Indiana Astronomical Society
Members Holiday Party
Saturday, December 12, 7:00 PM
Holcomb Observatory

Annual Holiday Party and Election Night

Our annual Holiday Party will be held at Butler University’s Holcomb Observatory beginning at 7:00 pm. IAS member, Paula Magar, will again provide the meat — a spiral ham and two roast turkey breasts. She also plans to bring her macaroni and cheese casserole. Condiments and rolls will be supplied. The Society will also furnish bottled water and coffee, as well as plates, cups, napkins, and eating utensils.

Members whose last name begins with A-Ma – please bring an appetizer, vegetable dish, salad, or fruit platter. Members whose last name begins with Mc-Z – please bring a dessert. Please also RSVP to membership@iasindy.org by Tuesday, Dec 7 and let us know how many people will be attending (those who signed up at our November general meeting need not do so again).

The party is open to IAS members, their families, and invited guests. There will be a short business meeting at the beginning of the evening to elect next year’s officers and board members. We will then break to enjoy good food and conversation with friends. We’re looking forward to seeing you there!

From the President’s Desk

During 2015 we have seen major accomplishments at Link and Tanager Hill Observatories. Indiana University made significant access improvements to Link by installing new front steps and safety hand rails for the front steps. We followed up with lighting for the front steps. Tanager Hill Observatory was dedicated during our annual Hog Roast after considerable work by Mike Kirsh, his construction company and IAS members. We now have two fully-functional, large-aperture telescopes for general and deep-sky observing.

I want to complement our qualified Telescope Operators who have made the 36" Link telescope available for observing by IAS members and the public. We currently need members who are interested in qualifying for Tanager Hill operations. Please contact Fred Keller for more information.

Link Observatory Space Science Institute (LOSSI) is moving forward with plans to make major improvements and additions to Link site facilities. Indiana University is in favor of these actions and
has joined in the planning. We will have a full presentation to the membership from LOSSI at one of our General Meetings early next year.

West preliminary alternatives to Interstate 69, Section 6 routing is a current major concern due to proposed interstate interchanges that would be built within one mile of Link. These proposed interchanges would create significant increases in sky-glow adjacent to the Link due to high-intensity interchange lighting. We will provide Indiana University with information on IAS and LOSSI utilization of the Link and Tanager Hill Observatories and assist in their response to this threat to the sky over the observatories. I will represent the Indiana Astronomical Society and make a presentation at the public meeting at Mooresville High School to express our preference that I-69 be routed up the previously established Highway 37 corridor rather than the west alternatives. We will also express our concern about light pollution at the interchanges that may be built to the north and south of Link if a west alternative route ends up being chosen. I intend to make certain that INDOT is aware of the observatories, the current and future activities conducted there and the need to minimize light trespass and sky glow in our area.

IAS Members are encouraged to make presentations at the public meetings concerning the impact on their own properties or activities in the area; however, we must be careful NOT to infer that we represent Indiana University. IU, with its staff of lawyers and property interests in the area has political clout that we do not possess. IU will be much more effective in protecting Link, Tanager Hill and perhaps Bradford Woods observatories, but at this writing I do not know what IU’s position will be. Please do not mention IU or IU’s use agreement with the IAS in your presentations. We do not want to compromise or complicate any position that IU decides to take.

Elections – The Nominating committee has presented a slate to the Board for our 2016 elections. Details on nominees are in this newsletter along with an absentee ballot should you be unable to attend the December meeting. Please ensure that you get the member’s agreement to serve before submitting a write-in candidate. We do not want to put anyone on the spot during the voting at our 12 December general meeting at Holcomb Observatory. There are no bylaw updates this year.

We need IAS members to step forward to deliver presentations at our general meetings in 2016. These can be feature or “new astronomer’s” presentations. We know that many of you have the background knowledge and/or sufficient personal experience to deliver interesting talks. We do not expect you to be “an expert from out of town” or polished lecturer. This is an opportunity to present to the membership an astronomical topic that is of interest to you. Please contact Ken Magar with your proposal. In other words, get off your fanny and show us you are not a couch potato. We need your help to make our meetings interesting and informative.

