Abstracts

Abstracts from other Journals, chosen for importance and timeliness, are published in the *Journal* from time to time. The greater number of these abstracts are translations, chiefly from the U.S.S.R., and made available by the *Kodak Monthly Abstract Bulletin*.

CAMERAS AND EXPOSURE

The Krugorama Motion-Picture Camera

The Krugorama camera is intended for taking films for the new circular panoramic motion-picture theater. It consists essentially of eleven synchronized 35 mm. motion-picture cameras arranged in a circle. (S. C. G.)—O. V. Peschans.ii *Tekh. Kino i Televideniya*, pp. 58–60, June 1959.

COLOR PHOTOGRAPHY

A Method of Practical Testing of Color Negative Films

To supplement the usual sensitometric tests carried out in production, a practical test of color negative films is suggested in which a standard test-object, made up from colored objects in a three-dimensional arrangement, is filmed under standard lighting conditions. A positive film is printed from the developed negative and is inspected. Exposure and processing are carefully controlled. (S. C. G.)—I. B. Gordiichuk. *Tekh. Kino i Televideniya*, pp. 60–67, June 1959.

The Law of the Change of Rate of Color Development With Change in the Properties and Increase of Concentration of Nondiffusing Color Couplers in a Photographic Material. I. The Relation Between the Coefficient of Contrast of a Color Image and the Log Concentration of the Nondiffusing Coupler

A number of considerations lead one to expect the contrast coefficient of the dye image produced by color development to be proportional to the logarithm of the concentration of the color coupler. To test this, a study was made of the dependence of γ on coupler concentration for a high-speed color emulsion, without optical sensitizers, containing different couplers, derivatives of 1,2-hydroxynaphthoic acid, of pyrazol-5-one, and of acylacetic acids, forming cyan, magenta, and yellow dyes, respectively. The linear relationship between γ and log concentration was confirmed for all the couplers studied over the concentration range used, 2 to 16 g per liter of emulsion. (S. C. G.)—V. I. Uspenskiĭ and I. I. Rodionova. *Zhur. Nauch. i Prikład. Fotografiĭ i Kinematografiĭ*, 4:285–88, No. 4, July-Aug. 1959.

HIGH SPEED PHOTOGRAPHY

A Rotating Mirror Camera

A convenient rotating-mirror camera has been devised as an auxiliary to an ammonium dihydrogen phosphate (ADP) Kerr-effect camera. The maximum number of rotations of the rotor is 700 rps., the maximum moving speed of the image on the film is 1 cm per 1.15 microsec., and the superposed time on one frame is about 7 μsec. A diagram of the optical system, and photographs taken with the camera are reproduced. (Author's Abstract)—Y. Wachi. *J. Appl. Physics, Japan*, 28:96–103, No. 2, 1959. (In Japanese, with a table and captions to the figures in English.)

The New "VFK" High-Speed Camera

A description is given of the principles and construction of a high-speed camera with a taking rate of 6000 to 42,000 frames/sec. A strip of film is placed inside an evenly rotating drum. Inside this drum is a second drum rotating around the same axis but at a different speed. On the periphery of the internal drum are placed several series of small objectives forming images of the subject on the light-sensitive layer. The small objectives work on the parallel beams, forming a collimating objective, the front focus of which coincides with the plane of the object being photographed. Mathematical consideration is given to the exposure time of individual frames, and also to the degree of optical compensation obtained. (S. C. G.)—[Translated from *Referativnyĭ Zhur., Fiz.*] J. Hampl. *Jemná mech. a opt.*, 3:89–92, No. 3, 1958. (In Czech.)

A Project for a Camera for Continuous Exposure With a Slit Grid. I. The Working Principles of a Slit-Grid Camera

The type of high-speed camera described uses a grid of transparent parallel slits on an opaque background. The grid is placed in front of a moving sensitized plate or film and several consecutive line images are recorded in the one frame, with sacrifice of detail. The individual images may be reconstituted by projecting the print through the original grid to give either separate pictures or a motion-picture film. The taking frequency and length of total ex-

posure will depend on the ratio of the width of the slit and the distance between slits. Expressions are derived for choosing these magnitudes for a given case. Several possible systems for the relative displacement of image and photographic material are described, and, finally, a description is given of an experimental camera of this type made for a popular science film studio in Moscow. Image displacement is achieved by fixing the film to a rotating disk. Reconstruction of the image can be carried out in the camera itself by means of a special cassette which is attached to the back of the camera in place of the taking cassette. The processed film is mounted on a disk and is viewed through a window, while an image of the grid, illuminated with strong, diffuse light, is projected onto the frame. A film can be made through the viewing window, with a time magnification ratio of approximately 10^7. The camera is specially useful for photographing self-luminous events lasting less than 10^{-4} sec. (S. C. G.)—S. V. Kulagin. *Zhur. Nauch. i Priklad. Fotografiĭ i Kinematografiĭ*, 4:215-221, No. 3, May-June 1959

