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Roger Hill, Editor

April was a most enjoyable month...from Easter to a Geekend at Gary Colwells to the courses at Discovery Landing, and even some observing at the Observatory! Oh, and the warmer weather continued, which meant that I got my first sunburn of the summer!

Fist off, though...the workshops at Discovery Landing. I've been enjoying myself at them, and after a break for Easter, we did the final two. It's the third one that is my particular favourite. You see, it's much more about the universe around us. It starts with a PowerPoint presentation I got from David Chapman in Halifax, and which I've modified a bit. It's entitled "How High is UP?" and it's a quick trip through the history of figuring out how give the universe is. It starts off with Eratosthenes figuring out the size of the Earth, and ends up with the Hubble constant and an expanding universe. There are lots of questions, and frequent digressions off-topic, and it's a lot of fun. After that, we hand out a basic Planisphere and show people how to use it.

What's good about the Planisphere presentation is that we go through the process of trying to find things with it. Each of about a dozen objects are represented by a little red circle, and I have an image on the screen showing the object, and I deliberately chose dates and times when the object would be high in the south about an hour after sunset in the summer, or 7pm in the winter. Up until this time, the students have been shown all kinds of pictures of all sorts of objects, and hopefully by this time they have had their appetite whetted to go out and find them.

The final night is dedicated to telescopes. During the first series, we put together GalileoScopes, which are a nice souvenir of the IYA in 2009, but not much else. This time, we were able to get hold of some Celestron FirstScopes, which are much better that the 50mm refractors. The great thing about them was that they were already assembled. I had hoped to go through some do's and don'ts prior to them opening up the scopes, but that was not to be. As soon as they got them, the boxes were opened.

With the help of several brave volunteers (Thanks to Ed Mizzi, Ev Rillett, Mark Pickett and Bob Botts), we got going. Mostly, it was just simple instructions like take the telescope outside, don't look at the Sun, be prepared, dress appropriately, etc.

Some people brought their own telescopes out, and one fellow was having a heckuva time with his. He was using every tube in his collection, so he had a Barlow, an erecting tube, a diagonal and a 4mm eyepiece. I think the scope was a 4" F/10, which would have produced somewhere over 600x. He was trying to look through a glass window and getting nowhere. I got him to put in the H20mm eyepiece instead of the H4mm, and got rid of all the other stuff. There was enough visible now that the telescope looked promising. I asked if he could hang around for a while as we helped others, and he said he could. Alas, when the evening was done, he was nowhere to be found. This was a shame as I wanted to go to my car and get a better eyepiece than the Huygens he was using. I keep a 26mm Plossl and a 22mm Koenig with me, which were in the car at the time.

Perhaps he'll show up at a meeting, or during one of the Sidewalk Astronomy events in the summer. I hope so.

I also had a chance to go to Gary Colwells cottage for a weekend. In fact, right after the 3rd workshop, Ev and I drove up, arriving at 2am. It rained for a few minutes on the way, but there were large patches of surprisingly dark sky, particularly after we left the 401 at Trenton. One of the delights of Farm Lake is that the neighbours get together frequently, but this weekend was a special one: it was Pot Luck Breakfast time. I took up a large slab of peameal bacon and roasted it whole in the oven for over an hour. When it came out, it was tender and moist and incredibly flavourful. I've wrapped these roasts in foil before and cooked them on the BBQ, but this was the first time I've done it in an oven. Delicious! There was some other stuff there, too. There was fruit galore, sausages, and pancakes, along with fresh maple syrup from this years sap. One of my favourites though was home made maple baked beans, done in a casserole, and topped with thick slices of smoky bacon. There are some real nice folks up there, and we were lucky to meet more than a few of them.

The main task of the weekend was to install the new Meade 14" RCX scope on it's pier and inside the SkyPod. However, there was a problem with the scope so it was sent home to California to recuperate. In the meantime, Andy Blanchards 10" scope was going in it's place. Gary Bennett and Dave Yates did the electrical work, and they wanted me to do the polar aligning once it got dark.

