## **Nuclear Systematics: II. The Cradle of the Nuclides**

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(Received )

The nuclear energy surface is presented as three-dimensional (3-D) plots of mass or atomic number *versus* charge density *versus* average energy per nucleon. These plots reveal a trough or "cradle of the nuclides." Stable and long-lived nuclides are located in the valley. Those that are radioactive or are easily destroyed by fusion or fission occupy higher positions. Separate modes of nucleosynthesis fill the cradle from different directions and produce distinct occupancy levels, i.e., different abundance patterns. The cradle can be used to estimate the properties of nuclear matter that cannot be studied in the laboratory.