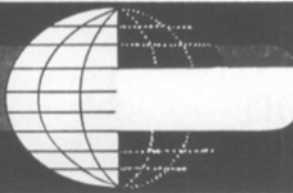


ABSTRACTS OF PAPERS FROM OTHER JOURNALS



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 Televizniya* 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:
Color
Film and Its Properties

General
Optics

COLOR

Procedures for equivalent-neutral-density (END) calibration of color densitometers using a digital computer, Albert J. Sant, *Phot. Sci. and Eng.*, 14: 356-362, Sept.-Oct. 1970.

The fundamental concepts necessary to an understanding of the equivalent-neutral-density (END) calibration of color densitometers for a given color film process are reviewed. The method employed in the Photographic Technology Division of the Eastman Kodak Company for END calibration is given in detail.

Range of perceived hues in two-primary projections, D. E. Pearson and C. B. Rubinstein, *Jour. Optical Soc. Am.*, 60: 1398-1403, October, 1970.

Hues perceived in two-primary projections were predicted for all combinations of pairs of 31 different special primaries by use of our computerized version of the Helson-Judd formulation. The computer was instructed to note the absence

from the predicted hues of any of the full possible complement of red, yellow-red, yellow, green-yellow, green, blue-green, blue, and red-blue. Experimental confirmation of the computations is reported, based on color naming by trained subjects of the cells in computer-generated quilts projected with a selection of near-spectral primaries. The results of these investigations confirm the usefulness of Helson-Judd formulation as a means of translating from chromaticity to perceived color in colored displays.

FILM AND ITS PROPERTIES

New blue-insensitive film, Willard E. Vary, *Industrial Phot.*, 19: 21 continued on page 36-43, Aug. 1970.

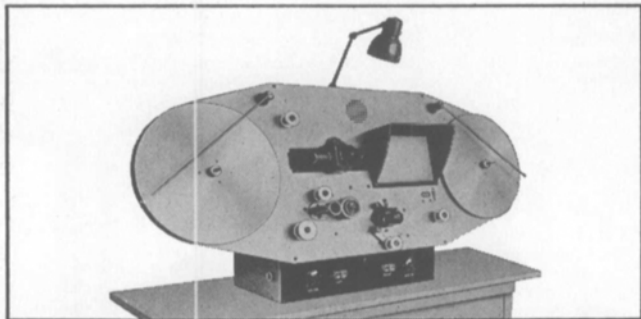
A special film, prepared by GAF for the Navy, eliminates the blue-sensitive top layer. Since a yellow filter is unnecessary, underwater photography can be done at higher effective speed, and with improved sharpness and detail.

Some basic parameters of test films (in Russian), E. L. Nel'skii and I. B. Suchkove, *Tekh. Kino i Televizniya*, 14: 28-31, June 1970.

A number of test films used in different countries for setting up apparatus in cinemas, for the control of printers and for other purposes in the motion-picture industry, have been examined and their main characteristics are discussed. — S.C.G.

Super 16, Lars Swanberg, *Brit. Kinemat. Sound and TV*, 52: 226-228, Aug. 1970.

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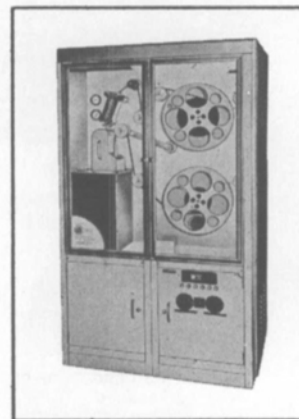
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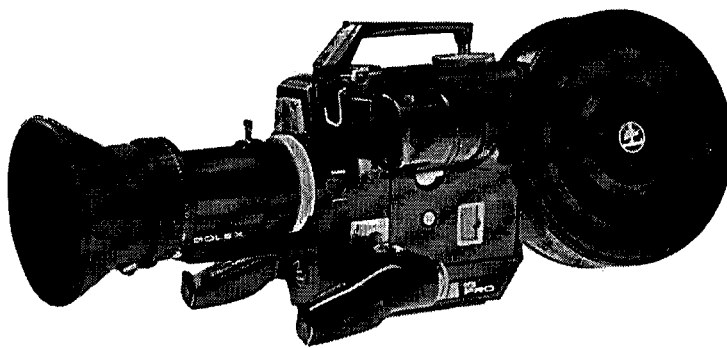


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GENERAL

Statistical characteristics of the vibrations of the base during motion-picture shooting (in Russian), V. Yu. Torochkov and

N. N. Bruevich, *Tekhn. Kino i Televideniya*, 14: 41-42, June 1970.

A statistical method of analyzing the vibrations of the base of a motion-picture camera is proposed, and formulae are derived from which calculations can be made for the design of stabilizing devices. — S.C.G.

The animated loop film in education, Patrick Murphy, *Brit. Kinemat. Sound and TV*, 52: 159, June 1970.

For the majority of children the school used to be the main source of intellectual stimulation and experience, through the agency of well informed teachers and their books. It was true that the average home environment seldom provided the opportunity for assimilating the necessary ingredients for the development of a useful

academic critique. Indeed the day to day experiences of teachers in schools were a constant reminder of the inadequacies of the average home background to which so little appeal could be made. In recent years however, both television and educational film have enabled children to acquire a standard of visual expectation which finds the average school lacking in the presentation of its own subject matter and, unless schools recruit the medium of film to their own purposes, their classroom performances will be adjudged only partially successful in presenting their case. Furthermore, they will have ignored the advantage of one of the simplest of modern teaching aids.

Down with 8mm — even super 8, Robert S. Steele, *Journal of the University Film Association*, 22: 43-47, No. 2, 1970.

The university should aim to have students become the practitioners of an art form. Equipment that most closely approximates that used by the professional artist is desirable for film in higher education.

Effects of background imagery on coordinate measurement, Robert E. Roger, *Photogrammetric Eng.*, 36: 931-934, Sept. 1970.

