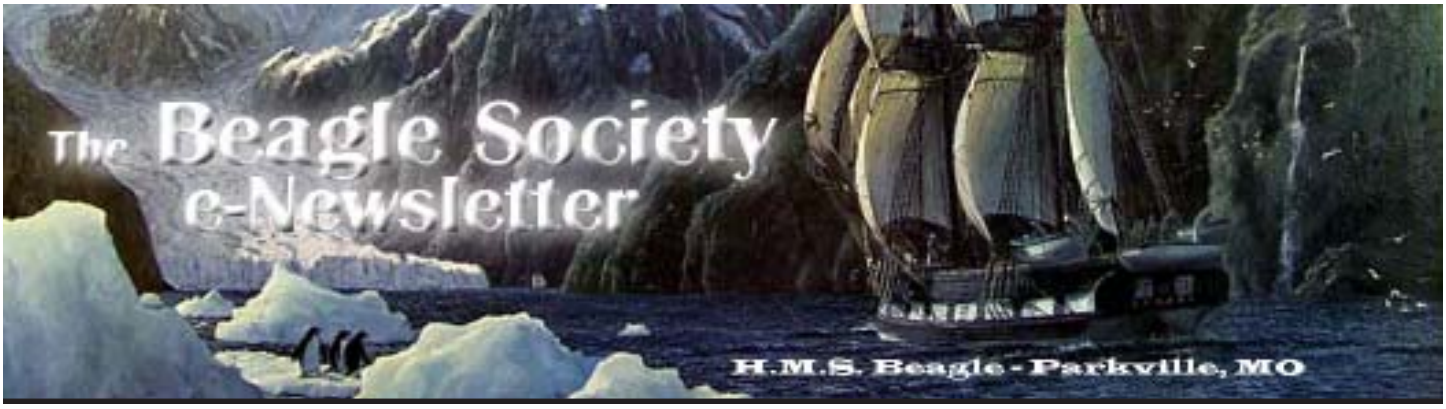


ISSUE #4 **January 2010**

Beagle Society Meeting

7 pm on Monday, January 18, 2010

Sexual Selection from Darwin's Descent of Man to 2010
from bugs to *Homo sapiens*
It's all about how a male displays to a female!
Trevor Schmidt, Science City

Trevor started his enquiry into sexual selection as an amatuer observing the chimps at KC Zoo, then moved on to the other primates all the while reading approximately 50 books about behavior. Trevor will supply a bibliography so anyone can read the same stuff he did. His observations serve as a testament to how much one can learn about human behavior by watching fellow primates and reading books by experts about primate behavior. And then learn a little bit about their own behavior.

Mars Spectacular

A spoof on the perennial hoax
Leif Bahl, Beagle Staff Astronomer

The Red Planet is about to be spectacular (well, pretty good)! This month and next, Earth is catching up with Mars in an encounter that will culminate in the closest approach between the two planets in recorded history since 2007. The next time Mars may come this close is in 2012. Due to the way Jupiter's gravity tugs on Mars and perturbs its orbit, astronomers can only be certain that Mars has not come this close to Earth in the last several years, but it may be as long as several more years before it happens again.

The encounter will culminate on January 27 when Mars comes to within 61,720,800 miles of Earth and will be (next to the moon, Jupiter, and Sirius) the brightest object in the night sky. It will attain a magnitude of -1.28 and will appear 14.10 arc seconds wide (an arc second is the apparent width of a dime at two kilometers (1.25 miles). At a modest 75-power magnification Mars will look as large as the full moon to the naked eye. (Actually this is a dumb comparison. How big something looks in the eyepiece depends on the telescope used, the eyepiece used,

(continued on following page)

Mars Spectacular

the combination of the telescope and eyepiece, and our own subjective (codeterminations based on how our eyes and brains conspire to trick us into believing something looks bigger than it really is. Mars will however look better through the telescope than it has in the past two years or for the next four.) Mars will be easy to spot. At the beginning of January it will rise in the east at 8 pm and reach its azimuth (uh, that would be zenith) at about 3 am.

By the end of January when the two planets are closest, Mars will rise at nightfall and reach its highest point in the sky at 12:51 am. That's pretty convenient to see something that no human being has seen since December 2007. So mark your calendar at the beginning of January to see Mars grow progressively brighter and brighter throughout the month. Share this with your children and grandchildren. *NO ONE ALIVE TODAY WILL EVER SEE THIS AGAIN FOR FOUR YEARS.*

This email, which is a re-write of one that goes around every year, sounds less exciting when injected with facts. But all joking aside, the opposition of Mars arrives soon. Opposition occurs when a planet lies opposite the sun in the sky. At this time earth and the other planet make their closest approach to each other, the other planet shines at its brightest, and appears its largest. The planet in opposition rises at sunset and sets at sunrise. This provides the opportunity to observe an object all night.

