

Triton Fun Company

Science Newsletter September 2008

Science Newsletter

September 2008

Visit to JPL and to Mars

J. Parks-diFranco

Special points of interest:

Jet Propulsion Lab

Triton Fun stuff

Superfluous questions

On a warm Sunday morning in the summer of 2000, I visited Pasadena's Jet Propulsion Laboratory (JPL) Open House. JPL is the premier center for planetary exploration in the United States and the world, and controls many missions that are out in space exploring the solar system. Once I parked my car and was on the shuttle bus to the so-called "Mars site", I had the good fortune to sit just behind the "guide," Larry Dumas, then-Deputy Director of JPL, who told us that, though JPL is a Federal entity, the employees work for Caltech. I learned that any child of these employees who has a Grade Point Average in school of 4.0 is eligible for a free college education at Caltech and that there was currently a 13 year old girl with her Ph.D. to prove it. We passed lots of buildings on the laboratory as well as a conical structure that is a telecommunications tracker for deep space, and a space simulator with a 25 foot chamber where the elements of space are provided: a large mirror to simulate sunlight and a "hard vacuum" for environmental authenticity. We saw a space propulsion building with a low thrust *ion engine* which was ten times as efficient as conventional rocket engines. There was mention of cryogenics using liquid nitrogen and "acoustical levitation" so one could do experiments on materials and

levitate them so they would be isolated from other materials.

As I disembarked at my station at the "Mars Yard", I noticed that, at first glance, the Mars Yard looks like a vacant lot with intermittent rocks and some scattered robotic toys. I soon learned that these were "Landers and Test Rovers" on a simulated Martian terrain. The rovers were built to know how to navigate around the many rock formations on the Mars surface. The docent at my stop said the Mars Pathfinder that landed on Mars in 1997 was the first visit by an American spacecraft to Mars' surface since the Viking missions 1 and 2 in 1976. Viking was a stationary lander. Pathfinder was the first rover mission to Mars that could actually go somewhere after landing. Pathfinder carried several scientific instruments that investigated the structure of the Mars atmosphere (which is very, very thin, e.g., 100 mph winds would be insignificant there), surface meteorology, surface geology, and the elemental composition of Martian rocks and soil. Mars' core is solid. Scientists know this from traces of its magnetic field frozen in its crust. The planet cooled because it is a smaller planet, has a thin crust, and loses heat more rapidly, and is at greater distance from the sun than Earth.



Mars Pathfinder:
Little rover that could

There is evidence of volcanoes three times the elevation of Mt. Everest, but at some point these became inactive as the core hardened.

The Mars Global Surveyor (MGS) spacecraft was launched as the Pathfinder landed (it takes 6 months to get to Mars). The big difference is that the MGS was an orbiter that orbited Mars every day to measure its remnant magnetic field (it doesn't have an intrinsic field like Earth), gravity, thermal properties, and to take images (about 65,000 by 2000) of the topography. Solar panels collected energy that powered the craft and operated the electronics. Propellants kept the craft stable and would eventually run out. MGS operated for 10 years, far longer than expected, and ceased operations in 2006. It took thousands of images and revolutionized our understanding of Mars climate and geology.

We are always looking for **contributors** to the Science Newsletter. If you would like to write an article about a science subject you are excited about, or contribute a superfluous question, or if you would like to be on our **mailing list** for future newsletters, please e-mail us at:

info@tritonfun.com

continued, pg 2 —>

Visiting Mars and JPL:

Photos/Info: NASA/JPL

Mars' *Olympus Mons* is the largest volcano in the solar system. The famous heart shape on Mars' surface is actually a pit formed by collapsed walls within a trough. The Mars Global Surveyor's camera also took photo-images of bluish-white water ice clouds around the volcanoes. At that time in 2000, Earth was at a maximum distance from Mars and it took about 25 minutes to send instructions to the spacecraft (every few days JPL sent up a different set).

The MGS provided scientists with the first opportunity for a complete data set from Mars. The riddle of Mars is the clear evidence of past liquid water and what happened to change that. The next mission launched in 2003 was the Mars Exploration rovers which are still roving today (summer 2008). In 2009, the Mars Science Lander (MSL) mission will launch to Mars and do a variety of advanced experiments to study Mars. MSL will get soil samples, look for fossils, and perhaps plant life as well as take cores of the ice. These exploratory studies of Mars give us invaluable and pertinent understanding of how our solar system (and particularly Earth) formed and evolved. The JPL annual Open House is an important opportunity for the layperson to grasp these concepts and appreciate the reasons for deep space exploration. I'm glad I went.

