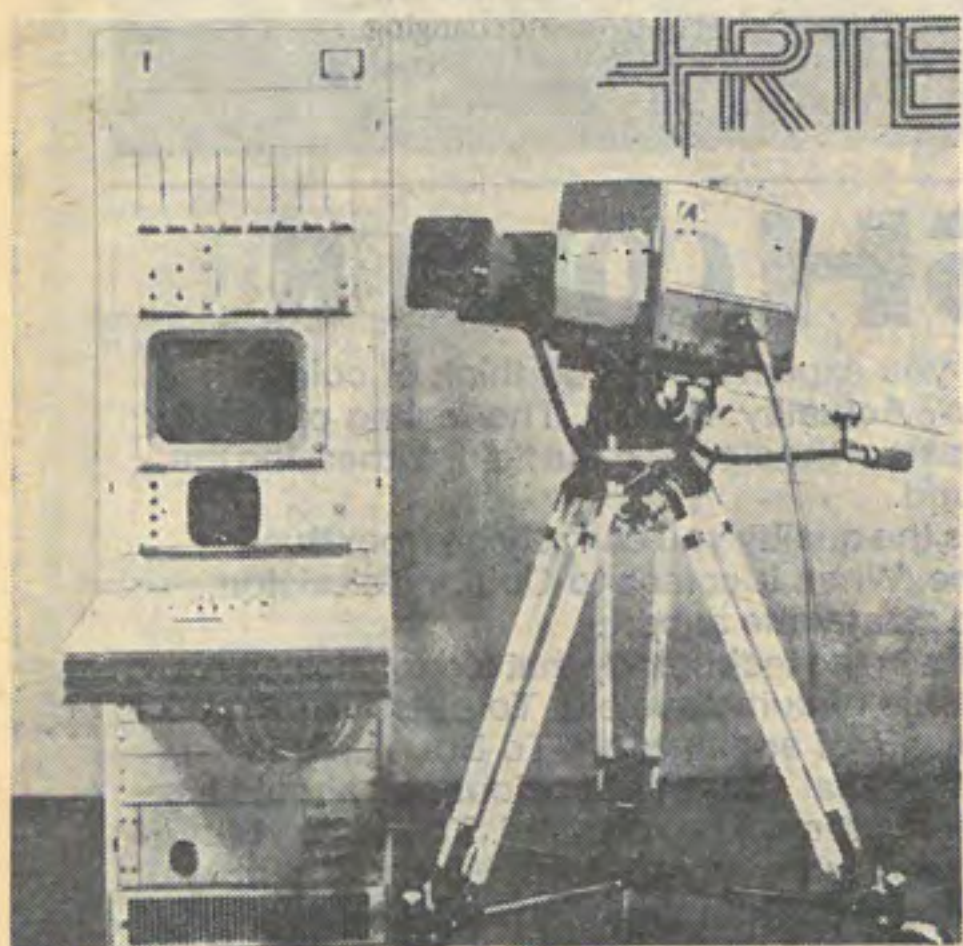


FIG. 3—THE COLOUR CAMERA



Ted Crowley . . . 'If a magnifying glass is used to examine a colour TV screen, while the set is switched on, it will reveal myriads of tiny coloured dots.'



An RTE Outside Broadcast colour camera and system.

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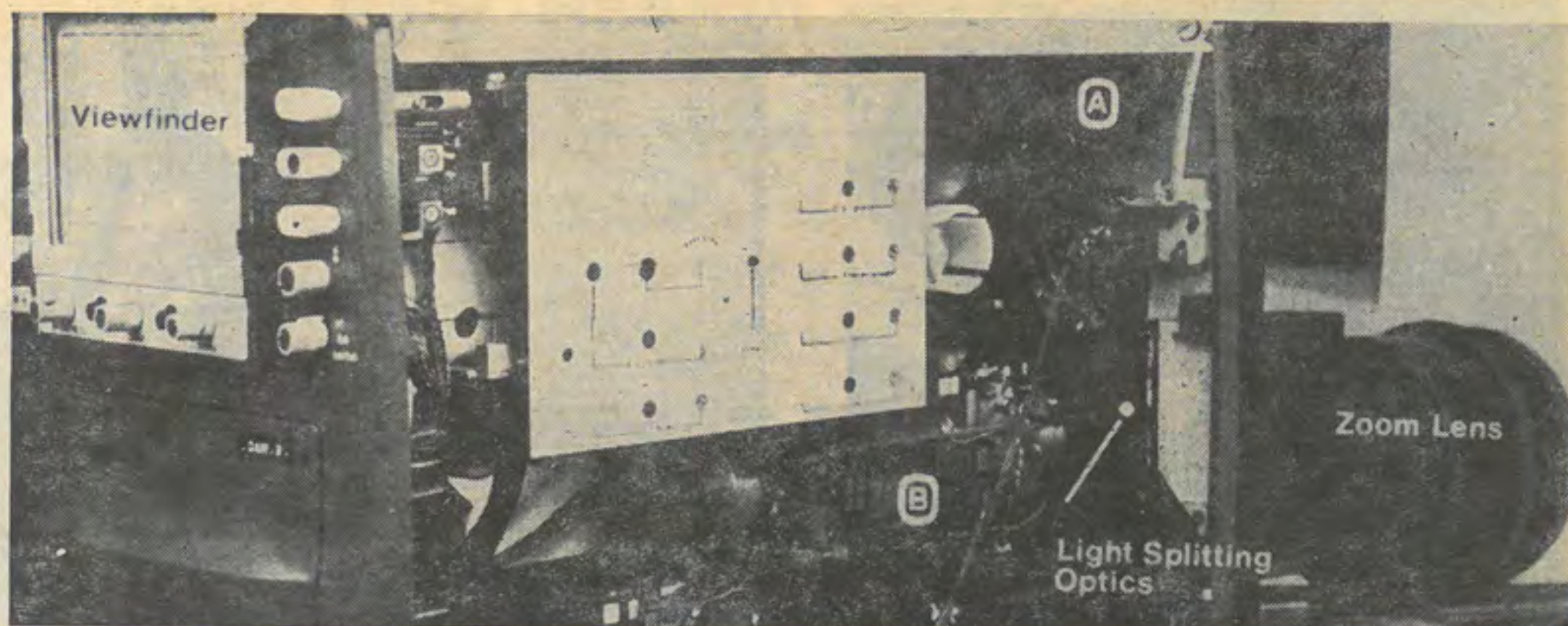
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The interior of a colour camera showing Head Amplifiers at points A and B. Not shown is another at bottom left.



