match the diffraction angle of the orders to be spatially filtered. Thus, when first order spectra are being filtered, a prism is selected with a diopter number of 100 λ/p. In this case, the spatial filter aperture remains fixed on the optical axis of the field lens and separation of the various images is accomplished simply by rotating the prism. Photographs of the filter plane distribution as the prism is rotated to pass the different image spectra are shown in Fig. 11, while the actual retrievals are shown in Fig. 12.

To illustrate the importance of linear storage, we repeated the same quadruple exposure experiment, but we processed the film to a $\gamma = 2$. Curve A of Fig. 8 characterizes the storage process. The resulting retrievals* are shown in Fig. 13. Crosstalk in this case is disturbing, while in Fig. 11 it is virtually undetectable. One technique to suppress the crosstalk associated with nonlinear storage is to control the carrier's transmission geometry. The development of this nonlinear multiple image method will be the subject of another paper.

Conclusions

A multiple image method has been shown that is straightforward in concept and relatively easy to implement. Linear storage is the only requirement of the process that may be considered tricky in the sense that close exposure and processing control should be practiced if optimum results are to be achieved.

The practical criteria of any multiplex scheme, namely, channel capacity and crosstalk levels, have been treated both analytically and experimentally. Equation (19) tells us the maximum number of images (channels) that can be stored when retrieval is achieved from the fundamental orders of one carrier frequency. On the other hand, Eq. (28) specifies the maximum

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*Notice that, similar to holograms, positive images are retrieved even though the recording was processed to a negative. The spatial carriers common to holograms and multiple image recording account for this phenomenon.

number of images that can be recorded linearly on an emulsion of finite input dynamic range. Since the retrieval model [see Eq. (26)] does not predict crosstalk and the retrievals shown in Fig. 12 do not exhibit crosstalk, we conclude that the assumptions implied in the derivation of Eq. (26) were substantially satisfied experimentally.

The technique described here can be used in a variety of applications such as in high density information storage, color image recording on black and white film, short sequence animation, stereoscopic storage on a single film frame, and composite image display. In subsequent papers we describe these applications.

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God grant that no one else has done
The work I want to do,
Then give me wit to write it up
In decent English too.*

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*This 1962 Christmas Competition quatrain is reprinted here by permission of The Chemical Society.

Microfiche vs Full Size

Harold Wooster, OSR director of Information Sciences, has written that there has been a growing tendency for Federal agencies to encourage, through differential pricing, the distribution of microfiche instead of full size copies of reports. The economic advantages of microfiche are obvious to the issuing agencies (and to the General Accounting Office); agency distribution lists show that some libraries actually prefer to receive microfiche. There is little information, however, on the acceptance and use of microfiche by individual scientists and