Abstracts

Abstracts of papers appearing in other journals, chosen for their importance and timeliness, are published in the *Journal* from time to time. Most of these abstracts are translations, chiefly from the U.S.S.R., and are made available to the *Journal* by the Research Laboratories of the Eastman Kodak Company. As a rule, translations are made of the foreign language abstracts, not of the paper itself. The respective complete original texts can be consulted at some libraries. Current issues of *Tekh. Kino i Telev.* can be consulted at, or borrowed from, the Society's Headquarters Office.

Those requiring definitive and thorough searches of current literature and patents are referred to *ABSTRACTS of Photographic Science & Engineering Literature* (*APSE*), published monthly by the Engineering Index, Inc., 345 East 47 St., New York, N.Y. 10017, with the editorial cooperation of the Society of Photographic Scientists & Engineers.

The subject areas are grouped below:

- Cameras and Equipment (Except High-Speed)
- Cinematography (Underwater)
- Film and Its Properties
- Film Processing (Color)
- General
- High-Speed Photography
- Lamps and Lighting
- Projection
- Sensitometry
- Sound Effects
- Television
- Tests and Measurements

CAMERAS AND EQUIPMENT (Except High-Speed)

Noise and Steadiness in 35mm Motion-Picture Cameras, *Brit. Kinemat., 43:* No. 3, 94–96, Sept., 1963.

At a meeting held on September 11, the Camera, Special Effects, and Processing Committee of the British Film Producers Association discussed noise and steadiness in 35mm motion-picture cameras. The discussion centered around register pin cameras of the Mitchell or Newall type.—R.F.F.

Improvement in the Distribution of Exposure Over the Frame in a Camera With Focal-Plane Shutter (In Russian), N. T. Zakaznov, *Optiko-Mekhanicheskaya Promȳshlennost'*, 46–51, No. 1, 1963; *Tekh. Kino i Televideniya, 7:* 86, Sept. 1963.

The problems of a theoretical basis for improving the distribution of exposure over the frame are discussed. It is concluded that a reduction in the unevenness of exposure over the frame in cameras with focal-plane shutters would have to be brought about by the greatest possible increase in the path of travel of the shutter in combination with the use of a spring drive.—S.C.G.

The Distribution of the Effective Exposure in Photographic Cameras (In Russian), E. T. Dubatovko, *Optiko-Mekhanicheskaya Promȳshlennost'*, 36–45, No. 1, 1963; *Tekh. Kino i Televideniya,* 86, Sept., 1963.

Problems are discussed connected with the distribution of the time of the passage of the light. This quantity is defined as the time during which light passes through a given point of a plane in which the exposing elements (discs, blinds, etc.) move. It is shown that with small dimensions of the cross section of the light beams in the plane of the shutter the distribution of effective exposure is the same as the distribution of the time of passage of the light.—S.C.G.

CINEMATOGRAPHY (Underwater)

Underwater Pinpoint Photography, Harold E. Edgerton, *SPIE Journal, 2:* No. 1, 3–5, Oct./Nov., 1963.

Lowering a camera to a position just above the sea floor is a critical operation. The "pinger" method of camera-to-bottom positioning has proved to be an excellent technique. A sonar transducer on the camera sends one sound signal directly to the surface, and another to the bottom. The bottom signal, reflected from the sea floor, rises to the surface where its delayed arrival time is measured against the camera signal beamed to the surface. An Alden recorder is used to record direct or reflected signals received.

FILM AND ITS PROPERTIES

A 16mm Title for Overlay Printing, R. F. Ebbetts, *Brit. Kinemat., 43:* 69, Aug. 1963.

Fine-grain motion-picture positive film is recommended as a material on which to obtain, by reversal processing, titles with clear letters on a dark ground of density above 3.0.—G.I.P.L.

FILM PROCESSING (Color)

The Control of a Color Process, C. T. Davies, *Brit. Kinemat., 43:* No. 3, 84–93, Sept., 1963.

Apart from the very necessary ancillary processes of fixing, bleaching, hardening and dye stabilization, the processing of a color film involves the relatively complex chemical reactions necessary for dye formation. Factors subject to direct control in the laboratory may be listed as follows: (1) Temperature of the solutions; (2) Concentration of the reactive chemicals in the solutions; (3) The rate at which the chemicals are replenished; (4) Machine speed, i.e., time of immersion; (5) Relative humidity and temperature of the drying cabinet; (6) Control of printer illumination; and (7) Mechanical control.

GENERAL

Graphite Pore Structure Evaluation by Serial Section Kinematography, J. W. Stammers, *J. Phot. Sci., 11:* 351–354, Nov./Dec. 1963.

