

The IAS News & Views



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IAS General Meeting April 14, 2012

7:00 PM

Holcomb Observatory

Butler University

Investigating the Environmental Influence of Galaxy Evolution

Dr. Robert C. Berrington

Assistant Professor of Astronomy

Ball State University

The hierarchical structure formation model predicts that a galaxy will see different environments throughout its evolutionary history. How each environment will, through numerous mechanisms, impact the structural and dynamical evolution of its constituent galaxies is unknown. I will discuss current and ongoing research to investigate secular trends in the observational properties of elliptical galaxies in clusters of galaxies. This study is part of a larger project to investigate the effects of environment on the dynamics and evolution of elliptical galaxies. We discuss the preliminary results of these models, and future directions of this study.

Bio

Dr. Berrington graduated with a PhD in Astronomy from the Department of Astronomy at Indiana University, Bloomington. From there he would go on to postdoctoral positions at the University of Wyoming and the Naval Research Laboratory in Washington DC. He is currently an assistant professor of Astronomy at Ball State University where he spends his time in the extragalactic realm of elliptical galaxies.

IAS NEWS

Are You Missing Out on Darkness?

by Bruce Bowman

Except for farmers, amateur astronomers may be more in tune with the seasons and the passing of time than any other collection of people. Yet few folks fully understand how time is reckoned. Simple things like the definition of "noon" don't necessarily have simple answers. Once upon a

time, "noon" meant "mid-day" -- the time when the Sun was due south and crossed the meridian. Not anymore.

A Brief History of Time

With the invention of the pendulum clock, astronomers came to realize that the Sun didn't actually cross the meridian on a regular basis. Although the earth rotates at a constant rate, its orbit around the Sun is elliptical, and its axis is tilted to the plane of the ecliptic. This causes solar noon to vary according to the "equation of time." At our latitude of 40 degrees north, this variation amounts to as much as half an hour. Correction tables were printed in almanacs so the true "mean solar time" could be determined.¹ However, locations having different geographical longitudes still used their own "local" time.

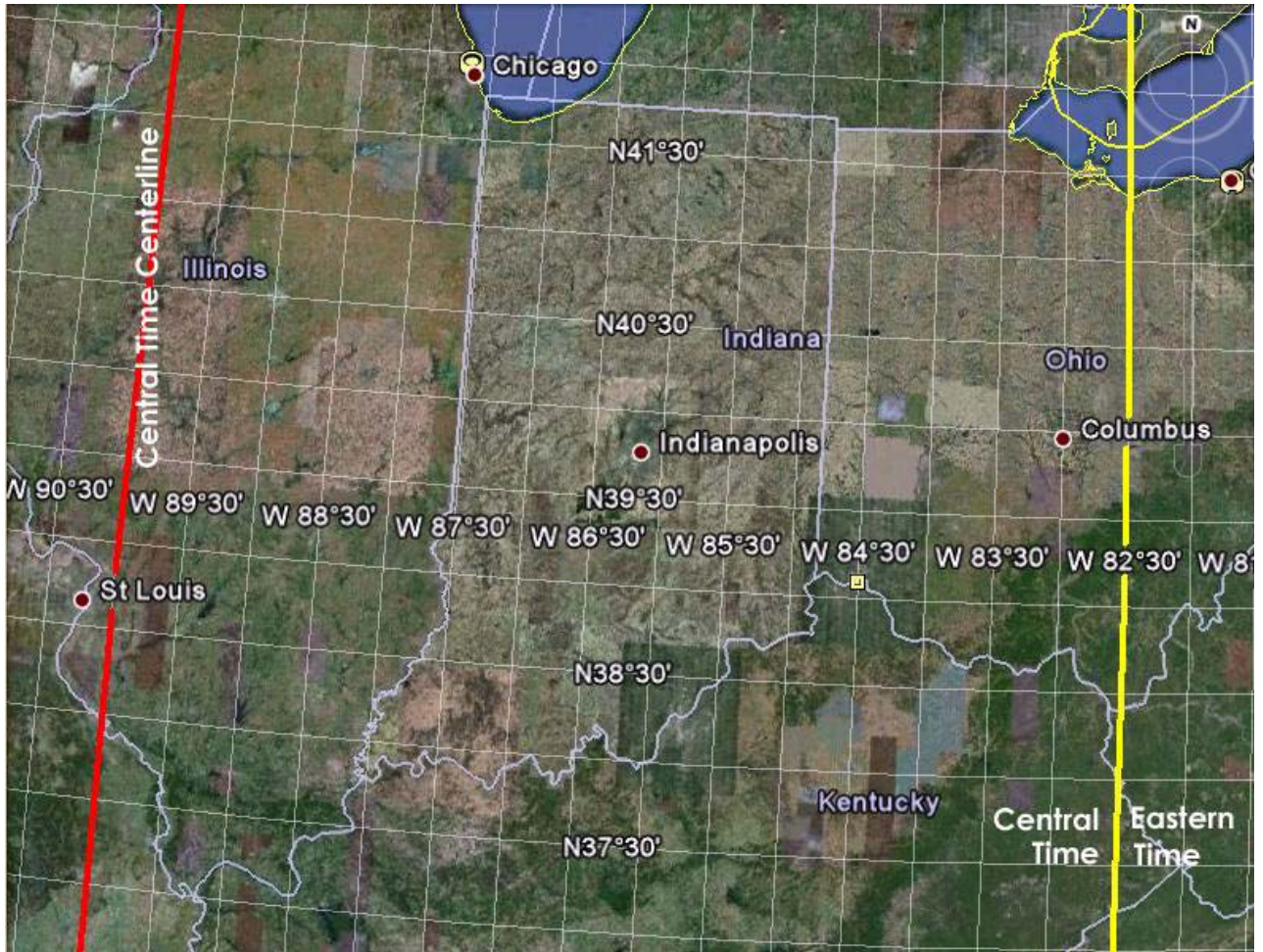
With the advent of the telegraph and high-speed transport (primarily railroads), the use of local time became more problematical. To remedy this, "time zones" were established. The standard was "Greenwich Mean Time," defined as mean solar time at the location of a brass plate on the grounds of the Royal Observatory in Greenwich, England. There were 24 time zones established to include the 360 degrees in longitude around the earth. Geographically, each time zone would then be 15 degrees of longitude wide, centered on its corresponding meridian line. In the United States, in 1883 the major railroads agreed to standardize time using zones centered on the 75th, 90th, 105th and 120th meridians. In practice, however, the borders of these time zones were often moved to correspond to political or other artificial boundaries.

