Wolbach Library: CfA in the News ~ Week ending 27 September 2009

1. It's behind you!, David Shiga, New Scientist, v203, n2727, p30-33, Saturday, September 26, 2009

2. The Smithsonian's National Air and Space Museum - Event, Washington Daybook, Friday, September 25, 2009

3. NASA's Spitzer Spots Clump of Swirling Planetary Material, National Aeronautics and Space Administration Documents, Wednesday, September 23, 2009

4. A Dynamic Earth Man, Pockley, Peter, Australasian Science, v30, n8, p42, Tuesday, September 1, 2009

5. SCIFEST 09, Imbs, Christine, St. Louis Commerce, n5, p52, Tuesday, September 1, 2009

Record - 1

DIALOG(R)
It's behind you!
David Shiga
New Scientist, v203, n2727, p30-33
Saturday, September 26, 2009

TEXT:
IT LOOKS inconsequential enough, the faint little spot moving leisurely across the sky. The mountain-top telescope that just detected it is taking it very seriously, though. It is an asteroid, one never seen before. Rapid-survey telescopes discover thousands of asteroids every year, but there's something very particular about this one. The telescope's software decides to wake several human astronomers with a text message they hoped they would never receive. The asteroid is on a collision course with Earth. It is the size of a skyscraper and it's big enough to raze a city to the ground. Oh, and it will be here in three days.

Far-fetched it might seem, but this scenario is all too plausible. Certainly it is realistic enough that the US air force recently brought together scientists, military officers and emergency-response officials for the first time to assess the nation's ability to cope, should it come to pass.

They were asked to imagine how their respective organisations would respond to a mythical asteroid called Innoculatus striking the Earth after just three days' warning. The asteroid consisted of two parts: a pile of rubble 270 metres across which was destined to splash down in the Atlantic Ocean off the west coast of Africa, and a 50-metre-wide rock heading, in true Hollywood style, directly for Washington DC.

The exercise, which took place in December 2008, exposed the chilling dangers asteroids pose. Not only is there no plan for what to do when an asteroid hits, but our early-warning systems - which could make the difference between life and death - are woefully inadequate. The meeting provided just the wake-up call organiser Peter Garreston had hoped to create. He has long been concerned about the threat of an impact. "As a taxpayer, I would appreciate my air force taking a look at something that would be certainly as bad as nuclear terrorism in a city, and potentially a civilisation-ending event," he says.

The latest space rock to put the frighteners on us was 2008 TC3. This car-sized object exploded in the atmosphere over Sudan in October last year. A telescope first spotted it just 20 hours before impact - at a distance of 500,000 kilometres - and astronomers say we were lucky to get any warning at all.

Thankfully, 2008 TC3 was far too small to do any damage on the ground, but we are nearly as blind to objects big enough to do serious harm. We have barely begun to track down the millions of skyscraper-sized asteroids zipping around Earth's neighbourhood, any one of which could unleash as much destructive power as a nuclear bomb on impact.

Asteroid impacts are not as rare as you might think. It is widely accepted that an asteroid or comet 30 to 50 metres across exploded over Tunguska in Siberia in 1908, flattening trees for dozens of kilometres all around. The chance of a similar impact is about 1 in 500 each year (Nature , vol 453, p 1178). Put another way, that's a 10 per cent chance of an impact in the next 50 years (see "Should we panic?").

"Fifty-metre asteroids scare me to death," says Timothy Spahr, director of the Minor Planet Center in Cambridge, Massachusetts. "I could easily see a 50-metre object hitting in three days causing absolute pandemonium."

During the US air force planning exercise, the participating scientists explained that with so little warning there would be no hope of preventing an impact. Even Innoculatus's smaller 50-metre asteroid would weigh hundreds of thousands of tonnes, requiring an enormous push to change its trajectory appreciably - so much so that detonating a nuke near it in space would not provide a sufficient impulse so late in the game to cause a miss. To deflect an asteroid sufficiently, force would need to be applied years in advance (see "Could we nuke it?").

