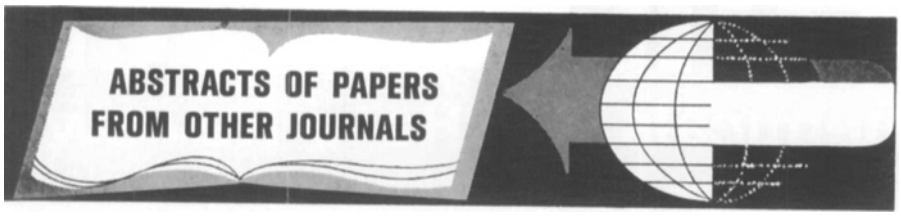

Abstracts of papers appearing in other journals chosen for their importance and possible value to researchers as well as those of timely interest, are published in the *Journal* from time to time. Many translations of abstracts from foreign journals, chiefly those of the USSR, are made available to the *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:

General
Instrumentation and
  High-Speed Photography
Optics
Photographic Theory and Materials
Sound Recording and Reproduction
Special Applications
Television

GENERAL

Highlights of lab history, *Am. Cinemat., 50:* 104–105, 167, 174–176, Jan. 1969.

It's a giant step from "rack and tank" to automated processing, but the lab is still the cinematographer's best friend.

INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY

High-speed photographic study of lubricated contacts using optical interferometry, F. J. Westlake and A. Cameron, *Jour. Phot. Sci.,* 17: 137–140, July/August 1969.

When a sphere approaches a flat surface which is covered by a fluid film, under certain conditions, a pool of fluid becomes entrapped in the contact region. A study of this phenomena is described in which optical interference is used. High-speed photography is employed at framing rates up to 5,000/s, with a gas laser as the light source.

OPTICS

Fibrox and its uses in cinematography and television, Dr. T. Flitcroft, *Brit. Kinemat. Sound and Telev., 51:* 326–327, Sept. 1969.

The principles of fibre optics have been known for some time and in fact, many of the original patents in this field were taken out by Logie Baird before he developed his television system. However, because of the difficulties of making the devices, which were known to be theoretically possible, the commercial development has been slow and only recently has opened up considerable potential business.

Servo zoom lenses for the film industry, J. H. Askew and C. B. Findt, *Brit. Kinemat. Sound and Telev. 51:* 356–358, Oct. 1969.

Although the use of servo controlled zoom lenses is almost universal in European television, their application to the film industry has so far been limited to sytsems having an auxiliary television viewing facility (such as Add-a-Vision or Electronicam).

PHOTOGRAPHIC THEORY AND MATERIALS

The effect of viewing conditions on required tone characteristics in color pho-

Professional Skier, Joe Jay Jalbert shoots tight close-up of Robert Redford.

tography, R. W. G. Hunt, *Brit. Kinemat. Sound and Telev., 51:* 268–275, July 1969.

The way in which viewing conditions affect the desirable tone-reproduction characteristics in color photographic systems is discussed. For reflection prints, where the average luminance of the surround is similar to that of the picture, an effective overall gamma of unity is required. For films projected in dark rooms, an effective overall gamma of 1.5 is required, because the dark surround lowers the apparent gamma. In both cases very light tones have to be reproduced at lower gammas in order to accommodate extreme highlights. For very dark tones, photographic systems must possess very high gammas to offset flare introduced by the camera, by the printing step (if any), and by the viewing situation. Practical tests on reflection-print and reversal-transparency systems widely used in practical show that, when measured in the absence of flare, their tone-reproduction characteristics approximate closely to curves evaluated theoretically to offset typical amounts of flare; but when used in practice the final tone reproduction over most of the scale is close to a gamma of 1.0 for reflection prints and 1.5 for projected transparencies. The implications of these findings for color reproduction, for duplicating — and for the use of color films in color television are discussed.

