

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 Televideniya* can be consulted at, or borrowed from, the Society's Headquarters Office.

The subject areas are grouped below:

Computer Use
Densitometry
High-Speed Photography and Instrumentation
Holography
Information Storage
Photographic Theory and Materials
Sensitometry
Sound
Television

COMPUTER USE

Domain Tip Memories, C. Battarel and M. Hanaut, *Radio and Electronic Eng.*, 47: 157-163, April 1977.

Recent domain tip efforts, mainly the DOT memory of CMI and BASF and the MOD memory of TECSI and Crouzet have been directed toward lowering the cost per bit through an increase in the bit density on the substrate and more efficient manufacturing processes. Domain tip memory technology takes advantage of the low cost per bit of the basic magnetic film deposited on a glass substrate despite the lower density as compared to the cost of semiconductors or bubble memory processed substrates. The paper reports mainly on the recent design of MOD which allows unilateral propagation of domains with one level of conductors. Several prototypes in DOT as well as in MOD technologies have been constructed and operated, some of them of a capacity larger than 2 megabits, showing overall error rates better than 10^{-9} without correction.

Microprocessors, Hoo-Min D. Toong, *Scientific American*, 237: 146-161, Sept. 1977.

A microprocessor is a computer central processing unit on a single chip. Currently it is associated with other chips in a microcomputing system. Now emerging, however, are complete computer systems on a single chip.

DENSITOMETRY

A New Digital Color Recording System, Y. Tamoto, *J. App. Phot. Eng.*, 3: 154-159, Summer 1977.

We have developed a new digital color recording system utilizing a rotating drum scan-

ning system which enables us to perform digital-analog hybrid image processing. By specifying a particular density range of the original image, only the range in question is recorded on color film by a digital color image display with the density levels recorded as ten colors. It is possible to record the other ranges simultaneously on the same film as a continuous tone (black-and-white) image. The new system also utilizes a tone-modification (γ -control).

New Approaches in Densitometry—A Review, C. S. McCamy, *Phot. Sci. and Eng.*, 21: 103-108, May/June 1977.

Since values of optical density depend on geometric and spectral conditions of measurement, standards specify certain conditions. The current approach is to standardize different sets of conditions to simulate various processes in use. The optical theories of wedge densitometry and microdensitometry have been established. New absolute methods of measurement have made primary calibration easier, more precise, and more accurate. Digital integrated circuitry has improved linearity, stability, and serviceability of densitometers and greatly facilitated display, recording, and processing of data. Extremely fast and stable color densitometry has been achieved by using a pulsed-xenon source, solid-state sensor, and pulse-detection electronics.

HIGH-SPEED PHOTOGRAPHY AND INSTRUMENTATION

Apparatus for the Control of High-Speed Motion-Picture Cameras With Prism Compensation and Continuous Film Transport (in Russian), I. V. Venatovskii and V. G. Novikov, *Materialy Vsesoyuz. Nauch.-Tekh. Konf. "Sovrem. Prikl. Optika i Optich. Pribory"*, Ch. 1, Leningrad 1975, p. 44.

An account is given of the design of apparatus for the synchronization of the operation of a high-speed motion-picture camera with the process being recorded and for the stabilization of the speed of transport of the film. The apparatus is constructed on the principle of the phase control of the supply voltage of the electric drive of the camera. — S.C.G. (Translated from *Ref. Zh., Fotokinotekhnika*)

Structural Principles of Modern Automated Motion-Picture Decoders (in Russian), I. V. Venatovskii and I. Ya. Glikman, *Materialy Vsesoyuz. Nauch.-Tekh. Konf. "Sovrem. Prikl. Optika i Optich. Pribory"*, Ch. 1 Leningrad 1975, pp. 45-46.

A discussion is given of the principles underlying the design of universal motion-picture decoders for the processing of the results of high-speed cinematography on 16mm and 35mm film stock. — S.C.G. (Translated from *Ref. Zh., Fotokinotekhnika*)

Point Images in a High-Speed Motion-Picture Camera With Prism Compensation (in Russian),

Yu. N. Yashkin, *Materialy Vsesoyuz. Nauch.-Tekh. Konf.*, "Sovrem. Prikl. Optika i Optich. Pribory," Ch. 1, Leningrad 1975, p. 50.

Formulae are given for calculating the shape and dimensions of the spot produced by scatter of a point image formed by a motion-picture camera. — S.C.G. (Translated from *Ref. Zh., Fotokinotekhnika*)

Features of the Control Systems of High-Speed Cameras Produced by the Industry (in Russian), N. M. Serdyukov, M. E. Gol'dfarb and N. V. Stepanova, *Materialy Vsesoyuz. Nauch.-Tekh. Konf. "Sovrem. Prikl. Optika i Optich. Pribory"*, Ch. 1 Leningrad, 1975, p. 51.

