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

Those requiring definitive and thorough searches of current literature and patents are referred to *Abstracts of Photographic Science & Engineering Literature* (*APSE*), produced by the Engineering Index, Inc., 345 E. 47 St., New York, N.Y. 10017, with the editorial cooperation of the Society of Photographic Scientists & Engineers.
The subject areas are grouped below:

Aerial Photography
Cameras
Cinematography
Color
Data Recording and Processing
Film and Its Properties
Motion Pictures

AERIAL PHOTOGRAPHY

The change of aerial camera exposure with solar altitude, M. R. Specht, N. L. Fritz and A. L. Sorem, *Phot. Sci. Eng., 10:* 150–155, No. 3, May–June 1966.

The relationship between solar altitude and apparent scene luminance for aerial photography has been determined by the evaluation of a series of aerial photographs made of specific scenes at solar altitudes ranging from 68° to −1°. Variations, as a function of solar altitude, in the apparent luminances of individual details, as well as in luminance distributions, were obtained from microdensitometer measurements on the negatives. The results are compared with the curves relating solar altitude with illuminance on a horizontal plane and with Jones and Condit's luminous density. Significant differences among these relationships are noted.

Synthetic aperture contour camera, Dwin R. Craig, *Photogrammetric Eng., 32:* 947–956, No. 6, Nov. 1966.

The Synthetic Aperture Contour Camera produces aerial photographs in which contours can be "seen" with the unaided eye on a simple light table. Operation of the camera is accomplished by making a time exposure on film moving at a rate to accomplish image motion compensation. The result is equivalent to an infinite number of stereo pairs—causing all objects at a given distance from the aircraft to be sharply defined, whereas, objects at all other distances are blurred. All sharply defined objects are at the same elevation and the shape of the contour line is a true orthographic projection.

The camera system is similar, in concept, to a giant monocular range finder, which is able to focus sharply at a predetermined distance from the aircraft, so that the images of all objects at that distance are in sharp focus. The depth of field is made critical by using a large aperture, generated synthetically by forward motion of the aircraft. Under typical conditions, such a monocular range finder can have a two-mile aperture and a four-mile focal length with a depth of "focus" (measured at the ground) equivalent to that of an $f/2$ optical system. Laboratory experiments demonstrate the ability to recognize visually the height of a contour with a precision of 1 part in 1000.

A bank of separate cameras (same focal length with different film transport speeds) could simultaneously photograph a multiplicity of contours at different elevations. Preferably, multiple lenses could operate with one film transport to perform the same function in a single camera.

The Synthetic Aperture Contour Camera (SACC) offers the possibility of vast reduction in time between original photography and the final map. This, combined with the elimination of complex stereo plotting equipment, makes possible extremely rapid combat mapping.

CAMERAS

Motion-picture camera for combination cinematography, Yu. M. Britan and V. M. Bernshteĭn, 10.15.64. *Byulleten' Izobreteniĭ* No. 23, 1965; *Tekhnika Kino i Telev., 10:* 89–90, July 1966.

A motion-picture camera allowing the simultaneous superposition of two images on the film, with viewing on a matte screen, contains an optical system of two objectives placed at an angle and a trapezoidal prism block, composed of two prisms with a common semitransparent mirror face. With the aim of obtaining a negative of a combined frame without the necessity of a duplicate negative, and of simplifying the technology of film processing the objectives in the camera are set at an angle of 60°, and the trapezoidal prism block has an even number of reflecting faces, one prism having, in plain view the form of a triangle with angles of 30 and 60°, and the other a quadrilateral obtained by cutting off one of the acute angles of an isosceles triangle with angles of 30° at the base.–S.C.G. (Abridged from *Tekh. Kino i Telev.*)

CINEMATOGRAPHY

The method of single shooting for the determination of frame stability in narrow-gage motion-picture cameras (in Russian), V. M. Gradoboev, *Optiko-*

mekhanicheskaya Promyshlennoct': 29–33, No. 12, 1965; *Tekhnika Kino i Telev., 10:* 83, May 1966.

A discussion is presented of the basic forms of the method of single shooting: indirect measurement of frame stability (the standard method) and the direct measurement of a particular instability of the frame. It is shown that the most reliable and reproducible method is that of direct measurement, using an adaptation of the type of film gate with register pegs for the film.—S.C.G. (Translated from *Tekhnika Kino i Telev.*)

The making of wide-screen news and documentary films by anamorphosis in printing (in Russian), E. V. Timofeev and G. G. Shevyakov, *Tekhnika Kino i Telev., 10:* 56–59, Apr. 1966.

Wide-screen films may be made by using normal optics in shooting with a mask to limit the frame to the wide-screen proportions. The same camera can be used for normal cinematography. An anamorphotic printer is described for printing such films onto 35mm film.—S.C.G.

COLOR

30 Years of modern color photography 1935–1965, G. Koshofer, *Brit. J. Phot., 113:* 562–563, 567, 571, July 1; 606–609, July 15; 644–647, 649, July 29; 738–741, August 26; 824–830, Sept. 1966.