What about Daylight Savings Time? Well, that's a long story. It has been mandated and lifted several times, only to be reestablished again. Individual counties in Indiana either recognized it or chose not to, often against the mandates of the federal department of transportation or even our own governor. Much of that sordid story can be found at http://en.wikipedia.org/wiki/Time_in_Indiana.

Okay fine. What *is* Indiana's Geographical Time Zone?

Central Standard Time is Greenwich Mean Time + 6 hours. So the meridian line for geographical Central Time is 6 hours x 15 degrees = 90 degrees of longitude. This line passes just east of St Louis, Missouri. Central Time should be observed anywhere within 7-1/2 degrees of longitude of this line. As you can see from the graphic below, the state of Indiana lies entirely within the geographical Central Time region, with the boundary between time zones located roughly 50 miles *east* of Columbus, Ohio.

¹ Those who are more interested in learning about the Equation of Time should pursue the new analemma certificate offered by the Astronomical League. See http://astroleague.org/Analemma_Introduction



What Does This Mean for Astronomers?

It means that Indiana's clocks run well ahead of solar time, year-round. In Marion county, the best agreement between the sun and our "civil time" is on or around the date that we "fall back" to standard time (the actual date varies to ensure that it always occurs on a Sunday). Between this change and the "equation of time," civil time runs fast by only 28 minutes. But in late July, when we're observing daylight savings time, our clocks can run fast by as much as 111 minutes (i.e.: nearly two hours).

For whatever reason, most astronomers prefer to do their stargazing in the evening. The ability to observe is also impacted by the angle of the ecliptic (the path of the Sun across the sky) to the horizon, in addition to the length of the day itself. In central Indiana, the worst-case situation for evening observing occurs a few days past the summer solstice -- on or around June 24, when astronomical twilight² does not end until 11:21 PM! As you can imagine, this might be problematical for those who would like to do some astronomy on a weekday evening; not to mention see fireworks on Independence Day, go to a drive-in movie, or...

There is a movement to put the entire state of Indiana back in its geographically-correct time zone. Tax regulations prevent the IAS from influencing legislation; but individuals can certainly get involved. Astronomers who are interested in having more observing opportunities --

2 Astronomical twilight ends when the center of the Sun is 18 degrees below the horizon.

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especially in the summer -- might want to examine the following web site:
<http://www.hoosiersforcentraltime.com/>

Painting Help Needed at McCloud!

Our Warming Room/Equipment Storage Building at McCloud Nature Park needs some minor exterior work, a little preparation and painting. We'd like to find a few people to do the project at their leisure – the IAS will supply the materials and paint (but welcome your supplying/donating things too!). Please contact John Molt at his new email address if you can help, Thanks in advance! Johnmolt99@gmail.com

Yahoo Group - Urgent - You may not be getting your messages

We are finding that some of us are not receiving messages from the yahoo group. Our suspicions are that your email service is flagging the messages as spam and killing the message before it comes to you. If you go on the yahoo group <http://tech.groups.yahoo.com/group/ias-indy/> and look at the messages and note that you have not been seeing them in your email then you need to work it out with your internet provider. Below is an article from Yahoo that tells you how to do it.

This article describes why members of your group may not be receiving emails.

Resolution

If a member is no longer receiving email messages from your group, even though you have confirmed that messages are being posted, it may be that their email provider is mistakenly identifying the group's email messages as spam, or is failing to deliver them. The member should check their email's spam folder to see if the messages are being redirected there.

If messages aren't in their spam folder, they should contact their email provider to ensure that messages are being delivered.

When contacting their email provider, we suggest that they provide them with the following link:
<http://tech.groups.yahoo.com/group/ygmailadmin/>

There, we maintain an up-to-date list of Yahoo! Groups outgoing mailer IP addresses. In addition, we would be happy to work with their email provider to answer any questions they have. They can contact our technical team by sending an email to ygmailadmin-owner@yahoogroups.com.

I apologize for the problem and we are trying to get through it as best as we can. I suggest you go online and check for messages. I changed mine from Comcast to hotmail and am back up running as usual again.