In fact, it could make things worse by breaking the asteroid into pieces, some of which could be large enough to do damage, and even create a blizzard of meteors that would destroy satellites in Earth orbit.

Panic on the streets

Realistically, though, the nuclear option would not be on the table in the first place: the nuclear-tipped missiles sitting patiently in silos around the world are not designed to track and home in on an asteroid or even survive for more than a few minutes in space. Instead, we would simply have to brace ourselves for the impact.

The good news is that even a little warning makes a big difference, simply because it would allow us to predict the time and location of impact. In the case of 2008 TC3, just a few hours after the asteroid's discovery, NASA scientists completed calculations that predicted an atmospheric plunge over an unpopulated desert area of northern Sudan, with timing accurate to within a minute.

But participants in the planning exercise worried that if an asteroid posing an imminent threat to a populated area were discovered, and the situation were not handled properly, panic and lack of coordination could lead to chaos on the roads.

Spahr was not involved in the exercise, but shares those concerns. "With a three-day warning, you can walk away and be safe. But it scares me, given how poorly we've handled things of this nature in the past," he says, citing the failure to fully evacuate New Orleans ahead of hurricane Katrina in 2005. "I'm picturing people panicking and driving the wrong way on the freeway, screaming 'Oh my god, it's going to kill us!'"

To prevent panic and disorganised movement, it is crucial for authorities to develop an evacuation plan and communicate it to the public as soon as possible after discovery of the dangerous object, since such discoveries are posted automatically online and would cause a media firestorm.

Such measures should ensure the streets would be very quiet as an object such as Innoculatus plunges into the atmosphere and makes its final approach to Washington DC. The compression of the atmosphere in front of the asteroid and friction with the air would cause rapid heating. At lower altitudes, where the air is denser, the heating becomes so intense that the asteroid vaporises and explodes. For the Tunguska event, this happened at about 8 kilometres above ground.

Supersonic shock wave

If you were unfortunate enough to be looking up from directly below, the explosion would be brighter than the sun. The visible and infrared radiation would be strong enough to make anything flammable ignite, says Mark Boslough of Sandia National Laboratory in Livermore, California. "It's like being in a broiler oven," he says. Anyone directly exposed would quickly be very badly burned.

Even before the sound of the blast reaches you, your body would be smashed by a devastating supersonic shock wave as the explosion creates a bubble of high-pressure air that expands faster than the speed of sound. Planetary scientist Jay Melosh of Purdue University in New York once experienced a shock wave from an experiment that exploded 500 tonnes of TNT, a tiny blast in comparison with the blast from an asteroid. "I was standing on top of a hill about 1.5 kilometres away wearing earplugs," he recalls. Melosh says you would see the shockwave in the air due to the way it refracts light. "It's a shimmering bubble," he says. "It spreads out in complete silence until it reaches you, then you hear a double boom."

Melosh was at a safe distance, but at ground zero below an exploding asteroid, the shock wave would be powerful enough to knock down buildings. It would arrive about 30 seconds after the blazing hot flash of light, and could also knock any nearby planes out of the sky, Boslough says. Any surviving buildings would be pummelled by raging winds blowing faster than any hurricane can muster.

Of course, two-thirds of Earth's surface is ocean. While our atmosphere is likely to protect us from asteroids smaller than 100 metres across, anything larger hitting the ocean - including chunks of Innoculatus's rubble pile - would cause a giant splash that could smash coastal buildings with high-speed volleys of water. The tremendous damage and loss of life that would ensue if multiple cities around an ocean basin were flooded led NASA scientists in 2003 to rate ocean impacts by asteroids as far more dangerous than those on or over land.

Recent computer simulations offer some hope, though. They suggest that the monster waves generated by ocean impacts would typically break far from shore, dissipating most of their energy before they could reach cities - unless the impact was very close to the coast, of course. Another ray of hope is that 100-metre asteroids hit Earth only about one-tenth as often as 30-metre objects.