A discussion is given of apparatus manufactured by the Krasnogorsk mechanical factory, namely types of high-speed motion-picture cameras, the optical systems of which operate on different principles, and control systems constructed according to a common functional scheme and carrying out the following basic tasks: control of the electric drive of the scanning mechanism; synchronization of the start of filming with the beginning of the process under study; control of the shutter; and measurement of the rotational speed of the scanning mechanism at the moment of exposure. — S.C.G. (Translated from *Ref. Zh., Fotokinotekhnika*)

Points in the Adjustment of a High-Speed Camera With Mirror Compensation (in Russian), I. I. Kozhukov, *Materialy Vsesoyuz. Nauch.-Tekh. Konf.*, "Sovrem. Prikl. Optika i Optich. Pribory," Ch. 1 Leningrad, 1975, p. 51.

An analysis is given of the adjustment of the FKIM camera of the instant-access type with a mirror compensator. The mathematical relations obtained may be used for other types of apparatus with mirror compensation for image movement. A discussion is given of the principles of de-compensation according to the magnification of the optical system, and apparatus is described for checking residual de-compensation. — S.C.G. (Translated from *Ref. Zh., Fotokinotekhnika*)

HOLOGRAPHY

White-Light Holograms, Emmett N. Leith, *Scientific American*, 235: 80-95, Oct. 1976.

Several ways have been devised for viewing holograms with ordinary incoherent light, making it unnecessary to rely on the coherent light of the laser or even the quasi-coherent light of a mercury-arc lamp.

The Use of Colored Pictures in Holographic Schlieren Photography and Interferometry (in Russian), N. G. Vlasov, V. Ya. Tsarfin and A. E. Shtan'ko, *Zh. Nauch. Prikl. Fotogr. Kinematogr.*, 21: 438-440, No. 6, 1976.

With ordinary schlieren photography, difficulties arise when it is required to study objects inside optical heterogeneities, and when high-speed photography is required. The combination of laser-produced holograms with classical color schlieren photography eliminates these difficulties. Optical schemes are briefly described for carrying out this kind of photography, and it is shown how interferometric comparisons can be made with two different schlieren holograms of the same subject. — S.C.G.

INFORMATION STORAGE

Microelectronic Memories, David A. Hodges,

Scientific American, 237: 130-145, Sept. 1977.

Present memories based on transistors typically store some 16,000 bits (binary digits) on a chip. Magnetic-bubble and charge-coupled devices are providing an even higher density of information storage.

PHOTOGRAPHIC THEORY AND MATERIALS

A Statistical Method for Image Classification and Tone Reproduction Determination, Robert Chung, *Jour. Appl. Photog. Eng.*, 3: 74-81, 1977.

A problem in photomechanical tone reproduction is to objectively classify originals so that

they can be reproduced with tone reproductions which tend to maximize reproduction quality. Such an objectively-based method of classification would enable a scanner to classify originals. A new approach, the tone distribution curve (TDC), was explored to see if it could solve this problem. The TDC is a graph of the tonal content of the picture obtained by a statistical sampling of the tones of the picture itself. Exploratory experiments found that TDCs could be used to objectively classify originals by picture type (high, normal, and low key) and by contrast. Criteria for these classifications are given. In addition, TDCs of originals and reproductions can be used to derive conventional tone reproduction curves which are potentially more accurate because they are based on the images themselves and not on gray scales.

A New Imaging System Utilizing Photoelectrophoretic Behavior of TiO_2 , Y. Toyoshima, A. Takahashi, H. Nozaki, T. Iida and M. Sukigara, *Phot. Sci. and Eng.*, 21: 29-31, Jan./Feb. 1977.

A novel direct imaging system, based upon the photoelectrophoretic phenomenon has been developed. It is shown that some light-sensitive pigment particles such as rutile TiO_2 suspended in a highly insulating liquid alter the sign of their ζ -potential by exposure to visible light. This phenomenon is applied to the direct image storage and display system. The imaging configuration and procedure are described and examples of image obtained by this method are given.

Comparison of Photographic and Digital Imagery from Film and Solid-State-Array Remote Sensing Cameras, P. N. Slater, *Phot. Sci. and Eng.*, 21: 198-203, July/Aug. 1977.