Holographic compensation of motion blur by shutter modulation, Olof Bryngdahl and Adolf Lohmann, *Jour. Opt. Soc. Am., 59:* 1175–1178, Sept. 1969.

Ordinarily, in photographic recording, the shutter is opened for a finite time which can be described by a rectangular shutter function (=flux as a function of time). Such a shutter function, in connection with linear image motion, creates a degradation due to motion blur. If the shutter modulates the flux by a function $\cos^2(t^2)$, a recording is obtained that has the properties of an incoherent one-dimensional hologram. Hence, compensation of motion blur is achieved by reconstructing a sharp image from the hologram. This method can be modified in order to cope with harmonic vibrational or random translational motion.

Image reconstruction from a Fraunhofer x-ray hologram with visible light, John W. Giles, Jr., *Jour. Opt. Soc. Am., 59:* 1179–1188, Sept. 1969.

The most severe problems in the recording of x-ray holograms have been overcome and the investigation of Fraunhofer holograms extended to the x-ray region. An in-line Fraunhofer hologram was made of a 5.9-μ-diam. glass fiber using beryllium x-rays (114 Å) produced in a scanning electron-probe microanalyzer. A magnified real image of the fiber was reconstructed from the negative hologram using He-Ne laser light. A lateral magnification of approximately 9X was obtained in the two-step imaging process. An analysis of the x-ray source, recorded hologram, and reconstructed real image is presented.

Photometry for interpretation, Robert G. Musgrove, *Photogrammetric Eng., 34:* Oct. 1969.

Craftsmanship

This mahogany armchair is a fine example of the work of the master craftsman Thomas Chippendale born Yorkshire England 1718 died 1779

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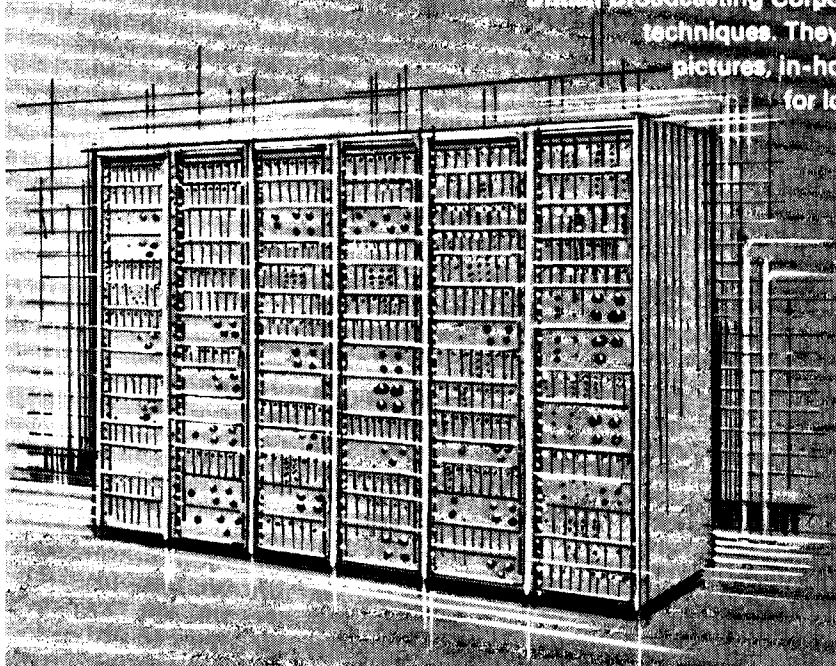
625/50 RGB to 625/50 RGB Synchronizers.



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A three-part discussion outlines the potential uses of photometry to the photoanalyst. The first part concerns the use of a microdensitometer as a quick-response aid for interpreting features for which general identities are known, but for which exact properties cannot be determined. The second part concerns the process of determining the resolution of an aerial photographic system by subjecting high-contrast edges occurring within an imaged area to frequency analysis. The resultant output is the modulation transfer function which expresses system response as a function of frequency (cycles/mm). Finally, photometry is applied to the mapping of offshore underwater areas. An account of an early research effort accompanies a description of current and future work.

