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 Tekhinika 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 Graphic Arts Research Center, College of Graphic Arts and Photography, Rochester Institute of Technology, Rochester, NY 14623, with the editorial cooperation of the Society of Photographic Scientists & Engineers.

The subject areas are grouped below:

Animation
Film and Its Properties
General
High-Speed Photography
Holography
Lenses and Optics
Light Sources
Photographic Theory and Materials

ANIMATION

Computer animation: answer or problem? Alan Kitching, *Brit. Kinemat. Sound and TV, 53:* 436–441, Dec. 1971.

There have been several recent opportunities to see computer-made films: at VISCOM '71 in Vienna, at the Atlas Laboratory at Didcot, and more recently in the BKST lecture program. Such increasing attention reflects the rapidly-advancing sophistication of computer animation systems, and this article examines some of the more important of these recent developments.

FILM AND ITS PROPERTIES

Film flattening in aerial cameras, H.-K. Meier, *Photogrammetric Eng., 38:* 367–378, Apr. 1972.

Based on the premise that film is to be used in an aerial camera rather than either glass or a reseau, several tests are cited and analyzed. The film surface has deviations of 6 to 7 μm if it is vacuum backed; they have an extensive distribution of 4 to 5 μm. The deviations occur irregularly over the area of the film and ordinarily do not correspond with the holes in the camera back. An armature camera with mechanical flattening showed even larger deviations.

EBU proposals for a universal leader, Sixten Lingheim, *Brit. Kinemat. Sound and TV, 54:* 10–12, Jan. 1972.

This paper, presented on behalf of EBU Working Party G, Sub-Group G3, describes the draft of a new universal film leader, intended to be used in the international exchange of films between motion-picture companies and television broadcasters throughout the world.

The factors influencing the choice between negative-positive and reversal systems for 16mm color film production, D. J. Craven, *Brit. Kinemat. Sound and TV, 54:* 72–75, 82, Mar. 1972.

This paper outlines the factors which should be taken into account when making a decision as to whether to use negative/positive or reversal materials when making 16mm color films. Many shades of opinion are expressed on this subject; at times, decisions are taken based on previous experience which may or may not have a bearing on the decision in hand. It is impossible to be completely objective in all the factors involved since those concerned with color rendering tend to be based on aesthetic valuations. One frequently hears statements such as "color reversal always looks like a picture postcard" or alternatively "neg/pos color looks too wishy-washy to me"; even more invalid are statements such as "color reversal always has a blue cast," etc. It is the purpose of this paper to define and quantify the differences between the two systems. These can be classified as follows: (1) technical parameters; (2) operational differences; (3) cost comparison.

A study of the stresses in film transport by claw mechanisms (in Russian), P. V. Melent'ov and G. E. Fedorov, *Tekh. Kino i Televideniya, 15:* 16–20 Apr. 1971.

The mathematical analysis of stresses arising in a film passing through a claw mechanism in a motion-picture camera or projector is discussed.—S.C.G.

Granularity and granularity spectra of color motion-picture films (in Russian), M. A. AIngorn, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr., 16:* 87–92, No. 2, Mar./Apr. 1971.

Some points connected with the methods of measurement of the granularity of multilayer color motion-picture films are discussed. Experimental results are given for the relation between color granularity and wavelength of light for monolayer coatings, optically separated layers of color motion-picture film and for multilayer samples. In particular it is shown that the granularity and graininess of blue-sensitive layers in motion-picture films is not significant and may be ne-

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glected. The granularity is maximal when it is measured in the main absorption band of the dyes, and minimal in the unwanted bands. Data are given for the granularity spectra of (Soviet) LN-5M, LN-6, KP-4Y and TsP-8P films, measured in the green and red bands. It is shown that the spectra are not uniform and show a rise in the region of low spatial frequencies—S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

Modern methods and devices for the drying of motion-picture and photographic film (in Russian), A. Sh. Shamilova. *Tekh. Kino i Televideniya, 15:* 78–80, Feb. 1971.

Modern methods of drying film are reviewed from non-Soviet patents—S.C.G.

Buckling of motion-picture film under the action of heating (in Russian), I. S. Golod, *Kinoapparatura, Inform.-Tekh. Sb.*, 9–15, No. 3, 1970; *Ref. Zh., Fotokinotekhnika*, Abstract No. 4.46.76., 1971.