So, in the bright April sunshine, I installed my scope on a brand new pier that Gary had put in for me. It was a little rough on top, so I used an old CD as a washer (worked perfectly). My home made wedge fit on it perfectly, and it didn't take long to get the scope balanced, the wires run and the computer all set up. I had my 300mm F/4 SMC Takumar with me, and I was really looking forward to using it under the lovely dark skies of eastern Ontario. In fact, I'd even brought two Canon DSLRs with me!

Around 4pm, it was becoming obvious that there was a very good possibility of clouds overnight, although we still held out hopes for a clearing about 10pm, or so. By the time supper came along, it was completely overcast. It didn't stop us from enjoying some rather wondrous steaks, though.

Sunday morning, we packed up, and Ev and I decided we'd head back home via Bancroft. Well, it was a bit out of the way, but she's a rock hound and I like hunting for minerals, too. We went to the York River, and hiked downstream to the Egan Chute (http://www.start.ca/users/mharris/waterfalls/egan-chute.html) - see the back page. After that, it was into Bancroft for lunch, and then off to the CN Rock dump, where I got some nice sized rocks for my rock garden...including a couple with some sodalite in them.

On the way home, we stopped at an open pit mine where hematite (a very rich iron ore) was taken out of the ground from 1950 to 1977. The pit has to be over 500 metres long, and at least half that wide. The colour of the water now slowly filling the pit is an incredible, almost Caribbean, blue.

All in all, it was a good weekend, despite the lack of stargazing.

Clear skies, one and all,

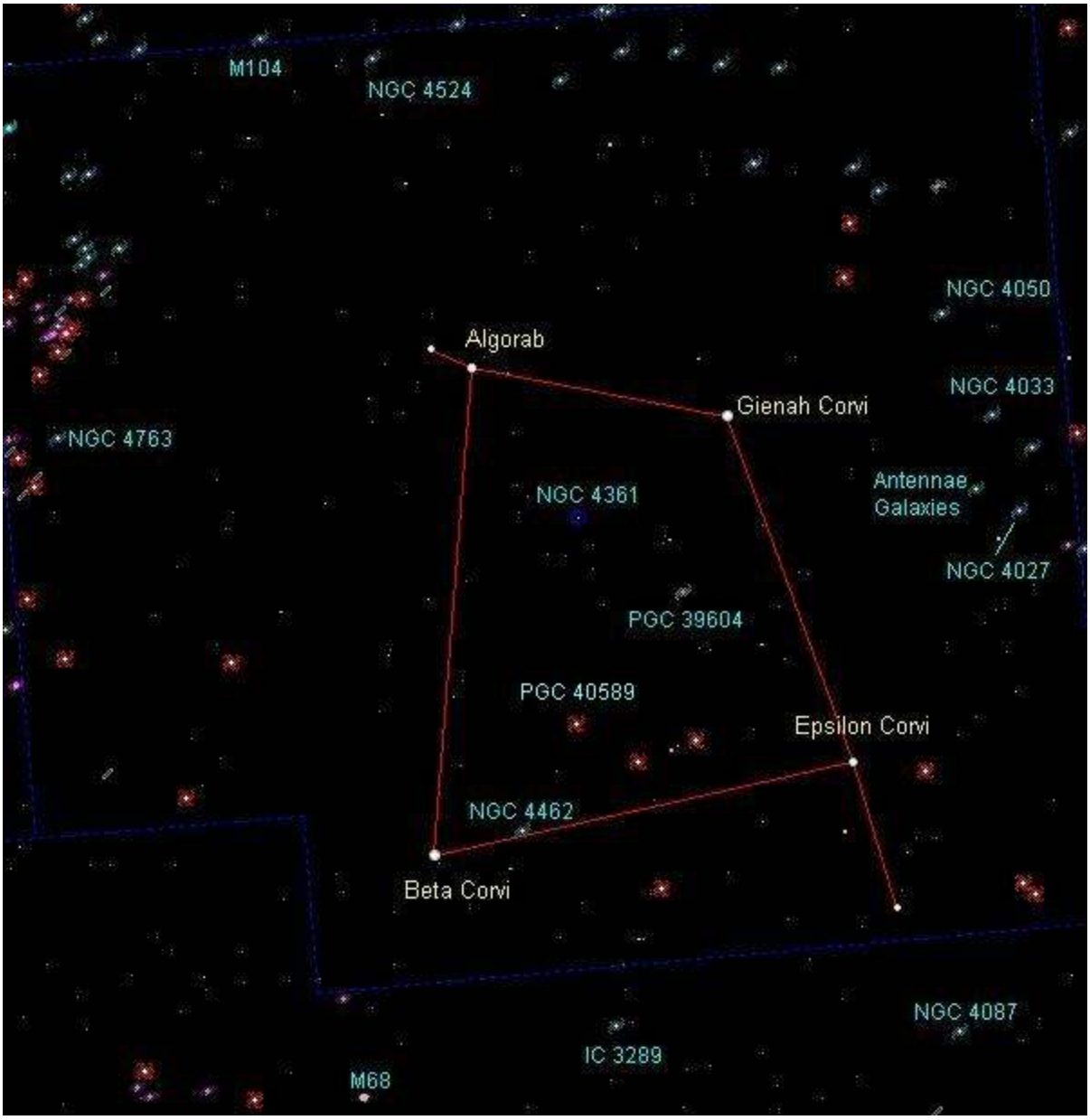
Roger Hill
Orbit editor and President.