Have a joyful holiday season with your family and friends.

— The Pres

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**IAS NEWS**

**Upcoming Events for December**

*The following events will occur rain or shine.*

**IAS General Meeting**

_Saturday, December 12 at 7:00 PM, Holcomb Observatory._ Tonight the IAS will hold their annual holiday party and elections. This is a members-only function.

There are no board or LOSSI presentations scheduled for December.
Observing Activities for December

The following events are weather-dependent and subject to last-minute cancellation. Please monitor the IAS Yahoo group for updates and do not drive out until you receive confirmation that it’s a “go.”

Link Activities (Members and Invited Guests) —

The IAS has a Deep-Sky observing session scheduled to occur on the Link Observatory grounds during the night of December 11. There will be no camping this month.

Public vs. Members-Only Events

Below please find some guidelines on inviting guests to IAS functions. Please keep these in mind while discussing upcoming events in social media.

- The annual hog roast and the holiday party are restricted to IAS members and their immediate families. These events require substantial planning to ensure adequate seating, food and beverages. Such details have proven difficult to manage if the public is invited.

- Monthly deep-sky observing is for IAS members and “invited guests” only. These sessions are often cancelled due to inclement weather or lack of an available key holder. We have no reliable way to contact non-members when this happens.

  If you invite a guest, it is your responsibility to both serve as host and advise them of any last-minute changes/cancellation. Also consider bringing your own scope, as the 36” is likely to be occupied with member projects.

- School events are carried out for the benefit of the school and inviting guests is inappropriate.

- Public events include our general meetings (with the exceptions mentioned above), McCloud stargazes, presentations/observing events at libraries, and LOSSI presentations. These events are listed in our calendar and last-minute changes are unlikely. When changes do occur, you will be notified on Yahoo and/or Facebook.

Coordinator Sought

The IAS is still seeking someone to fill the role of coordinator for New Astronomer’s Group (NAG). The NAG Coordinator is responsible for developing and presenting NAG programs, which are held during or immediately after the general meetings. The IAS has a library of 17 PowerPoint presentations, all of which are well-annotated with presenter’s notes. We just need someone to deliver them; or you can do something entirely different if you have other ideas on how to manage NAG.

If interested in serving in this capacity, please contact the IAS President.

Observing and Outreach Reports

All IAS members are encouraged to submit their observing reports, whether at IAS events or not!

October 29 (Carmel High school) — I did attend tonight. I was the only one. It went well and I enjoyed the experience.

The clouds never cleared so I set up in the hallway and used a portrait 200 feet away as my subject. I focused both of my scopes (4” and 11”) on the subject both at 70×. I explained to people why the subject was inverted and why the bigger scope had a better brighter image. Also, with the setup in a well light area people were able to see what the scopes really look like. In normal situations it is dark and the scopes are not as visible.
I estimate 30 people stopped to look and I was there for about an hour talking with people after the planetarium show ended.

So I would say it was a success. Definitely the kind of thing I joined the IAS for.

— Joel Sawaski

October 31 (Asteroid 2015 TB145) — I looked out my back door around 11:30 and saw nothing but flat, grey skies so I said “$@#!* you Indiana weather” and went to bed.

So…no!

— Mike Newberg

[Remarkably enough, ground-based radar images of this Halloween interloper bear a vague resemblance to a skull. — beb]

November 13 (impromptu session) — Mike Conover, Rick Betuker and Jon Thomas attended for a beautiful night at McCloud Nature Park. Nice dark and clear skies. We all were hitting the same objects so we could see different perspectives in the types of scopes. I had an 8" SCT, Mike Conover a 6" Newtonian reflector, and Rick Betuker had a 5" f/6 APO refractor.

Highlight Objects Observed.