The earth orbits the sun faster than Mars, so it does not enter opposition every year. Instead it takes about 26 months for the earth to lap Mars.

I should say one more thing about Mars oppositions. Not all oppositions are equal. Because Mars has an orbit much more elliptical than Earth, the distance to Mars at opposition ranges from 101.42 million km (63 million miles) to 55.7 million km (34.5 million miles). The distance at closest approach follows a cycle so that for approximately 7.5 years the oppositions get closer and then for approximately 7.5 years the oppositions get farther. The last close opposition was the record opposition in 2003 when Mars came to within 55.76 million km (34.7 million miles) of Earth and reached an apparent size of 25.11 arc seconds. It's been downhill since then and Mars reaches its farthest opposition on March 3, 2012.

So the bad news is that this year's opposition is the second worst in an 8.5 year period. The good news is that this is the best Mars will look in the next four years. So let's get out and take a look.

H.M.S. Beagle plans to host a Mars Observing Party for Friday, February 5 starting at 7 pm. You're invited to bring your telescope and observe with us. Don't plan to observe Mars just that one night. Mars is brilliant right now rising in the east about 9 pm. Start watching now and maybe you will notice it grow bigger over the next few weeks. And then watch it recede for the rest of the year. It's a great way to get a visceral sense of how Earth and Mars move through the solar system.

Upcoming Astronomy Events at H.M.S. Beagle

Mars Party
7 pm on Friday, February 5, 2010
Bring your telescope and observe the red planet!

Star Hopping Workshop
7 pm on Friday February 19, 2010
"The Winter Hexagon and Or4ion Point the Way" Bring your manual telescope and learn to find deep-sky objects.

Telescopes Basics Workshop
7 pm on Friday, March 19, 2010
A workshop for beginning astronomers!

The 49th Annual Kansas City Gem & Mineral Show

March means only one thing to local rockhounds - time for the Gem & Mineral Show! While not aspiring to such a grand scale as behemoth shows like Tucson, Denver, or Munich, the Kansas City Show is a comfortably-sized affair, with a mix of something for practically everyone. Mineral collectors will find dealers to help them fill out their collections, jewelry and lapidary hobbyists will find supplies and working displays, and kids will find all manner of things to fire their curiosity and imagination.

The 2010 Kansas City Gem & Mineral Show will be held, as in recent years, at the MMC-Business & Techology Campus Exhibit Hall, 1775 Universal Avenue, Kansas City, Missouri 64120 (exit I-435 at Front Street).

It will be open from Friday, 12 March through Sunday, 14 March 2010.
Hours are Friday, 9 - 8pm, Saturday, 10 - 7pm, and Sunday, 10 - 5pm

Discount coupons which will reduce the cost of admission are available at the Beagle, so drop in and pick up yours today. Admissions without coupon are Adults, $6, Children Aged 5-12, $2, and children under 5 free. ***And be sure to stop by and visit us at our booth when you're there!***

The Year In Science, 2009

compiled by William Nedblake, H.M.S. Beagle

With the beginning of a new year, it's always fashionable to stop and take a look back at the news features of the previous year. Here are some of the highlights culled from various news sites:

Ardipithecus

The announcement of the discovery of the 4.4 million year old Ardipithecus ramidus, yet another early entry on the tree of human evolution, has again expanded and enriched our understanding of human evolution.

http://www.sciencedaily.com/releases/2009/10/091001110548.htm

http://www.scientificamerican.com/article.cfm?id=ardi-hominid-human-ancestor

Darwin: 200 Years Later...

Darwin celebrations held around the world, marking the bicentennial of Darwin's birth, and the sesquicentennial of the publication of On the Origin of Species. Despite efforts by some of creationism's more clownish exponents, Kirk Cameron and Ray Comfort, to distribute their own "annotated" version of the Origin, celebrations of the anniversary of the book's publication took place.

http://www.darwinday.org/

Hubble Space Telescope: Another, Longer Lease on Life

The decision to undertake another Hubble Servicing Mission was fraught. On the one hand, Hubble is in a high orbit which is dangerous to reach, and the repairs themselves are incredibly difficult and complex. On the other hand, the HST has produced some of the most iconic and recognizable images in astronomy ever seen, and has gone from punchline status in 1990 to being the single most respected source for astroimages. NASA took a difficult decision, and elected to go

(continued on following page)

ahead with a servicing mission which again replaced and upgraded key components, with stunning results.