This investigation was concerned with the centering by the human visual system of a black circular measuring mark in sharp circular targets simulating artificially marked points in a photographic emulsion. Special instrumentation was used. The targets were viewed against an infinite density surrounding with white annular rings serving as heterogeneous background configurations, both symmetric and asymmetric configurations being used. Both monocular and binocular vision was used and the results indicate that heterogeneity should not cause a loss in precision. Asymmetry was found to cause a small systematic error in accuracy of centering but it would not be a factor in using the present-day one micrometer comparators. An interesting statistical approach was used to analyze the more than 25,000 pointings.

Optical storage, G. G. Scarrott, *Radio and Electronic Eng.*, 40: 89-95, Aug. 1970.

The paper discusses the requirements for information processing system components, drawing attention to the parallel manner in which systems and components evolve. A short survey follows of optical techniques which may be applied to digital storage, and of systems which have been produced in the past. Finally, suggestions are made as to optical storage systems which should have very desirable characteristics.

Progress in photographic processes for microelectronics, C. R. Hance, *Image Technology*, 12: 33-38, Feb./Mar. 1970.

The growth of microelectronic technology has been unprecedented since the discovery of the transistor two decades ago. A typical process for the mass manufacture of semiconductor products is described. Two basically different photographic systems are involved. One is a highly specialized form of photography

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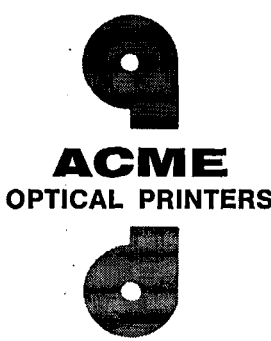
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commonly referred to as mask technology or precision mask making. The other is a photolithographic process that is concerned with photosensitive resists.

Polymers used for the thermoplastic recording of information (in Russian), V. Ya. Pochinok (*Sposoby zapisi informatsii na besserebryanikh nositelyakh. Vyp 1*, Kiev Univ., 1969, pp. 63-79), *Ref. Zh., Fotokinetekhnika*, Abstract No. 6.46.147, 1970.

A review is given of data derived from experiment and from the literature on polymers used for thermoplastic recording of information carried out by the action of a beam of electrons on a polymeric thermoplastic layer. The results of work performed at Kiev University are presented. — S.C.G. (Translated from *Ref. Zh., Fotokinetekhnika*.)

Some physical aspects of thermoplastic recording of information (in Russian), N. G. Nakhodkin (*Sposoby zapisi informatsii na besserebryanikh nositelyakh. Vyp 1*, Kiev Univ., 1969, pp. 8-62), *Ref. Zh. Fotokinetekhnika*, Abstract No. 6.46.146, 1970.

On the basis of experimental and literature data, a discussion is given of certain physical processes which determine the deformation of a thermoplastic carrier; the formation of a latent image in the form of a field of ponderomotive electrostatic forces; the decrease of charge with time; and the development of the latent image. A study has also been made of

the transfer characteristics of a thermoplastic carrier, its limiting resolution and its sensitivity. — S.C.G. (Translated from *Ref. Zh., Fotokinetekhnika*.)

Photoelectric image converters with optical switching (in Russian), V. P. Golovikhina and V. F. Zolotarev, *Tekh. Kino i Televideniya*, 14: 54-55, Mar. 1970.

An experimental study has been made of the properties of an image converter consisting of a photoelectret between electrodes, one of which is transparent. The image is formed as a polarization relief by exposing the photoelectret at the same time as a polarizing field is applied. The image is then scanned with a beam of light which depolarizes the image, and the depolarization current is converted into a video signal. — S.C.G.

Soviet photographic science (in Russian), K. V. Chibisov and V. I. Sheberstov, *Zh. Nauch. i Prikl. Fot. i Kinemat.*, 15: 85-119, No. 2, Mar.-Apr. 1970.

An account is given of the period of the birth of Soviet photographic science after the October Revolution, and of the work of Soviet scientists in the fields of the theory and technology of the manufacture of photographic materials, optical sensitization, and photographic development. Research in color photography is discussed in some detail. Special attention is paid to work in the field of the sensitometry of materials with different sensitivi-

ties, and also the evaluation of the physical properties of the photographic image. In conclusion the future prospects of the development of photographic science and of the applications of photography as a method of scientific research are discussed. (Bibliography of 296 references). — S.C.G. (Translated from *Zh. Nauch. i Prikl. Fot. i Kinemat.*)

The Soviet chemical-photographic industry (in Russian), V. L. Zelikman, *Zh. Nauch. i Prikl. Fot. i Kinemat.*, 15: 119-126, No. 2, Mar.-Apr. 1970.

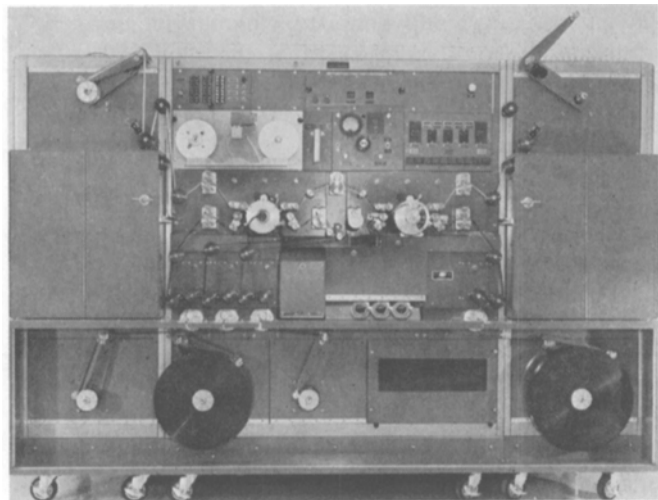
The historical aspects of the rise and development of the Soviet chemical photographic industry are discussed. The foundation of film factories and the mastering of the technology of the production of professional motion-picture film are discussed, and information is also given on the reconstruction of the industry in the post-war period and the further growth in production and the improvement of the quality of motion-picture materials. An evaluation is made of the part played by research and teaching institutes in the solution of the complicated problems of chemistry and photography and in dealing with the practical problems in the production of light-sensitive materials. The directions of further improvements in motion-picture film-stock and the corresponding development of the photochemical technology are indicated. — S.C.G. (Translated from *Zh. Nauch. i Prikl. Fot. i Kinemat.*)

