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Star Points for April 2008

Arthur C. Clarke: The Passing of a Visionary Mind

by Curtis Roelle

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Last month's passing of Sir Arthur Charles Clarke marked the loss of one of the most prolific writers of science fiction and non-fiction since the end of World War II. At the time of his death Clarke was 90 years old and living in Sri Lanka, his home since 1956. He is best known for his collaboration with movie director Stanley Kubrick in the classic 1968 MGM motion picture "2001: A Space Odyssey." Although Clarke authored a 1968 novel by the same name, the movie was based on a short story entitled "The Sentinel," which was first published in 1951 as part of a collection of stories entitled *The Avon Science Fiction and Fantasy Reader*.

Unlike the rectangular (with dimensions 1x4x9) alien monolith featured in the movie, the sentinel was a sleek and shiny small pyramid "twice as high as a man" planted on the moon's Mare Crisium by an ancient space-faring civilization. When its force field was finally breached following its discovery, the monolith ceased transmitting, and thus its creators, whoever they were and with whatever intentions they had in leaving it, were automatically notified that contact had been made. "[We] have set off the fire alarm and have nothing to do but wait," wrote Clarke.

The *Space Odyssey* novel published 17 years later was "based on the screenplay" of the film instead of the other way around. However, unlike the movie, which concluded at the planet Jupiter, the novel ended at Saturn. Yet when Clarke published the 1982 sequel "2010: Odyssey Two," the author mysteriously continues where the movie left off, back at Jupiter, and never bothered to explain the obvious disconnect between the two novels!

(Continued on page 3)

April Meeting: Wednesday, April 9, 2008, at 7:30 pm

Wayne Bird of the American Astronomical Society will talk with us about "How the Sun, Supernovae, and Gamma-Ray Bursts Work." Read more about "Skip" and his presentation on page 7.

Public Events: Please see page 7.

President's Message for April

by Stephen Reisinger

I know that some of our members are working on Astronomical League certificates and that other members couldn't care less about them. But they are designed to get us looking up. Up at what the night sky has to offer. I would like to see more of our members getting certificates from the Astronomical League, and even our own WASI 130. As some of you know, we have some Master Observers in our club. To become a Master Observer you need to complete the following 5 clubs: the Messier Club, the Binocular Messier Club, the Lunar Club, the Double Star Club, and the Herschel Club. The most daunting of these clubs is the Herschel Club. You also need to complete 5 additional clubs of your choice. These are all good clubs to complete, and they will give you a good taste of what the night sky holds.

There's a web file sponsored by the North Houston Astronomy Club called "What's Up Tonight, Doc?" found at <http://www.astronomyclub.org/wud.htm>. There are a few quirks about this file, and I'll address some of those at an upcoming meeting, but if you'll take a look at this file, you'll see that many of the objects are duplicated. This means that if you check off one of the objects for the Messier list, you might be able to check it off on another list as well, such as the Herschel Club list. As long as you *follow the criteria for each club*, you can check off one object on multiple lists. Another thing about the "AL" certificates: most of the clubs require only a description, and DO NOT require a drawing, although I personally think it's best to do both.

Why am I suggesting that all of us do what we can to get a certificate? Because at the very least, as amateur astronomers, we should be able to point out the constellations in the night sky. Every one of us, whether we use a GoTo telescope or not, should be able to point out the constellations to anyone we meet, and thanks to the Astronomical League, there is now a certificate even for the *constellations*.

If you've never received a certificate or if you've never attempted to complete one, then the Northern Constellation Hunter Club is the one for you. This is the easiest certificate to complete. Simply go outside – with a red light, pencil, paper, and a planisphere (or a simple star chart containing the names of the major stars and the constellation boundaries) – and then look up and "draw" what you see in the night sky. When you're finished, just connect the dots and label any named stars or prominent objects/planets that you've seen! The only real "drawing" that you'll need to do is when it comes to some fuzzy object, which you make with a smudge. By completing this, you'll be able to find your way around the night sky without any difficulty.