http://www.hubblesite.org

International Year of Astronomy

The International Year of Astronomy was a huge success, and a fitting celebration of the 400th anniversary of Galileo's use of a telescope to view the moons of Jupiter. Featuring a daily podcast (The 365 Days of Astronomy), countless events, and an attempt to get inexpensive, working telescopes into the hands of anyone who wanted one, IYA 2009 was tremendously successful.

http://www.iya2009.org

The Large Hadron Collider

After suffering a setback within weeks of first having been switched on, the most complicated machine ever constructed, the Large Hadron Collider, was brought online this year and has already completed a number of high-energy tests. Oh, and all of those people making up all sorts of nonsense about how the world was going to end as a result of the activation of the LHC? I just looked out of the window, and either the world is still here undamaged, or I need new glasses.

http://public.web.cern.ch/public/en/LHC/LHC-en.html

"Swine" Flu

The H1N1 influenza strain has been all over the news, from the more mild-mannered and rational pronouncements of the CDC (ie; "It could be bad, you should be vaccinated") to the intense fear-mongering of local tabloid "news" outlets ("we're all gonna die!!! Flee!!!"). The fact remains that this newest mutation has put the wind up a lot of people, and it has been an important, developing story of 2009 which continues with us into the new year.

http://www.sciencedaily.com/news/health_medicine/influenza/

Water on the Moon

Perhaps oversold by NASA as a grand display of pyrotechnics, the LCROSS mission to determine whether or not there is water to be found frozen in dark craters on the moon was nevertheless successful. Frozen water was found, in large quantities, thus setting the stage for a return to the moon, as well as opening the possibilities of permanent lunar outposts and fueling stations.

http://www.sciencedaily.com/releases/2009/10/091009101945.htm

This is just a small sampling of some of our favorite science stories from the last year. Got a story that you loved, or have a question about one of the one's that we selected? Email us, or look for the open comment thread on our blog at hms-beaglescienceblog.blogspot.com.

H.M.S. Beagle
180 English Landing Drive
Parkville, Missouri 64152
816-587-9998
www.hms-beagle.com
The Beagle Society e-newsletter is a publication of H.M.S. Beagle. Contributions are always welcome.

Editors
John Kuhns, William Nedblake, Leif Bahl, and Carol Kuhns

All comments and contributions should be sent to H.M.S. Beagle at clk@hms-beagle.com.

Recent Science Articles

compiled by John Farrell Kuhns, H.M.S. Beagle

Science moves on, despite the local, national and global economies. As a member of several professional and science-oriented organizations, I have the pleasure of being inundated with weekly updates of science at all levels. Some of these, of course, come to me via electronic news items, but the majority are from the various magazines and journals that I receive as a result of my memberships. In my opinion, the best of these published sources is the weekly journal *Science* published by the American Association for the Advancement of Science.

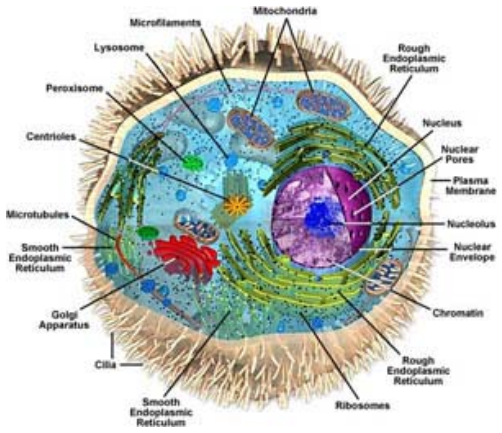
Here then are some recent reports from *Science*.

Water has been the number one concern around the world. While 70% of our planet is water, 97.5% of it is salt water, leaving only 2.5% as fresh water. Seventy percent of Earth's fresh water is frozen in the icecaps of Antarctica and Greenland. The rest is locked up as moisture in the soil, or is in deep underground aquifers as groundwater that is not directly accessible. Much of the ground water is, in fact, "fossil" water that accumulated, in some case, hundreds of thousands to millions of years ago. While it is a fact that the ice caps are rapidly melting due to global climate change, this water is directly entering the earth's oceans and is not being captured for our use.

Less that 1% of all fresh water (~0.007% of all water on earth) is directly accessible. Lakes, rivers, reservoirs and tapped underground sources constitute this precious resource and this represents the sustainable amount that is regularly renewed by precipitation. The problem is that our consumption is unsustainable and the demand for new resources continues to increase.

A relative recent technology that is again gaining interest around the world, especially in desert areas near oceans is desalination of seawater. The desalination process results in water that can be contaminated with "nontrivial levels of harmful byproducts." The conclusion, however, is that there is an "increasing likelihood that desalination will remain a viable option" for the foreseeable future[1].

