THE NEW WAVE PLANETOLOGY: ORIGIN OF PLATO'S POLYHEDRA AND HEXAGONS IN THE SOLAR SYSTEM. G.G. Kochemasov, IGEM of the Russian Academy of Sciences, 35 Staromonetny, 119017 Moscow, Russia, (kochem.36@mail.ru).

Saturn's polar dichotomy was observed as color hues: gold south and azure north. Now infrared images of NASA/JPL/University of Arizona allow to see substantial structural differences of two polar regions. First was observed a large centered on the south pole hurricane 8000 km across with a central eye about 1500 km across (PIA08333). Then on the northern night hemisphere was observed a huge centered on the pole hexagon about 25000 km across (PIA09186). The dichotomous structure of celestial bodies is their first characteristic feature marked as Theorem 1 of the wave planetology [1, 2, 3 & others]. Origin of this ubiquitous feature is due to an interference of warping waves 1 of four directions appearing in any rotating body (but all bodies rotate!) moving in elliptical orbit with periodically changing accelerations (I. Kepler has shown that all planetary bodies move in such orbits) [3]. The fundamental warping inertia-gravity wave 1 has overtones of which wave 2 – the first overtone is most prominent in structures of celestial bodies. It makes tectonic sectors superimposed on tectonic dichotomy (e.g., continents and secondary oceans of Earth; the Pacific basin is the primary ocean – one of the dichotomous segments of Earth).

Interfering waves tend to produce in globes geometrical figures according to their lengths. Thus, wave 1 makes tetrahedron, wave 2 octahedron, wave 4 cube (Fig. 1-4). Naturally, mighty gravity of relatively large bodies (more than 400 to 500 km across) "smashes" this superimposed figures in favor of a sphere. What is left, it is axes and planes of symmetry of this figures and perching but obliterated vertices (e.g., the Pamirs-Hindukush and antipodean to it the Easter Island) (Fig.5). A tetrahedron – the simplest polyhedron of Plato (Fig. 6) – has three faces narrowing to a vertex and widening to a fourth face. Thus, tetrahedron is a basically dichotomous body because cut amidst any of its 4 axes of symmetry it always has an opposition of a vertex (contraction) to a face (expansion) (Fig. 6). Traces (projection) of three tetrahedron faces are typically seen on surfaces of planetary spheres as hexagons, for an example, on many of the saturnian satellites icy surfaces (Fig. 10-14) and in total shapes of some small bodies (Fig. 1).

Now a hexagon shows itself on the northern polar region of Saturn where it is rather stable as it was observed even by the Voyagers about 30 years ago (Fig.7-9). This stability of planetary structural features (even in a gaseous media!) is explained by producing them standing waves that for larger waves have rather long periods of phase change. So, at Saturn now is the expanded northern hemisphere with well developed wide structural lines and the contracted southern hemisphere with smashed squeezed structures twisted in hurricane. Strikingly, hexagons of icy saturnian satellites (Fig. 10-14) mimic not only shape but relative size of big saturnian hexagon. This similarity betrays their common wave origin.

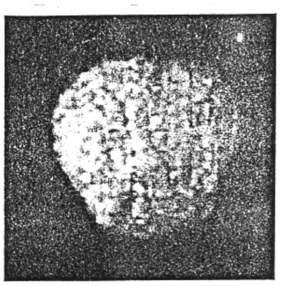
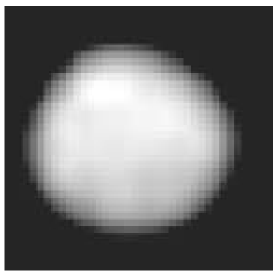
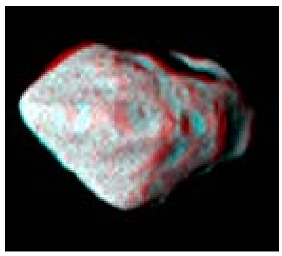


Fig.1. Proteus


2. Yanus


3. Pallas


4. Steins

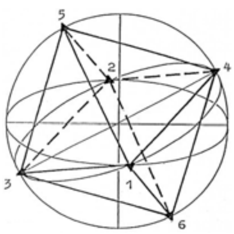
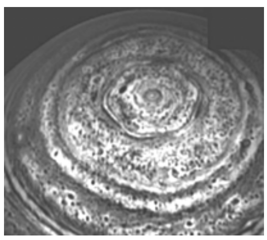


Fig. 5. Earth's octahedron


6. Sphalerite crystal


7. Saturn, polar hexagon

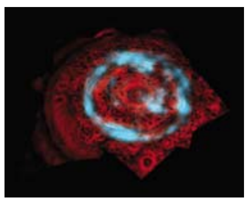
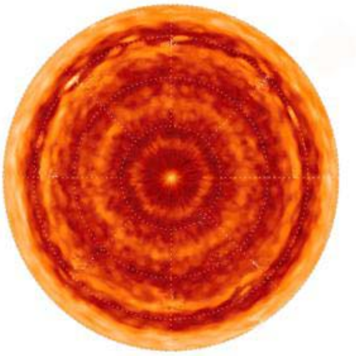
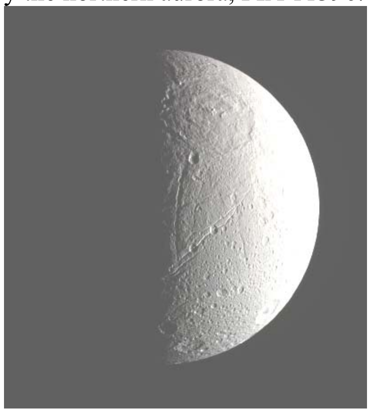