The Sky This Month - May 2010 By Gary Boyle, Ottawa

Corvus The Crow

Spring is a wonderful time of year for many reasons. There is the annual planting of flowers, reseeding the lawn or even painting the house or apartment. It is also known in the astronomy community as galaxy season. With semi dark skies, these distant islands containing hundred of billions of stars each, stretch all the way from Ursa Major (the Big Dipper) in the north, down through Coma Berenices, ending at Virgo in the south. If hunting galaxies is your passion, you have come to the right place. Hundreds of objects stretch across ninety degrees of sky.

Just off to the right of Virgo in the south and above Hydra, is a small trapezoid of four suns, shining at roughly third magnitude each. Here we find Corvus the Crow or Raven. It too has its fair share of galaxies embedded within its territory. But first, lets first a look at a couple of individual stars.



The top left star of the trapezoid is called Algorab. Designated as the bird's right wing, Algorab is only 88 light years away. It is a double star consisting of a third magnitude white B class star and a magnitude 8.5 orange K class star. They separation is 600 astronomical units or seven and a half of our solar systems lined up side by side. As a result, the K star orbits once every 9,000 years or so.

Turning to the raven's left wing, we come across Gienah Corvi. It is a blue giant star with a surface temperature of 12,400 degrees Celsius or a bit more than twice that of our Sun. It lies 166 light years from us and spins 150 kilometers per second on its axis compared to the Sun's two kilometers per second. When referring to this star, be sure not to confuse it with Gienah in Cygni.

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Located within the trapezoid is the only planetary nebula residing in Corvus. NGC 4361 appears as a fuzzy, tail less comet in small scopes. Its overall magnitude of 10.3 is accented by the 13th magnitude central star that is now entering the white dwarf phase. This, as well as all planetary nebulas are the remains of a once great sun that has used up its fuel.

The first of four interesting objects is NGC 4027. Also catalogued as ARP 22, this peculiar face on barred spiral galaxy is located 68 million light years away or when dinosaurs were probably still roaming the Earth. Its distorted single arm is probably the result of a collision with another galaxy a long time ago.

Speaking about collisions, make sure you look for the Antennae galaxies. They are listed as NGC 4038 and 4039 and are located three and a half degrees west and south of Gienah. This is one of the best examples of colliding galaxies. They might seem to be unique but there are many examples of this cosmic interaction throughout the universe. Another fine example is The Mice.

In the case of the Antennae, as the two galaxies blend together, the stretched and distorted galactic arms formed a likeness to a bug's antennae. When the fire works are over, astronomers believe the two galaxies will eventually form one large elliptical galaxy. NGC 4038/4039 lies roughly 55 million light years away.

Before you leave the area, there is a classic example of an edge on galaxy. Although it is technically not in Corvus by is a mere five arc minutes from the border line separating Corvus and Virgo, we have M104. Known as the Sombrero Galaxy, this gem is some 30 million light years from us.

The planet Mars is shrinking visually in size. It is about half the size from February. With our two worlds still separating in distance and its angle to the Sun shifting a bit, the Red Planet is taking on a more gibbous phase and dimming as the weeks go by.