The method and techniques employed in the investigation of the pore structure of graphites by serial sectioning combined with cinemicrography are discussed. Some of the simpler problems associated with the working of graphite samples to a good finish and yet with reasonable speed are also reviewed.

Effect of Magnetic Blowing on the Arc Quenching Period in Alternating Current Circuit-Breakers, D. Domonkos, *Periodica Polytechnica—Elektrotechnik, 66:* 125–147, No. 2, 1962.

Magnetic arc blowing plays an important part in a large group of low voltage circuit-breaker switch gear. The induction of the blowing magnet enhances the rate of growth of the voltage across the arc and decreases the back-striking voltage. In the quenching of the arc the back-striking as well as the thermal relations are of importance. The arc can be quenched at very low currents when, after back-striking, the conditions that would maintain it disappear.

With a given blowing magnet the arc duration is expressed by

$$t = AI^{-0.5}$$

Constant A varies almost reciprocally with the number of blowing magnet turns. At critical current the duration of the arc is 3 to 4 times that measured at maximum current density.

HIGH-SPEED PHOTOGRAPHY

Effective Exposure Time in High-Speed Cameras (In Russian), G. I. Belinskaya, *Zhur. Nauch. i Priklad. Fotografii i Kinematografii, 8:* 370–74, No. 5, Sept./Oct., 1963.

Two determinations of effective exposure time in high-speed cameras are considered. One determination, which provides for a time parameter called the "effective exposure time," starts out from the operation of the light shutter, depending only on the optical-mechanical characteristics of the apparatus. In the second determination, a time parameter called the "real exposure time" by the author (more correctly "photographically effective exposure time") is proposed. This parameter depends both on the operation of the shutter and on the properties of the photographic material. The first definition of the time parameter is introduced as the basic characteristic of the shutter, while the second is the characteristic of the combination of shutter and photographic material.

Formulae are derived for determining the photographically effective exposure time by utilizing the whole of the characteristic curve of the material. These formulae are used for setting up nomograms which allow the determination of photographically effective exposure times. Calculated effective exposure times for different shapes of shutter aperture are given.—S.C.G.

LAMPS AND LIGHTING

Working with the Xenon Light Source of the "Sibir'" Motion Picture Projector (In Russian), V. Krivtsun, *Kinomekhanik,* 33–36, Apr., 1963.

The constructional details of the xenon-arc light source of the Sibir' motion-picture projector are discussed. Recommendations are given for the adjustment of the light source and the reflector. A description is given of the power supply.—S.C.G.

for information only,

a new color film:

Elimination of Emulsion "Melting" on 76-mm Film Prints (In Russian), B. Korovkin, *Kinomekhanik*, 32–34, Mar.) 1963.

The increased light flux in two Soviet 16mm projectors has presented problems. The air flow in the film gate is inadequate to prevent evaporation of moisture from the emulsion, which condenses to form drops of hot water which damage the film where they fall on it. The measures which have been taken to overcome this difficulty by redesigning the film gate are described.—S.C.G.

Modern Light Sources for Motion Picture Projection (In Russian), G. Irskiĭ, *Kinomekhanik*, 25–32, Mar.) 1963.

A review is given of modern types of arc lamp, including the xenon arc, and of new types of incandescent lamp with mirror envelopes.—S.C.G.

PROJECTION

Performance of 16mm Portable Sound-and-Picture Cinematograph Projectors, *B.S.I. News*, 27, Dec., 1963.

Specifies certain requirements for 16mm portable cinematograph projectors with optical and/or magnetic sound reproduction, such as are used for audiences up to 200 people. It does not deal with the details of mechanical and electrical design except in so far as these may affect performance or convenience in use. It specifies such requirements, and prescribes such tests, as will ensure a satisfactory picture and sound performance, safety, and film life.

SENSITOMETRY

Practical Motion Picture Sensitometric Control, L. J. Wheeler, *Brit. Kinemat., 43:* 36–51, Aug., 1963.

A simplified method of sensitometric control has been established and tests show that, to obtain consistent results, the following points must be watched: (a) Batch-to-batch variations in developing solution concentration; (b) variation in volume of "unit-packed" developer supply; (c) accurate dilution of the concentrated solution; (d) batch-to-batch variations in photographic speed of the film stock, particularly telerecording Type 8374; (e) exact setting of lamp voltage in the sensitometer; (f) constant checking of the developer temperature in the processing machine; (g) precise adjustment of film loop length in the developing solution; (h) accurate control of processing-machine speed; (i) accurate calibration of the densitometer each time it is used and repeated calibration during long periods of constant use; (j) accurate interpretation of density measurements and careful plotting of these measurements.

