

The Objective View

Newsletter of the Northern Colorado Astronomical Society

June 2007

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Chamberlin Observatory Open House, dusk to 10 pm

Jun 23, Jul 21, Aug 18, Sep 22, Oct 20, Nov 17 303 871
5172 <http://www.du.edu/~rstencil/Chamberlin/>

Longmont Astronomical Society June 14 7 pm

FRCC, 2121 Miller Rd <http://longmontastro.org/>

May 3 Program

Astrobiology: Implications for Science and Religion

Bruce M. Jakosky, Ph.D., University of Colorado

All of us are interested in looking for life. Why do we care? For one reason, science and religion seem to be at odds. Negative comments are directed both ways. Should science and religion interact with each other? Taking a historical perspective, a battlefield can be seen. Should they be separate but equally respected spheres? Can they be integrated in a whole. Bruce selected Newton's Law of Gravity, Darwin's evolution, and quantum physics for review. Science is modeled on the Copernican Revolution. Conclusions are drawn from observations. Galileo found further support that Venus circled the Sun, and imperfections were seen in the heavens as sunspots and lunar craters. Newton explained planetary motion with an underlying force. He was soon vindicated with Halley's Comet, returning as predicted. A mechanistic view of the Universe developed. God's hand was not intervening day by day, but was responsible for setting all in motion. The history of astronomy is the best example of how science works. Models are developed and tested with observations. Refinement is expected. Darwin's finches on the Galapagos spurred his contribution on biological evolution. Variation occurs within a population's traits, and the best traits for the environment are favored. The time required for this favored proponents of a very old Earth. There was also a loss of distinction between humans and the animals. Mutation, climate changes, and competition for resources shaped populations. Humans became the consequence of random events over 4 billion years. The role for God in the modern world was questioned. As the mechanistic view prevailed, the behavior of elementary particles was developing. Contrary to Einstein's reaction, Heisenberg's Uncertainty Principle demonstrated that physics at that level needed statistical treatment. It was not deterministic. Theologians have responded with new understanding for God's role. St. Augustine saw a separation between the City of Man and the City of God. The dividing line brought its own problems, as progress in science produced a "God of the Gaps." God was invoked when knowledge was incomplete. Thomas Aquinas wrote of a world of God and Man. Pope John Paul II wrote that there can never truly be a divergence between faith and reason. Philosophy can take a wrong turn and fall into error. As Bruce went into considerations of astrobiologists, he asked, is science a religion? There are constraints: conservation of energy, conservation of momentum, physical constants, geological uniformitarianism. It is supposed to be testable and self-correcting. It does not rely on revealed truth. There is a stereotype of some religious as dogmatic and rigid. However,

Next Meeting: June 7 7:30 PM

Solar Eclipses

Richard Dietz, University of Northern Colorado

Discovery Science Center

703 E Prospect Ave, Fort Collins

Club business at 7:15 pm

Meeting directions:

In Fort Collins, from the intersection of College Ave and Prospect Rd, head East about 1/2 mile. See the Discovery Center sign to the South. From I-25, take Exit 268, West to Lemay Ave, continue West 1/2 mile, see Discovery Science Center on the left.

NCAS Programs

July 5 Craig DeForest, SWRI Developments, Solar Physics

Rocky Mountain National Park Starwatch

Dates for 2007 are June 15 & 22; July 6 & 20; Aug 3 & 17.

Site is the end of the Upper Beaver Meadows Road.