Membership Status

The following changes in membership took place in March:

Total Membership: 138

Renewals:

New student members:

Brad Hines - Indianapolis

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New Members:

Durga Perumalla - Indianapolis

Robert Guernsey - Greenfield

Gene R. Leeuw - Indianapolis

Reactivated from Inactive status:

Inactive Status:

Bob Cherf – Carmel

Steve Gardner – Shelbyville

John McShanog – Indianapolis

Adam Rockhill – Westfield

Ao Zhou

Other News

ALPO - Call for Papers at the 2012 ALCon!

The Astronomical League will hold their annual meetings in Chicago, July 4-7. This is a perfect time to go to Chicago and attend an astronomical convention and here some really great presentations. They generally have discounts at hotels etc. Your wife can also go out and spend all the rest of your money without any trouble.

The ALPO will be convening at the Astronomical League's 2012 ALCon in Lincolnshire, Illinois. Go to the ALCon website at this URL - <http://alcon2012.astroleague.org/> for details about attending the upcoming ALCon.

The ALPO intends to have its own papers sessions and ALPO Staff and members are encouraged to participate in delivering their own paper presentations concerning Solar System astronomy and related topics at these paper sessions. ALPO papers will be scheduled for Friday morning, July 6, 2012 and all day Saturday. If you wish to give a paper presentation, please submit an abstract of your paper presentation and your request for audio/visual needs to ALPO Executive Director, Julius L. Benton, Jr. at this email address: jlbaina@msn.com.

Thank you for your consideration and we look forward to seeing you at the ALCon 2012!

Pay Your Dues by PayPal

We can now pay dues on our website using paypal. There is a cart system where you can pay dues, order magazines, or donate to the Society. Thanks to John Shepherd and Doug Sangunetti for getting it done. It was not as easy as it seemed. The cart is found in the Join the Society section of the website. You will have to establish a PayPal account for yourself to make the transactions.

Logo Clothing

The Board has developed a new supply of logo ware with our new logo using Mid Central Trophy in Kokomo, IN. Typically T shirts, sweatshirts, polo shirts, and caps are available. Now we are even making it easier for you. We have changed our method of order so that you can have better service. Call Linda, tell her this is an order for the IAS logo ware, discuss what you want and give her the size. She can determine the cost and shipping and mail the order to your home. directly.

Linda

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Mid-Central Trophy

422 Arnold Ct

Kokomo, IN 46902

765-453-5494

All Major credit cards are accepted.

Hours 9-5 EST

Onions and Orchids

A bouquet of orchids to Steve McSpadden for opening the grounds for the Daffodil Society on weekends for Mrs. Link's flowers. They were early this year but beautiful. Thanks Steve.

IAS Calendar of Events for April

April 14 General Meeting at Holcomb Observatory

April 10 Board Meeting 7:00 PM

April 20-22 IAS/WVAS joint two day star party Begins 4pm on the 20th.

April 21 Lyrids Meteor watch and public star part Indianapolis Museum of Art begins at midnight.

April 28 NAG begins at McCloud 30 minutes before Sunset

We really need scopes at public events, please contact Gerald Venne at events-coordinator@iasindy.org

Observing Activities

Activities for April:

Link Observatory - None Planned

McCloud Activities– NAG begins April 28 Lecture at 7:30

The New Astronomer's Group is Changing

The staff at McCloud Nature Park has asked that the IAS provide a monthly outside What's Up Tonight sky tour and observing without a classroom instruction beforehand. These will be held as published on our IAS Events calendar on our website but won't happen if the weather isn't conducive to observing.

This now will enable us to provide more in-depth programs for our members before meeting with the general public – they're welcome to join us for the classroom program but it probably won't be published in Hendricks County Parks fliers or on their website.

We'd like input from our members both via our IAS Yahoo Groups site and at the General Meeting following our speaker on April 14th

Prairie Grass Observatory Activities–

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We are scheduled for our annual joint IAS/WVAS campout and two day party at Camp Cullom. The event begins at 400PM on April 20. You can stay the weekend.

We are able to go to the Link, Prairie Grass Observatories, and McCloud Nature Park at non scheduled times if they do not conflict with reserved activities:

For those interested in going to The Link Observatories for observing call John Shepherd at 1 317-862-3442.

For those interested in going to McCloud to observe, please call the park office 765 676 5437 before 4PM on the day you want to go out. They will give you permission to be there at night and make arrangements to cut off the lights.

For those interested in going to Prairie Grass Observatory for observing call Hoppe at 1-765-296-2753.

Other Observing Activities

On April 2,1 we have an event at the Indianapolis Museum of Art beginning at midnight to watch the Lyrids meteor shower. Map is on the website in our IAS events section. We also need scopes to show the sky to the public.

IU Kirkwood Observatory Bloomington

The Kirkwood Observatory Solar Telescope is open on the "First Saturday" of each month from 1-3 PM. Viewers may even be able to see a solar prominence or two weather permitting. Updated weather conditions and closings will be posted at the Kirkwood Observatory Hotline at (812) 855-7736, and at the Observatory webpage, <http://www.astro.indiana.edu/kirkwood.shtml>.

Monthly openings of the solar telescope are planned for the first Saturday of each month during our 2011 and 2012 observing seasons. And if you want to follow the Sun in between our monthly Solar Telescope openings, the website www.spaceweather.com provides daily updates.

