MARS IMPACT ENERGY ANALYSIS IN SUPPORT OF THE ORIGIN OF THE CRUSTAL DICHOTOMY AND OTHER ANOMALIES. G. R. Spexarth, Representing Self, 14510 Cobre Valley Dr, Houston, TX 77062. spexarth@houston.rr.com

Introduction: By analyzing Mars from an engineering perspective, a violent and cataclysmic past is unveiled. This paper looks at multiple anomalies of Mars, shows how they may be inter-related, and describes a very possible scenario, supported by analysis, that could have led to a violent and sudden destruction.

Impact Energy: The energy of impact for the 2300 km Hellas Basin, located in the southern hemisphere of Mars, is calculated to be 5.33E26 Joules. This is over 1200 times more energy than the K/T Impact that extinguished 75% of life on earth [1], and Mars is only 1/8 the volume of Earth. This is an enormous amount of energy for Mars to absorb.

This paper shows that the energy input to the Mars system by the Hellas impact is sufficient enough to strain the lithosphere until rupture, thus forming the Tharsis Montes and initiating the Valles Marineris, both of which are located 180 degrees away from the Hellas Basin (Fig-1).

By analyzing the lithosphere of Mars as a thin-wall pressure vessel, it is shown that the amount of energy required to rupture the lithosphere ranges from 36% to 84% of the total Hellas impact energy. This assumes that the lithosphere thickness is between 110-260km [2]. Based on this analysis, there was sufficient energy in the Hellas impact to rupture the planet's lithosphere. Prior to rupture, the lithosphere would deform due to excessive yielding, thus forming the Tharsis Montes.

Tharsis Montes: It is proposed that this rupture initiated radial fractures that are identified as originating at the center of the Tharsis Montes (Bulge) [3]. The Tharsis volcanoes and Valles Marineris are aligned 60-degrees radially from each other (Fig-2). It is shown that 60-degree radial fractures (six-sided petals) are a typical feature formed when thin-walled pressure vessels rupture due to a build-up of excessive internal pressure (Fig-3) [4], [5]. These radial fractures could have been the source of extensive volcanism observed in the Tharsis region, as well as the initiation of the Valles Marineris as a rupture in the lithosphere.

Northern Lowlands: In addition, the Northern Lowlands are 5 km below datum ("sea level") and the Tharsis Bulge is 10 km above datum [6]. It is proposed that the Northern Lowlands are a direct result of the lithosphere deforming to create the Tharsis Bulge. The increase of arc-length required to form the Tharsis Bulge is shown to correspond directly to the reduction of elevation and arc-length of the Northern Lowlands.

Rate of Rotation: The rotational rate of Mars is slower than predicted when compared to the angular momentum of the rest of the terrestrial planets [7], [8]. It is shown that only 8% to 18% (depending on the thickness of lithosphere assumed) of the total impact energy from the Hellas Basin would be required to reduce the rotational spin of Mars by 20%.

Magnetic Field: It is also suggested that this sudden reduction of Mars' rotation, as well as pressure waves originating from the Hellas impact and passing through the possible liquid iron core, would disrupt the rotation of the liquid core, and in turn, significantly affect the dynamo process. Unless specific conditions are met, the planetary dynamo is non-regenerative [9]. Therefore, the planetary magnetic field would remain at a depleted level, and Mars would be in the present state that we find it in today.

Atmosphere: Without a magnetosphere to protect the planet from the Sun's solar wind, the atmosphere of Mars would be etched away and blown into space and leave it with the minimal amount of atmosphere that it has today [10].

Conclusion: This paper proposes, and provides evidence for, an alternate geological past for Mars. Detailed structural analysis supporting this theory is provided herein. However, ultimately, Mars must be explored in order to unlock its secrets and fully understand the implications of its history.

References: [1] Sharpton, V. L. and Grieve, R. A. F. (1990), *Global Catastrophes in Earth History*, pp, 301-318. [2] Willemann, R. J. and Turcotte, D. L. (1982), *JGR*, Vol-87, No. B12, pgs (9793-9801). [3] Carr, M. H., (1974), *Tectosism and Volcanism in the Tharsis Region of Mars*, Jour. Geophys. Res., V. 79, pg 3943-3949. [4] Whitney, J. P. (1993), *NASA-JSC 32294*. [5] Friesen, L. J. (1985), *NASA-JSC 27081*. [6] Cattermole, Peter (1992), *Mars, The Story of the Red Planet*. [7] Mars Orbiter Laser Altimeter (MOLA), NASA/GSFC, http://ltpwww.gsfc.nasa.gov/tharsis/mola.html. [8] Chabai, A. J. (1977), *Influence of Gravitational Fields and Atmospheric Pressures on Scaling of Explosion Craters*, Impact and Explosion Cratering, pgs. (1191-1214). [9] Russell, C. T. (1986) *Solar and Planetary Magnetic Fields*. [10] Luhmann, Janet G., (1996), *Solar Wind Effects on the Atmospheres of*

the Weakly Magnetized Bodies: Mars, Titan, and the Moon, NASA Contractor Report 202224.
[11] Hancock, G. (1998), The Mars Mystery.

Figures:

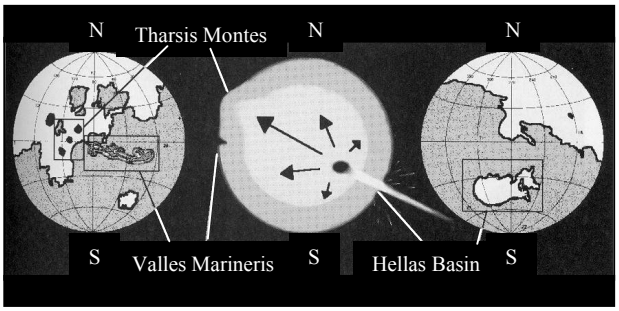

Figure-1. Formation of the Tharsis Montes and Valles Marineris due to the Hellas Impact. [11].

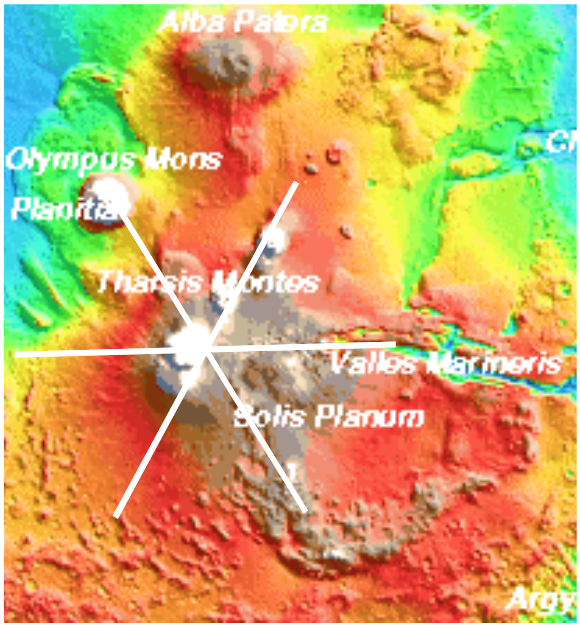

Figure-2: Six-sided star patter observed in the Tharsis region. This pattern is typical during rupture of thin-walled pressure vessels. [7] (radial lines added by author) (formation best observed on color map)

Figure-3: Six-sided star pattern observed in the rupture of thin-walled pressure vessels in a laboratory experiment [4], [5].