The results of the theory are of quite general validity, being based almost wholly on the requirement that angular momentum be conserved in all nuclear processes.
D.L.F.

Directional Correlation of Successive Nuclear Radiation. By D. L. Falkoff and G. E. Uhlenbeck. *Phys. Rev., 79: 334, July 15, 1950.*

Stratified

During the past decade multilayer arrangements of films have been found increasingly useful as a means of reducing reflection from glass, and of filtering polychromatic radiation. Several analyses of the propagation of electromagnetic waves through such multilayers have been published. These range from limited treatments of specific arrangements to general analyses which are marked by excessive mathematical complexity and meager physical content.

In this paper, which takes its title from a paper dealing with a related acoustical situation that was published by Lord Rayleigh almost forty years ago, a comprehensive analysis is developed from Maxwell's equations. The number and properties of the layers are unrestricted, and the applied wave may be incident at any angle. By using methods developed for solution of related problems in electrical communications, the analysis is presented in a form which lends itself to use of available numerical aids such as reflection and impedance charts; algebraic complications are thereby minimized and physical insight enhanced.

The general methods and results have proved useful for some years in the analysis and solution of a variety of optical and allied radio problems. Their utility is illustrated by applying them to two elementary problems; these are solved much more concisely than by the usual treatments to be found in the literature. In addition a useful theorem is derived, which expresses the necessary relations between refractive indexes of any number of quarter-wave and half-wave films comprising a multilayer system used for reduction of reflection. B.S.

Propagation of Electromagnetic Waves through a Stratified Medium, I. By Bernard Salzberg. *J. Opt. Soc. Am., 40: 465, June, 1950.*

Space Time Optics

The author considers such general physical problems as the generalization of the problems of optics, if extended to the space time continuum. Optics can be considered in three phases: geometrical optics, diffraction optics, and emission and absorption.

Geometrical optics determines the possible paths of light rays and wave surfaces, based upon Fermat's principle. A general field theory, based upon Hamilton's principle, governs the motion of *physical* entities and their wave surfaces in space time. It is shown that general relativity is contained as a special case on this level.

Diffraction optics is based upon the assumption of point disturbances sending out periodic impulses along the corresponding wave surfaces. The paper explains the physical meaning of these point disturbances, which create a field (or better, a superposition of a finite number of fields) which can be split up into their electromagnetic and gravitational components.

The reinterpretation of Schroedinger's equation in the emission and absorption theory assumes that a disturbance emits radiation of discrete frequencies. The absorption process is then equivalent to a resonance phenomenon in which only certain well defined energy amounts lead to stable solutions.

This attempt to explain all physical phenomena in a pseudoclassical way originated from research which the author started in 1933 to explain the diverging experimental evidence in the theory of the image formation in the microscope. A thorough study of all the literature on diffraction and interference made him suspect that the classical interpretation of optical phenomena is more suitable than the quantum-theoretical aspect, and that for instance, Heisenberg's indeterminacy principle, though correct, can be interpreted in a different way. An attempt was made to transfer the ideas of W. R. Hamilton, who showed the unity between geometrical optics and mechanics, to the diffraction and absorption theory. The author feels that an indiscriminate use of imaginary quantities to describe real phenomena has frequently obscured the simple existing laws. M.H.

An Optical Model of Physics. By M. Herzberger. *J. Opt. Soc. Am., 40: 424, July, 1950.*

Fast Camera

The velocity of the transients involved in the study of detonation and shock waves close to the edge of explosive charges is of the order of 8 millimeters per microsecond. In order to study these high speed transients, successive photographs taken at rates of between 10^7 and 10^8 frames per second are required. Large frames are also desired to maintain definition for measuring at moderate magnifications.

To meet these requirements a camera was developed which can be used to obtain successive frames at rates which can be varied from 10^5 to 10^9 frames per second. These ultra high speeds are obtained by the combination of a multi-slit focal plane shutter "framing grid" and a rotating mirror.

The event (detonation) to be photographed is imaged on the multi-slit focal plane shutter, and an image of the combined event-shutter is moved across the film plate by a rotating mirror. The mirror is only required to move the image the distance between two successive slits to expose the entire picture area. By using a very narrow slit the distance between slits can be kept small for a given number of frames (where the number of frames is the ratio of slit width to space between slits). The exposed plate is reviewed through the grid, and each successive frame is selected by moving the grid one slit width per frame. Each picture, therefore, is composed of a series of lines, and the amount of discontinuity across each frame is a function of the slit width and the number of frames.