Kirkwood Observatory on the IU campus is open each Wednesday evening from spring break until mid-November, weather permitting! Join us for a night of observing the night sky with the Kirkwood 12" refractor. Please visit our schedule at <http://www.astro.indiana.edu/kirkwood.shtml>, for a list of dates and times. For updated weather conditions and closings, please call the Kirkwood Observatory Hotline at (812) 855-7736.

Star Gazer

March 23, 2012

Stargazer #577

April 2012



Your guide to the stars: This chart shows the night sky as appears at **11 p.m. early in the month, 10 p.m. at mid month, and 9 p.m. late in the month from latitude 30° N**. Hold the chart so the direction you are facing is at the bottom. For example, if you are facing north, turn the chart around so "Northern Horizon" is at the bottom as you hold it out in front of you. The stars on the lower part of the chart are those you will be facing in the sky. The stars at the chart's center represents the part of the sky straight overhead. *[Sky chart generated using Cartes du Ciel freeware.]*

To keep your eyes adjusted to the darkness as you look at the night sky, use a red-light flashlight to view the chart. You can make your own by putting red cellophane over the light or by coloring the lens of the flashlight with a red marker pen.

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- **Sun**
Apr. 1 – Sunrise: 7:15 a.m.; Sunset: 7:48 p.m. / Apr. 15 – Sunrise: 7:00 a.m.; Sunset: 7:57 p.m. / Apr. 30 – Sunrise: 6:44 a.m. Sunset: 8:08 p.m. [Times exact for Waco, TX]
- **Moon**
Apr. 6: Full / Apr. 13: 3rd Quarter / Apr. 21: New / Apr. 29: 1st Quarter
- **Night Sky Events** [*Held at arm's length, the width of your fist is 10° and the width of your index finger is 1°. The width of a full Moon is 1/2°.*] [** = don't miss events]

**** Apr. 2 Mon. and 3 Tue. evenings:** Venus grazes the beautiful Pleiades star cluster (AKA the Seven Sisters) and should create a beautiful sight with naked eyes and through binoculars.

3 Tue. evening: The bright waxing gibbous Moon is 10 degrees below Mars.

6 Fri.: The full Moon, called the Egg Moon, Grass Moon, and Easter Moon, is immediately to the right of Spica (nearest) and Saturn, although the Moon's glare will make seeing them challenging.

13 Fri.: Friday the 13th, considered unlucky by the superstitious, comes around for the second of three 2012 occurrences, the last time coming in July.

11–16 Wed.-Mon. evenings: Venus passes within 10 degrees to the right of the star Aldebaran and the V-shaped Hyades star cluster.

13 Fri. morning: The Moon is at 3rd quarter.

15 Sun.: Mars, having moved back to within 4 degrees of Regulus, resumes direct (eastward) motion (as seen against the background stars) and will again begin moving away from the star.

15 Sun. all night: Saturn is at opposition – rising in the east at sunset and setting in the west at sunrise – and is at its nearest, brightest, and largest-appearing for the year.

18 Wed. morning: Mercury is at greatest elongation 27 degrees west of the rising Sun. The crescent Moon is less than a fist-width (7 degrees) above the tiny planet, and the next morning an even thinner crescent Moon is one fist-width to the left – very low in the east as dawn breaks. Binoculars will help.

21 Sat.: The Moon is new.

22 Sun. morning: Lyrid meteor shower peaks with no Moon interference this year.

22 Sun. early evening: The thin crescent Moon is 4 degrees above Jupiter near the west northwestern horizon at dusk.

23 Mon. early evening: The crescent Moon is in Taurus with the Pleiades star cluster 6 degrees to its lower right and the star Aldebaran 8 degrees to its upper left – all near the west northwestern horizon as the evening sky darkens.

24 Tue. early evening: Tonight the crescent Moon is now 7 degrees above Aldebaran with Venus 6 degrees to the Moon's upper right.

29 Sun. evening: The Moon is at 1st quarter.

30 Mon. evening: “Evening star” Venus is at its brightest at magnitude -4.5; other than fleeting events like fireball meteors, only the Sun and Moon outshine Venus.

30 Mon. evening: Reddish Mars (left), the Moon (below), and the star Regulus (upper right) form a triangle high in the SSW.

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- **Naked-eye Planets** [*The Sun, Moon and planets rise in the east and set in the west due to Earth's west-to-east rotation on its axis.*]

Evenings: Jupiter, Venus, Mars, Saturn

Mornings: Mercury, Saturn

* *Mercury*, low in the east all month, is at its best during mid-month.

* *Venus*, the dominating “evening star” in the west, still sets nearly four hours after the Sun.

* *Mars* is up most of the night, setting just before dawn.