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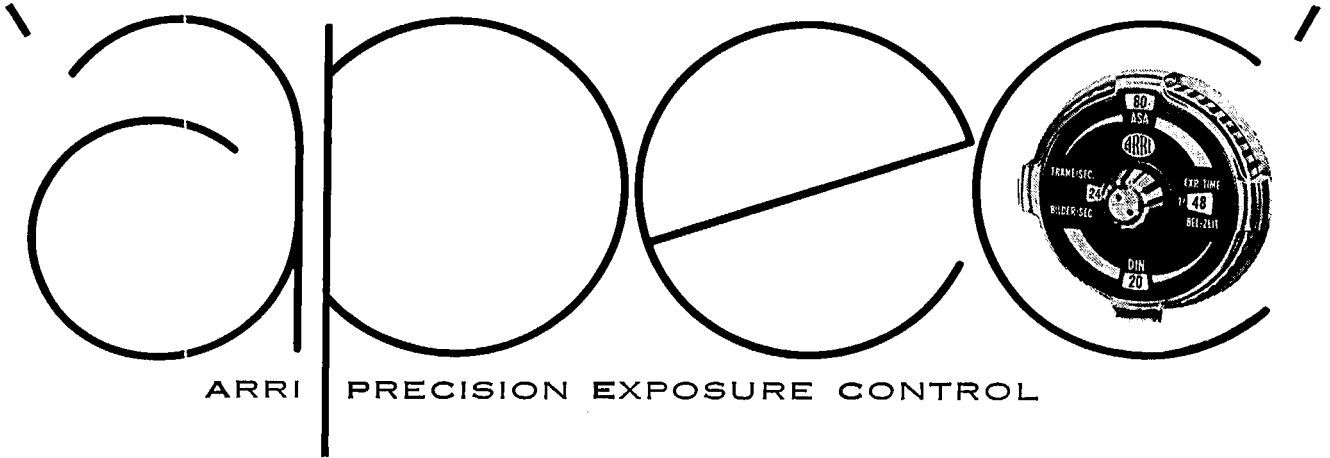
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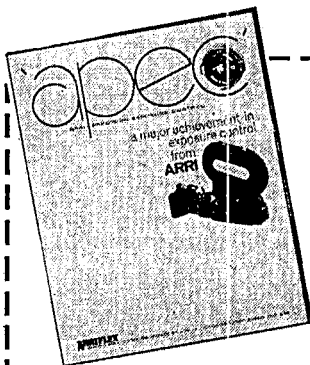
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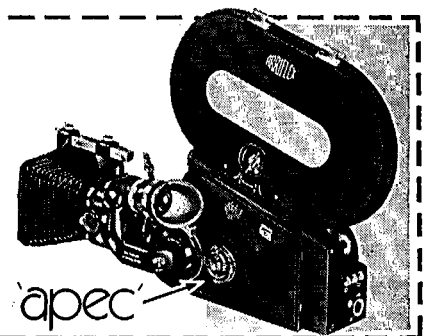
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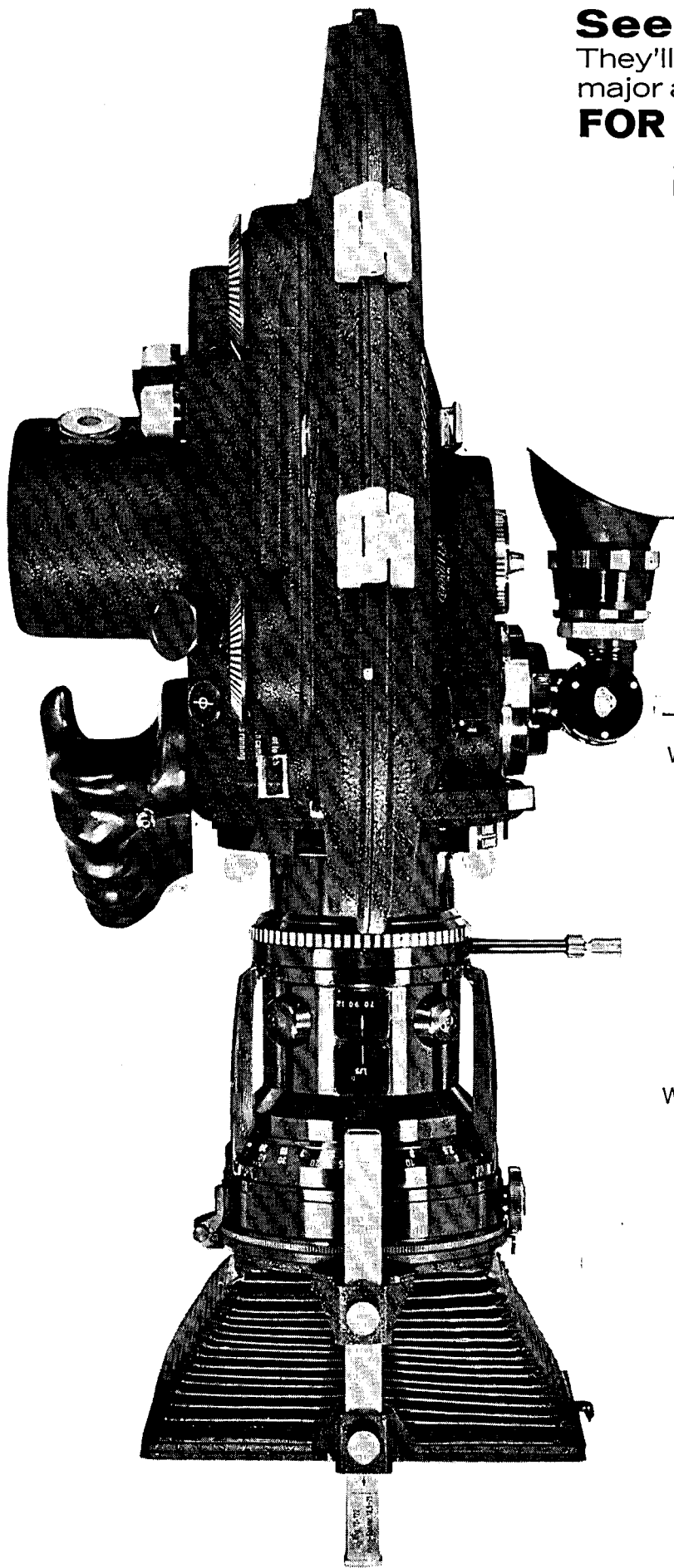
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312 South Pearl Street, Denver, Colo. 80209



