ABSTRACTS

"Economy Film" Ready. *Mot. Pict. Daily*, **29,** Feb. 5, 1931, p. 1. An announcement of a new panchromatic negative film requiring one-third to one-half the exposure necessary for the previous panchromatic negative stock. The red and green sensitiveness of the new emulsion adapts it particularly for use with incandescent illumination. Greater depth of focus is claimed for negatives exposed on the film than on previous emulsions, since lenses may be diaphragmed down more. The emulsion is especially adapted to natural color photography where lighting problems have always been difficult. G. E. M.

Development in Color Photography. G. GROTE. *Phot. Kor.*, **66,** July, 1930, pp. 177–81. A résumé of color photography patents, mostly for the year 1929, classified as follows:

Mosaic and Line Screen Process.—Ruzicka, Brit. Pats. 326,780; 326,764; 326,779. Th. Baker, Brit. Pat. 324,043 (1929). Bialon, Brit. Pat. 326,287; French Pat. 668,382 (1929). Busch-Larsen, Brit. Pat. 316,277 (1929). Zellr, Haring, and Piller, D.R.P. 493,064. Zimmermann, U. S. Pat. 1,746,330. Pal, D.R.P. 224,701. Dufay, D.R.P. 487,365. Ruzicka, Brit. Pat. 326,781 (1929). Chapman, Brit. Pat. 327,200 (1929).

Lenticular Film Process.—Soc. Franç. Cinematographique, Swiss Pats. 135,767; 135,765; Brit. Pat. 307,351 (1929). D.R.P. 492,207; D.R.P. 497,560. Soc. Civ. pour l'Étude de la Phot. et de la Cin. en couleurs, French Pat. 667,332; Brit. Pat. 309,540 (1929). Soc. Franç. Keller-Dorian, Brit. Pat. 298,951 (1929).

Motion Picture Processes by Additive Projection.—Emil Busch A.-G., D.R.P. 493,644. Alstrup and Jensen, D.R.P. 495,686. Nordmann, French Pat. 666,854. Dornig, D.R.P. 494,753. Cox, *Kinotechnik*, 1930, p. 201; D.R.P. 498,709. Rilny, Brit. Pat. 323,760 (1929).

Subtractive Print Processes.—Becker, Oliver, and Colour Phot., Ltd., Brit. Pats. 317,909; 317,911; 323,800 (1929); French Pats. 673,816; 675,550. Martinez, Brit. Pat. 280,252 (1929); French Pat. 634,074. Lierg, Brit. Pat. 298,979 (1929).

Tri-Packs.—Th. Baker, Brit. Pat. 324,394 (1929).

Direct Subtractive Process.—Martinez, Brit. Pat. 310,533 (1929).

Three- and Four-Color Subtractive Motion Picture Processes.—O. and A. Pilny, Swiss Pat. 136,573. Kelley, U. S. P. 1,753,379. M. W. S.

U. S. Sound Installation Survey. *Mot. Pict. Herald*, **102,** Feb. 7, 1931, p. 13. Of the 28,826 theaters reported in text-books, 17,899, or only 62 per cent, were actually found to exist. There were 11,553 theaters, or 65 per cent, equipped for sound pictures. Fifty per cent of the 6346 silent houses were closed. The location of theaters having sound installations was reported as follows: Eastern U. S. (20 states, including D. of C.), 4605 installations; Central U. S. (17 states), 5409; Western U. S. (11 states), 1533. (Presumably the survey was completed about Jan. 1, 1931.—Abstractor.) G. E. M.

Schools Using Non-Theatrical Films. *Mot. Pict. Herald*, **102,** Feb. 7, 1931,

p. 45. Forty per cent of the 44,186 motion pictures screened during 1930 in 517 primary and secondary schools in the United States dealt with social science subjects. Sound equipment was unavailable in the majority of the schools. Natural science material was next in popularity and combined with social science represented 66 per cent of the showings. Twenty-five per cent of the remaining subjects were represented by physical education, manual and industrial arts, home economics, English, and commercial. The data were assembled by E. I. Way, Chief of the Industrial and Educational Section, U. S. Dept. of Commerce.

G. E. M.

A Revolutionary Illuminant. *Bioscope (Modern Cinema Technique)*, **85,** Dec. 3, 1930, p. ix. A photoflash bulb fitted with a reflector provides the still cameraman with a convenient, smokeless, and silent flashlight for photographing sets and action in a studio during the progress of actual shooting. The bulb and reflector attached to a small battery are mounted on top of a press camera so that the shutter operates the flash as well. The flash lasts only $^1/_{75}$th of a second and is said to be unrecognizable by the eye. Where it is both difficult and expensive to transport and erect generating equipment, scenes may be illuminated by setting off one lamp per frame. This is stated, on test, to work out for one-third the cost of motor generator transportation. G. E. M.