Resources:

1) The JPL Open House happens every year in the spring, usually one weekend in May or June. The event is free to the public. Many information booths, videos, slide shows and kid-friendly activities are available. You can find out all the latest data from the space missions studying the planets.
2) See:

<http://www.jpl.nasa.gov>

<http://mars.jpl.nasa.gov>



Pathfinder rover exploring

The Pathfinder rover, named Sojourner, is pictured here tasting a rock on Mars. Actually, it is using its APXS instrument to study the elements in the rock and figure out its rock type and composition. Pathfinder landed in 1997 after a 20-year hiatus in NASA Mars landings. An exciting achievement..



Mars Global Surveyor

The MGS spacecraft launched in 1996 and spent 10 years orbiting Mars studying its geology, climate, atmosphere, topography, magnetic field and many other Martian features. The camera took over 200,000 images of the Mars surface and covered the entire planet. Fascinating structures are seen in these images: mountains, craters, valleys, channels, all in exquisite detail. For the image collection, see:

http://www.msss.com/msss_images

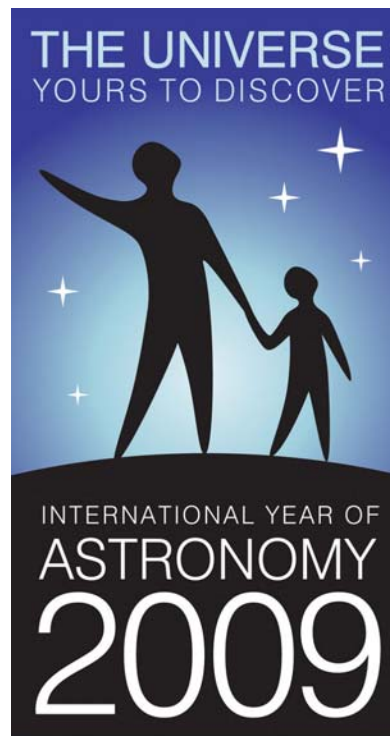
TRITON FUN PRODUCTS

2009 has been declared the "International Year of Astronomy". Events and activities to further the excitement of astronomy are being planned by IYA committees in over 100 countries. The logo for the IYA2009 is shown below. For more info on upcoming IYA2009 events, go to: <http://www.astronomy2009.org>

Triton Fun is an authorized distributor of T-shirts, sweatshirts and long-sleeve tees sporting this new logo. Part of the proceeds from the sale of these shirts will go to support astronomy clubs and astronomy activities connected with IYA2009 in California.

These shirts can be ordered online on our website:
<http://www.tritonfun.com>

Or, order by phone (toll-free) : 800-778-0560



<http://www.tritonfun.com>

Mailing Address:

Triton Fun Company
P.O. Box 1522
La Canada Flintridge, California 91012

Phone: 800-778-0560

E-mail: info@tritonfun.com

Website: <http://www.tritonfun.com>



Triton Fun Company

Science and Astronomy-related products for the whole family

See our online catalog for great gift ideas !

All back-issues of our Science Newsletter are available in our "Newsletter Archive" at:
<http://www.tritonfun.com>

We're on the Web !

<http://www.tritonfun.com>

** Send us your superfluous questions for a future issue ! They can be on any subject. The funnier, the better. M.D., our editor, appreciates the help and will send you a free Triton Fun coffee mug as compensation for your question. Or write an article for us and be read by professional and amateur astronomers and scientists in the U.S. and Canada ! **

Superfluous Questions:

- 1) In the TV show *The Odd Couple*, what was Oscar Madison's middle name ?
a) Henry b) Jonathan c) Trevor d) Jeffrey
- 2) What year was the first Tournament of Roses Parade held in Pasadena, California ?
a) 1890 b) 1898 c) 1912 d) 1920
- 3) What comet was observed by the astronauts on Skylab ?
a) McNaught b) Halley c) Boatini d) Kohoutek
- 4) The crater called "Arunaka" can be found on *what* moon of the solar system ?
a) Phobos b) Europa c) Rhea d) Dione

→ ANSWERS in next months issue of the Science Newsletter ! ←---

** ANSWERS to August's Superfluous Questions: 1. b) Malaysia 2. b) Johann Galle 3. d) Oak Park, IL 4. a) 1845