Some questions in the technique of picture demonstration (in Russian), V. G. Pell', *Tekh. Kino i Televideniya*, 14: 58-63, Mar. 1970.

The following points in the projection of pictures in schools and colleges are discussed: the illumination of the screened picture, the wide use of narrow-gage motion-picture projection, the placing of viewers beyond the limits of distance normal for the projection of films in cinemas. Recommendations are given for planning the installation of projection equipment for teaching purposes, and for the photography of graphical material for teaching films. Some points in the use of television in teaching are discussed. — S.C.G.

(Translated from *Tekh. Kino i Televideniya*.)

OPTICS

Recent advances in nonlinear optical materials, Robert L. Byer, *Optical Spectra*, 4: 42-48, Sept. 1970.

New search and testing procedures, combined with advances in crystal growth techniques, have led to the discovery and development of an expanding range of nonlinear optical materials for varying the frequency of laser outputs.

Fiber optics. XII. A technique for launching an arbitrary mode on an optical dielectric waveguide, N. S. Kapany, J. J.

Burke and T. Sawatari, *Jour. Optical Soc. Am.*, 60: 1178-1185, Sept. 1970.

A spatial-filtering technique is described which provides a means for launching an arbitrary mode on a fiber-optical waveguide. Appropriate amplitude and phase filters are used to discriminate against unwanted modes. These are inserted in the pupil of a launching lens which focuses collimated light onto the end of the guide. A double-path illuminating system is generally needed to obtain the required input polarization. The method is evaluated both theoretically and experimentally, and the agreement is found to be good within the practical limitations of cross-sectional irregularities in the nominally circular optical fibers.

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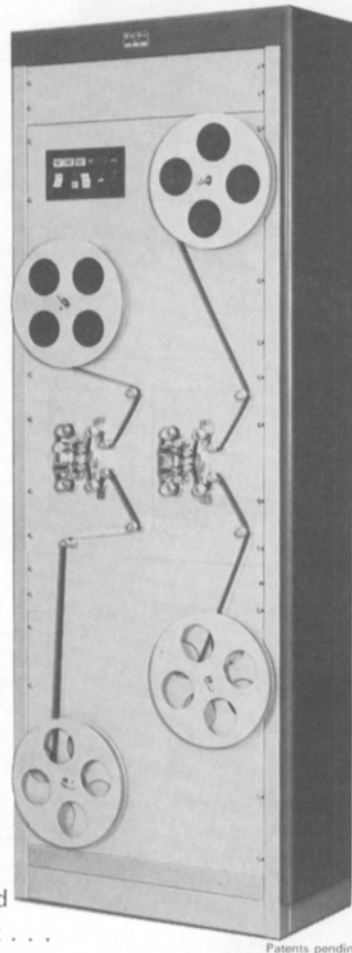
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Optical transmission utilizing injection light sources, K. L. Konnerth and B. R. Shah, *IEEE Spectrum*, 7: 37-46, Sept. 1970.

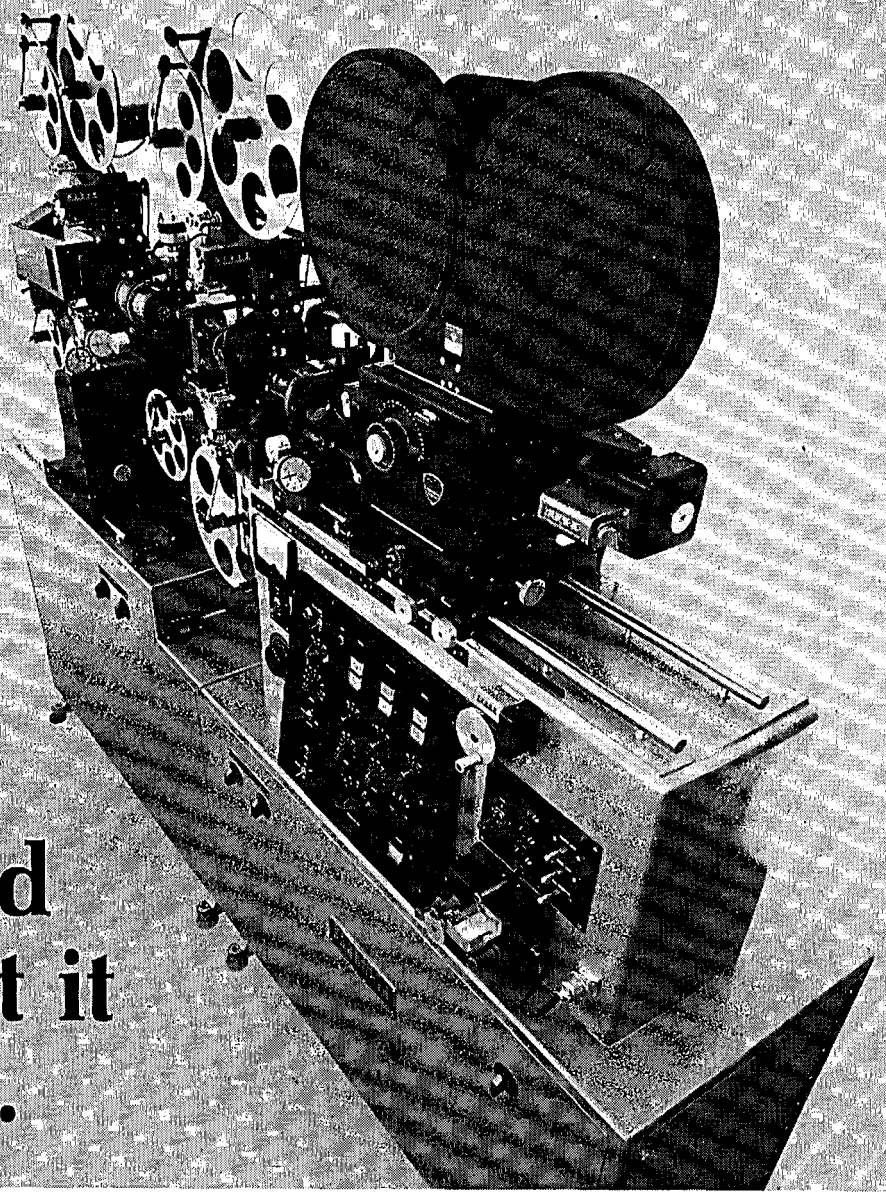
Although a large amount of work in optical transmission has been accomplished through the use of lasers, modern developments have enabled noncoherent light sources also to be used in this area with great success. In particular, injection light sources, in the form of the coherent injection laser and the noncoherent light-emitting diode (LED), offer designers of optical transmission systems characteristics that are, in many ways, superior to those of other methods. The present article deals essentially with how injection light sources may be employed to transmit or "communicate" information optically. Such optical techniques can be used not only in communication systems, in the classic RF sense, but in computer, video, telemetry, and detection systems as well.

