speed photography is well done. The discussions of light sources and the various cameras which are in existence are good; and, for a text, to serve as a background in high-speed photography, it is invaluable today, if for no other reason than that no other such source exists.

There are, however, some exceptions to be taken to the text and your reviewer has written the authors that they have neglected many of the advances that have been made in the United States in the last two or three years, advances which have been described in the symposia on high-speed photography held by the Society of Motion Picture and Television Engineers. Such include the high pulse-rate Edgerton flash unit, the late advances in flashtube design by General Electric, the design of rotating prism cameras, and the development and use of high-speed motion picture cameras in this country. Furthermore, there is no reference to the incandescent lights which have been developed by General Electric for high-speed photography. Your reviewer might be a little biased but he feels that, if rotating prism cameras are discussed, then the two kinds that are manufactured in this country should be discussed rather than confining the description to one. Since the two cameras are about equally popular in this country, an impartial review should include discussions of both.

For those who are seriously interested in high-speed photography, it is felt that this book is a must. Ability to read French is not a requirement for understanding this book quite thoroughly.

It should be noted that the next major project of your Society's High-Speed Photography Committee is to produce an American textbook. Whether that will be chiefly the work of one man or the result of the efforts of the Committee as a whole is not yet established, but there will soon be a text in English in production.—JOHN H. WADDELL, Industrial and Technical Photographic Division Fastax Cameras, Wollensak Optical Co., Rochester 21, N. Y.

Letters to the Editor

Re: Light Measurement for Exposure Control

[The publication of a paper under this title by Don Norwood, May 1950 JOURNAL pp. 585–602, has elicited the following comments.]

I was very interested to read the above noted article, for my development of the Duplex Incident Light Exposure Meter Technique has meant that for the last three years or so I have been working on almost parallel lines.

Before noting some further developments, I hope you will permit me to correct Mr. Norwood's statement on p. 595, in which he claims that his "concept of *Effective Illumination*, which takes into account illumination intensity and relative positions of observer, subject and light source *has not heretofore been crystallized or formulated*" [the latter italics are mine]. In contradiction to this statement, reference may be made to the November 1948 *British Kinematography* containing my article "Exposure Technique for Reversal Materials," from which it may be noted that I described this effect (which I named the "Duplex" technique) over two years ago before a meeting of the British Kinematograph Society in London.

Since reading my paper in 1948, a slight improvement over my originally described "Horizontal Duplex" method has been developed. The new recommended "Direct Duplex" method, which has been worked out by my colleague L. C. Walshe and myself, still consists of taking two readings with an incident light meter (of the flat window type), namely a "camera direction" reading (as

previously recommended) and a "major source direction" reading (as originally recommended for use alone by P. C. Smethurst, who first introduced the incident light meter technique in England in 1936—see his paper in *British Kinematography*, vol. 1, no. 1).

The required exposure for average work is then given by simply taking the geometric mean of the two Duplex readings, i.e., the mid-point on the stop scale between the two readings. For clear-cut conditions this technique will be found to line up almost exactly with the exposure levels recommended by the principal reversal color film manufacturers, and it has proved to be highly successful in practice. It has, incidentally, already been fully described in a book on this subject which is in preparation and will be published in due course . . . .

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July 21, 1950

In comparison with Mr. Dunn's statement that he has been working on almost parallel lines for the last three years or so, I should note that my experience with incident light exposure meters date from 1933 when my first incident light exposure meter (of the hemisphere light-collector type) was constructed. That meter was rigorously tested for several years, and patent application was made in 1938 (U.S. Patent 2,214,283).

The principle involved in that meter took into precise account both light intensity and the geometric relationship of keylight, subject and camera, as described in the aforementioned paper.

Work on other types of incident light exposure meters, which are based on the same fundamental principle, has proceeded since that time. See: U.S. Pat. #2,489,664, application filed in 1946; and U.S. Pat. #2,444,464, application filed in 1947. Both applications were filed prior to the time when Mr. Dunn reports the beginning of his endeavors, circa 1947. Explanation was made on p. 585 of May 1950 JOURNAL, that evolving patent protection had made full release of basic data inadvisable until 1948, when the paper was written. The JOURNAL publication showed that the Society received the paper in February 1949.

It has been recognized that some workers in this field have had a more or less hazy realization that more was involved in incident light measurement for exposure control than a simple measurement of light intensity. Various corrective expedients have been proposed by some of these workers, such as pointing a meter with a plane surface light collector toward the camera from subject's position; pointing said meter toward principal light source; aiming said meter toward a point halfway between said light source and said camera; pointing meter at camera and at light source in turn and using a mean reading as suggested by Mr. Dunn. However, none of these makeshift methods appears to indicate a full and clear-cut realization of the basic principles involved in the matter. None of the experimenters have, to my knowledge, brought forth precise and comprehensive formulae such as those shown in (15) and (16) on p. 595 of the May JOURNAL.

I do not agree that Mr. Dunn in describing his Duplex Method in *British Kinematography* has given a clear-cut, well crystallized comprehension of all the factors involved, as well as a formula for accurate solution of the problem. For instance, his formula for calibration of incident light meters was preceded by a quite similar formula on p. 14-6 of the *I.E.S. Lighting Handbook*, published in 1947. Neither formula takes into account the vital factor of geometrical relationship of subject, camera and light source. If this relationship were understood it would seem that it would have been put into Mr. Dunn's formula.