Saturn is well placed in the constellation Virgo as the sky darkens. It is still in retrograde till May 31st and continues to move westward with the stars. Next month it then resumes its eastward motion. Because Saturn's rings are still aimed at Earth, the tilt of the ring system is a thin 1.7 degrees. As the months and years trek on, the rings will eventually open to all its grandeur.

Object	Type	Magnitude	Coordinates	
M104	Galaxy	8.3	RA:12h 40m 0.0s	Dec:-11d 37'
NGC 4027	Galaxy	11.1	RA:11h 59m 30.0s	Dec:-19d 16'
NGC 4361	Galaxy	10.3	RA:12h 24m 30.0s	Dec:-18d 48'
Antennae Galaxies		10.4	RA:12h 0m 54.0s	Dec:-18d 52'

Only a couple of months ago we said farewell to the planet Jupiter. Well the King of Planets is back and now in the constellation Pisces. It rises about 5:00 a.m. local time at the beginning of the month low in eastern skies.

On May 16th, look for the 10% crescent moon very close to M35. This pair would make a very nice portrait. Then five nights later, Venus swings to the north M35 for another Kodak moment. New moon occurs on the 13th and full phase on the 27th.

Till next month, clear skies everyone.

On 26 April 2010, the ESO Council selected Cerro Armazones as the baseline site for the planned 42-metre European Extremely Large Telescope (E-ELT). Cerro Armazones is a mountain at an altitude of 3060 metres in the central part of Chile's Atacama Desert, some 130 kilometres south of the town of Antofagasta and about 20 kilometres from Cerro Paranal, home of ESO's Very Large Telescope.

"*This is an important milestone that allows us to finalise the baseline design of this very ambitious project, which will vastly advance astronomical knowledge,"* says Tim de Zeeuw, ESO's Director General. *"I thank the site selection team for the tremendous work they have done over the past few years.*"

ESO's next step is to build a European extremely large optical/infrared telescope (E-ELT) with a primary mirror 42 metres in diameter. The E-ELT will be "the world's biggest eye on the sky" — the only such telescope in the world. ESO is drawing up detailed construction plans together with the community. The E-ELT will address many of the most pressing unsolved questions in astronomy, and may, eventually, revolutionise our perception of the Universe, much as Galileo's telescope did 400 years ago. The final go-ahead for construction is expected at the end of 2010, with the start of operations planned for 2018.

The decision on the E-ELT site was taken by the ESO Council, which is the governing body of the Organisation composed of representatives of ESO's fourteen Member States, and is based on an extensive comparative meteorological investigation, which lasted several years. The majority of the data collected during the site selection campaigns will be made public in the course of the year 2010.

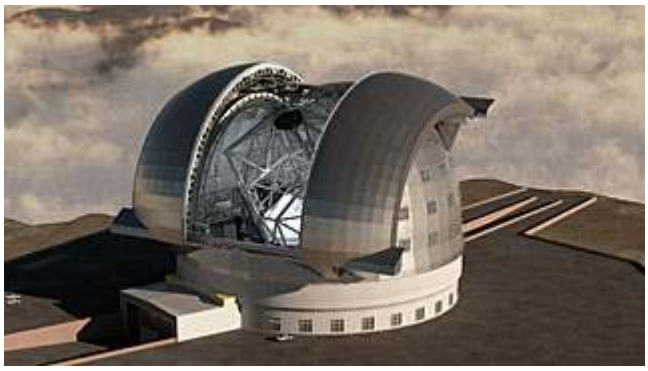
Various factors needed to be considered in the site selection process. Obviously the "astronomical quality" of the atmosphere, for instance, the number of clear nights, the amount of water vapour, and the "stability" of the atmosphere (also known as seeing) played a crucial role. But other parameters had to be taken into account as well, such as the costs of construction and operations, and the operational and scientific synergy with other major facilities (VLT/VLTI, VISTA, VST, ALMA and SKA etc).

In March 2010, the ESO Council was provided with a preliminary report with the main conclusions from the E-ELT Site Selection Advisory Committee [1]. These conclusions confirmed that all the sites examined in the final shortlist (Armazones, Ventarrones, Tolonchar and Vizcachas in Chile, and La Palma in Spain) have very good conditions for astronomical observing, each one with its particular strengths. The technical report concluded that Cerro Armazones, near Paranal, stands out as the clearly preferred site, because it has the best balance of sky quality for all the factors considered and can be operated in an integrated fashion with ESO's Paranal Observatory. Cerro Armazones and Paranal share the same ideal conditions for astronomical observations. In particular, over 320 nights are clear per year.

