Some Remarks on the Problem of Stellar Populations. WILHELMINA IWANOWSKA (introduced by PHILIP C. KENNAN), *Perkins Observatory, Delaware, Ohio (on leave from the Observatory of Copernicus University, Torun, Poland)*.—An alternative approach to the problem of stellar populations is considered which seems to be more flexible for further research.

Stars are assigned to Population II or I according to their probable origin in one of the two main condensations of matter in the galaxy: the central spheroid, or the disk with spiral arms in it. The present state and position of a star is considered to be a result of its initial endowment (the population type) and its age, with the mass of the star as an important parameter for its physical-chemical evolution and its kinematical behavior. It is assumed that the galactic system is roughly halfway to or from the equipartition of energy: (1) on a large scale between the energy of random motions in the spheroid and the energy of rotation in the disk, (2) on the small local scale in random motions in each of the main population sites.

In this scheme different species of stars: red or blue giants, dwarfs, white dwarfs, planetary nebulae, novae or other kinds of variable stars are not uniquely assigned to one population type, but are regarded as variational phenomena inherent in both population types. Room is left for considerable range of ages with the possibility of present star formation in both population types. This possibility for the Population II type is left open owing to our poor knowledge of the situation in the central regions of the galactic nucleus, of globular clusters and elliptical nebulae, where more massive and younger stars may exist, in symbiosis with interstellar gas.

The fundamental problem of chemical composition differences, whether initial or present, needs further investigation both observational and theoretical.

Periodic Drag Perturbations of Artificial Satellites. IMRE G. IZSAK, *Smithsonian Astrophysical Observatory*.—The most important air drag perturbation upon the motion of an artificial satellite is the secular decrease of the elements a and e . There also exists a small secular decrease in i and small long-periodic perturbations in Ω and ω , due to the rotation of the atmosphere. Beside these effects, short-periodic perturbations are present in each element. This paper presents an investigation of the nature of these variations in the elements a , e , ω , and M . The essence of the method is a development into Fourier series of the right sides of the differential equations for the orbital elements. The mean den-

sity distribution in the atmosphere is approximated by $\rho = 10^{-1.35(h-55)} - 5$. The computation of the perturbations has been programed for the IBM 704.

A New Explanation of Martian Phenomena. C. C. KIESS, S. KARRER, AND HARRIET K. KIESS, *Georgetown College Observatory, Washington, D. C., and U. S. Naval Weapons Laboratory, Dahlgren, Virginia*.—The existence of water vapor and oxygen in the atmosphere of Mars in amounts too small for spectroscopic detection justifies the assumption that the observed Martian phenomena may be due to the oxides of nitrogen. Thus, absorption by the peroxide will explain the low albedos of Mars in green, blue, and violet light; and chalky-white deposits of tetroxide will explain the polar caps, their yellowish tint being due to dioxide in equilibrium with the solid N_2O_4 . The dark belt bordering the melting cap is regarded as liquid N_2O_4 with NO and/or N_2O_3 in solution, or as wetting of the substrate. The spread of heavy gaseous N_2O_4 over the dark areas, toward the equator, will account for the seasonal changes of color shown by them, according to the nature of the mineral structure of the Martian soil. In the atmosphere of Mars the oxides of nitrogen may exist in both gaseous and solid phases, and, in these forms, account for the observed meteorological phenomena. In minute crystals, at the temperatures prevailing at various altitudes and latitudes, they may account for the haze and the transient blue and white clouds that are known to occur. In the gaseous phase absorption by the peroxide will account for the loss of blue and violet light, known as Wright's phenomenon. The occasional blue-clearing is, then, due to a shift in equilibrium from NO_2 to N_2O_4 owing to a cold wave. During a heat wave the shift will be in the direction of higher concentration of NO_2 , thus accounting for the yellow clouds, which, at times, may be planet-wide in extent. If this view is correct Mars may be considered as a gigantic photochemical nitrogen-fixation process. Further, the well-known toxic effects of these oxides argue against existence of living organisms on the planet.

Tables for Correcting Observed Distribution Functions in Proper Motion for the Effect of Accidental Errors of Measurement. JOOST H. KIEWIET DE JONGE, *Allegheny Observatory, University of Pittsburgh*.—The Kapteyn-van Rhijn integral equation relating the observed distribution function in proper motion to the true distribution function in proper motion is inverted into a double infinite integral over the observed distribution function. It is shown that, in the case of meaningful solutions, the