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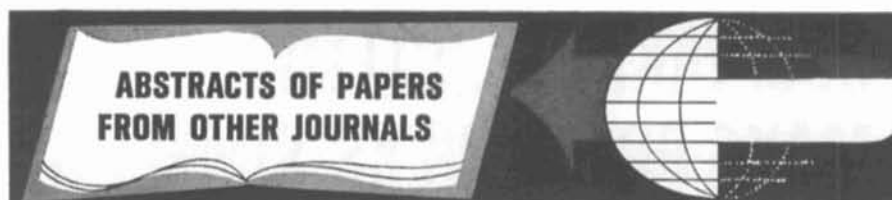
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Abstracts of papers appearing in other journals chosen for their importance and possible value to researchers as well as those of timely interest, are published in the *Journal* from time to time. Many translations of abstracts from foreign journals, chiefly those of the USSR, are made available to the *Journal* by the Research Laboratories of the Eastman Kodak Company. As a rule, translations are made of the abstracts and not of the papers. The journals in which the papers appear can be consulted at some libraries. Current issues of *Tekhnika Kino i Televideniya* 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)*, produced by the Engineering Index, Inc., 345 E. 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
- Cinematography
- Color
- General
- Instrumentation and High-Speed Photography
- Lasers
- Lens Systems
- Light Sources
- Photographic Theory and Materials
- Special Applications
- Television

CAMERAS

Resolving power of variable focus objectives for 8mm motion-picture cameras (in Russian), V. N. Mel'nikov, V. M. Grado-boev, L. P. Freivert, and V. N. Vedernikova. *Tekh. Kino i Televideniya*, 11: 50-56, Apr., 1967.

A large number of variable focus objectives for 8mm motion-picture cameras, made in the Soviet Union and elsewhere, have been tested for resolving power. The results are tabulated and a number of general conclusions are drawn.—S.C.G.

CINEMATOGRAPHY

Light meter for high-speed cinephotomicrographic studies, D. F. Sherony, T. J. Fitzgerald and R. C. Kintner, *Phot. Sci. Eng.*, 11: 124-125, No. 2, March-April 1967.

A light-measuring device suitable for use in high-speed cinephotomicrography is described. It has three scales, two of which are linear and one asymptotic, with incident light. Good exposures were obtained for framing speeds from 16 to 3000 pictures/s.

COLOR

Tristimulus spot colorimeter, H. A. S. Philippart, *BBC Engineering Division Monograph*, 5-17, No. 65, Dec. 1966.

The report describes a photoelectric tristimulus spot colorimeter which measures the three stimuli X, Y, Z, as specified by the C.I.E. (Commission Internationale de l'Eclairage) standard observer, and thus permits simple calculation of the x and y trichromatic coefficients (chromaticity coordinates).

In addition to the usual measurements of the colors of materials, the instrument permits measurements of the colors displayed on cathode-ray tube monitors; no such instrument is commercially available. The sensitivity of the instrument is sufficient to permit the measurement of color at the low luminance levels often encountered in color television pictures. Further, the narrow acceptance angle of the optical system enables the color of small areas to be measured at convenient distances from the object.

The dimensions of the instrument are such that, with a power supply unit and meter, the whole instrument is contained in a portable case 41 cm X 36 cm X 15 cm (16 in. X 14 in. X 6 in.).

First major color feature produced in the Philippines, Luis Nepomuceno, *Am. Cinemat.*, 48: 474-477, No. 7, July 1967.

Lush saga of life in the Philippines is vehicle for use of most modern equipment and filming methods—start of a new creative surge for the Filipino film industry.

GENERAL

Problems of international standardization: the dimensions of motion-picture film (in Russian), N. D. Bernshtein. *Tekh. Kino i Televideniya*, 11: 57-67, Apr., 1967.

In view of a forthcoming meeting of the ISO-TC 36 committee on standardization of motion-picture film, in Moscow (June 1967), a survey is made of the existing national standards and ISO recommendations on the dimensions of motion-picture film, including narrow and wide-gage films as well as standard film. Much of the data is set out in tabular form.—S.C.G.

**INSTRUMENTATION AND
HIGH-SPEED PHOTOGRAPHY**

A method of calculation and study of optical prism compensators (in Russian), G. I. Belinskaya, A. S. Dubovik, and M. S. Gus'kova, *Zh. Nauch. i Prikl. Fot. i Kinemat.*, 12: 113-120, no. 2., Mar-Apr., 1967.