While you're doing the Northern Constellation Hunter Club, though, there is another certificate that goes hand-in-hand with it. It's the Universe Sampler Club. This club can be done with or without a telescope, and again, there is some overlapping of the requirements between these two clubs. So, using nothing but your naked eyes you can get two certificates under your belt. In doing so, you've just become much more familiar with the night sky. When you decide to move on to the binocular and telescopic clubs, you'll have the foundation needed to find those objects more easily, now that you have the big picture.

Star Points, continued

It was only after discovering his science fiction that I began to appreciate the extraordinary vision in Clarke's non-fiction. For example, in a fascinating epilogue he wrote for the 1970 book *First Men on the Moon*, about the Apollo 11 moon journey, Clarke appears to forecast the impact of the internet and World Wide Web more than a quarter century before either became commonplace:

[E]very home could have a display console on whose screen could be flashed instantly any picture or text stored in any library on earth. 'Orbital Newspapers,' updated every hour, could be available on a global basis... The telephone transformed business and social life, at the beginning of this century; the forthcoming home console will have an even greater impact, because it will allow men to meet effectively face to face, to exchange any type of information, to converse with their computers and consult information banks - without ever leaving home, unless they wish to do so.

Clarke was nominated for the Nobel Prize for predicting the value of launching satellites into "geostationary" orbits, where they seem to hang motionless in the sky 22,240 statute miles (35,786 km) above a point on the equator, orbiting in sync with it. The advantage of placing a satellite there is that an earth-based antenna pointed toward it can track it while pointing in a fixed direction. It is not necessary for the antenna to move at all to follow the satellite in such a "Clarke orbit," as they are sometimes known.

Another book in my Clarke collection is *The Exploration of Space* (1951), where, in Figure 18, Clarke depicts a system of three radio relay satellites in geostationary orbit. This configuration is similar to NASA's Tracking and Data Relay Satellite System (TDRSS). The first TDRS was launched more than 30 years after the book was published, in 1983. TDRSS is the cornerstone of America's space communications, used for supporting satellite missions such as the Hubble Space Telescope (HST) and manned missions, including the Space Shuttle and the International Space Station (ISS).

Always forward-looking, Clarke concluded *The Exploration of Space* with a summary of the 20th Century as seen through the lens of time by a historian 1,000 years in the future: "With the landing of the first spaceship on Mars and Venus, the childhood of our race was over and history as we know it began."

Star Points by Curtis Roelle appears in the Carroll County Times on the first Sunday of each month. Visit the website at <http://www.starpoints.org> or send e-mail to StarPoints@Gmail.com.

SWAT REPORT

Well, once again we braved the elements and did the cleanup along our club's stretch of Route 27. Curt Roelle, Ian Slepian, Dave Larson, and I were the only ones who showed. We divided into two teams and began. We managed to fill up seven bags of trash and had a nice walk on the shoulder of the road. Carroll County is a bit cleaner now because of our efforts.

I called Pat, our State Highway Administration contact, and gave her my cleanup report. Seems that we are still waiting for our *sign* to be made up and posted. The SHA budget this year is not quite as big as they expected, and it might be a bit longer before we see our updated SWAT sign in place. Money is tight all around these days. They already have the blanks and the letters to put on the signs, just not the money to put them together. We'll wait and see.

Dave Larson was the winner in this month's "Find the Money from SWAT" prize. He found the twenty-dollar bill that the SHA hides along our cleanup route. WAY TO GO, DAVE! Just kidding, but it does bring out a point: you never know what you will find. So be sure to make the time and join us on our next little walk. Dates are posted on the club calendar.

Erich Bender, SWAT Officer

Kids of All Ages: Get Your Gummy Greenhouse Gases!

Making science edible – and sweet – is a reliable way to attract kids' interest. The new "Gummy Greenhouse Gases" activity on The Space Place web site makes it fun and easy to learn a bit of chemistry and to find out why too many of these kinds of molecules in the air are likely to cause Earth to get warmer. At <http://spaceplace.nasa.gov/en/kids/tes/gumdrops> kids use gumdrops and toothpicks to make simple molecules of ozone, nitrous oxide, carbon dioxide, water vapor, and methane. The curious can go on to <http://spaceplace.nasa.gov/en/kids/tes/gases> to learn more about the greenhouse effect and about the "good and bad" roles of ozone. A short video shows how new space technology can literally paint a 3-D picture of these gases all around the globe. Afterwards, the ghastly gases can be consumed (mind the toothpicks!), thus helping the environment.