8 Saturn, aurora

Fig. 1: Neptunian satellite Proteus, ~416 km across, P-34681. **Fig. 2**: Yanus, 179-181 km across, PIA08192. **Fig. 3**: Asteroid (2)Pallas, 582 km across, HST2007.jpg. **Fig. 4**: Asteroid (2867)Steins, 4.6 km across, ESA News, 6 Sept. 2008: "A diamond in the sky". **Fig. 5**: Earth's hidden octahedron – antipodean vertices: 1- Equatorial Atlantic, 2- New Guinea, 3- the Pamirs-Hindukush, 4- Easter Isl., 5-Bering Strait, 6-Bouvet Isl. **Fig. 6**:

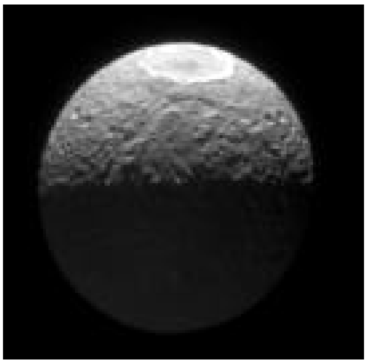
Tetrahedron – sphalerite ZnS crystal. **Fig. 7**: Saturn's north polar hexagon, 25000 km across, PIA09188. **Fig. 8**: Saturn's north polar hexagon projected to high atmosphere and marked by the northern aurora, PIA 11396.



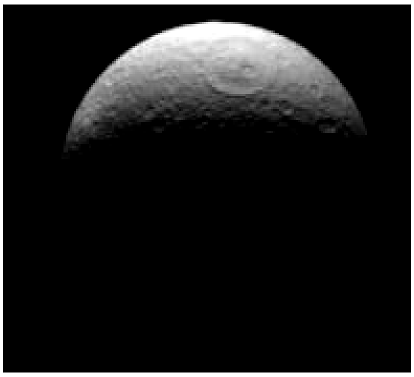
9. Saturn, polar hexagon



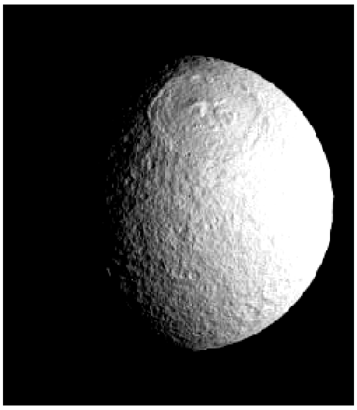
12. Dione



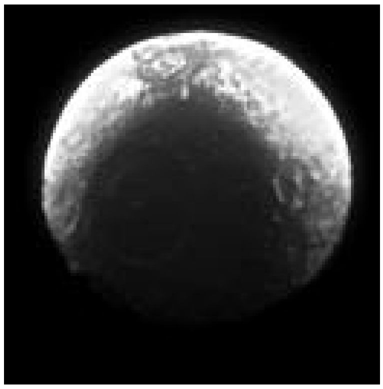
10. Mimas



13. Rhea



11. Tethys



14. Iapetus

Fig. 9: Saturn's north polar hexagon, 25000 km across, PIA 10217. **Fig. 10**: Mimas, 397 km across, Hershel hexagonal structure, PIA09811. **Fig. 11**: Tethys, 1062 km across, Odysseus hexagonal structure, PIA10438. **Fig. 12**: Dione, 1126 km across, Southern basin with hexagonal outlines, PIA 08938. **Fig. 13**: Rhea, 1528 km across, Tirawa hexagonal structure, PIA08909. **Fig. 14**: Iapetus, 1468 km across, hexagonal structure near the dichotomy boundary, PIA08273.

References: [1] Kochemasov G.G. Theorems of wave planetary tectonics // Geophys. Res. Abstr., 1999, V.1, №3, p.700 . **[2]** . Kochemasov G.G. Tectonic dichotomy, sectoring and granulation of Earth and other celestial bodies // Proceedings of the International Symposium on New Concepts in Global Tectonics, "NCGT-98 TSUKUBA", Geological Survey of Japan, Tsukuba, Nov 20-23, 1998, p. 144-147. **[3]** Kochemasov G.G. Mars and Earth: two dichotomies – one cause // In Workshop on "Hemispheres apart: the origin and modification of the martian crustal dichotomy", LPI Contribution # 1203, Lunar and Planetary Institute, Houston, 2004, p. 37.

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