- M27 - Dumbell Nebula
- M31 - Andromeda Galaxy
- M32 - Satellite Galaxy to M31
- M33 - Triangulum Galaxy
- M42 - Orion Nebula: we could see much more nebulosity once it was higher in the sky and could make out the 4 stars in the center really well
- M110 - Satellite Galaxy to M31
- NGC457 - Owl/E.T./Fighter Jet Open Cluster: Always a favorite
- NGC884 - Half of Double Cluster in Perseus: was able to get both clusters in the 8"SCT eyepiece. Was even more spectacular through the F6 5" refractor with the wider view!
- NGC869 - Half of Double Cluster in Perseus
- NGC7789 - Caroline's Rose Open Cluster: First time viewing this cluster for all of us. Very beautiful outer shape and bands through the middle making up the rose. Loaded with stars.

We all finished up around 11:45PM. Nice 3-4 hrs!

On the way out we also saw a couple with a 12" Dobsonian along the gravel road leading out of McCloud. I told them about the Indiana club and told them to check it out!

Wonderful night! I had a great time!

— Jon Thomas

November 14 (Deep-sky session) — Saturday evening we had a good time at Link Observatory. Fred and Laura Keller, Steve and Wayne McSpadden, and Mike Birch saw all ten objects on our DSO list but even though we had the correct star pattern, I couldn’t say that we saw the challenge object.

As we were finishing the list the stragglers started arriving including Rick Betuker, Mark and Katelyn Healey, Brian Matz, and two more people for whom I got no names. We wanted these late-comers to actually see something in the 36" so, in no particular order, we looked at M57, M27, M15, M78, M79, Neptune, Uranus, NGC7331 and a few members of Stephan’s Quintet.
IAS News and Views

Bill Conner stopped by and tried again to help us find the challenge object but we couldn’t get enough photons to his retina to claim that he saw it.

All of our guests left happy so it was a successful mission. — Steve McSpadden

Election Night

In accord with the Bylaws of the IAS, elections will take place during the Annual Meeting to be held December 12, 2015 at the Holcomb Observatory on the Butler campus. The meeting begins at 7 PM. Positions will be filled by majority vote. All members in good standing and their spouses are eligible to vote.

If you cannot attend, you may instead send in a signed absentee ballot (provided on page 8). Absentee ballots must either be received by mail prior to the election, or handed in person to the Secretary. Proxy votes and late-arriving ballots will not be recognized.

The Nominating Committee report is appended below. Additional nominations may be made from the floor. All nominees must agree to serve prior to the election; this includes any persons nominated by write-in.

The Report of the Committee on Nominations

The following slate of candidates has been received and the candidates have agreed to run.

President – Bill Conner
Vice President/Program Chairman – Ken Magar
Treasurer – John Kramer
Secretary – John Molt

Board of Directors (two to be elected):
Dave Hollinberger
Mike Newberg
Ed Rhoads
John Shepherd

Report presented by Bill Conner, Nominating Committee

Candidate Bios

Bill Conner — Bill Conner has served as President of the Indiana Astronomical Society for the past three years. With the assistance of the Board of Directors and active members he has guided the Society’s progress in renovating and reclaiming IAS use of the recently renamed Tananger Hill Observatory. He has coordinated our activities with the Link Observatory Space Science Institute, maintained cordial and productive relations with Indiana University and participates in Star Party and public programs. Bill requests your vote for one more year as President.

Ken Magar — I have been member of the IAS for 9 years. I have served as your Vice President and Program Director for the past year. In this position I am responsible for finding and scheduling our monthly guest speakers. This can be a challenge sometimes, but also very rewarding when I see that the membership enjoys the program. In 2016, I hope to be able to continue bringing the membership speakers that are interesting and expand our knowledge in astronomy. Thank you for your support.
John Kramer — Married to Beth Kramer, with two children, Henry (8) and Madeline (6). I have been a member of the IAS for more than 10 years, and I have been a board member, past Vice President, and current Treasurer of the IAS. I enjoy science of all types but mostly physics and astronomy. I have an 8" Schmidt-Cassegrain, an 8" Dobsonian, and a 16" Dobsonian. My hobbies, when time allows, include observing and participating in outdoor activities (including Cub Scouts) with my children.