A theoretical and experimental study is made of the buckling of motion-picture film under the action of heating. Formulas are given to allow the determination of the buckling under the combined action of the relative humidity of the air and the temperature of heating.—S.C.G. (Translated from *Ref. Zh., Fotokinotekhnika.*)

GENERAL

A step in time, A. R. Chi and H. S. Fosque, *IEEE Spectrum, 9:* 82–86, Jan. 1972.

An improved Coordinated Universal Time (UTC) system has been adopted by the International Radio Consultative Committee (CCIR). It was implemented internationally by the standard frequency and time broadcast stations on January 1, 1972. The new UTC system eliminates the frequency offset of 300 parts in 10^{10} between the old UTC and Atomic Time, thus making the broadcast time interval, the UTC second, constant and defined by the resonant frequency of cesium atoms. The new time scale will be kept in synchronism with the rotation of the earth within $\pm$ 0.7 second by step-time adjustments of exactly 1 s when needed. A time code will be added to the disseminated time signals that will permit Universal Time to be obtained from the broadcasts to the nearest 0.1 s for users requiring such precision.

Location film equipment, Fouad Said, *Brit. Kinemat. Sound and TV, 53:* 404–407, Nov. 1971.

There was a survey made by Controllers Associates about the trend of motion pictures all over the world and one of the things found about location production in the United States was that 90% of all motion-picture films are now shooting on actual locations while television films are still shot on stages. Last television season there were only three shows shooting on location; this season there are nine; triple the number, so the tremendous amount of location work is here to stay.

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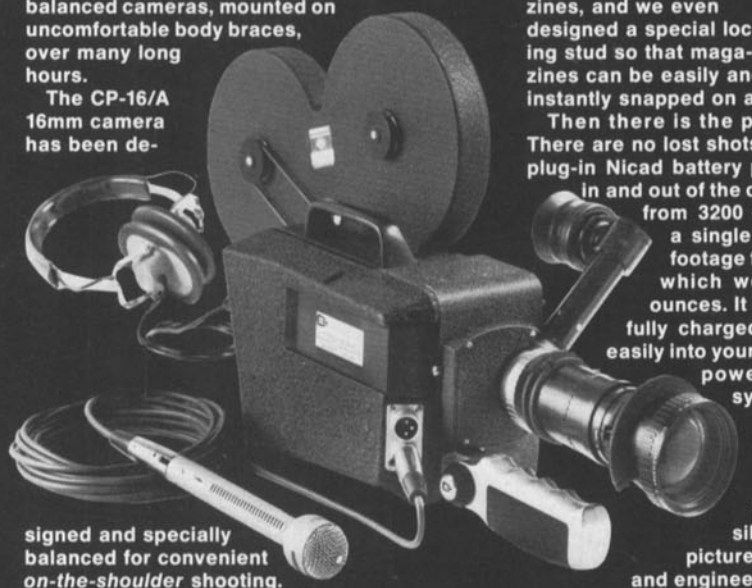

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The work of Section A of the International Congress on Photographic Science, Moscow (July 29–Aug. 5, 1970) (in Russian), P. V. Meĭklyar, *Zh. Nauch i Prikl. Fotogr. i Kinematogr., 16:* 226–231, No. 3, May/June, 1971.

The subjects discussed in Section A of the Congress included the nature of photographic sensitivity and the mechanisms of the formation of the latent image and of spectral sensitization. The papers presented are summarized.—S.C.G.

Review of work on motion-picture technology carried out in 1970 (in Russian), N. D. Bernshteĭn and others, *Tekh. Kino i Televideniya, 15:* 6–43, May, 1971.

The main work carried out during 1970 in various Soviet institutes and studios is reviewed: All-Union Scientific Research Institute (NIKFI), Leningrad Institute of Motion-Picture Engineers (LIKI), Design Office for Motion-Picture Apparatus and Equipment (TsKBK), Mosfilm Studios, Lenfilm Studios, and other studios in the RSFSR. A final section deals with the introduction of new technology into the motion-picture printing industry.—S.C.G.

HIGH-SPEED PHOTOGRAPHY

Use of high-speed photography in analysis of the acoustic reflex, D. P. Gans, R. H. Sweetman and H. C. Carlson, *Jour. Acoustic Soc. Am., 51:* 1826–1827, June 1972.

This paper is directed toward the description and evaluation of an optical technique utilizing high-speed photography in the quantitative analysis of middle-ear muscle reflex action.

Stop-action photos by laser light, H. Bates, *Optical Spectra, 6:* 30–31, May 1972.

