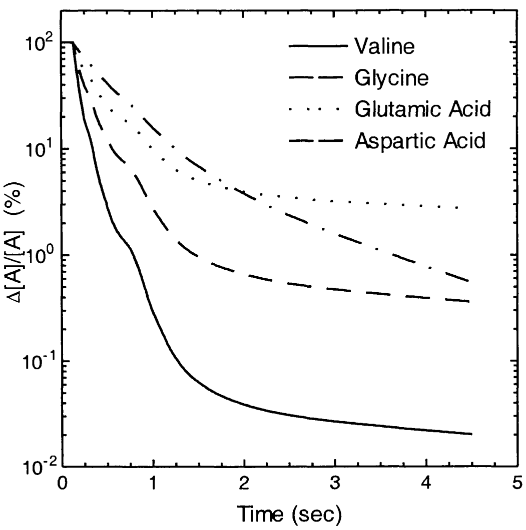

Fig. 1.

Hydrocode simulations were carried out using the two-dimensional finite differences hydrocode CSQ [5] coupled to the ANEOS equation of state package [6]. CSQ is a two-step Eulerian code that employs a space-fixed mesh. A resolution of 50 cells (or 2%) per projectile radius was used. Lagrangian tracer particles were used to follow the thermodynamic history of the material in the simulation. We modeled spherical asteroid and comet projectiles 1 km in radius, impacting the surface at 15 km/s. For this work we distributed 100 tracer particles in the projectile to reconstruct the projectile's thermodynamic history. Impact-related temperature histories (from the tracers) were then used in conjunction with known kinetic parameters for amino acids in the solid phase [7] to determine amino-acid survivability during an impact event. The solid phase results [7] differ substantially from previously available kinetic parameters for thermal degradation of amino acids in solution [8,9]. Together with the high resolution of our current runs (characterized by time steps of about 0.01 s), we believe these parameters are the main reason for the new and unexpected results.

While the survivability of amino acids in asteroidal impacts is very low, we find substantial survival rates of some amino acids for comet impacts. Some amino acids, like α-alanine, leucine, and isoleucine, are completely destroyed by both types of impacts. Other amino acids, however, survive the shock from cometary impact at the percent level, as is the case for asparagine, glutamic acid, and aspartic acid. Figure 1 shows the survival rates for some amino acids, spanning the range of survivability found, for a particular temperature history. This result has important implications for the origin of life and the role of impact-delivery of organic material on planetary surfaces.

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WOLD COTTAGE AND ITS INFLUENCE ON REPORTS OF THE PETTISWOOD AND EVORA METEORITES.

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Numerous authors have noted that the correspondence of Edward Topham with the editor of the *Oracle* newspaper, concerning the fall of the Wold Cottage meteorite, acted as a stimulus to others who had seen stones fall from the sky to report their experiences [1,2].

The first of these was by businessman William Bingley [3] in an extensive letter to the editor of the *Gentlemen's Magazine* about something that fell over 20 yr earlier when he was living at Pettiswood in Ireland. Bingley's account, and his attempt to offer an explanation for what he had quite obviously seen, has every semblance of authenticity. Bingley's career as a publisher and bookseller was one that would likely have brought him into contact with Topham, and he makes the very interesting observation that "upon further investigation by the learned my cake and Captain Topham's loaf will be found to have been both baked in the same stupendous oven." Bingley therefore is another early believer that all meteorites were related.

A second circumstance often cited is referred to as a letter from the poet Robert Southey [4] writing home from a visit to Portugal. There are numerous reasons to question the veracity of this theory. At the period in question, the poet was out of England avoiding the wrath of a benefactress aunt whom he had offended by getting involved in a scheme to found a commune. On his return to England he was somewhat financially embarrassed and just prior to entering training for the law, he submitted a manuscript for publication that supposedly contained letters written home during his travels in Spain and Portugal. Some letters are addressed and dated; many others have no indication of to whom they were sent and when. The one containing information about the meteorite is in this category and, like some other material in the book, could merely be padding to make the work more substantial.

Southey needed the money from sales. Southey was out of Britain when Wold Cottage fell and did not return until shortly before his book was submitted, and yet there are close parallels between the stories of Evora and Wold Cottage. For example, Southey has an account of the local magistrate swearing testimony (just as Topham did for his meteorites). The question that must be considered is did Southey, who is always credited with announcing the meteorite's fall, indulge in a little opportunistic reporting?

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BEAGLE 2: A LANDER FOR MARS.

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The year 2003 will present an opportunity for Europe to have its own planetary mission to Mars. The aim of the Beagle 2 project is to address each of the five objectives set out by the Science Definition Team for landers on the Mars Express Mission. Thus Beagle 2 seeks a full geological, mineralogical, and geochemical investigation program to characterize a landing site likely to have experienced erosion by water-transport mechanisms with an altitude <2 km with respect to the martian datum. The geochemical approach will include a qualitative, quantitative, and isotopic inventory of the light elements, H, C, N, O, and S, in their "organic," inorganic, and atmospheric situations. The distribution of the elements between species and any observed isotopic fractionation is to be used as a guide to provenance. In this respect, since recent work with martian meteorites indicates the existence of low-temperature geochemistry on Mars, a major aim will concern exobiology, to establish whether (1) conditions appropriate to life prevail, (2) any evidence for past life has survived, or (3) global disequilibrium, consistent with an active biology, exists. Because of the presumed harsh oxidizing conditions at the surface, materials selected from protected sites (subsurface or rock interiors) must comprise the major source of data. In any event, this deleterious property of the planet must be investigated for the benefit of future missions. The samples subjected to light-element analysis will be scrutinized by close-up imagery, documented in terms of chemical makeup/