Making photographs clearer, *Industrial Phot., 18:* 24–27, 81–87, Oct. 1969.

Additional information can be extracted from many poor-quality photographs by "image enhancement." The techniques are being developed in a number of U.S. research institutions, including Cornell Aeronautical Laboratory. Much basic investigation remains. However, it is already possible to make partial correction for camera motion, movement of the subject, heat turbulence in the atmosphere, and graininess in the enlargement process.

SOUND RECORDING AND REPRODUCTION

Cinema loudspeakers — correct alignment in auditoria by acoustic measurement, C. C. Buckle and A. W. Lumkin, *Brit. Kinemat. Sound and Telev., 5:* 132–137, May 1969.

In the process of developing a monophonic magnetic sound system, deficiencies and wide variations in auditorium acoustics and loudspeaker characteristics were accentuated. Subjective methods of alignment and correction were found inadequate and time consuming. A method of quantitative measurement and analysis has been evolved and applied to studio re-recording and review rooms. Liaison with member countries of ISO TC 36 has been established and work is proceeding to establish standards to which studio recording theaters and cinemas can be aligned. For practical reasons loudspeaker characteristics and theater acoustics must be investigated together. Subjective assessments should be supplemented with measured data giving information on reverberation times, sound pressure levels, and pulse reflection patterns. The methods used to make these tests are described, with a summary of the results obtained from a survey of studio re-recording theaters. To obtain better matching between these, adjustments can often be made using electrical compensation, but in larger theaters and in the cinema field this may be more difficult, and acoustic correction or re-design may be necessary in the worst cases.

SPECIAL APPLICATIONS

Recording of star spectra with a fiber optic electrostatic image intensifier, J. R. Han-

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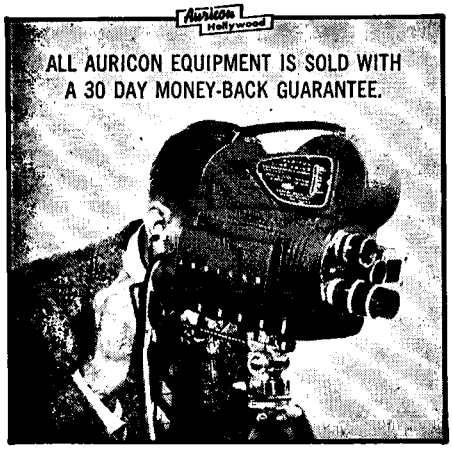

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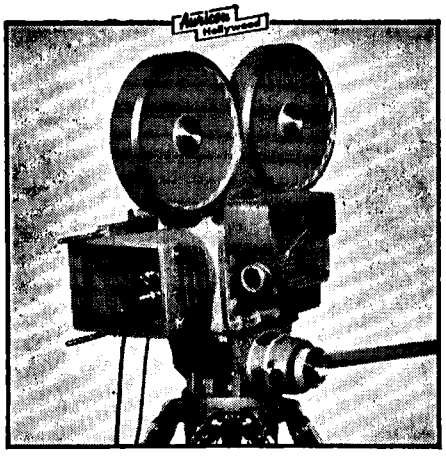

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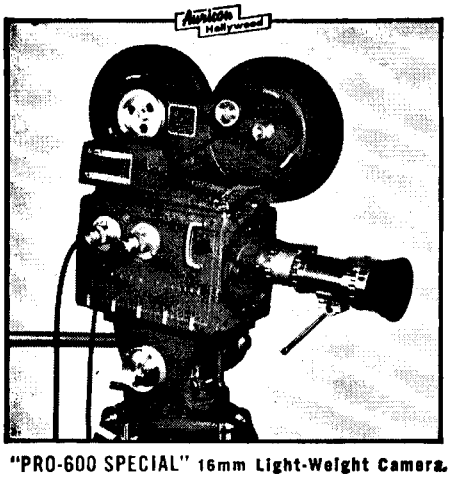