If we build it, they will come...

Reaching Out...

“Girl Scouts of the Nation’s Capital”

by Skip Bird

March 8, 2008 was “another wild day of public outreach” as approximately 3,125 Girl Scout guests converged at the National Air and Space Museum for the “Girl Scouts of the Nation’s Capital” program. Did I mention that over 13,000 members of the general public were there, too? The program ran from 9:00 am to 5:00 pm, a total of 8 really busy hours.

The first thing we did was spread out our activity tables. We set up five activities, and the American Astronomical Society set up four activities alongside us. Our programs included: 1) “Seeing Through Alien Eyes and Decoding Secret Messages; 2) “How Our Atmosphere Protects Us” (used as a game including UV beads); 3) “How We Find Planets Around Other Stars”; 4) the always-a-favorite “Pocket Solar System”; and 5) looking through my telescope at the moon (OK, so it wasn't the real Moon, but it was a really nice picture that we stuck to a wall way clear on the other side of the building. (NOTE: the Air and Space Museum frowns upon sticking things onto their property! Oops! SORRY!)

The AAS had tables set up for "Guess the Meteorite," "The World of Diffraction," "Building a Spectroscope," and "Building a Pluto Model." Highlights from the AAS Programs were Misty L.'s trying to keep track of the diffraction glasses; Susan K.'s making Pluto models; Alycia's sitting on the floor making spectrographs; Mike M.'s trying to fool the Girl Scouts in the meteorite game; Ed W.'s explaining the different views of a galaxy to someone who was having trouble understanding what a galaxy *is*; and Cassy, Susana, Margaret, and Hashima's laughing and having fun with all the kids.

Highlights for our WASI programs were Salvi M.'s explaining about our atmosphere in his best Russian to a couple of girls from Russia; Sergey M.'s handing out lithographs and trading cards to everyone who stopped at one of our activities; Stephen R.'s doing the Pocket Solar System with a bunch of giggling girls; John B.'s trying to do the same thing with help from his 6-year-old son; Dave L.'s trying to find the moon when the kids moved the scope; and Ian S. and Tony G.'s discussing how many planets there are with a VERY smart and stubborn 13-year-old girl (she almost had them convinced that there were *no* planets according to the IAU definition).

In short, the people had so much fun that the parents had to make the kids leave our area to see the rest of the museum and other activities. Everyone did every program sometime during the day. We had so many people trying to do, see, and/or observe that the ***Fire Marshall said that we were a hazard!*** (We've never had one of our astronomy programs declared a fire hazard before! First time for everything, I guess.)

We went through 15 rolls of register paper, 200 good-neighbor-lighting sheets, 400 secret message sheets, 600 Planet Quest stickers, 800+ posters, 1,000 JUNO postcards, 1,900 lithographs, 3,500 bookmarks, 15 pencils, 12 sodas, and a box of chocolate donuts. All in all, another great day was had by all.

Ramblings from a Second Fiddle

by Erich Bender

We have managed to kick off 2008 with a big bang! Since most of you saw fit to elect me back into office, that means another year of ME! I will promise to have more "News of The Weird" at our meetings.

Those of you that missed the February meeting, SHAME! It was really great! Dr. Don Thomas was a wonderful guest, and we found out a lot of neat things about our Space Shuttle program. I even got an autographed picture of him! Just to listen to him talk about the launch and how much power the astronauts feel under them when they lift off just held us all in awe. He showed us bookends that were made from the huge explosive bolts that hold the shuttle to Earth until the last nanosecond. How cool was that! The things we learned – like how the toilet operates – I wanted to know. And we verified that DUCT TAPE is not only part of the tool kit on board, but is also included in the survival gear in the space suits. And he is now the fastest person I know. My wife Faith was the record holder since 2002, when she went for ride in a NASCAR car at Dover Race track. She achieved a top speed of 136 mph. The record has been broken. Dr. Thomas now has it at 18,000+ mph! I want to thank him for coming to the meeting and sharing a part of his life with us.