Taking into account the very clear recommendation of the Site Selection Advisory Committee and all other relevant aspects, especially the scientific quality of the site, Council has now endorsed the choice of Cerro Armazones as the E-ELT baseline site.

"*Adding the transformational scientific capabilities of the E-ELT to the already tremendously powerful integrated VLT observatory guarantees the long-term future of Paranal as the most advanced optical/infrared observatory in the world and further strengthens ESO's position as the world-leading organisation for ground-based astronomy,*" says de Zeeuw.

In anticipation of the choice of Cerro Armazones as the future site of the E-ELT and to facilitate and support the project, the Chilean Government has agreed to donate to ESO a substantial tract of land contiguous to ESO's Paranal property and containing Armazones in order to ensure the continued protection of the site against all adverse influences, in particular light pollution and mining activities.



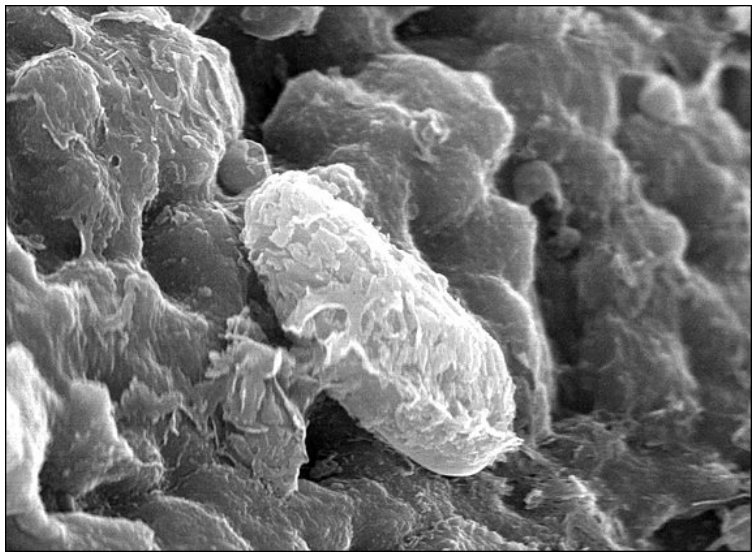
A new architectural concept drawing of ESO's planned European Extremely Large Telescope (E-ELT) shows the telescope at work, with its dome open and its record-setting 42-metre primary mirror pointed to the sky. In this illustration, clouds float over the valley overlooked by the E-ELT's summit. The comparatively tiny pickup truck parked at the base of the E-ELT helps to give a sense of the scale of this massive telescope. The E-ELT dome will be similar in size to a football stadium, with a diameter at its base of order 100 m and a height of order 80 m.

Scheduled to begin operations in 2018, the E-ELT will help track down Earth-like planets around other stars in the "habitable zones" where life could exist — one of the Holy Grails of modern observational astronomy. The E-ELT will also make fundamental contributions to cosmology by measuring the properties of the first stars and galaxies and probing the nature of dark matter and dark energy.