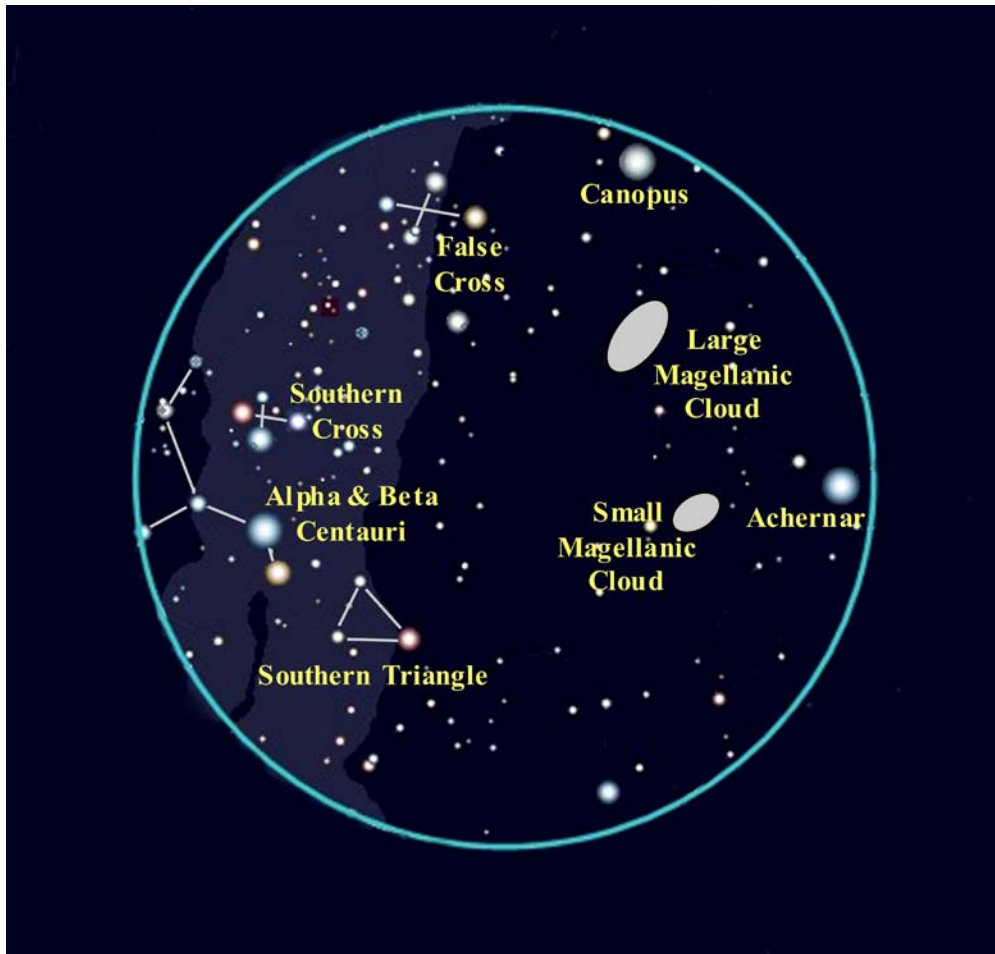
* *Jupiter*, low the west in the early evening, starts getting lost in the setting Sun by month's end.

* *Saturn*, up by 9 p.m., is in the southwest by morning.

- **Advance Notice**

It's now only 12 years until the Apr. 8, 2024, total solar eclipse passes over the U.S. from Texas to Maine.

- **South Circumpolar Region**



- **[Image: South Circumpolar Region (from Wikimedia Commons)]**

- In the northern hemisphere we have a section of the night sky we call the Circumpolar Region consisting of those stars and constellations that never dip below the northern horizon as they circle the north celestial pole (and Polaris) each day. We should call it the North Circumpolar Region since the southern hemisphere has a comparable South Circumpolar Region consisting of the stars and constellations that never dip below the southern horizon as they circle the south celestial pole.
- And it is those stars, constellations, and other night sky objects of the South Circumpolar Region that we in the U.S. can't see from our mid-northern latitudes as they never rise above our horizon. Getting to see these hidden jewels is why we northern stargazers get excited about viewing below the equator in places like New Zealand. In a recent column, we cited some of these, like the Southern Cross constellation, stars Alpha and Beta Centauri, Canopus, and Achernar, and the Eta Carina Nebula.
- The South Circumpolar Region is also home to two small galaxies known as the Large and Small Magellanic Clouds. Although the explorer Ferdinand Magellan gets credit for "discovering" them in 1519, they were, of course, undoubtedly known to southern hemisphere natives long before the 16th century. But since neither they nor Magellan knew about galaxies at that time, the Europeans called them clouds and named them for Magellan.
- The LMC and SMC are each composed of millions of stars and are believed to be companion galaxies gravitationally bound to our much larger Milky Way Galaxy. Whereas the Milky Way is 100,000 light years in diameter, the LMC is 33,000 light years and the SMC 20,000 light years in diameter. The LMC is 163,000 light years away and the SMC 196,000 light years distant – quite close compared to the Andromeda Galaxy's distance of 2+ million light years.
- Easily visible to the naked eye under dark skies, they appear like cosmic clouds, hence their names. Being galaxies, it's not surprising that they look like someone took two patches out of the Milky Way and placed them some distance away. The LMC spans some five degrees with the SMC half that size. (Your fist held at arm's length is about 10 degrees wide.)
- Ironically, the Southern Circumpolar Region, which we never see, is always visible to most residents of the southern hemisphere all night and throughout the entire year, just as the Northern Circumpolar Region is always visible to us. And while in New Zealand, I was reminded by fellow stargazer Gary Roberts, who has lived in New Zealand all his life, that they never see the stars, constellations, and other night sky objects in the North Circumpolar Region. He lamented that has never seen the Big Dipper, Cassiopeia, Polaris, or even the Andromeda Galaxy.
- **Astro Milestones**
 - * April 12 is the 51st anniversary of *Yuri Gagarin's* 1961 historic 108-minute orbital flight around Earth – the first for humankind.
 - * April 21 is the 50th anniversary of the 1962 landing of *Ranger 4*, the first American spacecraft on the Moon. Intended to soft-land scientific instruments on the lunar surface, a malfunction caused the craft to crash-land, but even that was progress as previous attempts had missed the Moon entirely.
 - * Apr. 25, 1990, the 8-foot (in diameter) *Hubble Space Telescope* was deployed by Discovery space shuttle astronauts, but the almost-immediate discovery of defective optics was met with bitter disappointment. Thanks to some ingenious scientists, engineers, and astronauts, corrective optics were installed in 1993, and to this day astronomers are using HST to make remarkable discoveries. And its thousands of images of our cosmos continue to dazzle us like no other scientific instrument.