Optical-path variation in a photographic emulsion, R. L. Lamberts, *Jour. Optical Soc. Am.*, 60: 1389-1397, Oct. 1970.

The variation of optical path length through the developed photographic image has been determined for Kodak Panatomix-X film by exposing with a spatial-frequency series of sinusoidal line patterns and scanning the developed images to determine the peak-to-peak variation of density and of optical path for each pattern. For the conditions studied, the ratio of the optical-path variation to the density difference in each pattern depended upon the average density of the pattern. A similar study was made to examine the relationship between the variation of optical path and the variation of silver per unit area on the film. Because the ratio of these showed little, if any, dependence upon the average density, it was concluded that a fairly linear relationship existed between optical path and the mass of silver in an area of the emulsion. Application of linear-systems theory proved to be successful in that the path variation associated with an isolated line exposure could be calculated from the sine-wave data by means of convolution and Fourier-transform techniques. By immersing the film sample in a liquid of known refractive index, it was possible to determine both the variation in optical

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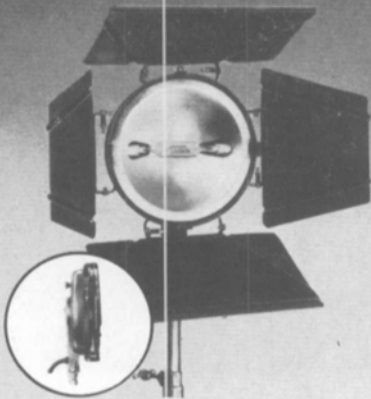
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path resulting from a variation in refractive index and that from the variations in thickness that constitute the relief image.

Reversible tele-objectives (in Russian), V. I. Kuzichev, *Trudy Mosh. Vyssh. Tekh. Uchil. im N. E. Baumana*, 88-95, No. 135, 1970; *Ref. Zh., Fotokinetekhnika*, Abstract No. 6.46.79, 1970.

The optical layout and the basic data are given for a number of telephoto lenses with high optical characteristics. — S.C.G. (Translated from *Ref. Zh., Fotokinetekhnika*.)

Resolving power and the overall density of lines (in Russian), A. N. Tikhonov and I. A. Chernyi, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr*, 15: 266-269, July-Aug. 1970.

In light-sensitive systems with small scattering of light, both highly dispersed silver-halide and non-silver systems, densities obtained under the action of light (and subsequent processing) are formed along the path of the rays of the active light. This is clearly observed in the case of quasi-parallel beams incident normal to or inclined to the layer. The observed resolution, for example of a system of parallel lines, depends on the angle at which the image is observed: it is highest when the angle corresponds to the inclination of the beam which formed the image. The decrease in the growth, or even the fall, which is observed in the resolving power as the size of the aperture of the optical system which forms the image is increased, can apparently be explained by the increase in the inclination of the outer rays forming the high-aperture beam. — S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr*.)

The mechanism of dyeing of gelatin layers: VII The diffusion of dyes into gelatin layers of matrix reliefs (in Russian), G. V. Velichko and N. S. Spasokukotskii, *Zh. Nauch. i Prikl. Fot. i Kinemat.*, 15: 135-142, No. 2, Mar.-Apr. 1970.

A study has been made of the diffusion coefficients (D) of an Acid Red dye into thin, strongly hardened gelatin matrix relief layers, and of the change in D under the influence of the conditions of dyeing: the dye concentration in the dyeing solution, the pH of the solution and the concentration of electrolytes in it, and the temperature. The value of D for the reliefs studied is approximately two orders of magnitude less than for normal unhardened gelatin layers, which is connected, apparently with the more compact structure of the relief. The value of D increases with the concentration and pH of the dyeing solution and decreases on the addition of neutral electrolytes. The increase of D as the dye concentration is increased is connected with the fact that the measured D is only "apparent," since the real diffusion of the dye into the relief consists of two processes: the natural diffusion in the medium taken up by the porous structure of the relief and the adsorption of the dye on active sites of this structure. The values found for the apparent diffusion are inversely proportional to the slope

of the adsorption isotherm. The energies of activation of the dye in the systems studied are calculated. — S.C.G. (Translated from *Zh. Nauch. i Prikl. Fot. i Kinemat.*)

A new method for the general sensitometric testing of black-and-white reversal motion-picture films (in Russian), B. I. Modestov, *Tekh. Kino i Televideniya*, 14: 29-30, Mar. 1970.