The history of three-color photography is reviewed over the period 1935–1965, with emphasis on marketing and the use of the different processes in cinematography.—S.C.G.

DATA RECORDING AND PROCESSING

The effect of sensitometric response on the geometric characteristics of photographically recorded digital data, William A. Miller, *J. SPIE, 4:* 199–204, No. 5, June/July 1966.

Continued improvement in the performance, both brightness and diameter control, of the spot of the annotator (CRT) has made precision under-exposure unnecessary in order to maintain the proper dot-geometry on the negative.

The requirement that not only the negative, but also the positive, be machine-readable has required a reconsideration of the analytical expression for the density-exposure characteristics of various films. A new model of this characteristic is presented. This model is accurate from very low densities to densities well above the point of inflection, and has been used to calculate exposure times, maximum density attainable, and dot-profiles with accuracy sufficient for annotator systems engineering purposes.

Laser beam and electron beam extremely wideband information storage and retrieval, Leo Beiser, *Phot. Sci. Eng., 10:* 222–228, No. 4, July-Aug. 1966.

Extremely wideband information storage and retrieval requires high-speed scanning of a high-resolution medium over a broad signal bandwidth—all simultaneously approaching their capacity limit. The ideal system is one which imposes minimum burden upon these major elements, while providing the necessary characteristics of stability and good logistics.

A study of the relative merits of present technology reveals two prime scanning techniques, electron beam and laser beam, and two storage media, silver halide and thermoplastic. Other techniques such as magnetic recording and alternative, less sensitive storage media, although very useful at moderate speeds, are presently incapable of establishing a data record at exposures corresponding to many megacycles of signal bandwidth. It is shown that the electron beam and laser beam may be focused to power densities in excess of 10^5 W/cm^2 and that similar electron and photon energies are required to expose silver halide to similar resolution and density. Thermoplastic (exposed by electrons) and photoplastic (exposed by light), although less sensitive, provide rapid access and re-use capability. A technology comparison chart tabulates a comprehensive review of the relative characteristics of three potential systems: electron beam on silver halide, electron beam on thermoplastic, and laser beam on silver halide. Sufficient detail permits assignment of weighting factors to the significant parameters required to fill a particular need. Since neither system appears intrinsically superior for all applications, success is dependent upon the implementation. The state-of-the-art has been carefully evaluated to reveal attainable characteristics.

A fast off-line digital correlator using magnetic tape for storage, repetition and scanning, D. P. Franklin, *Radio and Electronic Eng., 32:* 169–185, No. 3, Sept. 1966.

Special purpose digital apparatus is described for off-line correlation of time varying functions in analogue form. The necessary storage, repetition and relative scanning are afforded by an instrumentation magnetic tape recorder through the extension of its "closed loop." A new value of lag coincides with the complete replacement of that length of tape contained within the "closed loop," and a fresh value of correlation coefficient is printed out for each lag. The method takes up only two tracks, so those remaining can be used in the normal acquisition role at any convenient speed, later transferring their signals at high speed to the analysis circuits.

Operational notation for the analysis and synthesis of optical data-processing systems, A. Vander Lugt, *Proc. IEEE, 54:* 1055–1063, No. 8, Aug. 1966.

This paper describes an operational notation that characterizes basic optical elements as block diagrams and that, for bandlimited optical systems, gives results identical to those obtained by rigorous application of the Fresnel-Kirchhoff diffraction formula. In an analysis of a basic optical system in terms of this operational notation, it is shown how the system can perform either the imaging operation or the Fourier transform operation. Repeated application of this basic system results in cascaded systems that perform more complex operations.

FILM AND ITS PROPERTIES

The electrification of motion-picture film (in Russian), K. Wysocka, *Tekhnika Kino i Telev., 10:* 32–37, Sept. 1966, (Abridged translation from *Kinotechnik* (Poland) *19:* 12–19, No. 210–11, 1966: *Cf. Ref. Zh., Fotokinotechnika*, Abstract No. 7.46.157.)

A general review of the electrification of motion-picture films covers the causes of electrification, defects arising from electrostatic discharges, the determination of charges on the surface of the film, methods of eliminating electrostatic charges, the choice and use of chemical antielectrostatic agents, and the influence of the treatment on the sensitometric and other properties of the film.—S.C.G.

A duplicate negative motion-picture film with controllable contrast coefficient (in Russian), Z. Ya. Kurina, G. V. Derstuganov and L. M. Bogdanov, *Tekhnika Kino i Telev., 10:* 35–37, June 1966.

A description is given of a new black-and-white duplicate negative film for use with the Soviet imbibition color system. The gamma of the film can be varied by exposing through suitable color filters.—S.C.G.

MOTION PICTURES

New achievements in motion-picture technology and systems of video recording (in Russian), M. Z. Vŷsotskiĭ and V. G. Komar, *Tekhnika Kino i Telev., 10:* 74–83, Aug. 1966.

Recent developments in motion-picture technology outside the Soviet Union are reviewed.—S.C.G.