A mathematical analysis is carried out on the formation of an image in a high-speed camera with optical compensation with a

rotating prism. The aberrations of the system and their dependence on the angle of rotation are discussed.—S.C.G.

Development of short-exposure, high-resolution camera with the image orthicon (in German), W. Hlopmann. *Ber. Kernforschungsanlage Julich*, No. 290, 1966, vi, 73pp, ill.; *Ref. Zh., Fotokinetikhnika*, Abstract No. 4.46.56, 1967.

For studying a higher-temperature plasma a high-speed camera has been constructed giving single frames with exposures of 10^{-7} - 10^{-8} s, the shutter being an image-orthicon television tube. A number of problems are considered, regarding the use of television apparatus in high-speed photography and, in particular, the alterations and additions which it is necessary to introduce into standard television apparatus for this purpose. A calculation is made of the influence of the high light flux unavoidable with very small exposures on the destruction of the image, and the calculation is compared with experiment. The connection between the efficiency of the shutter and photo emission of the storage device is shown. From the point of view of the efficiency of the shutter, the optimum shape of the voltage pulse was found to be one with steep fronts and a flat maximum at 500 V; a circuit is described for forming such pulses. In the camera described a resolution of 450 lines is obtained at 10^{-7} s and 200 lines at 10^{-8} s. The efficiency of the shutter is 14×10^3 .—S.C.G. (Translated from *Ref. Zh. Fotokinetikhnika*)

Use of the Isodensitracer for pictorial data, Carlton S. Miller, *SPIE Journal*, 5: 139-146, No. 4, Apr./May, 1967.

The Isodensitracer is a two-dimensional, scanning microdensitometer which rapidly produces density "contours" by means of a cyclic dropped line code. For more than three years this instrument has proven its utility for making rapid photometric and geometric analyses of photographic imagery for such diverse applications as moon mapping, spectrum analysis, and medical x-ray interpretation.

Critical parameters and metric performance of image-orthicon tubes, Walter E. Woehl, *SPIE Journal*, 5: 150-154, 176, No. 4, Apr./May, 1967.

The high radiometric sensitivity of the image orthicon and the digital video signal processing have made the image tube very valuable for measuring positions versus time, spectral dispersion, and radiometric data on space objects and missiles. In order to derive meaningful data, assessment and calibration of critical tube parameters are necessary. Some examples are given, and test methods and results described.

The application of high-speed cinematography to the study of the kinetics of melting and oxidation of the electrode metal in arc welding (in Russian), A. A. Erokhin in "Eksperim. tekhn. i metody vysokotemperaturnykh izmerenii" (Experimental techniques and methods of high-temperature measurements). Moscow, Nauka, 1966, pp. 113-16; *Ref. Zh., Fotokinetikhnika*, Abstract No. 4.46.230, 1967.

A method for the study of the kinetics of drop melting of an electrode is proposed. In

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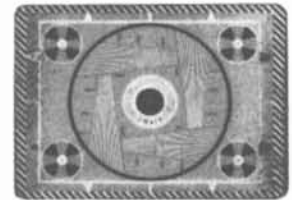
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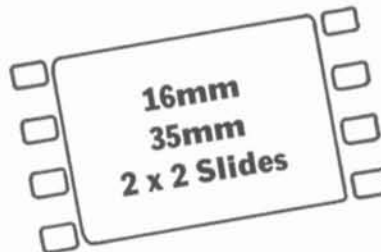
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many cases it is adequate to carry out the cinematography at a frequency of 1000 to 4000 frames/s with aid of a SKS-1 camera and MZ-2 panchromatic fine-grain film. Experiments made by this method have confirmed the supposition of a slowing down of the rate of growth of a drop with time and have allowed the numerical values of the parameters of the melting process to be determined.—S.C.G. (Translated from *Ref. Zh., Fotokinetika*).

A high-speed motion-picture camera with a strip frame (in Russian), I. A. Chernyi and L. Shmel'kin. *Zh., Nauch. i Prikl. Fot. i Kinemat.*, 12: 173-79, No. 3, May-June, 1967.

The camera described takes pictures with a frame size of $4.5 \times 150\text{mm}$ (aspect ratio 1:33) on a standard 190mm film, perforated both sides, in cartridges containing 60mm of film. It will take 12,000 frames with one loading in times ranging from 25 to 4,000 s, according to the frame frequency, which may be varied from 30 to 500 frames/s. The motion of the film is discontinuous, the film being advanced one perforation at a time (4.75mm).—S.C.G.

