

## Current Literature

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THE EDITORS present for convenient reference a list of articles dealing with subjects cognate to motion picture engineering published in a number of selected journals. Photostatic or microfilm copies of articles in magazines that are available may be obtained from The Library of Congress, Washington, D. C., or from the New York Public Library, New York, N. Y., at prevailing rates.

### **American Cinematographer**

29, 3, March, 1948

Electronic Flash for Still Exposures  
During Shooting (p. 85)

A New Light Source for Motion  
Picture and Television Studio  
Lighting (p. 88) D. W. PRIDEAUX

### **British Kinematography**

12, 3, March, 1948

Problems of 16-mm Projection  
Maintenance of Equipment (p. 81)

W. J. HUMBERSTONE

Requirements and Maintenance of  
Prints (p. 82) J. W. HISSEY

The Operator and His Problems in  
the Field (p. 84) G. EAST

### **Ideal Kinema**

14, March 11, 1948

Magnetic Sound Recording and Re-  
production. Recent Develop-  
ments Abroad (p. 19) R. H. CRICKS

### **International Photographer**

20, 3, March, 1948

Who Said "Television"? (p. 5) H. H.  
BIRCH

Review and Preview of Television  
(p. 20) D. SARNOFF

### **PSA Journal**

14, 3, March, 1948

Electronic Flashtube Illumination  
for Specialized and Motion Picture  
Photography (p. 149) H. M.  
LESTER

### **La Technique Cinematographique**

19, 61, February 5, 1948

Problèmes relatifs à la reproduction  
photographique et en particulier à  
celle des films sonores (Problems  
concerning photographic reproduc-  
tions, particularly sound films) (p.  
46) C. J. DIPPPEL AND K. KEUNING

19, 63, March 4, 1948

Nouvelles sources lumineuses à cor-  
rection chromatique pour cinéma  
et télévision (New light sources  
for color correction for motion  
pictures and television) (p. 89) H.  
BOURNE AND E. BOESON

19, 64, March 18, 1948

Nouvelles sources lumineuses à cor-  
rection chromatique pour cinema  
et television (New light sources  
for color correction for motion  
pictures and television) (p. 111)  
H. BOURNE AND E. BOESON

La procede Ivanoff de cinema en  
relief (Ivanoff procedure of relief  
motion picture) (p. 112)

### **International Projectionist**

23, 3, March, 1948

Projection Room Handling of Prints  
(p. 5) R. A. MITCHELL

### **Radio News**

39, 4, April, 1948

The Recording and Reproduction of  
Sound. Pt. 14 (p.72) O. READ

## Current Literature

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ON PAGE 314 of the March, 1948, issue of the *Proceedings of the I.R.E.*, there appeared an article which should be of interest to the motion picture engineer. A summary of this paper is given below.—THE EDITOR

### **A PROPOSED LOUDNESS EFFICIENCY RATING FOR LOUDSPEAKERS AND THE DETERMINATION OF SYSTEM POWER REQUIREMENTS FOR ENCLOSURES**

BY H. F. HOPKINS AND N. R. STRYKER

In this paper the authors describe a method of calculating the efficiency of a loudspeaker which relates the input power to the loudness of the loudspeaker rather than to its output power. Such a rating should be more useful than the power efficiency and more descriptive of the loudspeaker performance than free field pressure (outdoor) measurements on or near the horn axis.

Since loudness is a subjective phenomenon, the authors first derive from data on intensity versus frequency distribution of speech and music, a set of curves expressing loudness as a function of frequency. From the average of the speech and music loudness curves, another curve is computed in which the frequency range from 100 to 6000 cycles is divided into ten bands each having equal loudness increments. This includes 96 per cent of the entire loudness spectrum and defines the weighting factor by means of which pressure measurements may be converted to loudness. By arranging a sweep-frequency oscillator so that the sweep occupies equal intervals of time in each of these frequency bands, a single integrated pressure measurement over the audio spectrum provides a measure of the loudness. It has been found possible to make a further simplification by limiting the sweep to a range between 300 and 3300 cycles since this includes 75 per cent of the loudness. While an oscillator could be built to give this time-frequency weighting, the authors have found it more convenient to use a linear time sweep (6 cycles per second) combined with an equalizer giving corresponding amplitude variations. A flat noise spectrum equalized in this manner is also suggested as an input source.

Measurements made according to the above method give the loudness at a point in free space in terms of pressure measurements. However, when listening in an enclosure, such as an auditorium, it is necessary to consider the total radiation since a large proportion of the energy reaching the observer is reflected from the walls and may have been radiated from the loudspeaker in a direction far from a straight line between the two. In general the power radiated from a loudspeaker varies markedly both with change in frequency and change of direction. In order to avoid the very extensive measurements necessary to cover the required angles (up to 360 degrees at the lowest frequencies) the authors compute a correction factor for converting axial-pressure measurements to total acoustic

power radiated. This correction factor (called Directivity Index) is in turn converted to Loudness Directivity Index. Curves are given by means of which the Loudness Directivity Index may be found for most loudspeakers.

Experimental verification of the above computations has been obtained by computing the loudness efficiency of a wide variety of loudspeakers and comparing such figures with the results of listening tests. In most cases the calculated loudness came within one decibel of the values obtained by listening.

Further calculations are made to determine the amount of electrical power necessary to create satisfactory loudness in enclosures (rooms or auditoriums), taking into account the volume of the enclosure and the loudness efficiency of the loudspeaker. It is pointed out that while these measurements and calculations are useful in comparing the loudness which may be expected from various loudspeakers, with a given electrical input, they do not take into account such factors as uniformity of frequency response, distortion, damping, distribution, and other factors which are necessary in determining the relative over-all merits of loudspeakers.

## Book Review

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### Elements of Acoustical Engineering, by Harry F. Olson

Published (1947) by D. Van Nostrand Company, Inc., 250 Fourth Ave., New York, N. Y. 527 pages + 11-page index × xviii pages. 341 illustrations.  $6\frac{1}{4} \times 9\frac{1}{4}$  inches. Price, \$7.50.

The second edition of this well-known work treats acoustics from the electrical viewpoint, with heavy emphasis on equivalent circuits and the electro-acoustical aspects of audio engineering. Hence the reader with a background of general circuit and audio-frequency theory, aided by the methodical arrangement of the topics, will readily obtain usable and detailed information.

Especially well written are the portions on acoustical elements, loudspeakers, microphones, and measurements, which comprise over half the book. The properties of acoustical radiators, mechanical sound recorders, and pickups are also treated extensively, and there are excellent summaries of information on room acoustics, complete sound systems, and psychophysiological acoustics. Chapters on underwater sound and ultrasonics, embodying much war and industrial experience, are new to this edition. As a whole the book contains about 50 per cent more pages and 75 per cent more illustrations than the first edition; all chapters have been revised, and new material added.

As an aid to the user of electroacoustic transducers additional emphasis might have been placed on their use in systems. For example, in use the efficiency of a loudspeaker also depends on its ability to absorb power from the source, as well as its ability to transfer the accepted power to the output efficiently. The author accords the first item much less space than the second.

The usefulness of the book as a general reference is somewhat impaired by the