March 9, 2012
Stargazer #576

More Stargazing Below the Equator

This column, like the previous two, comes to you from the small but fascinating country of New Zealand situated deep in the Southern Hemisphere nearly a thousand miles southeast of Australia. The natural beauty, rich diversity of scenery, and many other factors (like friendly people and no snakes or poison ivy) make this land a virtual paradise.

And for stargazers, getting to see stars, constellations, and other night sky objects in the Southern Celestial Hemisphere is a thrill. But as reported last time, I've been frustrated by cloudiness and have to keep reminding myself that the Maori – the Polynesians who first settled the islands nearly a thousand years ago – named it Aotearoa, "land of the long white cloud." And it's the rains from the clouds that give so many places in New Zealand a lush tropical rain-forest feel. Still, I'd sure like more clear nights.



Image: Clouds like these over New Zealand's Southern Alps mountains suggest why the Maori called the land Aotearoa, the "land of the long white cloud." (photo by author)

One clear evening I did get to set up my wife's spotting scope (which she uses for birds) in the parking lot of a back packer (hostel) in which we were staying. Before long a small group

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assembled and we had a spontaneous mini-star party with folks from Canada, England, Holland and the U.S. When I pointed out Venus and Jupiter, the young man from Holland expressed surprise that the planets could also be seen from “down” here.

It gave me an opportunity to explain about the Sun's path across the sky (called the ecliptic), and how the Moon and planets also follow the same path as they move through the sky. And just as the Sun can be seen from all places on Earth, so can the Moon and planets. Owing to the Earth's west-to-east rotation on its axis, the Sun, Moon and planets all rise in the east and set in the west above and below the Equator.



Image: Venus (lower left) and Jupiter setting at dusk over the Coromandel Peninsula on the eastern coast of New Zealand's North Island (photo by author)

Still, there are differences. From the Northern Hemisphere, the ecliptic tilts toward the south whereas in the Southern Hemisphere it tilts toward the north, and that can be disorienting. When we in the north see the Sun move across our sky each day, we're facing in a southerly direction, and the Sun moves left-to-right across our sky. And it's the same with the Moon and planets at night.

However from the Southern Hemisphere and facing in a northerly direction, they move right-to-left – backward from what we're used to. Even during the day this is confusing: we're accustomed to seeing the morning Sun to our left and the afternoon Sun to our right, and can almost unconsciously estimate the approximate time of day with a quick glance at the Sun's location. But here, we northerners have to consciously remember to reverse things in our mind and realize that the morning Sun will be to our right and the afternoon Sun to our left.

There is also another difference. As mentioned previously, most constellations can be seen from both the Northern and Southern Hemisphere, yet when seen from south of the Equator, they

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appear upside-down to us northerners. And it's the same with the Sun, Moon, and planets – they too appear upside-down. While that's not noticeable with the Sun and planets (viewed naked-eye), the full Moon's “man in the Moon” is hard to make out as he too is upside-down.

And there are yet a couple of other notable departures from what we're used to seeing. In the Northern Hemisphere, circumpolar stars and constellations rotate around the North Star (Polaris) in a counterclockwise direction whereas in the Southern Hemisphere they rotate clockwise – and they rotate around an essentially empty space in the night sky.

By chance, we have a reasonably bright star – a star we have named Polaris (the North Star) – almost straight up from Earth's North Pole. But in the Southern Hemisphere they're not so lucky as there is no bright star straight above the South Pole, and hence no South Star.

On another note, I had an interesting experience while walking in a small town. A passing stranger looked at my t-shirt, smiled big, and gave me a thumbs-up. At first I was puzzled, but quickly realized I was wearing my “Bring back Pluto” t-shirt. I guess Pluto-lovers are found around the world.

A final issue not related to stargazing is worth mentioning. After our 2001 trip to New Zealand, I was asked if I noticed water draining down basins and toilets in a reverse direction. In fact, that popular notion is a myth. A phenomenon called the Coriolis effect, caused by the rotation of the Earth, does affect large-scale systems like hurricanes which rotate counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.

But the effect is far too weak to influence the rotational flow of things in our every-day life, like water down drains, except under highly controlled laboratory situations. Other factors – like the direction from which the water enters a toilet or basin or other subtle currents within the water – determine the direction of rotation. If you make it a point to notice such things, you'll find clockwise and counterclockwise motions occur with about equal frequency.

Paul Derrick, PhD

918 N. 30th St. * Waco, TX 76707

254-753-6920 (home) * 254-723-6346 (cell)

See my Stargazer website at:

*** * stargazerpaul.com * ***

NASA Space Place

The Planet in the Machine

By Diane K. Fisher and Tony Phillips

The story goes that a butterfly flapping its wings in Brazil can, over time, cause a tornado in Kansas. The “butterfly effect” is a common term to evoke the complexity of interdependent variables affecting weather around the globe. It alludes to the notion that small changes in initial conditions can cause wildly varying outcomes.