PROJECTION

An Experimental Setup for Shutterless Motion-Picture Projection With the Xenon Lamp

A short description is given of an experimental laboratory setup for shutterless motion-picture projection of 16mm films with a 1-kw, a-c xenon lamp giving 1500 lumens of useful light flux on the screen. The requirements of the optical system and the xenon lamp are discussed. The lighting characteristics of samples of xenon lamps developed by the Moscow electric lamp factory, and results obtained with these lamps in motion-picture projectors, are considered. (S. C. G.)—[Translated from *Referativnyĭ Zhur., Fiz.*] G. A. Golostenov. *Trudy Vsesoyuz. Nauch.-Issled. Kinofotoinst.* (Moscow), pp. 140-156. No. 13 (23), 1957.

A 15,000-Lumen Lighting System for a Motion-Picture Projector

The lighting system described for a motion-picture projector gives a light flux of 15,000 lumens. A method of calculation is put forward, and results are given, for some variant spheroelliptical and elliptical reflectors. The advantages of an aspherical glass reflector with a given profile are noted. The necessary light flux is achieved by means of a high-intensity arc with special carbons. The characteristics of Soviet and foreign lighting systems are set out and compared. The 15,000-lumen lighting system corresponds to the best in contemporary motion-picture projectors. (S. C. G.)—[Translated from *Referativnyĭ Zhur., Fiz.*] G. A. Golostenov and A. N. Lazereva. *Trudy Vsesoyuz. Nauch.-Issled. Kinofotoinst.* (Moscow), pp. 60–90, No. 13 (23), 1957.

The Circular Motion-Picture Panorama in Moscow

July, 1959, will see the opening, in Moscow, of a completely circular panoramic motion-picture theater which holds 200 to 250 spectators. The 360-degree panorama is obtained by the projection of eleven films, taken in a special camera, onto eleven screens. A brief description of the theater is given. (S. C. G.)—*Tekh. Kino i Televideniya*, pp. 55–57, June 1959.

The Noiseless Form of the Simple Carbon Arc

The causes of the formation and the specific properties of three forms of the simple carbon arc are considered: the quiet, the hissing, and the noiseless. The operative causes of the tendency to hissing of an arc are clarified. A suggestion is made for a method of controlling the quality of the sheathing of high-intensity carbons for cinematography. The method consists in recording from time to time the electrical characteristics of the arc and the determination of the critical current strength when the sheathing is used as anode.

Examples are given of records of the potential differences of arcs working with anodes in the form of sheaths containing carbon masses of different degrees of purity. (S. C. G.)—[Translation of Authors' Abstract] N. A. Karyakin and N. V. Chernysheva. *Tekh. Kino i Televideniya*, pp. 5–10, July 1959.

SOUND RECORDING AND REPRODUCTION

On the Theory of Linear Magnetic "Traces" of Varying Intensity

It is shown that losses in a magnetic recording and reproducing system with a

carrier in the form of a magnetic powder on a dielectric band, which, hitherto, have been classified as losses due to the finite thickness of the magnetic layer of the band, are the result of self-demagnetization of the traces.

Formulas are derived for calculating losses due to the self-demagnetization of a linear trace. (S. C. G.)—[Translation of Author's Abstract] V. A. Geranin. *Tekh. Kino i Televideniya*, pp. 11–16, June 1959.

More on the Question of a Single Technology of Sound Recording for Art Films

The current discussion of the standardization of sound-recording techniques in Soviet studios is continued with a comparison of 35 mm and 17.5 mm films as sound carriers, in which some earlier criticisms brought against the latter are countered. (S. C. G.)—G. A. Korenblyum. *Tekh. Kino i Televideniya*, pp. 20–22, June 1959.

Techniques of Editing and the Dimensions of Synchronized Magnetic Soundtracks

The apparatus described for printing magnetic soundtracks onto positive copies is the subject of a series of Author's Certificates (Soviet Patents) and was elaborated at the Kishinev film studios. It allows for synchronization of both 17.5- and 35-mm magnetic bands, advancement of the magnetic original in either direction, printing of selected portions without cutting the original, and automatic stopping of the magnetic original when the end of the film is reached. (S. C. G.)—S. A. Solov'ev. *Tekh. Kino i Televideniya*, pp. 17–19, June 1959.