Dynamic Reproducers in the Theater Sound System. H. G. CISN. *Mot. Pict. Herald*, **102,** Sect. 2, Jan. 17, 1931, pp. 47–8. The dynamic coil type of speaker is considered to be most applicable to theater use. A detailed description is given of the two types of dynamic speakers: (1) cone-type; and (2) horn-type. Although it is usually conceded to be more difficult to install a cone-type speaker, the effort is well paid for by the superior results as high and low notes are stated to be reproduced better by this type of speaker. A horn is sometimes used in certain theaters in conjunction with a cone-type speaker. Tests are described for sound equipment installations in theaters. G. E. M.

Methods of Determining the Filter Factor. K. CHIBISSOFF AND A. MICHAILOWA. *Kinotechnik*, **12,** Nov. 20, 1930, pp. 595–601. A comparison is made of the sensitometric methods of determining filter factors from the shifting of three critical points of the H. & D. curves along the exposure axis:

(1) The threshold value;
(2) The point of least useful gradient;
(3) The inertia point.

Agfa orthochromatic and panchromatic emulsions were employed, and the factors of the following filters determined: Zeiss "Color a" and "Color b;" Wratten Nos. 6 (K_1), 8 (K_2), 9 (K_3), 21, and 26. A tungsten filament lamp was used as a light source through a filter converting the color temperature to 5000°K. The determinations of change in threshold value were made with an Eder-Hecht wedge, the other determinations with an H. & D. sensitometer with a shutter of 80 rpm. Development was at a constant temperature of 15°C. in trays by the brush method, and was carried to a gamma of unity. Both metol-hydroquinone and para-aminophenol developers were used. By comparison of the results of the three methods of determining factors, the following conclusions are drawn:

(1) In determining filter factors from the shift in threshold value, the results are affected only slightly by variation in the intensity of the light source.

(2) The ratio of the filter factors determined from the point of least useful

gradient and from the inertia point is practically constant for the different filters. This means that the useful portion of the underexposure region of the H. & D. curve is not very different in form for different spectral composition of the light source.

(3) Filter factors determined from the threshold value are lower than those determined from the point of least useful gradient, which are, in turn, lower than those determined from inertia point.

(4) The ratio of the filter factors determined from the point of least useful gradient and from the threshold value is not a constant for different filters. This means that the non-useful portion of the underexposure region varies with the wave-length. Changing from a yellow to a redder filter causes this portion to become longer.

(5) The rate of renewal of the developer at the surface of the emulsion influences the value of the filter factor determined from the point of least useful gradient and from the inertia point.

(6) Filter factors determined with para-aminophenol were greater than those determined with metol-hydroquinone.

(7) For photography and motion picture photography, the determination of the filter factor from the point of least useful gradient is the method of most practical importance. M. W. S.

An Investigation of the Need for Objectives of Large Diameter in Motion Picture Projectors. F. HAUSER AND L. MOHR. *Kinotechnik*, **12**, Sept. 5, 1930, pp. 463–8. The light beams of various optical systems of a motion picture projector have been photographed and light losses demonstrated. The beams were made visible by smoke. A mirror arc with a "Busch-Neospiegel" mirror of 250 mm. diameter and 140 mm. focus was used to illumine a model of the film aperture. The distance from the center of the mirror to the plane of the film was 650 mm. A 25 ampere current was used. The objective focused the aperture on a distant screen. The arc was adjusted to give as nearly a uniform screen as possible. (Presumably, the crater was focused approximately in the plane of the apertures.) The beam of light issuing from the aperture was fairly divergent. Using several "Neokino-Objectiv" lenses of different focal lengths and diameters, the author finds that to utilize all of this cone of light, an objective of 140 mm. focus must have a diameter of 82.5 mm., and an objective of 185 mm. focus must have diameters of 82.5 and 104 mm. for the rear and front elements, respectively. It is concluded that the relative aperture of the projector objective must be greater than that of the mirror, defined by the ratio of the diameter of the mirror to the distance of the center from the film aperture.

By means of a metal plate containing two 2 mm. holes, placed in the gate, the form of the beams through the center and the corner of the film aperture were photographed for different illuminating systems. With a condenser arc, a slender beam was found to emerge from the center of the aperture, but a divergent beam from the corner. With such illumination used with objectives not corrected for divergent beams, the author believes that the sharpness at the edges of the picture must suffer. With a 170 mm. spherical mirror, and a 250 mm. "Neospiegel," the beams from the center and corner were found to be about equally divergent. M. W. S.