Now imagine millions of butterflies flapping their wings. And flies and crickets and birds. Now you understand why weather is so complex.

All kidding aside, insects are not in control. The real “butterfly effect” is driven by, for example, global winds and ocean currents, polar ice (melting *and* freezing), clouds and rain, and blowing desert dust. All these things interact with one another in bewilderingly complicated ways.

And then there’s the human race. If a butterfly can cause a tornado, what can humans cause with their boundlessly reckless disturbances of initial conditions?

Understanding how it all fits together is a relatively new field called Earth system science. Earth system scientists work on building and fine-tuning mathematical models (computer programs) that describe the complex inter-relationships of Earth’s carbon, water, energy, and trace gases as they are exchanged between the terrestrial biosphere and the atmosphere. Ultimately, they hope to understand Earth as an integrated system, and model changes in climate over the next 50-100 years. The better the models, the more accurate and detailed will be the image in the crystal ball.

NASA’s Earth System Science program provides real-world data for these models via a swarm of Earth-observing satellites. The satellites, which go by names like Terra and Aqua, keep an eye on Earth’s land, biosphere, atmosphere, clouds, ice, and oceans. The data they collect are crucial to the modeling efforts.

Some models aim to predict short-term effects—in other words, weather. They may become part of severe weather warning systems and actually save lives. Other models aim to predict long-term effects—or climate. But, long-term predictions are much more difficult and much less likely to be believed by the general population, since only time can actually prove or disprove their validity. After all, small errors become large errors as the model is left to run into the future. However, as the models are further validated with near- and longer-term data, and as different models converge on a common scenario, they become more and more trustworthy to show us the future while we can still do something about it—we hope.

For a listing and more information on each of NASA’s (and their partners’) Earth data-gathering missions, visit <http://science.nasa.gov/earth-science/missions/>. Kids can get an easy introduction to Earth system science and play Earthy word games at <http://spaceplace.nasa.gov/ecosphere> .

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



CloudSat is one of the Earth-observing satellites collecting data that will help develop and refine atmospheric circulation models and other types of weather and climate models. CloudSat's unique radar system reads the vertical structure of clouds, including liquid water and ice content, and how clouds affect the distribution of the Sun's energy in the atmosphere. See animation of this data simulation at www.nasa.gov/mission_pages/calipso/multimedia/cloud_calip_mm.html.

IAS LIBRARY:

There is a link on our website page for our Multi-Media Library containing a multitude of videos that are on the web. We think it will be a great addition to our library for both novices and experienced observers.

Do you have a question or need?

We have established a list of members who would be willing to receive calls for help on specific objects. If you have a specific skill and would be willing to help others please contact Jeff Patterson KB9SRB@hotmail.com.

Based upon the responses we received to your intro question recently, perhaps we should add a section to the bulletin naming those members who would be willing to receive calls for help on **specific subjects**.

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William Conner (wmtconner@att.net) - for CCD imaging and film photography.

Jeff Patterson (Contact Jeff via the webpage iasindy.org under the contact us section) –

Observatory design and construction

Eric Allen (ericandroberta@sbcglobal.net) - Telescope making and mirror grinding

Brian Murphy (bmurphy@monumentcompanies.com) - "telescope construction and collimation".

Public Outreach Programs – If you want to schedule a program at the Link Observatory or at your site, please contact the following people:

Gerald Venne is our Public Events Coordinator. He will be responsible for coordinating Public Events for the IAS. To schedule a public event contact Gerald Venne (Contact Gerald via the webpage iasindy.org under the contact us section).

He needs your help. Let Gerald know if you would like to show the public our sky. We need people to help at Link and elsewhere. It is actually a lot of fun.

If you would like to schedule the Goethe Link Observatory, please contact

John Shepherd. Contact John via the webpage iasindy.org under the contact us section)

Astro Ads

Are you changing or upgrading your equipment? Do you have or are you looking for astronomical materials and equipment? The Indiana Astronomical Society as a service to its members, will publish non-commercial ads at no charge. The ad will stay in the Bulletin for 4 months and may be renewed at the owner's request.

To place an ad, contact:

Bulletin Editor

Jeff Patterson

1780 S. Morgantown Rd.

Greenwood, IN 46143

(317) 300-0449

E-Mail: KB9SRB@Hotmail.com

For Sale: MEADE 8" F/4.5 NEWTONIAN

Includes German Equatorial Mount with three counterweights, felt-lined mounting rings, RA and Dec slow motion controls, accessory tray and 6x30 finder scope. Eyepieces include 25mm MA and 9mm Ortho. All instruction manuals are included.

Additional Accessories:

- * Quartz RA motor drive incl battery pack
- * Polar alignment viewfinder
- * 12.5mm illuminated reticle eyepiece
- * Meade 60mm guidescope with mounting rings and 1.25" diagonal
- * 1.25" camera adapter
- * Piggyback camera bracket

Aluminized mirror has been cleaned and collimated. Optics are excellent, like new.

Telescope is in very good condition. A complete package for wide-field astrophotography and deep sky observation.

Asking \$450.00 – Call Bill at 892-2036 or e-mail at bwilhite@tds.net.