Kidnapped free-living bacteria, it is explained in another *Science* article[2], were "coerced in various ways" by those cells that make up all life except the so-called monera (single-cell life forms). The "kidnapped" bacteria were utilized by the eukaryotic cells to supply them with energy through ATP synthesis as a means of aerobic respiration. These kidnapped organisms became the mitochondria that are the engines of our cells today. Mitochondria are shown in the illustration below:



The idea that certain organisms were pressed into duty to serve other cell types certainly isn't new, but what the article explains is that new discoveries of intercellular organelles in anaerobic cells demonstrate "mitochondrion-like" features. Notably, these are double membranes and proteins that assemble iron-sulfur "clusters" which are found in many enzymes that aid and support respiration. Cellular respiration involves the manufacture and storage of ATP (adenosine triphosphate) and this process is attributable to the mitochondria.

This article speaks of "patched together" protein manufacturing from bacterial sources. This concept of being "patched together" is a hallmark of evolution. Natural selection makes use of what is already available and cobbles together something that works within the context of the presiding environment. On-going selection, of course, determines what is ultimately successful.

Methane clatherates, as some of you will recall was a topic of discussion during our last presentation on space science and global climate change. Again, from an article originally published elsewhere[2] methane clatharates, or oceanic methane hydrates, that occur in marine sediments worldwide, are considered a "wildcard" in the

(continued on following page)

global climate system and a concern for the environment[3].

As is reported, substantial release of this trapped methane could accelerate global warming well above current estimates. The article's authors conclude that "humankind does have the capacity to cause large methane releases from the sea floor" and, consequently, have great impact on global warming. The impact, they state, is likely, however, to occur over millennia rather than abruptly within the next century.

Diseases of the face of two diverse types of mammals have wildlife biologist baffled and concerned around the world. First, there is the case of DFTD, or devil facial tumor disease, which has so devastated the population of Tasmanian devils, that their native population has dropped by about 60%. The disease is transmitted by biting, a very common occurrence among these, the largest, highly aggressive, extant, marsupial carnivores. With no genetic tests, vaccines or viable treatments current models predict that the Tasmanian devil will be extinct by 2060.

Studies have shown that the tumor cells themselves are the direct agents of transmission[4]. Affected animals usually die within months of being bitten because the tumors impair the animals' abilities to feed. In a report in *Science*, the authors have examined this transmission hypothesis by genotyping tumor-host pairs from diseased animals.

In Europe, a fungal disease in bats that has "devastated bat colonies" in the northeastern US, has been indentified[5]. The fungus has been found in otherwise healthy bats. In North America the fungus affecting bats is deadly, but in the European populations the bats seem to coexist with it with no deleterious effects. Called the "white-nose syndrome" and first discovered in a cave in upstate New York, this fungus grows over the nose and face of affected bats and causes them to leave hibernation too early, to loose body fat and eventually starve.

The fungus is known as *Geomyces destructans* and has been reported in bats from three countries in Europe, but so far no deaths have been reported. Scientists are looking for the reasons why the disease is so devastating in the North American bat species, but seemingly benign in the European species. Additionally, European bat populations do not show the levels of infection seen in North America. Researchers want to know where the disease originated and what genetic factors, either in the fungus or in the different bat species, causes the observed differences in disease and death. Meanwhile, the once massive bat colonies in New York have been declining significantly and it is hoped the good news from Europe will lead to a form of prevention.

1. "Chemistry: Pass the Salt", *Science*, p. 127, v. 327, 8 January 2010, from an article published in *Water Research* in 2009.
2. "Evolution: Sulfate Supplier", p. 127, *Science*, v. 327, 8 January 2010, reporting on an article published in the *Proceedings of the National Academy of Science* in 2009
3. "Climate Science: Slow Roast", p. 127, *Science*, v. 327, 8 January 2010, from an article published in the *Proceedings of the National Academy of Science* in 2009
4. Murchinson, et al, "The Tasmanian Devil Transcriptome Reveals Schwann Cell Origins of a Clonally Transmissible Cancer", *Science*, p. 84-87, v. 327, 1 January 2010.
5. 2. Stokstad, Eric, "Ecology: Europe's Bats Resist Fungal Scourge of North America", *Science*, p. 132, v. 327, 8 January 2010

The Beagle Society offers an opportunity to be a part of community of individuals with an abiding interest in all the sciences.

For an annual membership fee of $25.00 per person or $40.00 per household, members will be able to participate in events, presentations, lectures, workshops, trips and other, unique experiences. Through the Beagle Society, members can further their interests and satisfy their curiosities in everything from Astronomy to Zoology.

Bimonthly meetings are held on the third Monday at 7:00 PM in January, March, May, July, September, and November. Each meeting focuses on a different science-related subject. Other events, including field trips, are scheduled throughout the year.