A brief explanation is given of a new system recently introduced into the Soviet Union for the sensitometry of reversal black-and-white motion-picture films. All the sensitometric characteristics, including speed, are based on the reversed image, whereas the old method was based on the negative curve. — S.C.G.

Granularity spectra in duplicating (in Russian), M. A. Aingorn, *Zh. Nauch. i Prikl. Fot. i Kinemat.*, 15: 148-150, No. 2, Mar.-Apr. 1970.

Granularity spectra have been obtained at the different stages (negative, intermediate positive, dupe negative, and print) in the making of a motion-picture print with a dupe negative. The materials used were of Soviet and East German manufacture. The shape of the spectra for the different stages corresponded qualitatively and quantitatively to the mathematical model proposed by Doerner. The implications of the curves are discussed. — S.C.G.

Automation of the measurement of the frequency-contrast characteristic of photographic materials: I Test-object for the automatic measurement of FCC, K. V. Vendrovskii, Yu. S. Andreev, and A. I. Veitsman, *Zh. Nauch. i Prikl. Fot. i Kinemat.*, 15: 129-135, No. 2, Mar.-Apr. 1970.

The advantages of a radial test-object for a previously described method (Vol 14, pp. 442-445) of automatic measurement of frequency-contrast characteristics of photographic materials are discussed. Full use of these advantages requires the automatic conversion of densities into effective exposures. A unit with a combination radial test-object is described, and the errors arising from the use of a finite length of scanning slit are evaluated.

The test-object also includes a ring-shaped wedge, linear with regard to transmission. An optical-photoelectric method is described for the preparation of such a wedge, the light-source being a modulated cathode-ray tube. — S.C.G. (Abridged translated from *Zh. Nauch. i Prikl. Fot. i Kinemat.*)

The Geisser metering pump, V. M. Bondarchuk and Yu. V. Krystal', *Tekh. Kino i Televideniya*, 14: 75-77, June 1970.

The pump described has been designed for metering solutions in film-processing plants in the motion-picture industry. — S.C.G.

A photoresistor sensor for lens focusing (in Russian), A. P. Angaforov, A. M. Bratkov, O. B. Gusev, and B. S. Timofeev, *Tekh. Kino i Televideniya*, 14: 40-42, Mar. 1970.

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A discussion is given of the properties of photoresistors of CdS and CdSe, which change their longitudinal resistance when an optical image projected onto their sensitive faces is put out of focus. It is shown to be possible to use the sensor for controlling an objective and regulating the focusing of the optical image. — S.C.G. (Translated from *Tekh. Kino i Televideniya*.)

The gradation characteristics of black-and-white images in optical printing (in Russian), L. P. Krylov, A. V. Krupenina, and G. P. Vasil'eva, *Tekh. Kino i Televideniya*, 14: 38-43, Apr. 1970.

It is shown that the scattering of light by the negative density and by the objective has an influence on the gradation characteristics of the image obtained in optical printing in the 23TTO-1 printer (a Soviet model). It is possible to approximate the gradation characteristics of images obtained by optical and by contact printing under conditions in which light is scattered by the negative density. — S.C.G. (Translated from *Tekh. Kino i Televideniya*.)

The 25P-79 centrifugal pump (in Russian), V. M. Bondarchuk, *Tekh. Kino i Televideniya*, 14: 77-78, June 1970.

The pump described has been designed by a group of Leningrad establishments concerned with the film industry. It is for use in re-circulating processing systems. — S.C.G.

Cobb chart resolution as a tool in photographic system design, Pt I, J. G. Ballantyne, *Jour. Phot. Sci.*, 18: 117-130, July/Aug. 1970.

A number of methods for specifying and predicting the performance of complete photographic systems are discussed, and advantages are claimed for the use of Cobb chart resolution as an overall figure of merit. Fourier transform techniques are used to compute the Cobb resolution of a system from its modulation transfer function (expressed either analytically or numerically) and the granularity present, and methods are given for estimating the Cobb resolution of a complete system from those of its individual components, or from their modulation transfer functions or spread functions, when these are more readily available. Results are presented in graphical form, for quick performance estimates, and as empirical formulae for use in system optimization.

The measurement of the modulation transfer function of motion-picture films (in Russian), K. V. Vendrovskii, Yu. S. Andreev, and A. I. Veitsman, *Tekh. Kino i Televideniya*, 14: 18-24, June 1970.

In order to facilitate the automation of the determination of the MTF of motion-picture films, two new elements have been devised for use in the system used in the Soviet industry. One is a unit for the automatic conversion of density readings into effective exposures, and the other is a test-object with a large selection of lattices

with a wide range of spatial frequencies. The other parts of the system are standard Soviet equipment for measuring resolving power. Results obtained with Soviet motion-picture stocks are given. — S.C.G.

A study of the light and color characteristics of motion-picture film printers (in Russian), A. M. Kuritsyn, B. V. Valuiskii, and L. S. Tatarinova, *Tekh. Kino i Televideniya*, 14: 8-17, June 1970.