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gressively. The electron beams within the tube start at the top left hand corner and trace out line after line, each below the one before it, until a complete picture is produced. Then the beams quickly return to their starting point and repeat the entire process with such rapidity that the viewer is not conscious that the pictures are separate. This method of scanning the screen in lines is similar to the action of your eye as it scans over this page of print.

Since the display tube deals with one element of the picture at a time, it suffices to provide it with information about the correct colour mix for each picture element as it is scanned. This is achieved automatically, since the camera analyses the scene before it, one element at a time, by a similar scanning process.

The central block in Figure 1 represents the processing of the picture information on its way to the display tube. It includes the complex electronics of the studio equipment; of the transmitter and receiver circuits. A very important aspect of the colour signal processing is that colour transmissions produce normal black-and-white pictures on black-and-white receivers, while black-and-white transmissions produce black-and-white pictures on colour receivers.

Figure 3 shows the principal components of the colour television camera.

The lens collects light reflected from the scene and bends it to form images on the front plates of the three camera tubes. An arrangement of special mirrors (diachronics) is placed in the light path between the lens and the three tubes. These mirrors are coated to reflect some colours while allowing others to pass through. In this way, only red light falls on the upper tube (Fig. 3), green on the middle one and blue on the lower tube.

The scanning of the colour images is accurately synchronised so that each small element of the scene is scanned at the same instant in the three tubes, and its red, green and blue content analysed to produce the colour signals to control the intensity of the scanning beams in the home receiver. Synchronising signals are radiated with the picture signal. These ensure that when the camera is, in effect, reading a particular part of the scene and producing information about it, the receiver tube is writing in the appropriate part of its screen, when that information arrives.