An analytical study has been made to compare the imagery from a solid-state-array camera and a photographic film camera operating under the same conditions. The two cameras were the same size and yielded imagery having the same modulation at the same spatial frequency. The comparison included both digital imagery, in which the film was scanned by a microdensitometer, and analog imagery, in which the digital output from the array was recorded on film. The digital imagery was evaluated with regard to signal-to-noise ratio (SNR) and minimum detectable ground reflectance difference ($\Delta\rho$); the analog imagery was evaluated with regard to visual resolution limit. The effects on the imagery of various atmospheric conditions and of different ground scene contrast ratios were also investigated. The most interesting result of the study is that the digital imagery from the solid-state-array camera has a higher SNR than that from the film camera-microdensitometer system. Thus the array camera imagery is preferred for automated scene classification purposes. On the other hand, the film camera is preferred for cartographic and mensuration applications because the visual resolution limit is at a higher spatial frequency for the imagery from the film camera than from the array camera-film recorder system.

SENSITOMETRY

Sensitometry of Vesicular Films, M. G. Anderson, *J. App. Phot. Eng.*, 3: 135-142, Summer 1977.

The present end uses of vesicular film are described from manual sheet duplicates to high-speed continuous roll print duplicates. The heat developing conditions in the field equipment, as well as other use conditions, are related to sensitometry and densitometry required for vesicular films. A sensitometer and heat developer presently used are described in some detail. A report is made as to the present state of standardization for vesicular film by the American National Standards Institute.

SOUND

In Situ Measurement and Equalization of Sound Reproduction Systems, Robert B. Schulein, *Jour. Aud. Eng. Soc.*, 23: 178-186, April 1977.

The concept of frequency response is of basic importance to audio reproduction equipment. When analyzing electronic equipment, this characteristic is seldom a problem of measurement or interpretation. It is a problem, however,

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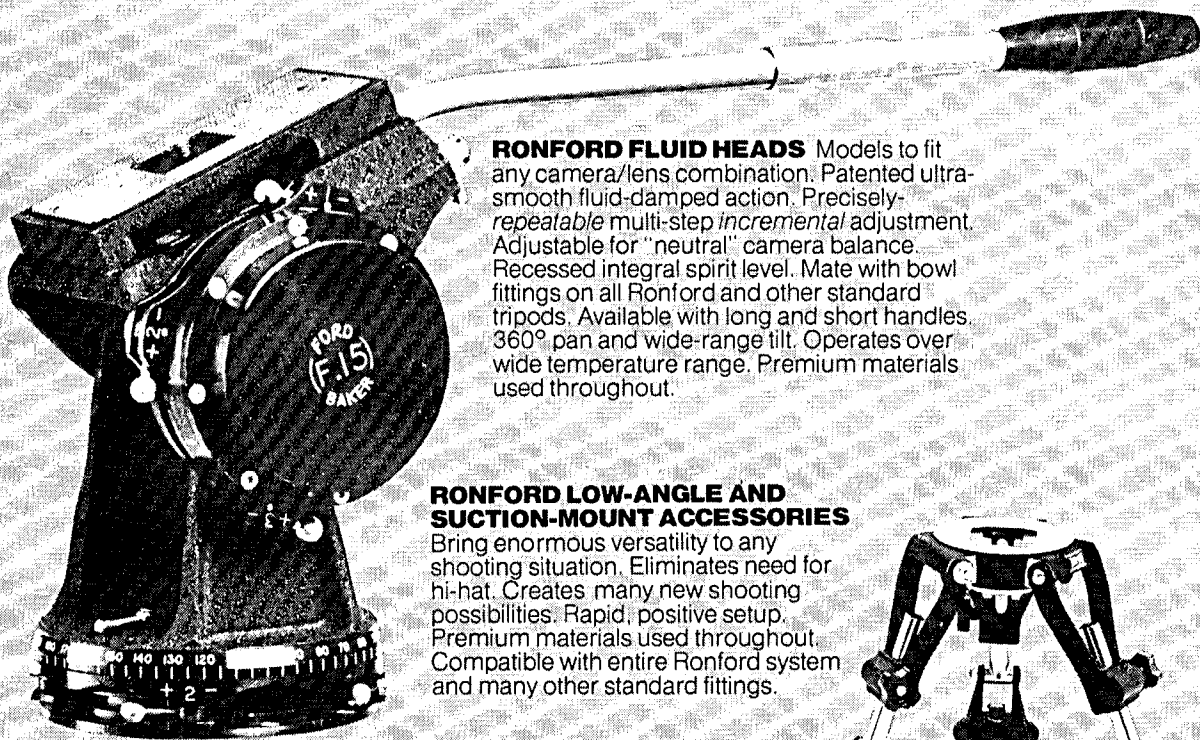
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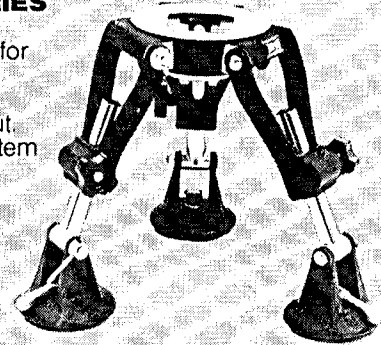
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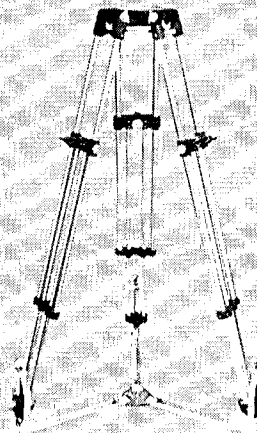
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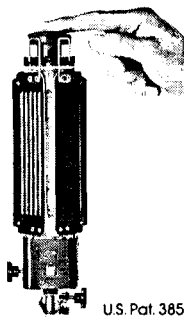
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for acoustical transducers such as loudspeakers. Unlike electronic equipment which has both electrical input and output terminals, the loudspeaker has an electrical input terminal but an acoustical output. This acoustical output is further complicated by the fact that a room is always interposed between the loudspeaker and the acoustical measuring device. With the human as the ultimate evaluation instrument, various measurement and interpretation questions arise regarding frequency response, variations among listeners, and effect of program material. The major question, however, is just what the frequency response of a particular sound reproduction system should be. In order to answer these questions, several psychoacoustical experiments were devised, based upon a listener's ability to detect differences. These experiments and their results are described in detail as they relate to the following types of sound reproductions systems; sound reinforcement systems; studio monitoring systems; and home high-fidelity systems.