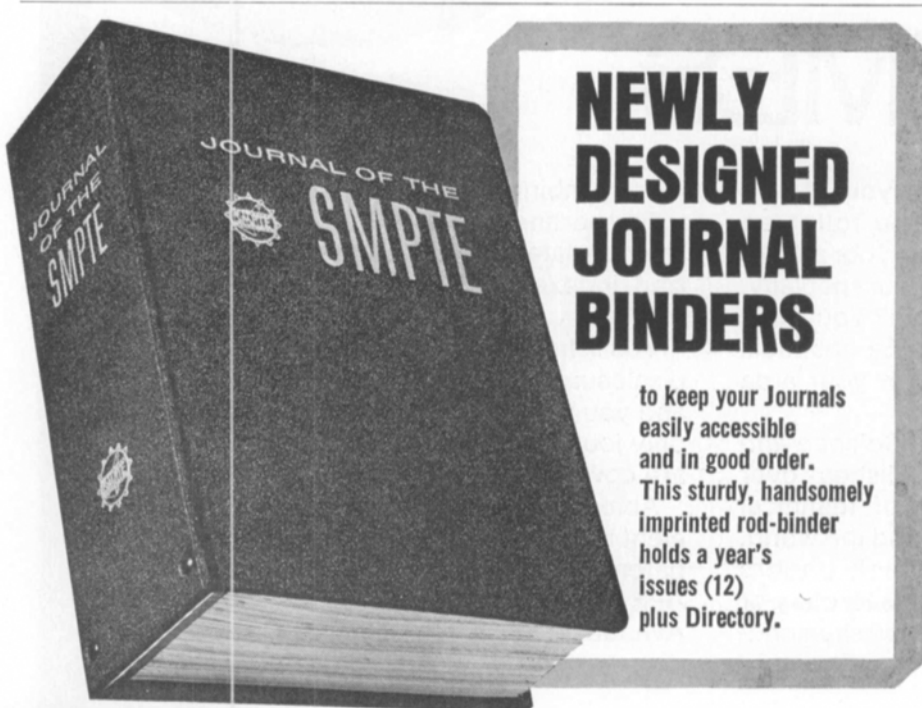
A photometer has been designed for measuring the intensity and quality of the light in the gate of a motion-picture printer, and also to study the evenness of illumination over the gate area. The characteristics of a number of printers used in the Soviet Union have been investigated with the new instrument. — S.C.G.

The absolute spectral sensitivity of photographic materials made by Gosniikhimfotoproekt for recording short-wave ultraviolet radiation (in Russian), A. V. Kravchenko, I. G. Morozova, and G. I. Startsev, *Zh. Nauch. i Prikl. Fot. i Kinemat.*, 15: 161-166, May-June 1970.

A determination has been made of the absolute spectral sensitivity and the monochromatic contrast coefficient (γ) of photographic materials from Gosniikhimfotoproekt, type UF-2T, UF-ot, UF-1L and UFSh-O over a wide spectral region from 40 to 450/m μ . Measurement of light fluxes was carried out with the aid of an FEU-39A photomultiplier, the end face of which was coated with a layer of sodium salicylate. The photomultiplier and phosphor were previously calibrated by the use of an ionization chamber by the complete saturation method. The results of spectrosensitometric measurements are set out in tables. — S.C.G. (Translated from *Zh. Nauch. i Prikl. Fot. i Kinemat.*)

A study of the reciprocity failure of photographic materials in the vacuum ultraviolet region of the spectrum (in Russian), A. I. Ryabtsev and N. K. Sukhodrev, *Zh. Nauch. i Prikl. Fot. i Kinemat.*, 15: 167-172, May-June 1970.

It is well known that the reciprocity law is not obeyed by materials exposed in visible and near-ultraviolet radiation, but that they do obey it in x-rays. Results are reported of an investigation carried out in the intermediate region of the spectrum, 3000-584 Å ($h\nu \pm 4.21$ eV) with a wide range of exposures, $9 \times 10^{-6} - 3 \times 10^6$ s. It was found that in the region of the spectrum 3000-2000 Å (4-6 eV) reciprocity failure did not depend on the wavelength of the radiation; at $\lambda < 2000$ Å ($h\nu > 6$ eV) a sharp fall in reciprocity failure began, and at $\lambda < 1200$ Å ($h\nu > 10$ eV) the reciprocity law was obeyed. The transition from non-observance to observance of the law begins at $h\nu_{min} = 2.2E_g$, where E_g is the minimum width of the forbidden band of the silver-bromide crystal, and is explained by the increase in electronic excitation at $h\nu > h\nu_{min}$. — S.C.G. (Translated from *Zh. Nauch. i Prikl. Fot. i Kinemat.*)



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Developing and tanning-developing properties of 6,7-dihydroxycoumaran-3-one and its 2-arylidene derivatives (in Russian), M. S. Khaikin, D. B. Shamil'skaya, E. E. F. Rul', and L. G. Fedorina, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*, 15: 243-246, July-Aug. 1970.

Studies have been made of the developing and tanning-developing properties of 6,7-dihydroxycoumaran-3-one and of 11 of its arylidene derivatives in comparison with pyrocatechol and pyrogallol. It was found that 6,7-dihydroxycoumaran-3-one allows higher image densities and speeds to be obtained than with polyphenols, but with an increase in fog, while in tanning development a better quality of relief is obtained than with pyrocatechol. The in-

roduction of arylidene residues leads to a falling-off of the photographic properties. The electronic character of the substituent in the arylidene residues shows an influence on the rate of development. A satisfactory correlation was found between the Hammet-Taft coefficient of these substituents and the rate of development. A mechanism for the transmission of the electronic influence in molecules of 2-arylidene-6,7-dihydroxycoumarones is discussed. — S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

The mechanism of the influence of a pulsed electric field on the photographic process (in Russian), Yu. F. Pevchev, V. I. Kalashnikova, and L. P. Konovalova, *Zh.*

Nauch. i Prikl. Fotogr. i Kinematogr., 15: 250-256, July-Aug. 1970.

It is shown that both the positive (type FT-SK film) and negative (type FT-30 film) [both films are probably graphic arts films—Abstractor] effect of the action of a pulsed electric field, defined by the ratio of the difference of density with and without the field to the density without the field, increases with increase in the potential of the field at first linearly and then goes on to saturation. A decrease in the illumination of the photographic layer leads to a sharp increase in the effect. If an exposure to a spark is introduced relative to the front of the potential pulse, the effect falls off according approximately to an exponential law with a characteristic time of about 30 μ s.