Lasting just one day, the 2008 US Air Force exercise could barely scratch the surface of the incoming-asteroid problem. Not surprisingly, it discovered that should the nightmare come true, there is no plan for how to coordinate the activities of NASA, emergency planners, the US military and other parts of government. Further planning exercises are needed: the time saved through early preparation will be crucial if an evacuation is ever required at short notice.

Our chance of having any prior warning at all for an approaching 30-metre asteroid is no better than 25 to 35 per cent with existing sky surveillance, calculates astronomer Alan Harris of the Space Science Institute in Boulder, Colorado . The sun washes out half of the sky with daylight, blinding us to 50 per cent of threatening objects. Even glare from the moon can hide unwelcome incoming guests.

What's more, two of the world's three leading asteroid surveys are based in Arizona, including the Catalina Sky Survey, which discovered 2008 TC3. The region tends to cloud over between July and September. "Shift 2008 TC3 back to July and forget it. It wouldn't have been seen," says Spahr.

Now picture this ugly scenario, which worried some participants in the Air Force exercise: an asteroid flies out of nowhere and explodes over a sensitive nuclear-armed region, like South-East Asia or the Middle East. There's a reasonable chance that such an airburst could be misinterpreted as a nuclear attack. Both produce a bright flash, a blast wave and raging winds.

Such concerns were one reason why, when NASA found 2008 TC3 in its sights, it not only issued a press release but also alerted the US State Department, military commanders, and White House officials, says Lindley Johnson at NASA headquarters, who oversees the agency's work on near-Earth objects. "If it had been going down in the middle of the Pacific somewhere, we probably would not have worried too much more about it, but since it was [going to be] on land and near the Middle East, we did our full alerting," he says.

There is one major way to improve our prospects - point more eyes at the skies. The European Space Agency wants to get into the monitoring game and may set its telescopes at the European Southern Observatory in Chile on the problem. This could fill a gap in the NASA-funded surveys, which are limited to watching the skies of the northern hemisphere, says Richard Crowther of the UK's Science and Technology Facilities Council, who is a consultant for ESA and heads a United Nations working group on near-Earth objects.

Be prepared

"Up to now, the US has taken the majority of the responsibility for dealing with this issue and I think it's time for other states to take on a more equitable share of that," he says.

Help will also come from two new US observatories designed to survey the entire sky visible from their locations every few days. The Panoramic Survey Telescope and Rapid Response System (Pan-STARRS), will consist of four 1.8-metre telescopes, the first of which is already up and running in Hawaii. Plans are afoot to construct the 8.4-metre Large Synoptic Survey Telescope in Chile by 2015, though the project is still raising funds. These will improve the chances of an early detection and potentially extend warning times for 30-metre objects to more than a month. But even so, every ground-based lookout suffers from interference from the sun and moon.

A dedicated space telescope would fix this problem, but such a mission could cost more than a billion dollars. "We're talking about investing in an insurance policy," says Irwin Shapiro of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts.

Shapiro is leading a US National Research Council panel that by year's end will recommend a strategy to better address the threat from near-Earth objects. That study, along with the Air Force's report on its asteroid impact exercise, is intended to help the White House develop an official policy on the near-Earth object hazard by October 2010, which Congress has requested.

While asteroid impacts are much rarer than hurricanes and earthquakes, they have the potential to do much greater damage, Johnson warns: "It's not something I think there needs to be billions of dollars per year spent on, but it does warrant some priority in the list of things that we ought to be worried about." The cash would at least give us a better idea of when the next asteroid might strike. "From what we know today," he says, "it could be next week."

David Shiga is New Scientist 's physical sciences reporter in Boston

Should we panic?

David Shiga

An asteroid blast like the one that flattened Tunguska in Siberia in 1908 is expected only once every 500 years or so, on average. It is likely to be a lot longer than that before one hits a populated area, given how small a fraction of Earth's surface is taken up by cities and towns. A NASA study in 2003 concluded that only one in four Tunguska-like impacts would kill anyone, and only one in 17 such impacts would have a death toll of 10,000 or more, comparable to severe earthquakes and tsunamis.

Can we nuke it?