LASERS

Laser applications, Theodore H. Maiman, *Physics Today*, 20: 24-28, No. 7, July 1967.

Unique properties have made the laser an important scientific tool in applications ranging from studies of plasma light scattering and of nonlinear phenomena to the development of instruments for photography and interferometry.

LENS SYSTEMS

Effect of chromatic aberration on the resolving power of photographic objectives, Francis E. Washer, *Jour. Optical Soc. Am.*, 57: 625-629, No. 5, May 1967.

An empirical method for estimation of probable resolving power of a lens affected by longitudinal chromatic aberration is discussed. Values of the resolving power at a series of values of the f -number are calculated for selected values of longitudinal chromatic aberration, d_c . The variation of resolving power with f -number is presented graphically for selected values of longitudinal chromatic aberration and relative contrast. Indication is given of a critical aperture for which the resolving power is a maximum for a given set of values of chromatic aberration and relative contrast. The variation of relative contrast with resolving power is presented graphically for several values of the f -number for a lens having selected amounts of longitudinal chromatic aberration. A method for predicting the resolving power of a given lens-film combination is also indicated.

Gabor's theorem and energy transfer through lenses, A Walther, *Jour. Optical Soc. Am.*, 57: 639-644, No. 5, May 1967.

A theorem is proved which relates the number of degrees of freedom in the image space of any lens to the light-gathering effectiveness of the lens. Under appropriate approximations this theorem is equivalent to Gabor's expansion theorem. If the number of degrees of freedom is small, these

approximations are not warranted and true superresolution becomes a possibility.

LIGHT SOURCES

Carbon arc in a controlled atmosphere as a radiation standard, Robert R. Jayroe, Jr., and R. G. Fowler, *Jour. Optical Soc. Am.*, 57: 513-516, No. 4, April 1967.

The carbon arc in argon, even at atmospheric pressure, possesses excellent qualities as a radiation standard, in comparison with which the so-called standard arc in air is much inferior. A further improvement is to be expected if the rapid intensity fluctuations common to all forms of the arc can be overcome. In its most easily attainable form, the arc is free from band structure and capable of a crater temperature of about 4300 K, under elevated pressure.

PHOTOGRAPHIC THEORY AND MATERIALS

An automated technique for deriving MTF's from edge traces, Robert A. Jones, *Photo. Sci. Eng.*, 11: 102-106, No. 2, March-April 1967.

An automated edge-gradient technique has been developed for fast, accurate determinations of the modulation transfer functions (MTF) of photographic systems. Photographic edges resulting from brightness step edges in the object plane are obtained from either laboratory exposures or normal operational exposures. A digitized microdensitometer is used to scan the edges and sensitometric exposures. A computer program directs a high-speed computer to accept the edge-scan data, produce the proper microdensitometer correction, perform the nonlinear sensitometric conversion, obtain the smooth spread function, and determine the MTF. The technique has been tested using both artificial and experimental edges and found to operate reliably.

Photocharge process, J. Gaynor and G. J. Sewell, *Photo. Sci. Eng.*, 11: 204-211, No. 3, May-June 1967.

A new image recording process based on the use of a deformable photovoltaic thermoplastic medium is described. To record, these photosensitive films are exposed to a light image and quickly heated to their flow point to permit deformation to occur. Reheating for longer periods of time erases the image. Thus, reuse is possible. Presensitization by electrostatic charging is not required. Deformed images are projected with schlieren optics. A potential mechanism for this new process is discussed. However, sufficient experimental evidence for a definite assignment is still lacking. The effects of light intensity, wavelength and film thickness on sensitivity are shown and current photographic characteristics such as gamma, resolution, gray scale, and reuse are presented.

Film-grain noise in wavefront-reconstruction imaging, J. W. Goodman, *Jour. Optical Soc. Am.*, 57: 493-502, No. 4, April 1967.

