by the passage of a shock front. The two-dimensional case is considered, according to the equations of de Hoffman & Teller.¹

The shock is described in terms of three parameters measuring the shock strength, the relative importance of the magnetic field, and the obliqueness of the shock front. Expressions for various quantities of interest, such as the velocities and the ratio of the densities on either side of the shock front, are obtained. The essentially complicated nature of the problem is manifested in an equation relating the relative importance of the magnetic field with the amount of bending the lines of force suffer upon passing through the shock front. A preliminary investigation of possible solutions of this equation indicates that very weak magnetic fields may be substantially amplified by the passage of such shock fronts. It is tentatively proposed, pending further numerical investigation of the solutions, that in a magneto-hydrodynamic fluid in which shock waves are not infrequent a possible mechanism may exist for the amplification of weak magnetic fields until the magnetic energy per unit volume obtained is within an order of magnitude or so of the pressure.

1. *Phys. Rev.* **80**, 692, 1950.

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Herget, Paul. Methods for minor planet perturbations.

The general problem of providing reliable ephemerides for the ordinary minor planets has led to experiments with three methods of computing perturbations by means of punched cards: Strömgren's, Hansen's, Encke's. The first is the simplest to compute; there are no integrations to be performed since integrals are replaced by summations. This method leaves the most work for the user who is going to derive a differential correction or compute an ephemeris, because he must derive new osculating elements for each date. In case of a close approach to Jupiter, this method has the advantage that one may change the reference ellipse after the approach.

Hansen's method requires about twice as much machine computation, but it is easier for the user because he has a fixed reference ellipse. This method is best suited to cases of non-commensurability of the mean motions, because then the perturbations do not build up to large values.

Encke's method presents essentially three non-linear, non-homogeneous differential equations,

but these have been put into a simple linear form and solved by iterations. This automatically eliminates the truncation errors and higher-order effects, and enables one to obtain a very high degree of accuracy, if necessary. This method will also be found satisfactory for use on large-scale computing equipment. It will be desirable to compute mean elements for the reference ellipse in order to keep the perturbations small.

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Hiltner, W. A. Compensation for seeing noise in photoelectric polarization photometry.

The seeing noise for perpendicular planes of vibration in a stellar source has been found to be coherent. Hence, an instrument has been designed and constructed that eliminates seeing noise from photoelectric polarization photometry by observing simultaneously the intensities of perpendicular planes of vibration and measuring the ratio, or the difference for ratios near one, of the two planes. The instrument consists of a Wollaston prism to separate the two perpendicular planes of vibration, a field lens of long focal length, 255 mm, to focus the objective of the telescope on the large unobstructed cathodes of two EMI 5311 multiplier phototubes, and a depolarizer to serve as a "zero" of intensity. The difference in the signals from the two phototubes, one receiving radiation in one plane of vibration and the second, radiation in the perpendicular plane, is measured with an amplifier the output of which is recorded on a Brown recorder.

The internal accuracy of such an instrument is limited, not by seeing noise, but primarily by the shot noise in the photocurrent. From a series of 24 observations of μ Herculis with the 82-inch reflector of the McDonald Observatory the probable error of a single observation has been found to be ± 0.00016 mag. The largest deviation from the mean was 0.0006 mag. This method of observing polarization should approach similar accuracy to the non-compensated DC photometer near the 10th magnitude with the 82-inch reflector of the McDonald Observatory. The time required to complete an observation is no greater than other methods employed heretofore.

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Hoag, Arthur A. Photoelectric photometry of M 13.

Magnitudes and colors of 57 stars near the center of M 13 have been measured photoelec-