David Shiga

The fastest way to deflect an asteroid away from Earth would be to send a nuclear bomb aboard a spacecraft, a la the film Deep Impact , though we'd still need several years' warning.

The spacecraft would have to be able to home in on the asteroid and to trigger the explosion at just the right distance. Precision is needed to avoid breaking up the hurtling rock while still giving it enough of a nudge to prevent the Earth impact years down the line.

That assumes we're already prepared. Designing and building new spacecraft typically takes a few years. With current rocket technology, it would probably take several additional years to reach a threatening asteroid. And since the explosion would need to occur years ahead of the predicted impact in order to make the asteroid miss Earth, we'd need decades of lead time if we hoped to deflect Armageddon. A confounding factor is that nukes in space are forbidden by the Outer Space Treaty of 1967, signed by the US, Russia, and other nuclear powers, though they might agree to turn a blind eye on this one.

With several decades of warning time, other deflection technologies could come into play. The gravity tractor, for example, would see a spacecraft hover near the asteroid for several years, gradually pulling the asteroid off its collision course using the tiny gravitational pull of the spacecraft's mass.

Another option would be to focus sunlight on a spot on the asteroid using a fleet of mirror-bearing spacecraft, heating it enough to vaporise rock. The escaping gases would act like the exhaust from a rocket engine, giving the asteroid a slight push in the opposite direction that could produce a substantial course change over many years.

Record - 2

DIALOG(R)
The Smithsonian's National Air and Space Museum - Event
Washington Daybook
Friday, September 25, 2009

TEXT:
20090930 - The Smithsonian's National Air and Space Museum

TIME: 9:15 a.m.

EVENT: The Smithsonian's National Air and Space Museum holds a ribbon-cutting ceremony for its Public Observatory and media preview of the "Journey to the Stars" planetarium show.

AGENDA: Highlights:

-- 9:15 a.m.: Ribbon-cutting ceremony for the Public Observatory, featuring an astronomical telescope in a 22-foot dome. The Observatory will be open during museum hours every Tuesday through Sunday, weather permitting, to view the sun, moon and planets from the east terrace of the Museum, starting September 30. David De Vorkin, curator of the program will be available for interviews

-- 10 a.m.: Press preview of "Journey to the Stars" planetarium show which will open to the public on October 2 at the museum's Einstein Planetarium

PARTICIPANTS: Smithsonian Institution Secretary Wayne Clough; John Dailey, director of the National Air and Space Museum; and Roger Brissenden, associate director of the Smithsonian Astrophysical Observatory

DATE: September 30, 2009

LOCATION: National Air and Space Museum, Seventh Street and Independence Avenue SW, Washington, D.C.

CONTACT: Isabel Lara, 202-633-2374, larai@si.edu; Brian Mullen, 202-633-2376, mullenb@si.edu [Note: Media RSVP required.]

Record - 3

DIALOG(R)
NASA's Spitzer Spots Clump of Swirling Planetary Material
National Aeronautics and Space Administration Documents
Wednesday, September 23, 2009

TEXT:
Whitney Clavin 818-354-4673

Jet Propulsion Laboratory, Pasadena, Calif.

whitney.clavin@jpl.nasa.gov

News release: 2009-146 - - - - -

Sept. 23, 2009

NASA's Spitzer Spots Clump of Swirling Planetary Material

PASADENA, Calif. -- Astronomers have witnessed odd behavior around a young star. Something, perhaps another star or a planet, appears to be pushing a clump of planet-forming material around. The observations, made with NASA's Spitzer Space Telescope, offer a rare look into the early stages of planet formation.

Planets form out of swirling disks of gas and dust. Spitzer observed infrared light coming from one such disk around a young star, called LRLL 31, over a period of five months. To the astronomers' surprise, the light varied in unexpected ways, and in as little time as one week. Planets take millions of years to form, so it's rare to see anything change on time scales we humans can perceive.

One possible explanation is that a close companion to the star -- either a star or a developing planet -- could be shoving planet-forming material together, causing its thickness to vary as it spins around the star.