A fundamental limitation to the quality of wavefront reconstruction images is noise generated by the granular structure of the recording medium. Predictions of the signal-to-noise ratios that can be achieved in

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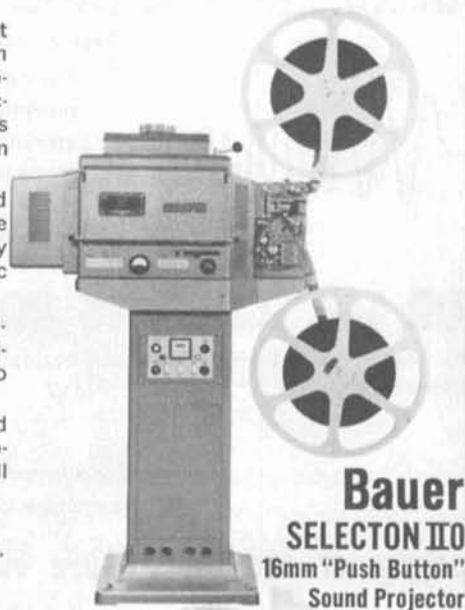
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wavefront reconstruction imaging are based on the checkerboard and overlapping circular-grain models of the recording medium. When the object consists of a multitude of resolvable point sources, the signal-to-noise ratio is found to be proportional to space-bandwidth product of the recording medium; when the object is a diffuse surface, the signal-to-noise ratio is found to be independent of that space-bandwidth product. The quantum limit to signal-to-noise ratio is approachable only with a judicious choice of reference exposure and a recording medium free of other classical noise sources.

Image characteristics in Kodak Bimat Transfer Film Processing, II. Image structure, L. W. Tregillus, *Jour. Photo. Sci.*, 15: 129-136, No. 3, May/June 1967.

Strong edge effects, leading to crisp image detail, are found in negatives which are diffusion-transfer-processed by means of Kodak Bimat Transfer Film. The positive images simultaneously formed in the Bimat Transfer Film have soft edges. The sharpness of the positive image can be increased (1) by increasing the physical development rate to promote the deposition of transferred silver on nuclei closest to the emulsion surface of the Bimat Transfer Film; (2) by allowing transfer to occur only until sufficient positive density is formed, and (3) by maintaining a minimum separation between the silver halide layer of the negative and the emulsion layer of the Bimat Transfer Film, such as by restricting the swell of the anti-abrasion overcoat of the negative.

SPECIAL APPLICATIONS

Spatial frequency response of flying-spot-scanner systems, Carl F. Shelton, *SPIE Jour.*, 5: 155-158, 159-160, No. 4, April/May, 1967.

The spatial frequency response of a CRT flying-spot-scanner system is discussed and film plane modulation response is calculated for response to periodic sine wave, square wave, and isolated Gaussian line signals on the input film. The effects of digital sampling on the spatial frequency response of a digital flying-spot-scanner are also derived from the digital sampling theory. The modulation response is then presented in terms of the film plane parameters for both analog and digital scanning systems and parametric trade-offs are discussed in terms of meeting performance requirements.

Optical aberration in stereo, R. J. Ondrejka, *Photogrammetric Eng.*, 33: 620-625, No. 6, June 1967.

Two techniques — the Hartmann Plate and Foucault Knife-Edge — are presented stereoscopically and evaluated photogrammetrically. In the Hartmann test for spherical aberration, the collimated light presented to the lens under test is divided into "bundles of rays" by passing it through a symmetrical array of holes in an opaque plate. The two photographs, viewed stereoscopically, visually display the different focus positions of rays passed through the various zones of the lens. In the Foucault Knife-Edge test, the pinhole and knife-edge stations are separated and interchanged,

photographically recording the illumination front at each of the knife-edge locations. When the photographic images are viewed stereoscopically, a three-dimensional "impression" of the optical wave front can be observed.

Further developments in the photography of two-phase gas-liquid flow, C. R. Arnold and G. F. Hewitt, *Jour. Photo. Sci.*, 15: 97-114, No. 3, May/June 1967.

Equipment and techniques for photography of two-phase flow are described. The application of photography to the determination of flow patterns, to the study of climbing and falling liquid film systems and to the study of two-phase flow accompanied by vapour generation, is discussed. The work has included the use of x-radiography, the use of microscopic techniques in studying the interface of a falling film, the use of axially directed photography in evaluating climbing film flow and the use of photography in studying droplet mass transfer.

Variable anamorphic optics for varioscopic cinematography (in Russian), V. G. Komar, A. G. Boltyanski, and F. S. Novik (NIKFI, Moscow). *Tekh. Kino i Televideniya*, 11: 3-13, Apr., 1967.

A new optical device has been designed by NIKFI with the collaboration of the Central Design Office for Cinematography. It is a double variable anamorphic system which allows the anamorphic coefficient to be altered continuously over the range 0.5 to 2, the optical enlargement remaining constant by area. Calculations and the study of models and prototypes show that these devices give images of the necessary quality, and may serve as the basis for the design of systems of varioscopic cinematography.—S.C.G.