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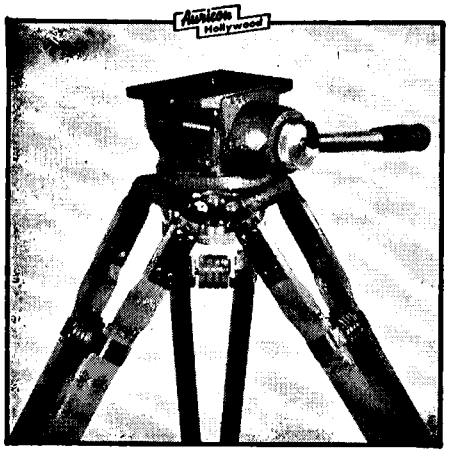

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sen, J. deJonge and W. R. Beardsley, *Image Technology, 11:* 25–30, Aug./Sept. 1969.

Electrostatic image intensifiers with fiber-optic faceplates offer potential advantage over two-stage magnetically-focused devices currently used in astronomical spectroscopy. The image intensifier used at Allegheny Observatory to record start spectra through the 31-inch Keeler reflector is a WL-30677, a single-stage electrostatically-focused tube of compact design and light weight utilizing fiberoptic input and output windows. On the telescope the input window of the intensifier is placed in the plane usually taken by the 1 x 3 glass photographic plate, while the plate is held by a special aluminum holder against the flat surface of the output window. Exposures were taken of comparison spectra and of stars whose spectra were known in order to measure the light gain of the image tube system. To allow assessment of the quality of the spectral lines, position measurements of several lines per plate were taken from which radial velocities were computed. Measurements yielded velocities which were in good agreement with the "standard" velocities, i.e., within the probable error. The light gain of the system is represented by the significant decrease in exposure time. The spectrum of the star HD 213014 of photographic magnitude 8.5 was recorded in 6 minutes. Without the intensifier this magnitude would require an exposure of about three hours, a reduction in exposure time of 30 times.

Underwater photography, Ron Church, *Industrial Phot. 18:* 20–22, Aug. 1969.

Deep submersible photographic systems present many problems due to stringent size, weight and location problems. An expert considers the state-of-the-art, based on his experience with the Westinghouse Deepstar 4000.

Improvements in electronics for nature photography, Harold E. Edgerton, Vernon E. MacRoberts and Manmohan Khanna, *IEEE Spectrum, 6:* 89–94, July 1969.

Nature photography was almost the first application of the electronic flash system of lighting when it became commonly available. Although these first units used paper capacitors charged to high voltages and discharging at microsecond rates, later "strobes" employed lower-voltage capacitors and operated at longer flush durations. Hence, today's conventional strobe is not suitable for the rapidly moving subjects of nature photography. This article describes a development in strobe equipment that incorporates new and improved design to create flash units of not only lighter weight, but with exposure time of less than 10 microseconds.

TELEVISION

Direct-feedback coders: design and performance with television signals, Ralph C. Brainard and James C. Candy, *Proceedings of the IEEE, 57:* 776–792, May 1969.

Direct-feedback coding is a refinement on the well-known differential coding method. Two filters are used at the transmitter of a direct-feedback coder; one connected in series with the input and the other in the forward path of a feedback loop that contains the quantizer. The first filter pre-emphasizes the signal and determines the overload characteristic of the coder; the other filter shapes the quantization noise and sets the stability of the feedback. At the receiver a filter reconstitutes the signal spectrum and de-emphasizes the noise. For television the pre-emphasis should be a short time-constant differentiator, the de-emphasis a short time integrator, and the feedback filter a long time integrator.

Conventional differential coders use a single filter in the feedback path both to provide pre-emphasis and to shape the feedback characteristic, so the design is a compromise. Compared with direct-feedback coding they usually have less feedback gain and a larger time constant in the pre-emphasis and de-emphasis, consequently, the contouring noise is more visible and the streaking caused by transmission-error is longer.