"We don't know if planets have formed, or will form, but we are gaining a better understanding of the properties and dynamics of the fine dust that could either become, or indirectly shape, a planet," said James Muzerolle of the Space Telescope Science Institute, Baltimore, Md. Muzerolle is first author of a paper accepted for publication in the Astrophysical Journal Letters. "This is a unique, real-time glimpse into the lengthy process of building planets."

One theory of planet formation suggests that planets start out as dusty grains swirling around a star in a disk. They slowly bulk up in size, collecting more and more mass like sticky snow. As the planets get bigger and bigger, they carve out gaps in the dust, until a so-called transitional disk takes shape with a large doughnut-like hole at its center. Over time, this disk fades and a new type of disk emerges, made up of debris from collisions between planets, asteroids and comets. Ultimately, a more settled, mature solar system like our own forms.

Before Spitzer was launched in 2003, only a few transitional disks with gaps or holes were known. With Spitzer's improved infrared vision, dozens have now been found. The space telescope sensed the warm glow of the disks and indirectly mapped out their structures.

Muzerolle and his team set out to study a family of young stars, many with known transitional disks. The stars are about two to three million years old and about 1,000 light-years away, in the IC 348 star-forming region of the constellation Perseus. A few of the stars showed surprising hints of variations. The astronomers followed up on one, LRLL 31, studying the star over five months with all three of Spitzer's instruments.

The observations showed that light from the inner region of the star's disk changes every few weeks, and, in one instance, in only one week. "Transition disks are rare enough, so to see one with this type of variability is really exciting," said co-author Kevin Flaherty of the University of Arizona, Tucson.

Both the intensity and the wavelength of infrared light varied over time. For instance, when the amount of light seen at shorter wavelengths went up, the brightness at longer wavelengths went down, and vice versa.

Muzerolle and his team say that a companion to the star, circling in a gap in the system's disk, could explain the data. "A companion in the gap of an almost edge-on disk would periodically change the height of the inner disk rim as it circles around the star: a higher rim would emit more light at shorter wavelengths because it is larger and hot, but at the same time, the high rim would shadow the cool material of the outer disk, causing a decrease in the longer-wavelength light. A low rim would do the opposite. This is exactly what we observe in our data," said Elise Furlan, a co-author from NASA's Jet Propulsion Laboratory, Pasadena, Calif.

The companion would have to be close in order to move the material around so fast -- about one- tenth the distance between Earth and the sun.

The astronomers plan to follow up with ground-based telescopes to see if a companion is tugging on the star hard enough to be perceived. Spitzer will also observe the system again in its "warm" mission to see if the changes are periodic, as would be expected with an orbiting companion. Spitzer ran out of coolant in May of this year, and is now operating at a slightly warmer temperature with two infrared channels still functioning.

"For astronomers, watching anything in real-time is exciting," said Muzerolle. "It's like we're biologists getting to watch cells grow in a petri dish, only our specimen is light-years away."

Other authors are Zoltan Balog, Max Planck Institute for Astronomy, Germany; Paul S. Smith and George Rieke, University of Arizona; Lori Allen, National Optical Astronomy Observatory, Tucson; Nuria Calvet, University of Michigan, Ann Arbor; Paola D'Alessio, National Autonomous University of Mexico; S. Thomas Megeath, University of Toledo, Ohio; August Muench, Harvard-Smithsonian Center for Astrophysics, Cambridge; William H. Sherry, National Solar Observatory, Tucson.

NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology, also in Pasadena. Caltech manages JPL for NASA. For more information about Spitzer, visit http://www.spitzer.caltech.edu/spitzer and http://www.nasa.gov/spitzer.

-end-

Record - 4

DIALOG(R)

A Dynamic Earth Man

Pockley, Peter
Australasian Science, v30, n8, p42
Tuesday, September 1, 2009

TEXT:
HEADNOTE

From modest beginnings, Kurt Lambeck made successive decisions to seek more challenging work that propelled him from his arrival in Australia with no English to a world leader in the science of understanding the Earth.