Under present conditions and including all operationl tolerances, films nominally processed to a gamma of 0.65 are held within ±0.04, while films nominally processed to a gamma of 1.0 are held within ±0.06.—G.I.P.L.

SOUND EFFECTS

Radiophonics in the BBC, F. C. Brooker, *BBC Engineering Monograph, No. 51:* 5–19, Nov. 1963.

The term "radiophonics" is taken (in the BBC at any rate) to mean the production of sounds from natural or artificial sources to convey the mood of a broadcast program, but not the creation of musical compositions as such. This monograph describes the BBC's Radiophonic Workshop, the type of work which it undertakes, and the equipment used to create the desired sounds. Since the end product is almost invariably a tape recording, much of the equipment is necessarily concerned with the manipulation of tape recordings using fairly standard equipment. However, in order to carry out some of these manipulations, several ancillary pieces of equipment have specially developed and these are described. The electronic gunfire effects generator is also described, although it is not strictly a part of the equipment of the Radiophonic Workshop; it was developed for direct, or "spot," effects in studios some years before the workshop came into being.

TELEVISION

The Calibration of VHF and UHF Field-Strength Meters by Means of a Standard Field Generator, B. J. Spencer, *Marconi Review, 26:* No. 149, 171–181, Second Quarter 1963.

Experience has shown the need for extreme care in the checking and calibration of field-strength meters in order to achieve satisfactory overall accuracy. In general there are two methods of calibration. In one of these the constants of the individual parts of the apparatus are measured, e.g. gain of aerial, feeder attenuation, receiver response, etc. These constants are then lumped together so that the field in which the aerial is immersed can be determined from the receiver response.

The second is known as the "standard field method," in which the aerial is immersed in a known field and the apparatus is calibrated as a whole. The method may be subdivided according to the way in which the field is determined. The field may be measured using a standard aerial and detector, and this may be called "the standard receiver method." Alternatively the field may be determined from the path geometry and measured ground constants, using a standard transmitter. This is the "standard generator method," which is described.

If independent level standards are employed in calibrating a field-strength meter by standard field and step-by-step methods, and the results agree, considerable reliance can be placed upon the instrument.

Determination of the Power Radiated From a Long-Wave Aerial by Field-Strength Measurement, G. Millington and B. J. Spencer, *Marconi Review, 26:* No. 149, 132–143, Second Quarter 1963.

At low frequencies for which an aerial structure may be only a small fraction of a

The old-fashioned "mix-and-mess" of bulk chemicals can go right in the ash can. Hunt research brings you a totally new concept for processing B & W cine reversal film, **CINE LIQUID CONCENTRATES.** A complete all liquid system for reversal processing, it takes the guesswork out of "mix-it-yourself" chemistry and does away with the waste of bulk chemical inventories. The Cine Liquid system includes ■ **Cine Liquid 1, Reversal First Developer,** ■ **Cine Liquid 2, Reversal Bleach Solution,** ■ **Cine Liquid 3, Reversal Clearing Solution,** ■ **Cine Liquid 4, Reversal Redeveloper.** At last the problem of developer degradation has been overcome through the exclusive Hunt patented Developer Activator*. By simply adding the Hunt Developer Activator* to Cine Liquid 1 (First Developer) or Cine Liquid 4 (Redeveloper), the user is guaranteed a ready-to-use factory-fresh solution regardless of how long the concentrate has remained in inventory. When using Cine Liquid Concentrates, you'll find them in easy-to-handle 5-gallon Cubitainers, each of which produces 20 gallons of consistent working reversal chemicals. Insure a successful finish to the processing cycle by using Flash-O-Graph®, the perfect companion fixer for this system. For more detailed information write for Photographic Information Bulletin No. 11.

*U.S. Patent 3038801—Foreign Patents Pending

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wavelength in height the radiation resistance may be small compared with the loss resistance comprising the conductor and earth resistances. It is then difficult to find the radiated power accurately from measurements of the input power and terminal impedances. If the field set up at a distant point is seriously below the value assumed in designing the transmitter and aerial system, it is difficult to know whether the discrepancy is due to a poor estimate of the radiated power required, or to uncertainties in deducing the radiated power from measurements made at the transmitter. This article deals with the measurement of the actual radiated power by a field-strength survey in a region around the transmitter using a specially designed transitorized measuring set under conditions where simple Hertzian dipole theory for a plane perfectly conducting earth can be applied.