A frequency-doubled four-level laser illumination system developed at Martin-Marietta is bringing new precision to the recording and analysis of high-speed events, both in conventional and holographic photography.

Lasers in the underwater environment, Richard C. Honey, *Optical Spectra, 6:* 25–31, Apr. 1972.

The effectiveness of a laser system under water can be analyzed by making use of certain known absorption and attenuation characteristics of sea water.

Apparatus for the photography of the tracks of rapidly moving aerosol particles (in Russian), S. P. Belyaev and E. G. Tertyshnik, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr., 16:* 241–245, No. 4, July/Aug., 1971.

A stand is described for the photographic study of different processes connected with the motion of an ensemble of aerosol particles. An electronic flash light source is used for the illumination. The stand makes it possible to photograph the trajectory of the particles by exposing with three light flashes following each other at a short interval of time (from 60 to 600 μs). It is possible with the stand to study processes over a considerable distance (the field of view is 5.3 × 8.0 cm^2) with aerosol particles of greater than 10 μm in diameter, moving at a speed of up to 20 ms^{-1}. An electronic circuit is described for controlling the operation of the flash light.—S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

The use of gas bearings in high-speed motion-picture cameras (in Japanese), Kamogawa Hasasi and Arai Dzyundzi, *J. Jap. Soc. Lubricating Eng., 15:* 589–594, (No. 9, 1970); *Ref. Zh. Fotokinotekhnika,* Abstract No. 6.46.10, 1971.

The use of gas bearings in high-speed motion-picture apparatus with optical scanning is discussed. The angular velocity of the scanning mirror reaches 7000 rs^{-1}. Among the advantages of gas bearings are the possibility of using compressed air, the absence of dirt on the polished surfaces of parts due to oil, reliability of operation, and simplicity of manufacture. Gas bearings are rated for high angular and peripheral velocities at negligable loads. Studies have been made of the possibility of increasing the rate of rotation of gas bearings and the conditions under which vibrations arise. Optimum and limiting conditions have been found for reliable operation: clearance, 30 to 40 μm, inlet diameter 0.5 mm, width of gas bearings 6 to 8 mm, diameter of rotor 8 mm. The relation between the damping coefficient and the amplitude of vibration is given. Experimental and theoretical curves are given for the relation between the frequency of the vibration and the above variables. In order to increase the velocity of rotation, helium is recommended as the working gas. The influence of viscosity has been studied, and a method is suggested for calculating the moment of the friction due to viscosity.—S.C.G. (Translated from *Ref. Zh., Fotokinotekhnika.*)

HOLOGRAPHY

Photopolymers in holography, R. L. Van Renesse, *Opt. Laser Technol., 4:* 24–27, No. 1, Feb. 1972.

Photopolymers for application in holography have the advantage over silver halide emulsions in that a phase hologram is formed in situ during exposure. The paper describes the results of tests concerning the resolving power and photo-sensitivity of a combination of the monomers acryl amide and methylene-bis-acryl amide. This combination forms a copolymer under the influence of red light, when methylene blue is used as a sensitizer. In spite of their low sensitivity, photopolymers, in some instances, appear to be promising substitutes for the conventional silver halide materials.

Quasi-holographic techniques in the microwave region, Emmett N. Leith, *Proc. IEEE, 59:* 1305–1318, Sept. 1971.

Various microwave processes, including snythetic-aperture radar and linearly frequency-modulated pulse compression, are described as analogs of holography. The

holographic viewpoint often leads to a new understanding and to new methods of signal processing.

An introduction to the principles and applications of holography, Joseph W. Goodman, *Proc. IEEE, 59:* 1292–1304, Sept. 1971.

Holography has strong historical ties with electrical engineering and potential application to many electrical engineering problems. The basic problem addressed by holography is introduced in both physical and mathematical terms. The analogy between the hologram of a point-source object and the linear FM signals of chirp radar is stressed, and the first-order imaging properties of holograms recorded in arbitrary geometries are derived. Various types of holograms are described, including thin, think, transmission, reflection, amplitude and phase holograms. The important properties of each type of hologram are introduced. A survey of various applications of holography is presented, with introductions to the use of holography in interferometry, microscopy, imaging through distorting media, optical data processing and optical data storage. The use of simple holograms as optical elements is also described.

Animated motion-picture holograms of three-dimensional subjects (in Russian), Sh. D. Kakichashvili, *Tekh. Kino i Televideniya, 15:* 17–18, Mar. 1971.