Now an Emeritus Professor of Geophysics at the Australian National University and President ofthe Australian Academy of Science, Kurt Lambeck has "vivid memories" of World War II. Born in 1941 in Holland to active members of the Resistance to Nazi occupation, he recalls witnessing the Gestapo searching unsuccessfully for his father, who was hiding under a woodpile, and Allied bombing of railway yards prior to liberating the Dutch.

Yet the transition back to civil self-rule after peace in 1945 greatly disappointed father Jacob, a draughtsman, and mother Johanna. Lambeck says: "After all those difficult times they felt that their effort in resisting hadn't really been rewarded in the sense of a new society. Activists who had sat out the war were not those [conservatives] who were now running the country and business."

The family emigrated to Australia in 1950, settling in Wollongong where the children expanded to seven. Kurt went to primary school without any command of English and no special instruction, as is now available to modern immigrants. He says: "We were thrown in at the deep end to sink or swim". Nevertheless he became sufficiently proficient to be in a position to choose between secondary education at the local technical college or the selective Wollongong High School.

His mother supported the academic option, and he did well enough in his studies to face a debate at home over his first major career choice of whether, after school, to learn a trade for working in the local Port Kembla steelworks or go to university, "which didn't enter into the family's considerations".

Lambeck says: "It was by my own effort that I got a scholarship from the NSW government, which offered a place in engineering at the University of NSW where I started in 1959". He went into the surveying stream but says: "I soon found there were probably more interesting things to do in life. From the compulsory humanities subjects I became aware of exciting possibilities. My eyes were opened with reading a vast literature that we were excluded from at school. Hemingway, Faulkner, Steinbeck and others gave me a new view of the world and I realised there was more to do in life than an ordinary career.

"Towards the end of my undergraduate days in the early 1960s I realised that Australia was a dull place and I had made a mistake. But, I had no choice as my scholarship bonded me to work for the State government for 5 years or I had to pay up the bond." Nonetheless, he had been inspired by contact at university with the emerging use of satellites for geodesy, the science of measuring the Earth. On the strength of an Honours thesis on the topic, he won a scholarship for further study at the Technical University of Delft in his country of birth (he gained Australian citizenship in 1956). This opportunity led to another major career decision.

Satellite Science

Lambeck worked as a surveyor in NSW country regions, using the traditional theodolite, tape measure and compass, accumulating savings towards further study and applying for 2 years' leave without pay. He says: "I was told in no uncertain terms that the government didn't need people with further education, whereupon I wrote a cheque on the spot for Pound Sterling500 to pay off my bond".

Delft was one ofthe world's leading universities in geodetic science but Lambeck almost had to relearn his native language, which he had ceased using in Australia. "My supervisor, Professor W. Baarda, had been impressed by my UNSW thesis and said I'd be wasting time with another degree when I had a perfectly good one, and I should use my time to learn a lot about the energy field of satellite geodesy, which I did in quick time."

This earned Lambeck two more scholarships. One from the Greek government triggered interest in archaeological sites. A Commonwealth scholarship then took him to the University of Oxford, where he completed a D Phil in 1 967 on the uses of satellites and met his future wife, Meg Nicholls (from Worcester; they have a lawyer daughter and geologist son). Nine years later he gained a DSc from Oxford.

His Oxford work earned him a geodesist post at the famed Smithsonian Astrophysical Observatory at Harvard University in the USA until 1970. By now he was publishing original papers on new techniques for improving the accuracy of satellite observations. These have proved of fundamental importance in, for example, mapping and following changes in the precise shape of the Earth, the distribution of its gravity field, its rotation and sea levels. This led to what Lambeck rates as his first major development with Mike Gaposchkin the 1969 Smithsonian Standard Earth Model. This defined the Earth's gravity field so precisely that "for at least a decade, it guided the trajectories of satellites around the world and probably ballistic missiles as well". One widely disseminated dividend later has been the multi-satellite Global Positioning System (GPS), which enables anyone with a dedicated receiver to locate themselves on a map with astonishing precision.