The Plane of Polarization as a Factor in VHF and UHF Broadcasting, M. W. Gough, *Marconi Review, 26:* No. 149, 117–131, Second Quarter 1963.

The prevailing preference for the use of horizontal polarization in the vhf and uhf bands both in broadcasting systems and in point-to-point links has prompted a critical appraisal of the consequences of this policy from the propagation viewpoint. Attention is focused on those regions within the visual range where destructive interference between direct and surface-reflected waves may cause deep nulls wherein the field-strength is much below the desirable "free space" value. Consideration of representative frequencies in the broadcast bands I-V inclusive shows that the use of vertical polarization—rather than horizontal—can confer a substantial increase in field-strength in the nulls (particularly for oversea paths), under practical conditions.

Long-Range Interference in Band III, C. E. Parkinson, *Marconi Review, 26:* No. 149, 107–116, Second Quarter 1963.

An analysis of field-strength measurements, recorded in Hereford, of Mendlesham and Chillerton Down I.T.A. transmissions is given, as a means of assessing the probable levels of co-channel interference which would be experienced by an ancillary television station broadcasting in Channel 11. The results are compared with those from similar surveys which have been summarized in C.C.I.R. Document 64. The correlation between the incidence of high signal levels and anticyclonic weather conditions is demonstrated.

Vertical Aperture Correction Using Continuously Variable Ultrasonic Delay Lines, *BBC Engineering Div. Monograph,* No. 47; May, 1963.

Part I of this monograph describes the principle of operation, construction, and calibration of a simple vertical aperture corrector which has been made possible by the use of ultrasonic delay lines. The performance of this aperture corrector and some of the problems involved in the design of an operational version are discussed. The method of calibration is based on a 'Calibration Factor' obtained

by a simple and convenient pulse procedure. It is shown that the steady-state amplitude/frequency characteristic, and also the effect of the aperture corrector on signal-to-noise ratio, can be determined from this factor.

In Part II the construction and characteristics of an ultrasonic delay line using mercury as the transmission medium are discussed in some detail, and an experimental variable delay unit suitable for a 405-line television system is described. There is an account of the difficulties encountered in constructing the video delay unit and some indication is given as to the possibility of extending the use of the line to television systems requiring a higher video bandwidth. In addition to its use in the vertical aperture corrector, such a unit may have other television applications.

Radio-Wave Propagation and the Planning of VHF and UHF Sound and Television Services, G. A. Vickers, *The Marconi Review, 26:* No. 149, 55–92, Second Quarter 1963.

The importance of the detailed planning of vhf and uhf sound and television services if the desired service area is to be achieved within the limited number of available frequency channels and without causing undue co-channel interference is stressed. After a summary of the chief features of radio-wave propagation in these broadcast bands, the field strength requirements for satisfactory reception are reviewed and the relative performance in the three television bands is contrasted.

Since the planning requires a knowledge of the relationship between the radiated power and the field strength at each receiving locality, the various available methods of establishing this relationship are discussed, with special reference to the theoretical or "paper" method used extensively by the Marconi Company. A description is given of the estimation of co-channel interference levels and the preparation of predicted coverage maps, and the article ends with a review of some of the many practical aspects of the planning, including the selection of transmitting sites.

Field-Strength Surveys of VHF and UHF Broadcast and Television Service Areas, G. A. Isted, *Marconi Review, 26:* No. 149, 93–106, Second Quarter 1963.

Notwithstanding the high degree of accuracy attained by prediction techniques in determining the probable performance of vhf and uhf television and broadcast services, practical measurements of field-strength still have most important functions to perform. This article describes principally the techniques used for final measurement surveys; this is followed by a discussion of pilot surveys with the aid of a balloon. The apparatus used for mobile and fixed long-term surveys is described, and some discussion is devoted to calibration, maintenance and automatic recording. The effect of fading signals on the measurements is also discussed, and means are described to meet the problem. The reporting procedure is an important feature of a practical survey, and this is dealt with in the article.