OPTICS

The Possibility of Calculating an Achromatic Objective for the Long Wave-Length Part of the Spectrum

It is stated that the relative dispersion of lithium fluoride and fluorite changes within a narrow range (1.9–2.1) in the spectral region from $\lambda = 2\mu$ to $\lambda = 5.5\ \mu$. This makes it possible to calculate an achromatic objective with a small secondary spectrum from these materials. Data are given for one objective calculated in this way, with a focal length of 100 mm. and a relative aperture of $f/5$. (S. C. G.)—[Translated from *Tekh. Kino i Televideniya*] I. V. Peĭsakhson. *Optiko-Mekh. Prom.*, p. 13, No. 2, 1959.

SENSITOMETRY

Scientific Discussion on the Sensitometry of Black-and-White and Color Photographic Materials

The papers presented at a discussion held by the Commission for Scientific Photography and Cinematography of the Academy of Sciences, U.S.S.R. (April 21–23, 1959) are abstracted. (S. C. G.)—Yu. N. Gorokhovskii. *Zhur. Nauch. i Priklad. Fotografii i Kinematografii*, 4:317–319, No. 4, July-Aug. 1959.

The International Standardization of a Method of Numerical Expression of the Speed of Black-and-White Negative Materials

The principles on which the Russian, German, and American national sensitometric standards, GOST 2817–50, D. I. N. 4512 (1957 revision), and ASA PH2–5–1954 (= R-6), are based are set out. The main points in the draft of a new international standard, presented by the U.S. delegation to the Harrogate conference, are set out, and the system is explained. It is considered to be a good basis for compromise between the national groups. (S. C. G.)—I. A. Chernyĭ. *Zhur. Nauch. i Priklad. Fotografii i Kinematografii*, 4:313–316, No. 4, July-Aug. 1959.

IMAGE STRUCTURE

A Study of Factors Influencing the Properties of Polarization Images

The results of a study of the process of printing polarization images are presented. Consideration is given to the following: densitometry for the measurement of the polarization density; characteristic curves of the silver, relief, and polarization images; the relationship between the change in shape of the polarization characteristic curve and the concentration of iodine in the printing solution; and the relationship between the change of shape of the polarization characteristic curve and the degree of stretching of the film. (S. C. G.)—[Translated from *Tekh. Kino i Televideniya*] S. S. Savko and G. P. Faerman. *Optiko mekhan. prom.*, pp. 13–17, No. 1, 1959.

Detail Quality in Motion-Picture Negatives and Positives

Results are given of comparisons of standard and five types of wide-screen cinematography in regard to the detail quality which can be obtained on a negative frame and on its positive copy. The detail quality is conventionally taken to be equal to the product of the frame area and the square of the resolving power at its center, or of frame area and resolving power in the main direction for anamorphic systems. Resolving power is determined from empirical formulas, taking into account the properties of the negative and positive materials, the focal length of the taking objective, and the degree of enlargement during printing. Calculations have shown that systems using the wider frame size can give positive images with approximately double the detail quality. (S. C. G.)—[Translated from *Referativnyĭ Zhur., Fiz.*] R. Tiedeken. *Techn. Kinematogr.*, pp. 9–13, No. 9, 1957. (In Polish.)

Studies in the Ability of Photographic Materials to Reproduce Small Elements of an Optical Image. I. A Quantitative Evaluation of the Photographic Reproduction of a Two-Dimensional Subject

A method is proposed for the quantitative evaluation of photographic materials to reproduce, with geometrical correctness, fine two-dimensional detail. The corresponding quantity is named "discriminating power." It was found that basically the rules for discriminating power—the influence of subject contrast, exposure, de-

velopment time—are similar to the analogous rules for resolving power.

The linear dimensions of detail at the limit of recognition are 2.5 to 3 times greater than the dimensions of a linear grid at the limit of resolvability. The relation between the absolute values of the discriminating and resolving powers differs to some extent for different materials.

The optimal density and exposure for discriminating power are somewhat higher than for resolving power, because of the difference between the optical tasks of the *recognition of shape* and of the *differentiation of lines* in a regular grid. (S. C. G.)—[Translation of Authors' Abstract] Yu. K. Vifanskiĭ and Yu. N. Gorokhovskiĭ. *Zhur. Nauch. i Priklad. Fotografiĭ i Kinematografiĭ*, 4:276–284, No. 4, July-Aug. 1959.