A Restless Earth Emerges

While Lambeck says that "the primary motivation of our work had been to map the gravity field of Earth so that the motions of satellites could be predicted accurately, the availability of precision down to the centimetre scale informed a concurrent revolution in geophysics as the Earth was coming to be seen as a very dynamic system".

The originally contentious hypothesis of "plate tectonics" explained the observations of "continental drift" and "sea floor spreading" by postulating vast plates of the Earth's crust and mantle moving inexorably over and beneath each other. However, this could not be satisfactorily verified solely from classical geological evidence.

Lambeck says: "Two other observations hadn't contributed - the effects of gravity and the heat flow coming out of the Earth. Satellite measurements provided one of the few independent ways of verifying the hypothesis with direct support because they demonstrated gravity anomalies (i.e. higher gravity) over the ridges and trenches created in the subduction zones as one plate slides under another... We discovered tectonic plates were moving at rates of several centimetres per year, which correlated closely with changes in Earth's gravitational field. This also enabled estimates of the convection systems [heat] which drive the plates."

He categorises this as "an important piece of work, the very basis of modern geophysics which explains the dynamics of the Earth". Nonetheless, he could not foresee new technologies on the horizon and made another major career decision to concentrate on fundamental questions about the meaning of the gravity field and its role in the dynamics of the Earth. This prompted him to move to France for positions as Scientific Director of the Space Agency and Professor in the University of Paris (where he had to teach himself French).

Lambeck pursued "big ideas" regarding the changing deformation of the Earth's shape by tides caused by the Sun and Moon and micro-irregularities in the Earth's rotation. Studies of the interactions between the solid Earth, oceans, ice sheets and atmosphere led to his authoritative standing in measuring rising sea levels. Among numerous field studies across the globe, he blended archaeology with geophysics to determine rising sea levels from two millennia ago.

After 6 years in France, Lambeck returned to Australia to a chair in the Australian National University's Research School of Earth Sciences, which he later directed for 10 years. In the second part of his profile next month we shall examine his seminal contributions on rising sea levels as a consequence of climate change and the state of science in the nation in his role as President of the Australian Academy of Science.

SIDEBAR

Prof Lambeck at Nanortalik, southern Greenland in 2001 while surveying for submerged evidence of palaeo shorelines indicating how Greenland rebounded in response to the de-glaciation of the past 20,000 years.

SIDEBAR

The Roman epoch harbour at Ventotene, Italy, where the foot walks are now submerged due to sea level rise of 1.5 metres over 2000 years. From left: Prof Lambeck, Dr Marco Anzidei, Dr Fabrizio Antonioli, and an Italian local. Photo: courtesy Prof Lambeck

SIDEBAR
remlrriSc/ence draws on extended biographical interviews recorded by Peter Pockley for the Oral History Archives of the National Library of Australia. These interviews are being progressively put online at www.nla.gov.au/digcoll/3udio.

Record - 5

DIALOG(R)
SCIFEST 09
Imbs, Christine
St. Louis Commerce, n5, p52
Tuesday, September 1, 2009

TEXT:
SciFest is the joint brainchild of the folks at the Science Center and the creators of the Cheltenham Science Festival in Cheltenham, England. Both festivals were developed as a way to change people's perceptions about science and technology by presenting it in a fun and entertaining way. Based on last year's crowd, it seems to be working.

"Last year attendance was somewhere between 21,000 and 22,000 which was pretty good for our first year," says Al Wiman, vice president for Public Understanding of Science. "Naturally we hope to increase that number this year. We've been working really hard to bring in some great speakers, and come up with some really interesting and fun topics. I think people are going to love it."

This year's festivities will kick-off Wednesday night, October 7 with a presentation by Dean Kamen, who's perhaps best known for developing the Segway PT. Kamen also founded FIRST - For Inspiration and Recognition of Science and Technology - an organization which develops ways to inspire students in engineering and technology fields. FIRST created the international high school robotics competition where students compete to build robots that complete assigned tasks. This year, St. Louis is one of three cities nationwide that have applied for the FIRST Robotics Competition nationals.