The action of the electric field is discussed as the result of processes in the separate emulsion grains. Since the photoelectrons are displaced by the electric field to the surface of the grain, their behavior is essentially determined by the number and nature of the electron traps on a small portion of the surface. The absence of a sensitivity center in the region where the photoelectrons accumulate leads to the formation of a disperse latent image and, ultimately to a negative effect; the presence of a sensitivity center provides the conditions for the concentration of latent-image silver on the center, thus giving rise to a positive field effect.

The magnitude of the effect is determined by the ratio between the intensity of the exposure, which determines the total number of photoelectrons, and the potential of the electric field, which gives the number of charge carriers required for compensating for the field in the grain. The sign of the effect of the action of the electric field is connected with the average number of sensitivity centers on the grain.

The proposed mechanism of the phenomenon is in complete agreement with the experimental results. — S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

A study of the growth of emulsion microcrystals protected by gelatin (in Russian), I. R. Protas and V. I. Mikhailov, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*, 15: 272-274, July-Aug. 1970.

A study has been made of the effect of the charge of gelatin particles on the dispersion characteristics of aqueous-gelatin suspensions of AgHal. The charge on the particles is measured by measuring the pH of the disperse medium. It was found that the rate of growth of the negatively charged AgHal grains formed in the presence of an excess of KBr increases with an increase of the pH of the medium. At high pHs (>5.0) the negatively charged particles of gelatin produce a high negative charge on the surface of the grains, which causes a strong attraction of Ag⁺ ions. At a pH lying close to the isoelectric point of gelatin (pH ~5.0) ionization of the gelatin molecules is minimal and hydration is very low. Hence the AgHal grains carry a negative charge formed by the Br⁻ ion only, which leads to a slower

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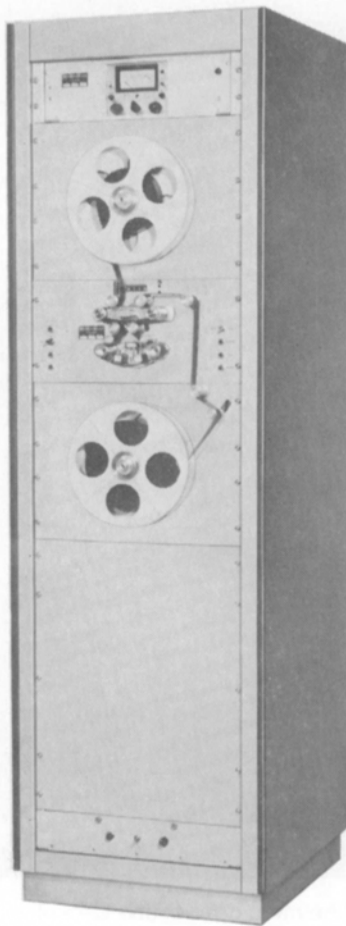
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growth of the grains. Grain growth in an acid medium ($\text{pH} < 5.0$) proceeds still more slowly, since under these conditions the negative charge of the AgHal is partly neutralized by the adsorbed positively charged gelatin particles. The polydispersity of the AgHal suspensions, characterized by the differences in the dimensions of the projected area, also depends on the pH of the medium. The AgHal grains vary more in dimension, the lower the pH of the dispersion medium. — S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

The reversibility of the desensitizing action of moisture on photographic materials on storage (in Russian), A. L. Kartuzhanskii and L. G. Trofimova, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*, 15: 275-281, July-Aug. 1970.

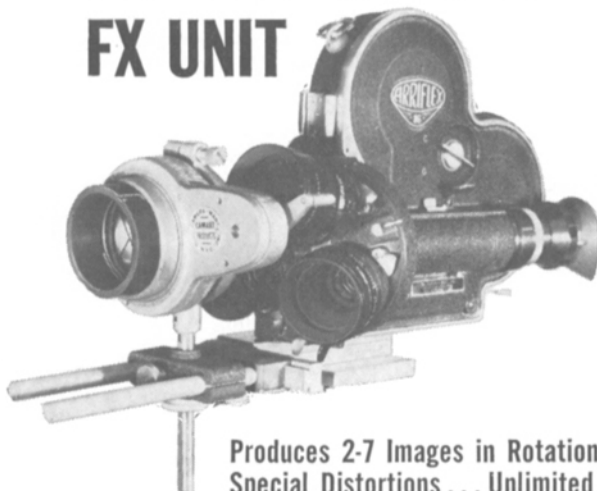
A study has been made of the reversibility of the desensitizing action of moisture on various photographic emulsion products during storage, and confirmation has been made of the relation, previously described by Vendrovskii and Sheberstov, between the degree of reversibility and the time of storage with subsequent exposure: reversibility is less the smaller the keeping time, and completely disappears for times smaller than the optimum from the point of view of reciprocity failure. It is shown that extended storage of the layers under conditions of high humidity causes irreversible changes in the sensitivity centers and in certain cases also in the molecules of the sensitizing dyes. Until the action of the moisture affects the dye, the desensitizing action and reversibility are the same for natural and conferred sensitivity. Moisture affects not only the surface sensitivity centers with which it is in contact, but also internal centers with which it is not in contact; if irreversible changes take place in surface centers as a result of the action of moisture, they are also certain to be found in the internal centers. This has a bearing on the existence of an equilibrium between the surface and internal centers which is individual for each storage, as a result of which a change in one of the components of the equilibrium necessarily shows the same effect on the other (although indirectly). — S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

A study of some photographic properties of uramil (in Russian), V. L. Abritalin, T. G. Andreyanova, O. B. Krylova, and G. I. Lebedkina, *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*, 15: 241-243, No. 4, July-Aug. 1970.

Results are given which show the presence of a significant super-additive effect in developers with uramil (5-aminobarbituric acid) and phenylenediamines, an insignificant effect with aminophenols, and no effect in developers with hydroxybenzenes and 3-pyrazolidones. In developers containing aminophenols and phenylenediamines, uramil causes an increase in the rate of development of the image and in the photographic speed while decreasing the fog density. — S.C.G. (Translated from *Zh. Nauch. i Prikl. Fotogr. i Kinematogr.*)

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