TELEVISION

Television wired broadcasting systems, R. I. Kinross, *Radio and Electronic Eng.*, 33: 369-383, No. 6, June 1967.

The paper outlines the growth of television wired broadcasting in the United Kingdom. After considering the fundamental problems involved in the use of video HF and VHF frequencies, it describes the way these problems have been solved for HF and VHF systems. Brief descriptions of practical HF and VHF systems are given and this is followed by a comparison of the relative costs of these two systems. It is concluded that, if a large selection of a town is to be wired, the HF system is the most economical overall. Blocks of flats in a town that has no HF distribution system can most economically be dealt with by a VHF system. Various borderline cases in between the two extremes are dealt with.

The precautions necessary for distributing color television are mentioned, and suggestions made for appropriate tolerances to which wired broadcasting operators should work. Finally, the author gives some indication of the way in which wired broadcasting may develop in the future.

Indoor hockey arenas lighted for color TV, David W. Frick, *Illuminating Eng.*, 42: 289-293, No. 5, May 1967.

A report on the lighting requirements for

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color telecasting of league hockey games, based on an investigation and study made for the Canadian Broadcasting Corporation.

Simultaneous transmission of two sound channels in television, Saburo Yamane and Yukoh Fujii, *NHK Technical Research Laboratories, Serial No. 109*, 1-17, March, 1967.

The simultaneous transmission of two sound programs for television broadcasting may be employed in various services, such as the broadcasting service in a country using multilanguages, simultaneous broadcasting service of foreign films in the original and translated languages, and international program exchange service.

Although various methods are conceivable in order to embody the above-mentioned transmission system, a group of frequency-divided systems is considered to be most attractive. On this ground a series of experiments on this system were conducted, and it was revealed that FM_M-FM and SSB_{BIL}-FM systems are most suitable for these frequency-divided systems.

Problems associated with color television, C. B. B. Wood, *Phot. Jour.*, 107: 193-98, No. 6, June 1967.

Color television receivers have displays limited in brightness range, and which are used in high levels of ambient lighting, so that films made for optical projection appear lacking in shadow detail. A more suitable film for color television use should have

lower contrast in the light tones relative to the shadows.

Poor matching of the color sensitivity of telecine equipment with the film's dye transmissions, and unwanted absorptions of the dyes, lead to cross-modulation of the electrical signals, giving poor color saturation. A method of electronic correction to remove this cross-modulation is mentioned.—C.W.H.

Wired television systems, R. P. Gabriel, *Int. Broadcast Eng.*, No. 25, 413-420, Oct. 1966.

Their economics and details of systems for pay TV and audience measurement.

Motion perception using oscilloscope display, C. F. Hempstead, *IEEE Spectrum*, 3: 128-135, No. 9, Sept. 1966.

A new type of stimulus generator has been designed and built to investigate some of the properties of the eye-brain perceptual mechanism and how it operates to perceive and interpret motion. Several time constants of the eye-brain have been measured, and their relations to other known time constants have been interpreted. Some time constants are associated with the brain and others with the retina, but all appear to interact with each other and with time constants of comparable magnitude that may occur in practical visual display systems. The application of this information to the design of practical systems is discussed briefly.

current literature



The Editors present for convenient reference a list of articles dealing with subjects cognate to motion-picture engineering published in a number of selected journals. Photostatic or microfilm copies of articles in magazines that are available may be obtained from The Library of Congress, Washington, D.C., or from the New York Public Library, New York, N.Y., at prevailing rates.

American Cinematographer

vol. 47, no. 12, Dec. 1966

Meeting the Challenges of Underwater Cinematography (p. 822) *Christopher Swann*

vol. 48, no. 1, Jan. 1967

Ray Bradbury Speaks on "Film in The Space Age" (p. 34)

How Technology From the Moon Will Advance Photography on Earth (p. 48)

vol. 48, no. 2, Feb. 1967

Filming the Greatest Parade in the World (p. 102) *William E. Brusseau*

What You Should Know About 16mm Workprint Editing (p. 112)

Reviewed by the SMPTE Advisory Committee on Special Effects in Motion Pictures: Herbert Meyer, Chairman, Russell Brown, Thomas G. Fisher, Jack Froehlich, Max Hankins, Ub Iwerks, Ivan Martin, Bob Matthey, Frederic L. Ponedel, John Roche, J. Edward Stembridge, Edward Stones, Virgil Summers.

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