Arc Silencing Apparatus. *Kinotechnik*, **12**, Sept. 5, 1930, p. 484. Choke

coils for silencing arc lamps in taking sound pictures are supplied by a German firm in 25, 40, and 150 ampere models. The two smaller sizes, weighing 15 and 30 kilograms (about 33 and 66 pounds), respectively, are mounted on wood bases and fitted with handles for carrying, while the larger size, weighing 90 kilograms (about 198 pounds), is mounted on rubber tired wheels. M. W. S.

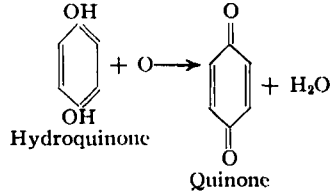
Cinema and Visual Fatigue. *Intern. Rev. Educational Cinemat.*, **2**, Dec., 1931, pp. 1379–94. The result of an inquiry by questionnaire among 25,000 Italian school children and also of one among eye specialists showed that 28.6 per cent of the children normally experience visual fatigue after a motion picture show, and 4.4 per cent occasionally do. The percentage of eye-strain is higher for children under twelve. Good projection conditions with unworn films should cause no undue strain for normal eyesight. The duration of a cinema show is too long for children's eyes. Schoolroom films are probably too short to be harmful. Titles are particularly bad if the lettering is different or the background too light. R. P. L.

The Studios of France. FERNAND VINCENT. *Cinemat. Franç.*, **13**, Dec. 27, 1930, p. 141. A detailed account of eleven French studios together with the nature of the equipment employed. The number of studios using the various types of sound recording equipment are as follows:

RCA Photophone	3
Western Electric	2
Gaumont-Petersen-Poulsen	3
Tobis-Klang Film	2
Radio-Cinema	1

J. I. C.

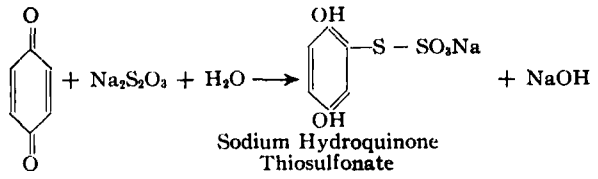
The Role of Sulfite in Photographic Developers. J. RZYMKOWSKI. *Camera* (Luzerne), **9**, Nov., 1930, pp. 128–32; Dec., 1930, pp. 164–7. The preservative action of sulfite in photographic developers is due, not to a preferential oxidation of the sulfite by the oxygen of the air to the exclusion of the hydroquinone, but to a series of reactions in which both hydroquinone and sulfite take part. Upon the basis of evidence from the literature, and from original experimental work, the author constructs the theory that these reactions are the following:

(1) 

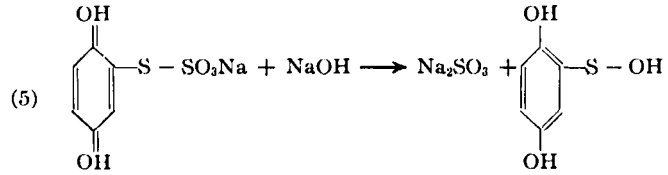
Hydroquinone Quinone

(2) $3Na_2SO_3 + H_2O \longrightarrow 2Na_2SO_4 + S + 2NaOH$

(3) $S + Na_2SO_3 \rightleftharpoons Na_2S_2O_3$

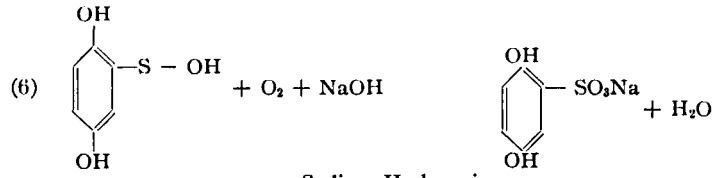
(4) 

Sodium Hydroquinone Thiosulfonate



(5)

Hydroquinone Thiohydroperoxide



(6)

Sodium Hydroquinone Monosulfonate

The sodium hydroquinone thiosulfonate, formed in eq. (4), is believed to be the hydroquinone-sulfite complex previously assumed by Mees and Piper (*Brit. J. Phot.*, 1912, pp. 441–3) to explain the fogging action and minimal electrical conductivity of hydroquinone developers with a deficiency of sulfite. By assuming that the monosulfonate undergoes the above series of reactions like the hydroquinone itself, an explanation is advanced for the formation of sodium hydroquinone disulfonate, found in thoroughly oxidized developers. M. W. S.