Although application only to television is considered, the methods have wider use. General formulas are given for the output noise and optimum filter characteristics they take into account signal spectra, frequency weighting for noise sampling rate, quantization step size, and an overload parameter. Measurements on real coders, operating on TV signals and digital simulations confirm the results.

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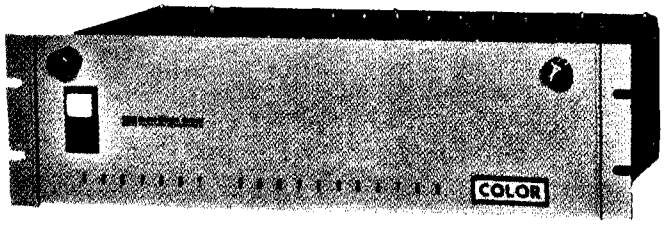

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The future of cable TV, Archer S. Taylor, *IEEE Spectrum, 6:* 77–81, Nov. 1969.

The problem of polluting our skies extends beyond man's senses; our ether is becoming ensnarled with electromagnetic emanations. The situation has become critical and, if our technology is not to mire in a morass of radio signals, something will have to be done to quiet the confusion. Some systems by nature of their operation must pick their inputs from the airwaves. But there are a host of others that can do just as well — if not better — linked directly to a transmitter. Thus, many receivers now operating, and envisaged for future operation, will be phased to cable operation.

A corrector for the composite color-television signal, for improving the reproduction of color films, G. Hogel, *E.B.U. Rev. 116-A Technical,* 153–159, Aug. 1969.

Most color television programs at present still consist of color films. Unfortunately, in many cases these films do not meet the requirement of color-television transmission and, therefore, it will not be possible for the time being to do without electronic correction of the defects of the films. There are two ways of modifying the television signals for the purpose of correction: a color correction of the RGB signals has already been described in detail. The present article describes a new correcting device by means of which color corrections may be made in the coded signal. In this way, it is possible to control the overall saturation, the color in the high-lights and the color in the shadows, as well as reducing the saturation in the lower-level regions. With these possibilities, significant improvements may be obtained for nearly all color-film faults.

The Variable Inductance Frequency Modulator, J. E. Packman, *BBC Engineering Monograph* No. 76.

The monograph describes an electronic method of varying the effective value of an inductance and derives the theoretical value of this inductance. This method is exploited in an oscillator whose frequency is determined by a control voltage. An expression is obtained for the voltage required to cause a certain deviation in frequency, and in the course of this analysis it is shown that the center frequency should be reasonably stable over a period of time. An evaluation is made of the distortion which may be introduced by this circuit when driven by a sinusoidal waveform, and of the conditions to be fulfilled for minimum distortion. It is further shown that it is possible to produce a pre-emphasized frequency response without the use of an external network.

A practical modulator design is described and the performance analyzed theoretically. The results are compared with those obtained in practice. It is thereby shown that the apparatus would be of adequate performance to be used in broadcast transmitters for a pilot tone stereophonic transmission system.

Electron video recording, Sir Francis McLean, *Brit. Kinemat. Sound and Telev., 51:* 328–332, Sept. 1969.

Television signals can be recorded with good quality on either film or magnetic tape. The choice is dependent upon many factors, such as the speed with which copies are required, the number of copies, the cost of copies and the degree of complexity permissible in the playback mechanism. Where speed of playback with only a small number of copies is required, video tape has advantages which are very difficult to match with film. Where, however, speed is not so important and a large number of copies and simple playback equipment is required, film has many advantages. The EVR system has been developed to meet these requirements. The basic ideas originated with Dr. Peter C. Goldmark and his team at the Columbia Broadcasting System Laboratories. The development of the special films required took place in collaboration with Ilford who also developed the special equipment used in the film printing and processing.