Other Events

Little Thompson Observatory Star Night

June 15 7:30 pm Race to the Moon, Suzanne Traub-Metlay

<http://www.starkids.org>

CSU Madison Macdonald Observatory Public Nights

On East Drive, north of Pitkin Street

Tuesdays 8 pm if clear, when class is in session

Cheyenne Astronomical Society, Cheyenne Botanical Garden

June 15 9 pm Herschel 400, Marv Schutz

<http://home.bresnan.net/%7Ecurranm/index.html>

the scientists can be hard to pry from a favorite hypothesis. For Calvin, religion is derived from scripture, but there is analysis and interpretation. Science is a human endeavor. It has its own set of dogma. "Goodness of fit" is a value judgement. It is based on observing how the world works. Exciting discoveries have occurred in the past 30 years. We still only have one proven example of life in the universe. Requirements are liquid water, access to biogenic elements, and a source of energy to drive chemical disequilibrium. Would silicon work? It is 1000x more abundant than carbon, and life chooses carbon. Life arose quickly in geologic terms. Conditions allowing life can be harsh. Grand Prismatic Spring in Yellowstone hosts bacteria in its boiling water. They "freeze" at room temperature. Organisms deep below Earth's surface derive energy from chemical reactions. They may have relatives on other planets. Mars, our next planet out, seems too cold on the surface for liquid water now. Numerous features point to water in the past. Water's signature is seen in Opportunity images of blueberries on the surface, and impressions from dissolved crystals. So the idea that Mars has life is not a stupid one. Jupiter's moon Europa probably has a global ocean, so is another candidate. There are 200 planets outside our solar system. Recently a potentially habitable planet was reported. The numerous hot Jupiters are not good candidates, just too hot. We are hobbled by the fact that we don't know what life is. We are not helped much by Mark Twain's observation that life is "One damned thing after another." Life has order at the molecular level, takes in nutrients, gives off waste products, utilizes energy, grows and develops, has biochemical reactions, responds to the environment, and adapts to the environment. Exceptions can be found to some of these. Borrowing Potter Stewart's words from his Supreme Court opinion, we know it when we see it. Bruce showed a sigmoid curve with his sliding scale definition of life, showing increasing consensus with an increase in number of life characteristics possessed. As the case for defining a planet, nature has a continuum and a definition will be arbitrary. Do we live in an anthropic universe? We can list parameters which if changed would not allow H fusion, planet formation, This has been addressed by the multiverse hypothesis. It posits the possibility that we grew in the way our Universe dictates, and we are not developing in one of the many other discontinuous Universes unsuited to us. Is evolution of life on Earth consistent with Christian theology? Is 4 billion years a long time? To Bruce, God should be considered outside time. Are multiple Redeemers like Jesus required for other worlds? Not every answer is in. Kenneth Miller of Brown University stated: Science cannot assign meaning or purpose. Human tendencies must transform science to give us a reason to care. We must prefer the light of knowledge to the darkness of ignorance.

Bruce M. Jakosky is Professor of Geological Sciences at the University of Colorado, and is Director of the Center for Astrobiology. He is a Faculty Research Associate at the Laboratory for Atmospheric and Space Physics. His most recent book is *Science, Society and the Search for Life in the Universe* published by the University of Arizona Press, 2006.

NCAS Business, May 3 2007

President Nate Perkins called the meeting to order. The meeting schedule and observing nights were announced. Space Night for Kruse Elementary is May 17. Steve Little reported groundbreaking in June of the memorial observatory at Estes Park High School. They have received several telescope donations.

From Andrea Schweitzer

The American Institute of Physics Bulletin of Science Policy News Number 47: May 9, 2007

Web Version:

<http://www.aip.org/fyi/2007/047.html>><http://www.aip.org/fyi/2007/047.html>

Concerns Voiced Over Future of Space Science Programs

"It is both 'the best of times and the worst of times' for NASA's space science programs. We have witnessed a whole series of exciting events in recent months.... The bad news is that while those accomplishments were enabled by the nation's past investments in NASA's science activities, the outlook for the needed future investments is not good if present trends are any indication." - House S&T Space and Aeronautics Subcommittee Chair Mark Udall (D-CO)