Europe is at the forefront of all areas of contemporary astronomy, thanks, in particular, to the flagship ground-based facilities operated by ESO, the pre-eminent intergovernmental science and technology organisation in astronomy. The challenge is to consolidate and strengthen this position for the future. This will be achieved with a revolutionary new ground-based telescope concept, the European Extremely Large Telescope (E-ELT). A majestic 42 metres in diameter, it will be the world's biggest eye on the sky.
The telescope has an innovative five-mirror design that includes advanced adaptive optics to correct for the turbulent atmosphere, giving exceptional image quality. The main mirror will consist of almost 1000 hexagonal segments, each 1.4 metres across. The gain is substantial: the E-ELT will gather 15 times more light than the largest optical telescopes operating today.
The basic reference design for the European Extremely Large Telescope was completed in 2006. The project is currently in a detailed design phase during which critical components are being prototyped. During this phase, the project placed contracts with industry and institutes in Europe amounting to about 60 million Euros. In addition to these design activities, more than 30 European scientific institutes and high-tech companies studied the technological aspects of large telescopes within the EU Framework Programmes 6 and 7, partially funded by the European Commission. Ten studies for instruments and adaptive optics systems have also been completed during this phase, allowing the project to build a most competitive instrumentation plan for the first decade.
The construction phase is planned to start in 2011. The construction cost is estimated to be close to a billion Euros. The E-ELT is a high technology, highly prestigious science-driven project that incorporates many innovative developments, offering numerous possibilities for technology spin-off and transfer, together with challenging technology contract opportunities and providing a dramatic showcase for European industry.
The E-ELT has already gained wide support in the European scientific community. It is the only visible-light astronomy project selected in the roadmap of the European Strategy Forum on Research Infrastructures. It also features as the top priority in ground-based astronomy in the *ASTRONET European Science Vision and Infrastructure Roadmap for Astronomy*.
With the start of operations planned for 2018, the E-ELT will address many of the most pressing unsolved questions in astronomy. It may, eventually, revolutionise our perception of the Universe, much as Galileo's telescope did, 400 years ago.

NASA team cites new evidence that meteorites from Mars contain ancient fossils

By Marc Kaufman
Washington Post Staff Writer



LEAGUE CITY, TEX. -- NASA's Mars Meteorite Research Team reopened a 14-year-old controversy on extraterrestrial life last week, reaffirming and offering support for its widely challenged assertion that a 4-billion-year-old meteorite that landed thousands of years ago on Antarctica shows evidence of microscopic life on Mars.

In addition to presenting research that they said disproved some of their critics, the scientists reported that additional Martian meteorites appear to house distinct and identifiable microbial fossils that point even more strongly to the existence of life.

"We feel more confident than ever that Mars probably once was, and maybe still is, home to life," team leader David McKay said at a NASA-sponsored conference on astrobiology.

The researchers' presentations were not met with any of the excited frenzy that greeted the original 1996 announcement about the meteorite -- which led to a televised statement by President Bill Clinton in which he announced a "space summit," the formation of a commission to examine its implications and the birth of a NASA-funded astrobiology program.

Fourteen years of relentless criticism have turned many scientists against the McKay results, and the Mars meteorite "discovery" has remained an unresolved and somewhat awkward issue. This has continued even though the team's central finding -- that Mars once had living creatures -- has gained broad acceptance among the biologists, chemists, geologists, astronomers and other scientists who make up the astrobiology community.

Speaking at a four-day conference near NASA's Johnson Space Center, McKay's team didn't claim it had definitive proof that the meteorites they are studying -- which can be identified as Martian because the gases inside them match the Martian atmosphere -- contain the remains of living organisms. Rather, the researchers described their re-energized confidence as emerging from a process of nitty-gritty science, based on inference, simulated testing and a kind of interplanetary forensics.

McKay cited years of work by team members Kathie Thomas-Keprta and Simon Clemett that he said rebuts a central critique of the meteorite's significance. He also pointed to the presence of what appear to be fossilized microbes in other Martian meteorites, as well as the steady flow of discoveries by others pointing to a Mars that at one time could have supported life -- wet, warmer and enveloped in a potentially protective atmosphere and a magnetic field.

Rebutting the critics

The Thomas-Keprta work, published late last year in the journal Geochemical, centers on the origin of iron-based crystals called magnetites in the original Mars meteorite, called ALH84001. Magnetites on Earth are sometimes created by bacteria that respond to the planet's magnetic field; the McKay team argued that some of the Martian magnetites were of this biologically created type.

Critics had said that the magnetites could have just as easily existed without bacteria or biology -- that they sometimes form as a result of the shock and searing heat that could come, for instance, from an asteroid strike. But in the recent paper, Thomas-Keprta, an expert in the use of electron beam technology to look inside rocks, reported that the purity of the magnetites made that explanation impossible.

Reflecting both the contentiousness and drama of the debate, Thomas-Keprta finished her talk by referring to a recent article in a science journal that said the astrobiology community had "mostly abandoned" the biological explanations for the makeup of ALH84001. Her retort: "As Mark Twain put it, 'Reports of our death have been greatly exaggerated.' "

McKay complained that not enough attention had been paid to work such as Thomas-Keprta's.