For Sale or Trade: CELESTRON HEAVY-DUTY TRIPOD, WEDGE, DRIVE, FORK ARMS
Heavy-duty tripod and wedge for the classic C8. Tripod has 2" legs that are extendable with step-locks and has a center post with an integral leg spreader. Wedge is cast iron with a hand-screw latitude adjustment. These components were built to last a lifetime and then some. I'm also including the drive base, fork arms, and power cord. This is the old-style base with the RA spur drive (no worm). The drive has slow-motion controls and setting circles and yes, it still works.

The C8 optical tube assembly is NOT included. \$300 takes all. I will also consider taking a good wide-field eyepiece in exchange (20mm f.l. minimum). Contact bruce.bowman@tds.net or call 317-539-2753

Equipment Loan Program

The Loan Program has been helpful to those new to the hobby and others in need of observing equipment. We consider offers of equipment you may not have need for any longer.

Did you know you could borrow a scope or piece of astronomy equipment from the Society and take it for a test drive? The Society has a program where members who are trying to determine what kind of equipment to buy can borrow one of the Society's scopes for a month or two and see how they like it. Philip Dimpelfeld is the chairman of the program and can arrange for your pickup and training on the use of the particular instrument. This is a great way to see what telescope you want to purchase. We have several scopes, eyepieces and binoculars to loan. Philip Dimpelfeld **Contact via the webpage iasindy.org under the contact us section**

Board Meeting –April 10, 2012

The IAS Board Meeting is being held at 430 Massachusetts Avenue in downtown Indianapolis. The building is at the point of convergence of Mass. Ave., Vermont and Alabama Streets. There is a Starbucks located in the frontage of the building. The coffee shop stays open late into the evening. Try to park as close to Starbucks as possible, preferably in a metered space. On-street parking is free after 9pm. Some meter sites are still free after 6PM but are hard to find. . Handicapped parking is directly in front of Starbucks entrance. The entrance to the building is to the left of Starbucks around on the side. We meet in the basement. Ride the elevator (around the corner to your left) to the basement. Turn right as you exit the elevator and go through the first door on your right. This is the conference/meeting room. If you need further assistance, please contact Jeff Patterson via the webpage iasindy.org under the contact us section

2012 Calendar of Meetings

	NAG	General	Board
January		14	17
February		11	14
March		10	6
April	28	14	10
May	8	12	8
June	None	9	12
July	28	14	10
August	25	11	7
September	22	8	4

IAS News and Views

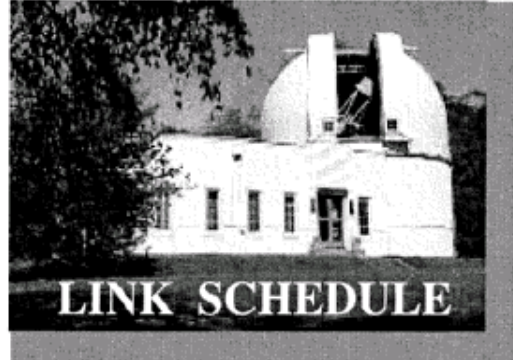
October	20	13	9
November		10	6
December		15	

Goethe Link Observatory

Observatory Address

**Goethe Link Observatory
8403 N. Observatory Lane
Martinsville, IN 46151**

Latitude: 39 degrees, 33 minutes north
Longitude: 86 degrees, 24 minutes west
Phone: (317) 831-0668



This schedule is being published to assure proper access to the Link Observatory for programs that are designed as observational, general education, astronomy conferences, or amateur research projects. Training programs are tentatively scheduled for Saturday evenings only. Although other requests can over-ride these sessions. It is the purpose of this listing to prevent activity conflicts.

If you need to acquire use of the 36-inch telescope: remember two important IAS guidelines: 1) *There has to be two or more IAS members present.....*2) *contact the Observatory Manager: John Shepherd* **Contact via the webpage iasindy.org under the contact us section. DON'T WAIT UNTIL THE LAST MINUTE TO MAKE YOUR REQUEST OR YOU MAY NOT GET ACCESS.**

IAS News & Views Stats

Accessing the IAS News & Views

The current bulletin can be found on the website www.iasindy.org

IAS News & Views

The monthly newsletter welcomes articles of local astronomical interest information and want ads:

Please submit to

The Indiana Astronomical Society, Inc

Jeff Patterson, editor

1780 S. Morgantown Rd

Greenwood, IN 46143

Phone: (317) 300-0449

KB9SRB@hotmail.com

Membership information Contact via the webpage iasindy.org under the contact us section

Contact any IAS officer or the Treasurer John Shepherd or Vicki Switzer

Observatory Manager

John Shepherd **Contact via the webpage iasindy.org under the contact us section**

Public Event Coordinator

Gerald Venne Contact via the webpage iasindy.org under the contact us section

Equipment Loan Program Coordinator

Philip Dimpelfeld Contact Phil at philip.dimpelfeld@comcast.net

Membership Coordinator

Vicki Switzer Contact Vicki via the webpage iasindy.org under the contact us section

APRIL Calendar, 2012

For a more detailed Calendar of Events see the webpage www.iasindy.org

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6 Full Moon ○	7
8	9	10 Board Meeting 7PM	11	12	13 3rd QTR ☾	14 General Meeting Holcomb Observatory 7PM
15 TSP	16 TSP	17 TSP	18 TSP	19 TSP	20 Joint IAS/WVAS Star Party Camp Cullom TSP	21 New Moon ● TSP
22	23	24	25	26	27	28 NAG 7:30
29 1 st QTR ☾	30	31				