is weak; and simple solutions result for the ionization front. However, if the shock is isothermal, high density in the H I shell makes the magnetic pressure dynamically important there. Then at some field orientations three solutions to the conservation equations for ionization fronts result, different branches of the solutions being required at various orientations. Here a proper choice of ionization fronts is unclear and must be decided as part of the whole dynamical problem. Speculative flow patterns are presented for this case, and the possibility that highly aspherical H II regions may evolve is raised.

Some Experiments on the Limits of Photographic Spectrophotometry. DAVID W. LATHAM, *Smithsonian Astrophysical Observatory and Harvard College Observatory*.—The purpose of our experiments was to investigate quantitatively the accuracy with which an intensity scale can be transferred from a calibration exposure to an experimental exposure for emulsions and conditions typical of astronomical spectrophotometry.

Our procedure was to determine both the large and small scale fluctuations resulting on 4×5 plates which had been exposed uniformly over most of their area. These fluctuations were determined by measuring the transmission of each plate at about 2000 points in the uniform area, then converting the points to an intensity scale using a calibration curve on the same plate and finally calculating the standard deviations of the intensities of the points. We developed a digitizing system for a Jarrell Ash microphotometer and computer programs for an IBM 7094 to make it feasible to perform these statistics for a large number of plates in a reasonable amount of time.

In our first experiment we tried four methods of agitation, using 4×5 IIaO plates. Three of the techniques gave typical large-scale nonuniformities of 1.5%, although a few plates were better than 1.0%. In our second experiment we adopted nitrogen burst agitation as standard and ran a series of 25 IIaO and 25 103aO plates, all with the same exposure, but using five different developers with five different developing times each. The resulting small-scale fluctuations were more or less independent of the developer and developing time, but depended primarily on the emulsion type, IIaO's being about 50% better than 103aO's.

Orbit Determination of Comet Ikeya-Seki. PAUL A. LAVOIE, *TRW Systems*.—The results of an orbit determination of comet Ikeya-Seki (1965f) are presented. The observations from several observatories taken prior to the perihelion passages (*UIAU* Nos. 1923–1933) were the basis for this determination. A differential correction was initiated using a position and velocity estimate derived from Cun-

ningham's preliminary orbit (*UIAU* No. 1928). A Cowell integration program including perturbations from Venus to Saturn was used. Uncertainties in the orbit determination are discussed. With a sparse number of observations, it is shown that the orbital uncertainties can be large enough to change an elliptic determination to a hyperbolic one. An estimate of the orbital period is given with an associated uncertainty. The effect of planetary perturbations on the osculating Kepler period is discussed. The possibility of detecting the effects of mass loss from a change in the angular momentum before and after perihelion passage is also discussed.

Models of the Lunar Surface with Temperature-Dependent Thermal Properties. JEFFREY LINSKY, *Harvard College Observatory*.—For the interpretation of recent data on lunar thermal emission, I have written a Fortran encoded computer program to solve the heat conduction equation and to compute radio brightness temperatures for a medium having conductive and radiative energy transport and characterized by arbitrary temperature- and depth-dependent thermal properties. This program will also solve periodic heat conduction problems of a more general nature.

A number of models were constructed with a range of temperature-dependent conductivities and specific heats, but each was consistent with the minimum surface temperature of 90°K observed by Low (*Astrophys. J.* **142**, 806, 1965) at the morning terminator. All of these models predict infrared and radio brightness temperatures for eclipses and lunations which agree favorably with high-resolution data for the center of the lunar disk.

If there are no internal heat sources, a significant increase in the mean radio brightness temperature with wavelength occurs when the conductivity, but not the specific heat, increases with temperature. This increase in the mean radio brightness temperature results from the nonlinear nature of heat conduction under these circumstances, and is sufficient to explain the observed increase with wavelength described by Krotikov and Troitskii (*Soviet Phys.—Uspe.* **6**, 841, 1964), without requiring as a postulate an unusually high level of radioactivity in the moon.

The general behavior of silicates at lunar temperatures and laboratory measurements of probable lunar materials suggest that radiative energy transport is the most probable mechanism to account for an increase in the conductivity with temperature. Several models in which radiative transfer and thermal conduction are of comparable importance at 350°K agree favorably with the data of Krotikov and Troitskii. The present findings support the hypothesis that porous or frothy material characterize