A description is given of a method for reconstructing the motion of a three-dimensional subject from holograms.—S.C.G.

Photochromic glass as a means of recording holograms (in Russian), V. I. Sukhanov, D. N. Sitnik, I. V. Tunimanova and V. A. Tsekhomsky, *Opt.-Mekh. Prom.*, 39–41, No. 12, 1970; *Ref: Zh., Fotokinotekhnika,* Abstract No. 4.46.59, 1971.

A report is given on the possibility of obtaining holograms on photochromic glasses based on silver halide. Results are given of a study of the main factors of photochromic glasses which have an influence on the properties of the holograms recorded.—S.C.G. (Translated from *Ref. Zh., Fotokinotekhnika.*)

Interference resolving power measurement (in Russian), Yu. I. Ostrovskii. *Zap. Leningrad Gorn. Inst., 51:* 136–142, No. 3, 1970; *Ref: Zh., Fotokinotekhnika,* Abstract No. 4.46.68, 1971.

A number of interference resolving power designs and methods are discussed. They have been worked out for testing the resolving power of light-sensitive materials for holography with a resolving power of up to a few thousand lines per mm.—S.C.G. (Translated from *Ref: Zh., Fotokinotekhnika.*)

LENSES AND OPTICS

Characteristics of objectives for 35mm and 70mm motion-picture cameras (in Polish), A. Kolasa, *Probl. Tech. Kinema-*

togr., S. 1: 95–112, 1970; *Ref. Zh., Fotokinotekhnika,* Abstract No. 5.46.82, 1971.

Results are given of a study of the MTF of a large group of motion-picture objectives, carried out at FODU (Motion-Picture Research and Servicing Centre, Poland). This included lenses from LOMO (USSR), Rank, Taylor and Hobson, (England), Schneider (GFR), Angenieux (France) and Zeiss Jena (GDR).—S.C.G. (Abridged from *Ref. Zh., Fotokinotekhnika.*)

A recording microdensitometer with high sensitivity (in Russian), Yu. N. Gorokhovskiĭ, A. G. Grigor'ev, A. M. Ivanov, V. P. Sorokin and A. A. Stepochkin. *Optiko-mekh. Prom.,* 33–37, No. 11, 1970; *Ref. Zh., Fotokinotekhnika,* Abstract No. 3.46.69, 1971.

A description is given of a double-beam recording microdensitometer which allows the measurement of optical density up to 4.0 with a measured field area of 500 μm^2 or more, with an error of measurement of ± 0.01 density unit over a wide range of enlargement (from 10 to 100 $\times$) and recording scales (1:1 to 1:2000).—S.C.G. (Translated from *Ref. Zh., Fotokinotekhnika.*)

Stereoscopic perception with single pictures, Alfred H. Schwartz, *Optical Spectra, 5:* 25–27, Sept. 1971.

Single pictures can produce stereoscopic perception of the recorded scene. This little-known phenomenon can be used to enhance perception of visual information without increasing the energy-related parameters of an optical system.

Optical transfer function of glass light filters (in Polish), A. Kolasa, *Probl. Tech. Kinematogr., S. 1:* 1970, 84–94; *Ref: Zh., Fotokinotekhnika,* Abstract No. 5.46.183, 1971.

Results are given of investigations on the influence on image quality of the glass light filters used in shooting. Comparison of the different methods of studying filters with the results of control cinematography show that the fullest representation of filter quality is given by measuring its MTF. A quality criterion for filters is introduced and a classification of filters is given depending on their quality. The quality criterion determined by the MTF is an overall criterion and embraces the physical-chemical properties of the filter itself (uniformity of the glass, parallelism of the bounding surfaces) and the changes in its properties during use (surface damage, unsticking, etc.). It is shown that it is necessary to test the quality of a filter not only during use, but also when received from the supplier, since the conditions of storage and transport have an influence on the quality. Thus on testing 145 unused cemented Kodak Wratten filters, the optical properties of 16.5% were unsatisfactory.—S.C.G.

Camera lenses for 35 mm films with a wide range of focal lengths (in Russian), F. S. Novik, *Tekh. Kino i Televideniya, 15:* 23–31, Mar. 1971.

A review is made of motion-picture camera objectives with variable focus over a wide range, available in the Soviet Union and abroad.—S.C.G.

A periscope lens for adjusting motion-picture cameras (in Russian), G. A. Bondarenko, *Tekh. Kino i Televideniya, 15:* 71–72, Mar. 1971.