TELEVISION

Color Signal Inphase and Quadrature Distortion Measurement and Evaluation, D. H. Pritchard and T. M. Wagner, *RCA Review* 38: 3-32, Mar. 1977.

The total transient response at a color transition in a color television system is a highly complex function involving a number of system parameters. This report enumerates these factors and provides a brief description of the cause and effects of chroma quadrature distortion. A variety of measurement techniques are discussed, coupled with the results of subjective

evaluation of practical limits of color edge distortion. A novel technique for describing color edge reproduction involving colorimetric analysis is included.

Optical Design for Underwater Television Viewing Systems, Joseph B. Hughes, *Opt. Eng.*, 16: 152-158, Mar./Apr. 1977.

This paper describes three lens designs which have been produced for three different underwater remote viewing applications: remote controlled underwater inspection vehicle for offshore operations; a miniature underwater camera for internal inspection of water cooled nuclear reactors; and an underwater camera for submersibles, search systems, and work vehicle application. A unique feature of these lenses is the ability to orient the line of sight by rotation of the optics rather than the camera. The added complexity of the optics in each case is more than offset by resulting advantages in the overall viewing system performance. The paper emphasizes the necessity for a system approach which coordinates the design of the optics, sensor and illumination with other elements of the system to achieve optimum performance.

Experimental Direct Broadcast Reception of 12 GHz Television Signals from the Canadian Communications Technology Satellite, K. G. Freeman, *Radio and Electronic Eng.*, 47: 234-236, May 1977.

In order to gain practical experience of reception of television from satellites, a long-term experiment has been set up in Canada. The ground receiving station equipment and the monitoring arrangements are described.

New Products & Developments



The Moviecam-3 a self-blinded compact 35mm mirror reflex camera has been announced by Neilson-Hordell Ltd., Central Trading Estate, Staines Middlesex, TW18 4UU, England. The movement is a dual-pin registered with a 4-pin transport system providing continuously variable speeds from 3 to 140 pictures/s as well as stop motion and synchronous 24 and 25 pictures/s. By use of an interlock coupled to the lens iris it is possible to alter the camera speeds while

shooting and automatically maintain correct exposure of the film. Drive is achieved by a built-in controlled printed circuit motor that can be powered by batteries or mains electric. The viewfinder is orientable throughout 360°. The camera incorporates a high-contrast television pickup tube which can feed television monitors and a videotape recorder. Other features include the built-in "Digiclapper" which prints in a dialled scene number onto the first frames. It also provides start, stop and synchronization pulse marks. The camera is 530 mm long; 310 mm wide and 360 mm high. It accepts a 120-m magazine and weighs 14 kg including the magazine. Price of the Moviecam-3 is \$32,400; the price includes the Moviespeed system, the Digiclapper, television pickup and carrying case. Also available is a 120-m magazine priced at \$2115; a computerized power unit, priced at \$2650; a complete set of cables priced at \$378; and the iris control system priced at \$1895.

The Thonnon-Pannaye lighting generator, a mobile film and television lighting generator vehicle providing an output of 25 kVA, 380/220 V, 50 Hz, has been announced by Neilson-Hordell Ltd., Central Trading Estate, Staines, Middlesex, TW18 4UU England. A built-in