based on brachiopod distributions, that Turkey was located on the northern side of Tethys during the Mesozoic. Other papers that may elicit healthy debate include those on the opening and closing of marine passages for dispersal of ammonites, deep- or cool-water barriers, dispersal of angiosperms, vanished islands as stepping stones for trans-Pacific spread of Cretaceous bivalves (rudistids), and the dispersal of tetrapod groups across Pangea and among the rapidly assembling fragments of Southeast Asia. Rosen and Smith focus on Cretaceous to Recent reef corals and echinoids. They employ a new cladistic method of parsimony analysis in recognizing endemism and reconstructing biogeographic relationships that holds promise for overcoming prejudices that bias conventional approaches.

This book is a timely and well-produced treatise. The editors have done a commendable job.

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Stellar Cosmogony

Formation and Evolution of Low Mass Stars. A. K. DUPREE and M. T. V. T. LAGO, Eds. Kluwer, Norwell, MA, 1988. xvi, 462 pp., illus. $119. NATO Advanced Science Institutes Series C, vol. 241. From an institute, Viano do Castelo, Portugal, Sept.–Oct. 1987.

Almost two centuries ago, Laplace conjectured that the solar system formed through condensation of a nebula of the sort then being studied by F. W. Herschel. Though Laplace's conjecture turned out to be spectacularly incorrect for nebulae that were later resolved into spiral galaxies, the Laplacian concept of star and planet formation from a rotating, gaseous nebula has survived the centuries and now constitutes the unifying foundation of stellar and planetary system cosmogony. The overwhelming success of the nebular theory is nowhere more apparent than in *Formation and Evolution of Low Mass Stars*, which describes observational and theoretical studies of the origin and earliest evolution of solar-type stars.

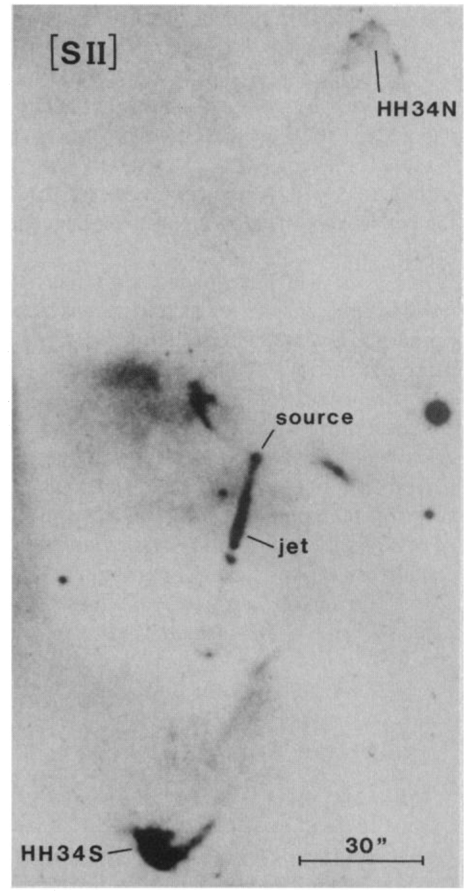
[From *Formation and Evolution of Low Mass Stars*]

We now have a generally accepted outline for the formation of low mass stars. The gas and dust in interstellar clouds clump into gravitationally bound, often magnetically supported, dense molecular cloud cores, which undergo self-gravitational collapse and contraction, increasing some 20 orders of magnitude in density. The collapse creates young stellar objects surrounded by envelopes of gas that fall inward and accrete onto the newly formed "protostars" within about a million years. The energy generated by the rapid accretion of the gas results in high luminosities peaking at infrared wavelengths. Strong stellar winds begin to clear away the residual gas and dust, and the protostars emerge from their cocoons as optically visible, pre-main-sequence stars. Continually losing angular momentum through their magnetic winds, these stars contract further and finally reach the long-lived main-sequence phase typified by our sun. All of these phases are covered with considerable expertise in the reviews and other papers in this volume.

Astronomical observations have already supported nearly all of the basic points of this cosmogonical outline. In particular, observations have provided abundant evidence, both indirect and direct, for the presence of nebular disks around young stellar objects, such as excess infrared emission from the cool portions of the disks, bipolar outflows of molecular gas collimated by nebular structures, receding lobes of bipolar flows that are obscured by the presence of foreground disks, and even interferometric maps of molecular gas rotating in flattened disks about young stellar objects. Undoubtedly Laplace would have been pleased by the accuracy of his once seemingly farfetched conjecture.

The prospects for further refinement of our understanding of stellar cosmogony through future observations look bright indeed; *Formation and Evolution of Low Mass Stars* describes the space telescopes proposed for the near future that will significantly improve our understanding of star formation. The detection and characterization of other planetary systems are another of the great challenges for future observations. For much too long, cosmogonical theorists have had to try to understand planet formation with only our solar system as a model.

Driven in part by the costs of the ambitious ground-based and orbiting telescopes soon to be in operation or proposed for the future and by increasing strength of the



The jet from a young star in the constellation Orion. Bow shock structures (HH34N and HH34S), caused by material expelled from the young star, are visible at the top and bottom of the figure as the material interacts with the interstellar medium. Such energetic and bipolar mass flows are an important phase in early evolution for all types of stars. This image was obtained in the light of S II by R. Mundt of the Max-Planck-Institut für Astronomie, Heidelberg-Konigstuhl, at the 3.5-meter telescope of the Calar Alto Observatory in Spain with a semiconductor detector. [From R. Mundt, "Flows and jets from young stars," in *Formation and Evolution of Low Mass Stars*.]

European, Japanese, and Soviet programs in astronomy and planetary science, we are now firmly in an era of increasing international collaboration. Considering the already strongly international character of astronomy (demonstrated by the wide and youthful representation of nations at the meeting that gave rise to this volume), future international cooperation in astronomy and planetary science is likely to be extremely fruitful. We in the United States can only hope that our nation continues to cooperate and to support scientific research at a level consistent with our national wealth.

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