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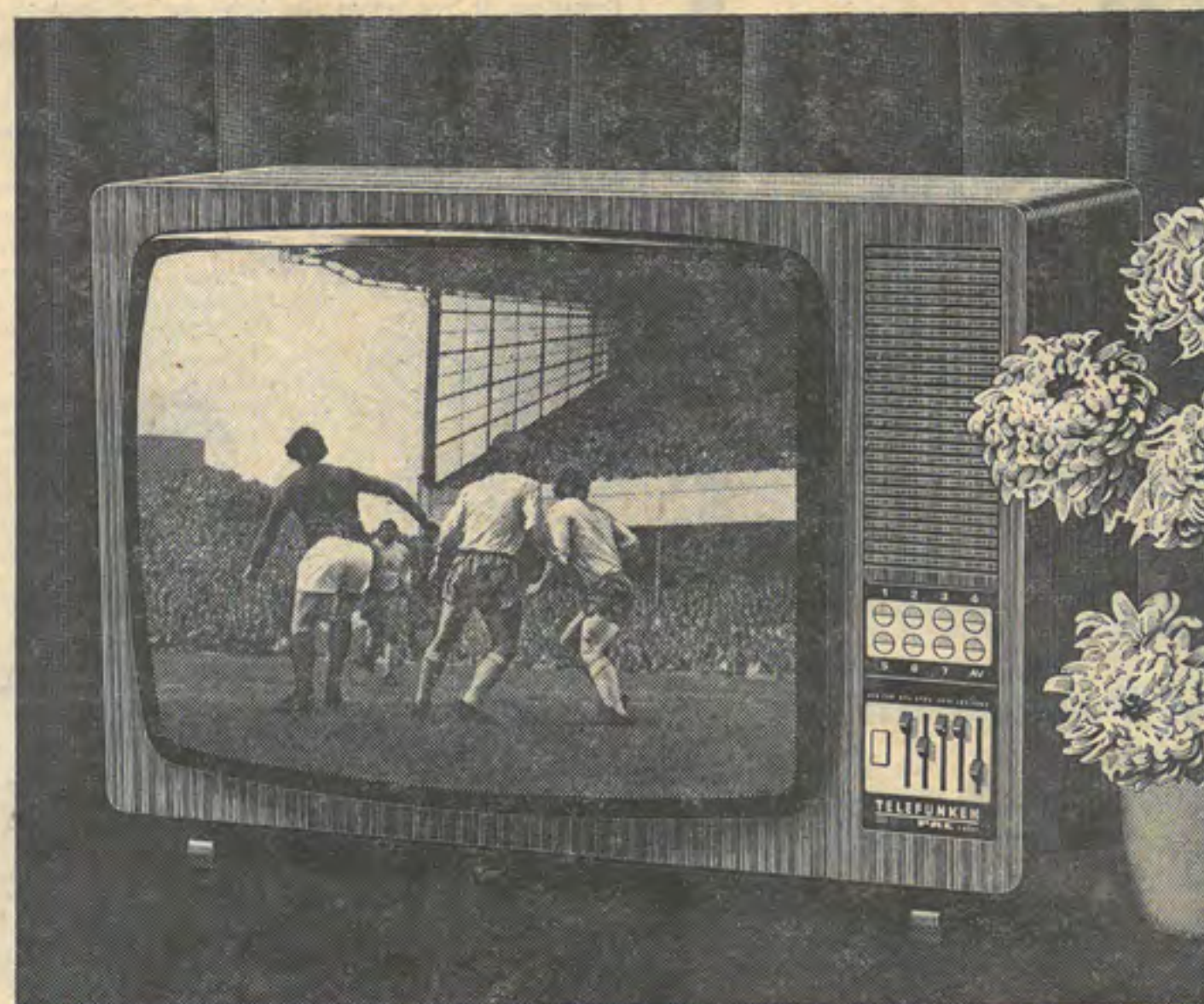
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Kevin McHugh played John Millington Synge in the RTE colour production *That Rooted Man*.



Eddie Joynt . . . 'a good receiving installation is essential.'

ADJUSTING YOUR SET

Eddie Joynt, Senior Engineer, Reception Investigation, R.T.E., explains how viewers may get the best colour television reception.

THE TELEVISION receiver, whether black-and-white or colour, will produce results only in accordance with the input signal. A good receiving installation is therefore essential. The aerial must be designed for the channel in use, the polarization must suit that of the transmitter while the gain and orientation of the aerial will depend on the viewer's location. These, of course, are matters with which the television dealer will be familiar and on which he will provide suitable advice.

Pollution, wind and rain all take their toll on aerials and cables alike, making maintenance just as important as the initial purchase. Broken aerial elements, corroded joints and ageing water-logged cables all contribute to poor-quality pictures. So, before complaining about poor reception, take a look at the receive installation and see if it is still in good condition. Remember if you adopt the attitude "Ah, it will do" you will be the only one to suffer.

When using a wired system, the viewer need not worry about aerials and cables but the system operator must. The same principles apply but the system operator can be far more selective in choice of

site and can afford to erect a much more elaborate aerial system to ensure optimum results.

Having stressed the importance of a proper receive installation let us now concern ourselves with the colour receiver and the advice given by the television dealer. Particular attention should be paid to his advice with regard to locating the colour receiver. For example, positions where bright light, natural or artificial, falls directly on the screen should be avoided. The diluted or 'de-saturated' colour which would result is unfortunately too often seen when sets are demonstrated in shop windows or badly positioned in the local pub.

The receiver is, generally speaking, better left alone after it has been adjusted to one's satisfaction by the television dealer at the time of installation. However, the inevitable happens and it is as well to know what to do in the case of the viewer's controls becoming maladjusted. If you are unsure about these controls check with your dealer.

Where a customer control for fine tuning is provided on the front of the receiver, fine-tune the set so that the best combination of vision and sound is received.

When colour is visible this operation is somewhat easier as, if the control is adjusted too far in one direction, the colour will disappear and, if too far in the other direction, a pattern or loss of picture will result. With the tuning complete, the next step is to reduce the colour content by use of the colour control or, if a colour switch is provided, to remove it altogether. Brightness and contrast should then be adjusted for a good black-and-white picture. When this is achieved the colour is switched on, that is, if a switch is provided, and the colour content is increased by means of the colour control to suit the viewer, using facial or skin tones as a guide. If you are still dissatisfied, having carefully gone through this procedure, ask your dealer for further advice.

When the receiver has been adjusted to your satisfaction, resist the temptation to continually adjust the controls, particularly when sudden loss of picture, colour or sound, occurs. Remember it may not be your receiver that is at fault and a quick check with your neighbours, if things do not return to normal in a short time, will indicate the proper action to take.

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The Onedin Line, starring Anne Stallybrass and Peter Gilmore, was one of the popular imported series shown in colour by RTE.