"All the criticisms of our original paper got widely distributed, but when we did the work to prove the critics were wrong, it hardly made a ripple," he said at a conference interview. "We're now in a position to say we've knocked down all the criticisms -- and our biological explanation is the one left standing."

Mary Voytek, director of NASA's astrobiology program, praised McKay and his team for their continued research into Mars meteorites, saying they have been crucial to the field.

She said, however, that the astrobiology community as a whole remained unconvinced of their findings, in part because "the bar is so high." She also said it was still not proved that any possible microfossils on the meteorites had come from Mars, rather than forming as contaminants after the meteorites landed on Earth. In addition, all the Martian meteorites consist of hard igneous rock; the more fragile sedimentary rock, which is most likely to contain sign of life, falls apart before reaching Earth.

Strong feelings

Because the stakes involved with any announcement of possible or likely extraterrestrial life are so high -- both for science and for the societal and religious implications of such a discovery -- the issue brings out very strong feelings. At the conference, a leading cautionary voice in astrobiology proposed that a special protocol be established to oversee release of any journal articles making dramatic extraterrestrial claims.

Andrew Steele, of the Carnegie Institution for Science in Washington and once a member of the McKay team, compared the absence of astrobiology review with the formal procedures set up by scientists involved with the search for extraterrestrial life, or SETI.

He said that SETI leaders understood the societal sensitivity of their work and that it was time for researchers in astrobiology "grow up and do the same."

Astrobiology is the relatively new field of science that both searches for and tries to understand life beyond Earth, as well as how life began on Earth. The biennial conference attracted more than 700 microbiologists, chemists, geologists, astronomers, geochemists and other researchers drawn into what might be science's most interdisciplinary field.

Even as scientists debate McKay's assertions, the field has become increasingly optimistic about the possibility of finding remains (or perhaps even samples) of microbial life on Mars. Scores of papers presented during the conference supported the view that the now dry and frigid planet once was warm, wet and seemingly quite habitable.

For instance, NASA planetary scientist Carol Stoker said that NASA's Phoenix lander -- which touched down near the Martian north polar region in 2008 -- found conditions that were harsh but even today suitable for life. Stoker, who was a co-investigator for several instruments on the Phoenix, said that data sent back met predetermined criteria that would indicate that the area could have supported Martian life even in recent times.

Steven Squyres, another top scientist with extensive knowledge of Mars, said that he, too, is convinced that Mars once had conditions that could support life.

The principal investigator for the two NASA rovers, Spirit and Opportunity, that have traveled Mars for the past six years, Squyres said that Mars once had water at or near the surface, now has many minerals that can be formed only in the presence of water and even had springs that once produced hot water and steam.

"These are all things that lead to local habitable niches," he said. "When you have the evidence right there in front of you for habitability, it makes a convincing case that you better go out and see if anyone lived out there."

In a plenary session, in which Squyres solicited the group's views on how the field should move forward, McKay stood up to say that examining possible Martian microfossils should be a much higher priority. He said that the "biomorphs" now being found could answer some of the basic questions about life on Mars and that it could be done at a much lower cost than the multibillion-dollar alternative plan -- sending a rover to Mars to pick up some rock samples and bringing them back to Earth.

"These meteorites are samples from Mars," he said, "and need to be treated as the valuable resource they are."