The Reproduction of Negatives. PAUL HANNEKE. *Camera* (Luzerne), **9**, Dec., 1930, pp. 155–7. A novel method of making a duplicate negative consists in bathing a silver bromide film or plate in a 4 per cent solution of potassium bichromate by subdued light, drying, and exposing under the negative to be copied until a faint brown positive image is visible. The print is then washed and finally developed by ordinary light in a regular photographic developer. The portions unexposed in the printing process develop most fully. A duplicate negative is thus obtained. The contrast can be altered by varying the printing exposure or by giving a subsequent flash exposure. M. W. S.

Automatic Rewind. *Film Daily*, **55**, Feb. 1, 1931, p. 7. A motor-driven automatic rewind, designed for the efficient handling of sound film and said to accommodate up to 3000 feet of film and any make of reel, is described briefly. The inside circumference of the magazine is said to be lined with sound absorbing felt, which prevents noise and danger to film ends from abrasion and slapping. Adjustable friction for any desired tension is provided through accurately machined automobile type brakes, asbestos lined. C. H. S.

Projector Attachment Eliminates Distortion and Eyestrain. *Film. Daily*, **55**, Feb. 15, 1931, p. 9. An optical system which can be attached to an ordinary projector, and with which, it is claimed, eye-strain and distortion is eliminated, has been demonstrated in England. The attachment consists of a blue screen through which the picture is projected, while at the same time another image of the same picture is superimposed after it has been reflected from a gold mirror. C. H. S.

The Cataloging of Cinema Films. J. HANAUER. *Intern. Rev. Educational*

Cinemat., **2**, Nov., 1930, p. 1271. An international uniform system independent of language or alphabets should be established, with a complete file at international headquarters at Rome. Recommends and discusses the Dewey decimal system for the purpose and gives examples. R. P. L.

When Industry Calls on 16 Mm. R. FAWN MITCHELL AND M. W. LARUE. *International Photographer*, **3**, February, 1931, p. 32. An account of the practical uses found for 16 mm. cameras in industry. In time and motion studies of manufacturing operations a film record of the entire process, synchronized with the time element, is of value, both for study of the operation and for the training of employees. The use of the motion picture in research and for the standardization of methods in branch factories is also mentioned, and a table of data on artificial lighting is given. A. A. C.

Study Conducted on Use of Films for Advertising. *Proj. Eng.*, **3**, February, 1931, p. 14; *Amer. Cinematographer*, **11**, February, 1931, p. 36. The Motion Picture Division, Department of Commerce, is making a survey to determine the many uses to which the motion picture is being put in business and the value attending its employment. A questionnaire will be sent to the 2000 concerns in the United States who have used the motion picture for business purposes. From this experience record much helpful information is expected on the production, distribution, and effective use of films in different branches of business. A. A. C.

Testing Equipment for Sound Projection. E. W. D'ARCY. *Proj. Eng.*, **3**, February, 1931, p. 11. A testing set has been designed for making a rapid and complete check of theater sound systems. It has facilities for measuring vacuum tube characteristics, continuity of circuits, photoelectric cell operation, phasing of loud speakers, and to test the frequency response of the entire system. A general description of the method of measurement is given. A. A. C.

New Motion Picture Projection Optics. W. B. RAYTON. *Proj. Eng.*, **3**, February, 1931, p. 20. The introduction of sound created a demand for more light on the theater screen. To meet this condition new projection and condensing lenses have been developed by the Bausch & Lomb Optical Company. The projection lenses are anastigmats, and the first part of the paper is an explanation of what this means and why such correction is necessary to secure a sharp picture over the entire area of the screen. The condenser lenses, of patented construction, are also described in some detail. They are said to give 50 to 100 per cent more light than ordinary spherical condensers. A. A. C.

Pick-Up Possibilities. S. MCCLATCHIE. *Proj. Eng.*, **3**, March, 1931, p. 7. There has been little development in electromagnetic pick-up design since 1925, when the first commercial outfit appeared, based on the earlier work of Baldwin and Capps. The frequency characteristics of the present product in relation to the limits imposed by the record itself are discussed and comparison is made between American pick-ups and the types in use in England and Germany. The author concludes that armature resonance can be eliminated by locating the resonance peak beyond the musical range, thus eliminating the need for damping and making the characteristic curve a straight line throughout the musical range. A. A. C.

