INTRODUCTION TO MARTIAN METEORITES

Meteorites from Mars are among the most exotic substances on Earth. The determination of the Martian origin of select meteorites is the result of research conducted by hundreds of scientists throughout the world. In addition to many arcane markers, these unique meteorites share the following fundamental characteristics: they exhibit an unusually young crystalline age (so they can't be from Earth); they contain water-bearing minerals (so they can't be from the asteroid belt—the place of origin of 99.9% of all meteorites); there is evidence of a planetary sized gravitational field on their crystalline structure (which makes the most likely candidates of origin our two closest neighbors—Venus and Mars). The link to Mars was speculative until an analysis was conducted on the glassy inclusions of a meteorite suspected to be of Martian origin. In this glass were tiny voids, and in these voids were tiny volumes of gas. In 1997 the technology existed to analyze the gas—and it matched perfectly with the signature of the Martian atmosphere as reported by NASA's Viking Missions to Mars. As is the case with lunar meteorites, the delivery mechanism was an asteroid impact, which jettisoned material off of the Martian surface into an Earth-intersecting orbit.