TELEVISION

Electron-Beam Tubes for the Televising of Motion-Picture Films by the Flying-Spot Method

The 18LK8ZL projection tube for the transmission of color and black-and-white films by the flying-spot method is considered. The characteristics of this tube are set out, together with the results of tests of such tubes in a flying-spot system.

Similar information is provided regarding the 18LK13L tube for the transmission of black-and-white films over a black-and-white television system. [Abstractor's Note: The designations refer to Russian tubes.] (S. C. G.)—[Translated from Tekh. Kino i Televideniya] E. V. Vorb'ev and E. I. Zhukovskaya. *Televiz. Elektronika (Trudy OKB)*, pp. 40–53, No. 1, 1959.

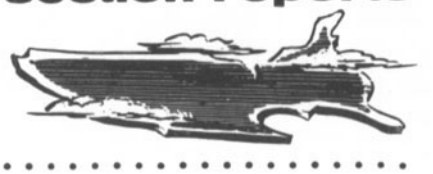
A Gating Circuit for Single-Gun Colour Television Tubes

The requirements of an ideal gating circuit for use with single-gun colour television tubes and the limitations of some existing circuits are discussed. A new type of gating circuit which employs low-level gating of the red, green and blue video signals in conjunction with a wideband amplifier is described. Such a circuit is believed to have a performance superior to that of most existing circuits and by fairly simple modification is applicable to either reversing colour sequence, continuous colour sequence or to colour difference operation.—K. G. Freeman, *Jour. Brit I.R.E.*, pp. 667–677, Nov. 1959.

Some Aspects of the Design of a Small Television Station

Some of the factors governing the choice of equipment for use in small commercial television stations in isolated areas are discussed. Specific reference is made to two different types of installation at station ZBM-TV, Bermuda, using the same basic equipment. The two systems described relate to (a) a combined television center containing both studio and transmitter in the same building, and (b) separate studio and transmitter sites. The equipment used included vidicon telecine and studio cameras and a 500w vision transmitter. Details are given of these items and also of vision, sound and control facilities.—Aubrey Harris, *Jour. Brit I.R.E.*, pp. 705–721, Nov. 1959.

section reports



The Chicago Section met on December 16 with an attendance of 45 for a tour of Chicago's Armour Research Foundation. Nelson Rodelius, a photographic engineer with the Armour Research Foundation, was guest speaker at the meeting.

Following the film opener, *The Armour Research Reactor*, produced by Atomics International, the SMPTE group was welcomed by Dr. Christopher Barthel, Assistant Director of Armour Research Foundation. His introduction urged greater SMPTE leadership in developing young people for work in basic research areas.

Mr. Rodelius, who is a member of the SMPTE Chicago Section, presented a paper on "Photography in Research at Armour Research Foundation," which covered the applications and special problems of motion-picture documentation in acoustical, electrical, fluid, heat and mechanical research.

The meeting concluded with a guided tour of Armour's research reactor, Univac 1105 installation, and acoustical laboratory reverberation and anechoic chambers.—William H. Smith, *Secretary-Treasurer*, Lakeside Lab., Box 2408, Gary, Ind.

The Chicago Section met on January 20 at the Bell & Howell Co. with an attendance of 72. After a brief welcome by Malcolm G. Townsley, Engineering Vice-President of Bell & Howell, two papers were presented by H. C. Wohlrab of the Bell & Howell technical staff.

In his first paper, Dr. Wohlrab gave a brief history of the development of automation in commercial film printing and a detailed account of the most recent automation in additive color printing. His talk was illustrated with a number of excellent slides, motion-picture shorts and actual equipment demonstration. The height of audio-visual presentation was achieved in demonstrating the actual operation of the automatic printer fully synchronized with a motion-picture short which illustrated in greater detail the functioning of the essential parts of the printer.

Dr. Wohlrab's second paper included a description of the operation of the new Bell & Howell 16mm Continuous Film Printer, Type JM, and an actual illustration of the equipment. Following the meeting, the equipment was available for inspection by the audience.

An intermission followed the first paper during which time coffee and doughnuts were served through the courtesy of the Bell & Howell Co.

Prior to the meeting, a short meeting of the Board of Managers of the Chicago Section was held at the W. J. German offices, 6040 North Pulaski, Chicago.—Philip E. Smith, *Secretary-Treasurer*, Eastman Kodak Co., 1712 South Prairie Ave., Chicago 16, Ill.