Surgery in Moving Pictures. RICHARD B. STOUT, M.D. *Proj. Eng.*, **3**, March, 1931, p. 9; *International Photographer*, **3**, February, 1931, p. 35. A

solution is offered for some of the problems of photography in the operating room. A 16 mm. camera was attached to the regular Operay light above the operating table, and remote control devices were used for actuating the release button and for rewinding. The surgeon or his assistant may act as cameraman and take only the important steps in the operation. Good results were obtained in black and white at $f/4.5$ with ordinary lights, but for Kodacolor pictures more light was needed and eight small automobile spotlights were fitted up as auxiliary illumination. A. A. C.

Camera Noise Silencing Blimps. GORDON S. MITCHELL. *Proj. Eng.*, **3**, March, 1931, p. 10. A story of camera silencing devices from the booths and blankets used in early days to the latest blimp made at the Pathé Studios by L. E. Clarke (see this JOURNAL, **15**, Aug., 1930, p. 165). The difficulties attending the use of the earlier make-shift devices led to the Pathé design, a description of which is given in some detail. The usefulness of this type of sound proofing is apparent and will continue until a noiseless camera appears on the market. A. A. C.

Progress in Sound Recording. CARL DREHER. *Electronics*, March, 1931, p. 542. One of the most important improvements in the sound recording art during the past year has been the introduction of anti-ground noise recording. This was first accomplished with the variable area type of record by biasing the recording galvanometer in such a manner that weak signals are recorded near the edge of the track. The resultant reduction in the amount of transparent area produces a proportional decrease in the noise caused by dirt or scratches on the film. This method has the disadvantage that with low modulation the useful portion of the sound track is so close to the edge of the scanning beam that, if the scanning beam is incorrectly located, the signal may not come through at all. This method has been recently improved to permit the recording to be centrally located on the sound track, while the useless transparent portion of the track is masked by means of a movable shutter. The corresponding methods in the variable density type of record are likewise discussed. A decrease in ground noise of about 10 db. is claimed for the method and it is probable that greater reductions are possible.

The paper also discusses recent developments in the use of the microphone and auxiliary apparatus in the studio. It is pointed out that the present tendency is to bring the recordist into closer touch with the director, the first cameraman, and the sound assistants. A. C. H.

Impedance Matching Network. ARTHUR E. THIESSEN. *Electronics*, March, 1931, p. 552. A very simple resistance network called a "taper pad" is described for matching the impedance of two circuits. Although it is common practice to use an impedance-matching transformer for this purpose, the taper pad, which can usually be built up of two decade resistance boxes, is a very useful substitute. A. C. H.

Reflecting Screens for Relief Picture Projection. *Jour. Opt. Soc. of America*, February, 1931, p. 109. A continuation of an earlier paper (*Jour. Opt. Soc. of America* and *Rev. Sci. Inter.*, **18**, 118, 1929) concerning a method of projecting pictures in relief which depends upon the simultaneous projection of a large number of views from a battery of juxtaposed projectors. In the previous paper, a translucent projection screen was described. In the present paper, a special type of projection screen is described that operates with reflected light. A. C. H.

An Analysis of the Literature concerning the Dependency of Visual Functions upon the Illumination Intensity. LEONARD T. TROLAND. *Trans. Illum. Eng. Soc.*, February, 1931, p. 107. This paper was prepared for the Committee on Industrial Lighting of the National Research Council. The literature concerning the visual functions occurs in such widely separated places that a paper of this type is of immense value. The scope of the eighty-five pages which this paper comprises can be indicated best by giving the table of contents prepared by the author, *viz.*: I. Preface. II. Method and scope of literature search. III. Abstract of the literature bearing on the dependency of visual functions upon intensity of the stimulus: (1) General survey of the problem. (2) Absolute sensitivity to light; references on absolute energy and brightness threshold; references on areal relations of the threshold; references on light and dark adaptation. (3) Fechner's law: discrimination of reflection coefficients of large areas; references on brightness discrimination threshold. (4) Dependency of visual acuity upon illumination intensity; references on visual acuity, general; references on visual acuity as a function of intensity; references on glare. (5) Speed of vision as determined by intensity; references on speed of vision. (6) The dependency of color vision upon intensity; references on color and intensity. (7) Oculomotor functions, eye-strain, fatigue, and injury; references on the pupil and other oculomotor functions; references on eye-strain and fatigue; references on injury to the eye due to light. (8) The influence of illumination intensity upon practical operations; references on illumination intensity and practical operations; miscellaneous references. (9) Summary and conclusion.