A periscopic device is described for examining the image at points inside a motion-picture camera during its adjustment after maintenance or repair.—S.C.G.

LIGHT SOURCES

New discharge lamps for television and film lighting, B. Kuhl, *Brit. Kinemat. Sound and TV, 53:* 368–371, 374, 375, Oct. 1971.

In the years since the introduction of color television, the technology of light sources has made great progress, particularly by the developments of metal halide lamps. These lamps comply with the requirements for maximum quality in picture reproduction in a very economical way.

PHOTOGRAPHIC THEORY AND MATERIALS

The problem of the resolution of photosystems with subjects illuminated with coherent laser light (in Russian), E. A. Tarantov and V. S. Fedorov, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr., 16:* 260–268, No. 4, July/Aug., 1971.

An experimental study has been made of the relation of the image quality of photosystems to their relative apertures when the subject is illuminated with a divergent coherent beam (direct, scattered or oscillating). In distinction from existing theories, the phenomenon of speckle in the illumination and the image, the change in diameter and contrast of the spots with changes in the variables of the photosystem and the light source, and the loss in resolution of the optical system as its relative aperture is decreased, are given a theoretical basis from the position of physical optics (multibeam interference). This has also allowed an explanation of the increase of resolving power in the case of the introduction into the divergent coherent beam of a light scatterer, at a distance from the center of the spherical wave of the beam from the source, or the case of oscillation of the beam from the source about an axis, also at a distance from the center of the spherical wave, i.e., with a decrease in the spatial coherence of the radiation. It is shown that the relations, well-known from the theory of diffraction, which connect the resolution of a system in transmitted light with the sums of the apertures of the objective of the system and the light source, are not applicable for the evaluation of resolving power in the photography of scattering subjects illuminated with coherent light.—S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

Color television in microneurosurgery, Dr. Homer G. McClintock and Arthur Kaiser, *Indust. Phot., 20:* 23, 44, Aug. 1971.

High-resolution, high-quality color television pictures of each phase of a neurosurgical procedure are now possible.

A study of color reproduction in printing with masked (LN-5) and non-masked (LN-5) negatives on F-4 photographic paper. I. Spectro-photometric analysis of a multilayer film with integral masking (DS-5, LN-5) (in Russian), D. K. Balabukha and L. I. Guitor, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr. 16:* 245–250, No. 4, July/Aug. 1971.

A study has been made of the spectral properties of the dyes forming the negative image on films with integral masking. The subject of the study was single-layer coatings of LN-5 film containing both a full complement of couplers and each coupler singly. It was found, spectro-photometrically speaking, that from the point of view of secondary color separation, films with integral masking can be considered as having three couplers even though they may contain a larger number of dyes. The negative image can be considered to be composed of only three dyes: yellow (combining the residual yellow masking coupler and the yellow dye itself in the top layer), magenta and cyan. Absorption of light by the second masking coupler is small enough to be neglected. Equations are derived for the determination of these generalized dyes in spectro-photometric units from measurements of the monochromatic optical densities of the negative at three wavelengths. The error of calculation is about 0.1–0.2 spectro-photometric units. Visual measurements have been made (at the threshold of observation of the dye) of the spectral sensitivity of the elementary layers of F-4 paper, and it is shown that from the point of view of the problem of secondary color separation it agrees sufficiently well with the spectral absorption of the dyes of the film being studied.—S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

A study of the mechanism of anomalous aging of optically sensitized light-sensitive materials (in Russian), A. V. Borin, B. I. Slesareva and S. N. Popova, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr., 16:* 250–259, July/Aug. 1971.

A desensitizing action previously found for the products of dicarbocyanine dyes formed on decoloration in the dark has been confirmed. It has also been observed that these products lower the conferred sensitivity of a sensitized material more than they do the natural sensitivity. In addition it has been observed that not all dyes form desensitizing substances on decoloration. This type of dye includes dicarbocyanines and other sensitizers. However, pyrocatechols which increase the rate of dark decoloration of dye solutions, also accelerate the anomalous aging of layers containing both kinds of dye. A study of the state of the dyes adsorbed on the surface of emulsion grains has shown that on prolonged keeping, the value of their absorption maxima changes insignificantly, while pyrocatechol under these conditions somewhat enhances the absorption maximum of some dyes. The experiments described show that the explanation of aging

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of the image and the accumulation of desensitizing substances in the layer is not complete and cannot be applied to all sensitized materials. A preliminary explanation is given of the nature of the processes occurring in anomalous aging.—S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

A study of the mechanism of the formation of the grain structure of black-and-white photographic materials (in Russian), K. V. Vendrovskiĭ and I. G. Minkevich, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr., 16:* 191–199, No. 3, May/June 1971.