"They should decide by the end of September or first of October where the nationals will be held," Wiman says. "We're keeping our fingers crossed that on the night of October 7 Dean Kamen will stand up and say, guess what!"

On Thursday night, October 8, SciFest continues as members of the Saint Louis Symphony Orchestra participate in Science of the Symphony to be held at the Planetarium. Then on Friday evening everyone will get the chance to party down at Extravaganza, which offers a taste of good food, good drink and a bit of what is to come over the next two days.

"There will be activities spread throughout the Science Center," Wiman adds. "There will be interactive displays and a series of short programs; a sort of teaser for the rest of the festival. For instance, we've got Mark Leeway, the physicist from England, coming back to do his rock guitar program, and Walter the Edutainer coming from Technopolis the Flemish Science Center in Belgium. We'll also have Drs. Fred and Anita Chu doing a demonstration of their program, Tango to Your Health. So it should be a lot of fun."

That fun will extend into the final two days of the festival where things will really get rolling with the The Science of NASCAR where you'll not only learn how to build an engine that can run at 9,000 rpm for three hours without blowing up, but that driving a car in a circle is a lot harder than you think. In Drumming Up Health you'll see how drum therapy is being used for patients with Parkinson's, cancer, and autism. You'll learn about ball speed and trajectory in The Science of Baseball as well as the psychology of guessing what the opposition is going to do next.

Flirting, the Scientific Way will show that humans aren't the only creatures that use this courtship signal. And then there's A Star is Born and Dies; Honeybees in Crisis; Genetic Diagnosis: Operating on Well Folks; Facebook, Twitter and YouTube; Keeping Your Brain in the Game; Internet Safari and Skype to the Ends of the Earth which will take you live to some really cool places around the world.

Doug King, president and CEO of the Science Center, says there is definitely something for everybody.
"There are serious subjects and fun subjects," he says. But if last year is any indication, people will go to both. It's not just one group attending serious topics and another group the fun stuff. Basically, people want to hear about things that are vital, but at the same time they want to relax and have fun. And I think we've got some really cool things this year."

King says based on last year's experience they have made some changes to this year's festival. For instance, they have expanded their school sessions to run from Wednesday through Friday during the day. Also despite being designed primarily for adults, last year's crowd at SciFest included quite a few kids. As a result they are including more family-oriented things during the day, while more adult sessions will occur at night. A good example is Saturday night's The Science Behind Science Fiction where New York Times best selling fantasy and paranormal fiction author Lauren K. Hamilton will discuss the inspiration for her Anita Blake: Vampire Hunter series.

"It may not be science, but it's fun," King says. "And as our Cheltenham partners told us, make sure you have high science content, but don't let yourselves get too proper. Remember, it's a festival."

King says eventually he'd like to see the festival grow beyond the Science Center.
"By next year I'd like to be doing little mini festivals in all of Missouri and Illinois; half-day things that culminate in St. Louis at SciFest in October.

Then people will get the idea that there's something going on here that's worth visiting. That means additional revenue for hotels, restaurants and so on. You know Cheltenham is not a big town, but people come from all over England, Scotland and Wales to their festivals."

King also sees a time when the festival will grow beyond the Science Center.

"We fully expect the Garden, the Zoo and some of the universities to eventually become involved," he explains. "But right now we just want to fill up the place first. We have to walk before we can run."

King says surveys from last year's SciFest show that although visitors weren't quite sure what to expect, they were pleasantly surprised.

"They indicated they'd be back this year and would tell others about it. We also got some great feedback from the presenters. Giovanni Fazio (senior physicist from Harvard Smithsonian Center for Astrophysics) said yes immediately when we asked him back this year, because he had such a good experience. And we've also been embraced by the scientific community here in St. Louis. That's very gratifying. And to think that last year we were saying, gee I hope this works."

This year, individual ticket prices for the daytime sessions are $6 per session, however you may purchase a day pass for $20. All evening sessions on Wednesday, Thursday and Saturday will run you $10 per session. But if you'd like an all-access pass to the festival plus Friday night's Extravaganza, a Golden ticket is available for $100.