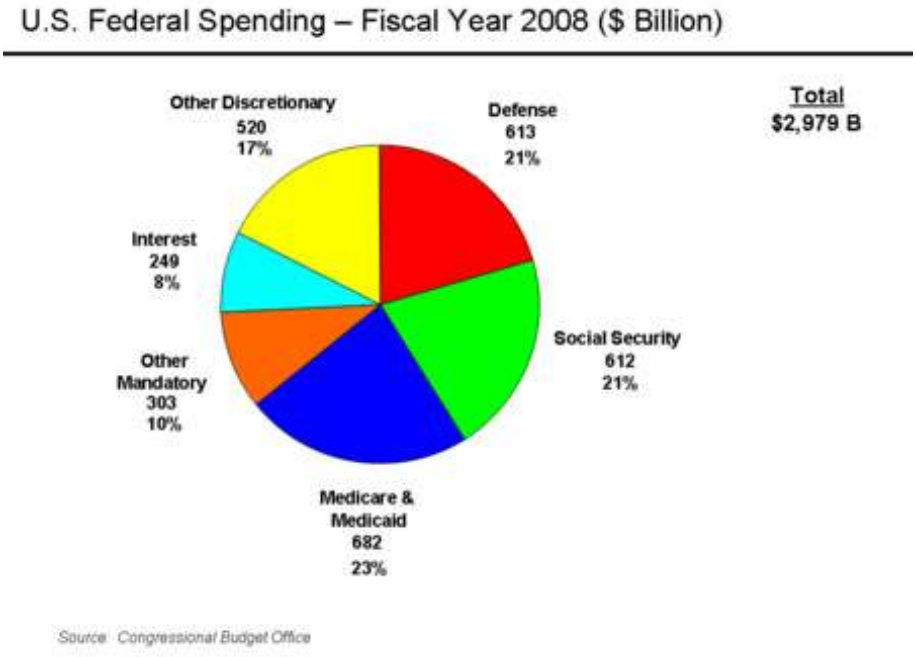
8 Ridiculous Things Bigger Than NASA's Budget Written by Nancy Atkinson

Why do we explore? In the days of Magellan, Columbus and ad Gama, undoubtedly the average person thought it was foolish to risk lives and spend large amounts of money to find out what was beyond the horizon. Those explorers didn't find what they expected, but their explorations changed the world. What drives us to explore and discover is what we don't know, and the spirit of exploration inspires us to create and invent so that we can go explore and possibly change the world. We don't know yet exactly what we'll find if humans ever go to Mars, Europa or beyond, but if we stay in our caves we'll never find out. Similarly, space probes and telescopes like Hubble, as well as ground-based telescopes have helped us explore remotely and have facilitated the discovery of so many things we didn't know — and didn't expect — about our universe.

However, exploration takes money.

The most often-used argument against space exploration is that we should use that money to alleviate problems here on Earth. But that argument fails to realize that NASA doesn't just pack millions of dollar bills into a rocket and blast them into space. The money NASA uses creates jobs, providing an opportunity for some of the world's brightest minds to use their talents to, yes, actually benefit humanity. NASA's exploration spurs inventions that we use everyday, many which save lives and improve the quality of life. Plus, we're expanding our horizons and feeding our curiosity, while learning so, so much and attempting to answer really big questions about ourselves and the cosmos.

NASA's annual budget for fiscal year 2009 is $17.2 billion. The proposed budget for FY 2010 would raise it to about $18.7 billion. That sounds like a lot of money, and it is, but let's put it in perspective. The US annual budget is almost $3 trillion and NASA's cut of the US budget is less than 1%, which isn't big enough to create even a single line on this pie chart.



A few other things to put NASA's budget in perspective:

Former NASA administrator Mike Griffin mentioned recently that US consumers spend more on pizza ($27 billion) than NASA's budget. (Head nod to Ian O'Neill)

Miles O'Brien recently brought it to our attention that the amount of money Bernie Maddof scammed with his Ponzi scheme ($50 billion) is way bigger than NASA's budget.

Americans spend a lot of money on some pretty ridiculous things. Returning to that oft-used phrase about spending the money used in space to solve the problems on Earth, consider this: *

Annually, Americans spend about $88.8 billion on tobacco products and another $97 billion on alcohol. $313 billion is spent each year in America for treatment of tobacco and alcohol related medical problems.

Likewise, people in the US spend about $64 billion on illegal drugs, and $114.2 billion for health-related care of drug use.

Americans also spend $586.5 billion a year on gambling.

It's possible we could give up some other things to help alleviate the problems in our country without having to give up the spirit of exploration.

*the numbers used here are from various years, depending on what was readily available, but range from the years 2000 and 2008.

What you missed last Month!

Aprils General Meeting at Discovery Landing was the first one I've had to miss, but I gather that it was another thoroughly enjoyable night! Colin Haig talked about his recent trip to the Atacama.

So, instead of the usual pictures from the meeting, take a look at some snaps that Ed Mizzi took of the 4th workshop:

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What you Missed pictures by Ed Mizzi. Egan Chute on the York River by Ev Rillett.