The dichotomy between the plethora of exciting scientific results today and a possible dearth of results in the future, if current budget trends continue, was the subject of a May 2 hearing of the House S&T Subcommittee on Space and Aeronautics. Scientists representing several space science disciplines warned that NASA's FY 2008 budget request and future funding plans will be detrimental to its science programs. They particularly decried cuts to Research and Analysis (R&A) funding and to suborbital, small- and medium-sized science missions that provide a career path for young investigators. The hearing, which focused on space science programs within NASA's Science Mission Directorate (SMD), also highlighted concerns over the increasing costs of access to space, the upcoming elimination of an important launch vehicle for smaller missions, poor historical estimates of mission costs, and the burden of oversight and risk reduction. Life and microgravity science programs were not discussed, nor was earth science, which will be the topic of a forthcoming subcommittee hearing.

RELEASE: 07-102: NASA'S CHANDRA SEES BRIGHTEST SUPERNOVA EVER

WASHINGTON - The brightest stellar explosion ever recorded may be a long-sought new type of supernova, according to observations by NASA's Chandra X-ray Observatory and ground-based optical telescopes. This discovery indicates that violent explosions of extremely massive stars were relatively common in the early universe,

and that a similar explosion may be ready to go off in our own galaxy.

"This was a truly monstrous explosion, a hundred times more energetic than a typical supernova," said Nathan Smith of the University of California at Berkeley, who led a team of astronomers from California and the University of Texas in Austin. "That means the star that exploded might have been as massive as a star can get, about 150 times that of our sun. We've never seen that before."

From: NASA News <hqnews@mediaservices.nasa.gov>, by way of Harley Thronson:

RELEASE: 07-118: MARS ROVER SPIRIT UNEARTHES SURPRISE EVIDENCE OF WETTER PAST

PASADENA, Calif. - A patch of Martian soil analyzed by NASA's rover Spirit is so rich in silica that it may provide some of the strongest evidence yet that ancient Mars was much wetter than it is now. The processes that could have produced such a concentrated deposit of silica require the presence of water.

Members of the rover science team heard from a colleague during a recent teleconference that the alpha particle X-ray spectrometer, a chemical analyzer at the end of Spirit's arm, had measured a composition of about 90 percent pure silica for this soil.

"You could hear people gasp in astonishment," said Steve Squyres of Cornell University, Ithaca, N.Y., principal investigator for the Mars rovers' science instruments. "This is a remarkable discovery. And the fact that we found something this new and different after nearly 1,200 days on Mars makes it even more remarkable. It makes you wonder what else is still out there."

Spirit's miniature thermal emission spectrometer observed the patch, and Steve Ruff of Arizona State University, Tempe, noticed that its spectrum showed a high silica content. The team has laid out plans for further study of the soil patch and surrounding deposits.

Exploring a low range of hills inside a Connecticut-sized basin named Gusev Crater, Spirit had previously found other indicators of long-ago water at the site, such as patches of water-bearing, sulfur-rich soil; alteration of minerals; and evidence of explosive volcanism.

"This is some of the best evidence Spirit has found for water at Gusev," said Albert Yen, a geochemist at NASA's Jet Propulsion Laboratory, Pasadena, Calif. One possible origin for the silica could have been interaction of soil with acid vapors produced by volcanic activity in the presence of water. Another could have been from water in a hot spring

environment. The latest discovery adds compelling new evidence for ancient conditions that might have been favorable for life, according to members of the rover science team.

David Des Marais, an astrobiologist at NASA's Ames Research Center, Moffett Field, Calif., said, "What's so exciting is that this could tell us about environments that have similarities to places on Earth that are clement for organisms."

Spirit and its twin rover Opportunity completed their original three-month prime missions in April 2004. Both are still operating, though showing signs of age. One of Spirit's six wheels no longer rotates, so it leaves a deep track as it drags through soil. That churning has exposed several patches of bright soil, leading to some of Spirit's biggest discoveries at Gusev, including this recent discovery.