Our March Meeting was another one that if you missed it, SHAME! Mark Kochte from the MESSENGER program to Mercury was our guest. Did you know that with just one flyby of Mercury, on the way to a course correction maneuver, the MESSENGER space craft obtained more photographic knowledge for us than the MARINER 10 program provided over its entire service period more than thirty years ago? Of course, computers were as big as trucks back then, and electronic things like resistors were huge compared with what we have today. Mark is part of one of the instrument teams known as MASCs, which stands for Mercury Atmospheric and Surface Composition Spectrometer. He is the mission operation lead, which means he probably gets yelled at if something's wrong. His presentation was great, and the pictures were fantastic.

Mercury is really a planet of extremes. They suspect that there may be ice at the poles, although that will not be confirmed for some time. Having Mark come to our meetings is always a good time. He really knows how to work a crowd. I myself learned a lot about the spacecraft and how it is controlled. Keeping the thermal shield pointed to the Sun is one of the most important things they have to do. Otherwise it will fry. I have been to the Messenger web site and it is topnotch – very easy to get around – and it had a wealth of information to share. Be sure to check it out from time to time at <http://messenger.jhuapl.edu/index.php>.

Mark's humor during the meeting was great. Did you know that they are not permitted to use the word "LAVA"? He had to say something like "magma of volcanic origin," or something along those lines. We tried to trip him up, but he was too good. Hopefully, he will be coming back again real soon. If you have not met Mark, he truly is a person that you would enjoy talking (or listening) to. Any project he works on gets 110% of his attention. He really enjoys his job. Thanks, Mark!

Till next month, clear skies and good times.

Guest Speaker for April Meeting: Wayne “Skip” Bird

Topic: The Sun, Supernovae, and Gamma-Ray Bursts

Fly with the Westminster Astronomy Club and the Night Sky Network through the not-so-friendly skies. Explore how the sun and supernovae work, how our atmosphere protects us (most of the time), and what happens when a gamma-ray burst hits. We will explore with “Alien Eyes” (things are not always as they look). We will find out who is smarter than a fifth-grader with Cosmic Survey Cards (start studying now, otherwise you will *not* have a chance). If time permits, we will build glow-in-the-dark Constellation Guides. (Topics may change depending upon age and number of people in attendance.)

Skip Bird, our speaker, is the world renowned author of the "Night Flying Astronomy Bird" articles and is an Education Assistant with the American Astronomical Society. He is a former President of WASI, and currently serves as, in his own words, “Treasurer and Chief Bag Man and Money Launderer for the Club (OK, just Treasurer, and it was only a \$24 deposit that got washed).” He also holds the title of “World’s Greatest Dad,” and has the lapel button to prove it. He also proudly wears the title of “Outreach Fanatic,” with *fanatic* defined as “someone who won’t change his mind AND won’t change the subject.”

Coming Attractions

Guest Speakers:

May: Tony Maranto, speaking on the Spitzer Space Telescope

June: Brian Eney (topic to be announced)

Upcoming Events:

April 12: 400th anniversary of the telescope at the Udvar-Hazy Center near Dulles Airport

May 10: Astronomy Day at the Carroll County Public Library, Eldersburg Branch

May 17: Springfest, Taneytown

As easy as π . . . the number defined as the ratio of the circumference of a circle to its diameter (3.14159 . . .) Today the first trillion digits are known, and some people with very good memories make it a quest to memorize as many digits of π as possible. The current world record holder is Akira Haraguchi, who correctly recited from memory the first 100,000 digits on October 3, 2006 in 16 hours.

The Science Corner

“Seasons” at the Equator

Most of us in the USA live in the so-called temperate zone, between the Tropic of Cancer and the Arctic Circle. We experience four distinct seasons: spring, summer, autumn, and winter. From our viewpoint we speak of a spring and an autumn equinox and of a summer and a winter solstice. The same seasons occur in the temperate southern hemisphere, but they are reversed from those in the northern hemisphere. The seasons are characterized by significant differences in temperature and length of daylight. Astronomically, the most striking difference is the height of the noontime sun at the solstices, being highest in summer and lowest in winter. The height of the noontime sun at the March equinox (our spring) matches its height at the September equinox (our autumn).