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NEW

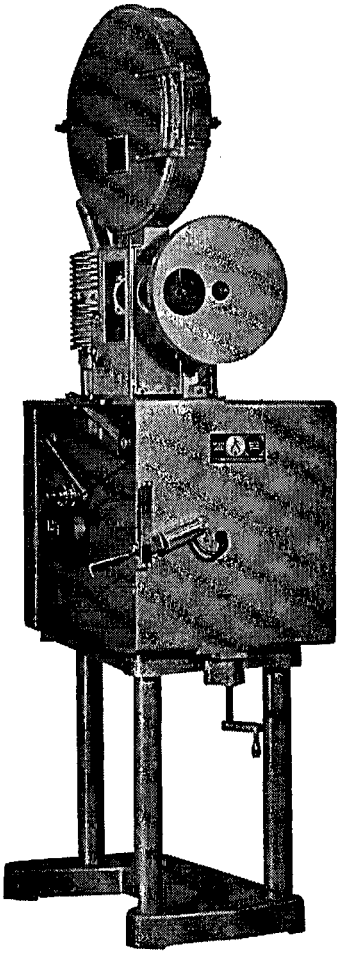
The projector is a converted front shutter Simplex with a two pin intermittent. 16mm or 35/32 film runs at a speed of 144 ft. per minute while 35mm film runs at a speed of 165 ft. per minute.

1. A variac controls the light intensity.
2. A 500 watt lamp is used for 16mm and a 1,000 watt for 35mm (a blower is used to cool the lamphouse).
3. A 2½ inch projection lens is furnished with each unit.
4. A start-stop lever controls the power to the lamp and motor.
5. The magazine and take up core takes up to 3,000 ft. of film.
6. Upper guide rollers are made to handle the film from either direction of the feed reel.
7. A free wheeling take off flange is provided in the magazine.
8. A lamp near the takeup reel permits hand inspection of the film prior to takeup.

NOUVEAU

Le projecteur contient un obturateur Simplex anterieur transformé avec deux clavettes intermittent. Les films de 16mm ou 35/32 tournent avec une vitesse de 144 pieds à la minute, tandis que les films de 35mm tournent avec une vitesse de 165 pieds á la minute.

1. Le regulateur de voltage d'intensité d'eclairage.
2. La lampe de 500 watt est nécessaire pour les films de 16mm, et de 1000 watt, pour les films de 35mm (un ventilateur est mise pour rafraichir la chambre de la lampe).
3. L'objectif de 2½ est instalé.
4. La manette de mise en marche et d'arret controle en meme temps la lampe et le moteur.
5. La boite de films avec noyau peut contenir 3000 pieds du films.
6. La roue supérieure est construite de manière de recevoir le film dans les deux directions, nourrie par la bobine centrale.
7. Une roue est instalée pour libérer rapidement le film de la boite.
8. La lampe se trouve pres de la bobine recepteuse, et donne toute facilité pour inspecter le film a main dans le projecteur.



NUOVO

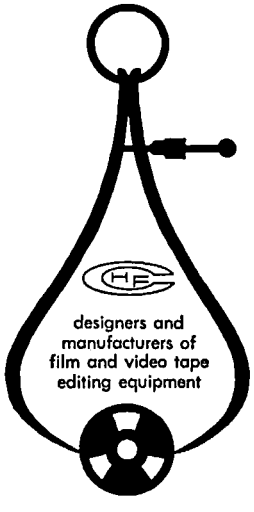
Questi proiettori sono Simplex transformati, otturatore al fronte, meccanismo di scatto di due punte. La velocitá di proiezione in 16 o 35/32mm e di 144 piedi per minuto, e in 35mm, di 165 piedi per minuto.

1. Controllo manuale della luminositá della lampada.
2. Lampada di 500 watt per 16mm e di 1000 watt per 35mm.
3. Obbiettivo di proiezione di 2½".
4. Maniglia per controllo di motore e lampada di proiezione.
5. La cassetta porta pellicola puo contenere 3000 piedi.
6. I rulli superiori di guida sono construiti per operare con film provenente di ambi lati della bobina svolgitrice.
7. Disco con montatura sporgente nel magazzino.
8. Una lampadina illumina la bobina avvolgitrice, permettendo l'ispezione manuale del film prima che si avvolga nel proiettore.

NUEVO

Esta máquina es un proyector simplex convertido, obturador al frente y movimiento intermitente a doble grifa. Para 16mm o 35/32mm, la velocidad fija de proyección es de 144 pies por minuto, para 35mm es de 165 pies por minuto.

1. Un reostato controla la intensidad de la lampara de proyección.
2. Para 16mm se usa una lampara de 500 watt, y una de 1000 watt para 35mm (un chorro de aire ventila las lámparas en ambos casos).
3. Cada unidad está provista de un lente de proyección de 2 pulgadas y media.
4. Una palanca de control opera el motor y la lampara simultáneamente.
5. Capacidad de proyección: rollos de hasta 3000'.
6. Los rodillos de guía superiores operan con la película en ambas direcciones.
7. La tapa de la bobina de carga es desenroscable.
8. Una lámpara ubicada junto a la bobina de toma permite la inspección manual de la película antes que se rebobine en la bobina superior del proyector.



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