Doug McCuistion, director of NASA's Mars Exploration Program, said, "This unexpected new discovery is a reminder that Spirit and Opportunity are still doing cutting-edge exploration more than three years into their extended missions. It also reinforces the fact that significant amounts of water were present in Mars' past, which continues to spur the hope that we can show that Mars was once habitable and possibly supported life."

The newly discovered patch of soil has been given the informal name "Gertrude Weise," after a player in the All-American Girls Professional Baseball League, according to Ray Arvidson of Washington University in St. Louis, deputy principal investigator for the rovers.

Best Looks

Moon By Antares + Jupiter 6/27, 28; By Mars 6/10
By Venus and Saturn 6/18
Occults Regulus 6/19 in daylight 18:08-19:15 MDT
Mercury Low in WNW at dusk first week of month
Venus Brilliant in W at dusk. Converges with Saturn
Mars Low in SE at sunrise
Vesta Mag 5.5 in Ophiuchus
Jupiter Low in S middle of the night
Saturn High in W in evening. 0.7 deg from Venus 6/30
Uranus In SE predawn
Neptune In S predawn

From: Daniel Laszlo
2001 S Shields St Building H
Fort Collins CO 80526

TO:

Check for updated predictions after the STS Launch scheduled this month

Date	Mag	Starts			Max. Altitude			Ends		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
05 Jun	0.1	21:56:42	10	WSW	21:59:32	50	NNW	22:02:18	10	NE
05 Jun	2.8	23:33:36	10	NW	23:35:00	13	NNW	23:36:23	10	NNE
06 Jun	1.7	02:44:22	10	NNW	02:46:45	23	NNE	02:49:07	10	E
06 Jun	-0.4	04:19:05	10	WNW	04:21:51	38	SW	04:24:29	10	SSE
06 Jun	1.9	22:18:01	10	W	22:20:21	22	NNW	22:22:41	10	NNE
07 Jun	2.7	01:30:38	10	NNW	01:32:05	13	NNE	01:33:34	10	NE
07 Jun	-0.2	03:04:45	10	NW	03:07:31	54	NNE	03:10:23	10	ESE
07 Jun	-0.1	21:03:05	10	WSW	21:05:55	57	NNW	21:08:43	10	NE
07 Jun	2.7	22:39:50	10	NW	22:41:20	13	NNW	22:42:51	10	NNE
08 Jun	2.2	01:50:48	10	NNW	01:51:46	16	NNW	01:51:46	16	NNW
08 Jun	1.8	21:24:17	10	W	21:26:40	23	NNW	21:29:05	10	NNE
09 Jun	2.6	00:37:04	10	NNW	00:38:25	12	NNE	00:39:06	12	NNE
09 Jun	2.6	21:46:00	10	NW	21:47:36	14	NNW	21:49:13	10	NNE
10 Jun	2.4	00:57:09	10	NNW	00:58:01	15	NNW	00:58:01	15	NNW
10 Jun	2.9	22:08:16	10	NNW	22:08:39	10	N	22:09:02	10	N
10 Jun	2.6	23:43:25	10	NNW	23:44:38	12	NNE	23:45:50	10	NE
12 Jun	2.0	00:03:26	10	NNW	00:05:06	18	N	00:05:06	18	N
12 Jun	2.7	21:14:12	10	NNW	21:14:47	10	N	21:15:21	10	N
12 Jun	2.5	22:49:41	10	N	22:50:45	11	NNE	22:51:50	10	NE
13 Jun	2.2	00:23:37	10	NW	00:24:19	15	NW	00:24:19	15	NW
13 Jun	1.8	23:09:39	10	NNW	23:11:41	17	NNE	23:12:22	16	NE
14 Jun	2.4	21:55:54	10	N	21:56:49	11	N	21:57:43	10	NNE
14 Jun	1.2	23:29:46	10	NW	23:31:39	28	N	23:31:39	28	N

Check passes at: <http://www.heavens-above.com/main.aspx?Loc=Fort+Collins&Lat=40.585&Lng=-105.084&Alt=1525&TZ=MST>