At the equator itself, however, one cannot speak, astronomically, of a “spring” or “autumn” equinox, or of a “summer” or “winter” solstice, because the equator is itself the dividing line between the northern and southern hemispheres. The dividing line does not experience the seasons for the following reasons: 1) At both equinoxes the sun stands directly overhead, at the zenith, the highest possible altitude of the sun, at solar noon; and 2) At either solstice the noon altitude of the sun is 23.5° away from the zenith, and the sun is thus at the same height above the horizon – 66.5° – both in June and in December. Paradoxically, at Westminster’s latitude, about 39.5°N , the summer solstice noon altitude of the sun is actually *higher* – 74° – than at the equator. On the other hand, the equatorial noontime sun’s altitude *matches* Westminster’s summer solstice altitude *four times a year*: May 4-5 and August 8-9, in our spring and summer; and November 6-7 and February 4-5, in our autumn and winter.

From the foregoing we can see that the solstices at the equator are *symmetrical*. The symmetry of the solstices therefore makes winter and summer impossible concepts there. If there is no winter or summer, there can also be no spring or autumn, because the seasons are defined as a *sequence*. There *is* a sequence at the equator, but it is of a different sort than the sequence observed in the temperate zones, or even in those parts of the tropical zones significantly distant from the equator. The equatorial sequence is simply the *oscillation* of the noontime sun northward or southward to a maximum distance of 23.5° from the zenith. The sun’s altitude decreases following an equinox and increases following a solstice.

In summary, in the temperate zones the sun’s altitude changes markedly between winter and summer solstices, but at the equator both solstice suns have the same altitude: north of the zenith in June and south of the zenith in December. It is thus not possible to name four distinct seasons at the equator, astronomically, in the same way that we name seasons in the temperate regions, or even in the polar regions, for that matter.

---KNL



Tracking Wildlife from Space

by Patrick Barry

It's 10 o'clock, and do you know where your Oriental Honey Buzzard is?

Tracking the whereabouts of birds and other migrating wildlife across thousands of miles of land, air, and sea is no easy feat. Yet to protect the habitats of endangered species, scientists need to know where these roving animals go during their seasonal travels.

Rather than chasing these animals around the globe, a growing number of scientists are leveraging the bird's-eye view of orbiting satellites to easily monitor animals' movements anywhere in the world.

The system piggybacks on weather satellites called Polar Operational Environmental Satellites, which are operated by the National Oceanic and Atmospheric Administration (NOAA), as well as a European satellite called MetOp. Sensors aboard these satellites pick up signals beamed from portable transmitters on the Earth's surface, 850 kilometers below. NOAA began the project—called Argos—in cooperation with NASA and the French space agency (CNES) in 1974. At that time, scientists placed these transmitters primarily on buoys and balloons to study the oceans and atmosphere. As electronics shrank and new satellites' sensors became more sensitive, the transmitters became small and light enough by the 1990s that scientists could mount them safely on animals. Yes, even on birds like the Oriental Honey Buzzard.

“Scientists just never had the capability of doing this before,” says Christopher O'Connors, Program Manager for Argos at NOAA. Today, transmitters weigh as little as 1/20th of a pound and require a fraction of a watt of power. The satellites can detect these feeble signals in part because the transmitters broadcast at frequencies between 401 and 403 MHz, a part of the spectrum reserved for environmental uses. That way there's very little interference from other sources of radio noise. “Argos is being used more and more for animal tracking,” O'Connors says. More than 17,000 transmitters are currently being tracked by Argos, and almost 4,000 of them are on wildlife. “The animal research has been the most interesting area in terms of innovative science.”

For example, researchers in Japan used Argos to track endangered Grey-faced Buzzards and Oriental Honey Buzzards for thousands of kilometers along the birds' migrations through Japan and Southeast Asia. Scientists have also mapped the movements of loggerhead sea turtles off the west coast of Africa. Other studies have documented migrations of wood storks,

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Malaysian elephants, porcupine caribou, right whales, and walrus, to name a few.

Argos data is available online at www.argos-system.org, so every evening scientists can check the whereabouts of all their herds, schools, and flocks. Kids can learn about some of these endangered species and play a memory game with them at spaceplace.nasa.gov/en/kids/poes_tracking

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The ARGOS program tracks the whereabouts of endangered migrating animals via miniature transmitters on the animals and the POES satellites in orbit.