Transfer characteristics in the film-television process, G. B. Townsend, *Brit. Kinemat. Sound and Telev., 51:* 310–316, 322–324, Sept. 1969.

It has become traditional in the film and television industry for the transfer characteristics of the reproduction process to be described in terms which are particular to a specific part of the process. Thus the film lighting-cameraman is thinking (if he has been metricated) in

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terms of lux, the laboratory technician is thinking in terms of density, while the television engineer is thinking in terms of volts. The relationship between these units is not linear and may vary in different parts of the process chain; for example, a given part of the scene will produce different television signal voltages before and after the gamma-correctors.

Tone reproduction from color telecine systems, S. B Novick, *Brit. Kinemat. Sound and Telev., 51:* 342–347, Oct. 1969.

There has been considerable discussion concerning the reconciliation of the characteristics of motion-picture films with the requirements of color television. Much of this work has been of a rather qualitative nature, and hence it seemed that a more quantitative approach to the problem would be useful. In the present work, the factors affecting tone reproduction have been investigated; it is hoped to extend the investigation to color reproduction at a later date.

Bartleson and Breneman, working with projected images, found that when slides were viewed under different surround conditions, observers required different tone-reproduction characteristics for optimum results: with a light surround, the gamma of the log-luminance tone-reproduction characteristic had to be about 1.0, but for a dark surround it had to be about 1.5. It was therefore decided to find out what gamma of tone-reproduction curve observers preferred when color television displays derived from color slides were viewed with various levels of surround luminance. By comparing these results with values of the transfer functions of telecine equipment, and of domestic color television receivers, the transfer functions of motion-picture films capable of giving good tone reproduction over the color television medium could be suggested for various circumstances.

A technical appraisal of color film in television, C. B. B. Wood, *Brit. Kinemat. Sound and Telev., 51:* 260–267, July 1969.

It may seem obvious that, when two imperfect reproduction media are taken in cascade, the end result will probably be inferior to either of them taken singly. It is certainly true that when color television has for its input material a reproduction of the original scene by means of color motion-picture film, the picture quality reaching the television viewer is inferior to that which reaches him when a color television camera views the scene directly. Regrettably the gap in technical quality between pictures from live television and those derived through film is widening rather than closing. The broadcasting engineer feels that despite frequent improvements, the color television camera has still not reached the stage where its potentialities for resolution, sensitivity and color fidelity have been fully exploited, whereas on looking at color motion-picture films, he is inclined to believe that improvements in this field are now coming very slowly.

Moscow's new television center, Vladimia Makoveer, *Brit. Kinemat. Sound and Telev., 51:* 296–297, Aug. 1969.

The giant glass and concrete building of the Soviet national television studios was put up in a picturesque park district of Moscow, Ostankino, in less than five years, an exceptionally short time for such a building. This is the biggest edifice on the continent, with a volume of 1,100,000 cubic meters. The shining facade occupies half a kilometer along Korolyov Avenue, named after the famous rocket designer. Across the street stands the Ostankino Tower, the tallest in the world, 537 meters high, ensuring reception within a radius of 160 or 170 kilometers.

Contrast and brightness control in color television picture monitors, M. J. D. Nurse, *Radio and Electronic Eng., 37:* 299–302, May 1969.

The three guns of the color-picture tube are fed through dc controlled amplifiers. The potentials which control gain and dc level are themselves controlled by error signals derived from the video signal at black-and-white levels. Elaborate and expensive ganged controls are not needed.

Cabling without cable, Ira Kamen, *Broadcast Management Eng., 5:* 36–38, June 1969.

Called the "Quasi-Laser," a new millimeter-wave-transmission system can substantially reduce costs and time needed to get a cable TV system on line. But the system's future isn't just in eliminating costly trunk feeders — it could be the basis of a worldwide CATV network, letting viewers in Oshkosh tune in Paris, London, Tokyo or Accra at the flip of a dial.