A model of photographic density is discussed in which the contributions of separate grains in the density are independent of one another and are distinguished by the effective surface absorption of the grains. An analysis is made of the effect of the difference between the geometrical and effective size of the grains on the dependence of the change in mean density and the mean square deviation of the density on the grain size. It is found experimentally that the relations between the geometrical and effective grain sizes for mean density and the mean square deviation of the density are close and may be approximated by a single expression. An experimental determination has been made of the degree of enlargement of the effective grain size on development in four developers; from this it seems that it is practically independent of the conditions of development.—S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

The reciprocity phenomenon in the photosensitive semiconductor-metal system (in Russian), M. T. Kostyshin, E. P. Krasnozhenov and P. F. Romanenko, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr., 16:* 199–201, No. 3, May/June 1971.

A study has been made of the reciprocity phenomenon in photosensitive systems of semiconductor and metal, consisting of thin layers of semiconducting substances (As_2S_2, As_2S_3, CuI, PbI_2) on silver at different temperatures. Analysis of the reciprocity curve of the processes of photochemical transformation in systems consisting of arsenic chalcogenides shows that for all the studied intensities of actinic light the reciprocity law is obeyed at all temperatures up to values at which the photosensitivity, although small, is still appreciable. In the system CuI-Ag reciprocity is found only in the region of medium and small intensities and fails badly at high intensities. For the system PbI_2-Ag the reciprocity law is not obeyed within the range of intensities studied. When the temperature is lowered reciprocity failure becomes more significant in this system. Simultaneously an essential change in character takes place in the shape of the reciprocity curve, indicating a different relation between photosensitivity and temperature at different intensities of illumination. Possible causes of this variation in behaviour in the systems studied are discussed in relation to reciprocity in photochemical reactions.—S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

The problem of the mechanism of dying of gelatin layers, XI, The relation between the structure of dyes and their influence on the strength of gelatin matrix layers (in Russian), M. P. Arbuzova, N. S. Spasokukotskiĭ and G. V. Derstuganov, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr., 16:* 165–170, No. 3, May/June 1971.

A study has been made of the influence of the components of a dye solution — acids, neutral electrolytes, dyes — on the strength of dyed matrix reliefs. In acid solutions without dye the strength falls by approximately 20% in comparison with neutral solutions; the presence of Na_2SO_4 in the acid solution raises the strength a little, while NaCl lowers it. In neutral solutions of $CaCl_2$ the strength is higher than in water, which is connected with the formation of calcium bridges between the carboxyl groups of the gelatin. Acid solutions of acid dyes give an especially large drop in strength (70–90%). The largest fall in strength is caused by dyes with one sulpho-group Dyes with three or more sulpho-groups occupy an intermediate position. The fall in strength is explained by the destruction of intermolecular bonds of the gelatin molecules as a result of the adsorption of the dyes to the free amino-groups of the gelatin, which in the case of dyes with several sulpho-groups can be partly compensated for by the simultaneous adsorption of the dye onto different gelatin molecules. Differences in the quantity of adsorbed dyes have no effect on the strength of the layer, apparently because they are connected not with changes in the number of amino-groups bound by the dye, but with differences in the degree of aggregation of the dyes.—S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

The nature of the induction period of development (in Russian), Yu. E. Usanov and G. P. Faerman, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr., 16:* 174–180, No. 3, May/June 1971.

A study has been made of the rate of penetration of Metol and hydroquinone into a gelatin layer. It is shown that in normal development equality of the concentrations of the developing agents in the layer and in the solution is reached quickly, while equality of pH is reached more slowly. The length of the induction period of development is determined by the pH at which a given developing agent begins to develop. The lower the threshold pH of the developing agent, the more quickly development begins.—S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

A method for testing FSR-4(41) sensitometers by calculation (in Russian), Z. A. Belorusets and G. S. Baranov, *Tekh. Kino i Televideniya, 15:* 34–36, Mar. 1971.

FSR-4(41) sensitometers are used in the Soviet Union for the testing of black-and-white photographic materials. The method of testing the sensitometers suggested is based on the relation between the power of the sensitometer lamp and the intensity of its light. Some ideas on putting the method into practice simply are given.—S.C.G.