John Molt — A self-employed arborist, in the past holding Board and Officer positions in the Indianapolis Landscape Association, Indiana Arborist Association and the IAS - currently the Secretary. Also in the past; Coordinator for the Equipment Loan Program, the New Astronomer’s Group and the McCloud Stargaze.

Born in Chicago, raised around Indianapolis; father to a daughter and stepson - an advocate for nature, enjoying mostly astronomy, camping, streams and ponds, forests and creatures of all sorts. Not much of a sports enthusiast except for NASCAR and hockey-playing until injuries were too frequent.

Serious interest in astronomy surfaced late in life and has rewarded me with many friends and adventures. Observing deep sky objects at star parties in somewhat dark locations has been much of my enjoyment; logging and attempting to sketch some is on the horizon.

Part of the dedication to family, friends, community or hobbies lies is being of service to others - as each gives, we receive.

Dave Hollinberger — I am a retired engineer who worked for 35 years for the U.S. Navy, Naval Avionics Center Indianapolis (now Raytheon) and Naval Surface Warfare Center Crane, south of Bloomington. At Naval Avionics Center, I worked with John Herp, a long-time IAS member, who told me tales of a 36" telescope hidden deep in the hills south of Mooresville and who encouraged me to join IAS, which I finally did in 2007.

Over the next few years I learned that I have a short attention span as an observer. Second, I most enjoy “observing” with binoculars from my backyard while seated on the fully reclining middle seat removed from my minivan. And finally, I remain active in IAS because of the excellent guest speakers and the friendliness of the members.

If elected to the board, I would work to advance the following –

1. Have the IAS president or vice president formally present the guest speakers with some token of our appreciation – an IAS coffee mug, pin, t-shirt or ball cap or a gift certificate to a restaurant or whatever.


3. Provide telescope support for Butler’s Planetarium Open House Nights. These are well attended events that go even if the weather is bad. It’s a good opportunity to payback Butler for their longstanding support and to let people know about IAS.

4. Video record Indiana University Astronomy Department Colloquium talks for later playback at IAS meetings in place of a live speaker. The video recordings maybe of use to IU and Butlers well.

5. Improvements/additions for outreach programs

   a. Like the IAS member who , on a recent cloudy night, set up a poster of a star field or galaxy at the end of a hall to give the people attending some experience of looking through a telescope.
b. Use a Mallicam video camera on clear nights to allow a number of people to view the same object at the same time.

c. Use the Spritzer Glimpse 360 website to view deep sky objects in detail on a cloudy night.

d. Use the Lunar Reconnaissance Orbiter Camera WMS website to view the moon in detail.

Thank You.

**Mike Newberg** — Mike has been a member of the IAS for five years, having served on the Board and as McCloud Stargaze Coordinator for the last three. Mike enjoys sharing his passion for Astronomy with the general public and hopes to continue to make the McCloud Stargaze bigger and better.

**Ed Rhoads** — I am a lecturer of Astronomy and Physics at IUPUI and have had a love of the stars since third grade.

While I struggle as an amateur Astronomer my lifelong study has given me a great understanding of the universe around me that I like to share with others.

As a result I hope that you will vote for me to be on the board.

**John Shepherd** — John Shepherd, “Shep”, was born and raised in the Greenwood area and attended Center Grove High School. John obtained his BS degree in Molecular Biology and a BS degree in Cell Biology from Purdue University in 1980 and graduate studies in Medical Biophysics from IU Medical: Artificial Intelligence and Fuzzy Logic certifications from Georgia Tech.

John is retired from Eli Lilly and Company and has held several positions in research and Information Technology during his 40 years with the company. Upon his retirement, John was a Quality Consultant for the Business to Business value cycle of the company. John also serves as faculty at IUPU Columbus teaching planetary and stellar astronomies.

John is active in several organizations. He is a Senior Member and Certified Software Quality Engineer of the American Society for Quality; Chief Science Officer / Senior Astronomer of the Link Observatory Space Science Institute; NASA Solar System Ambassador; Educator and Operator for JPL’s Goldstone Apple Valley Radio Telescope Array participating in both NASA’s Quasar Variability Study and NASA’s JUNO Mission.

Shep first became interested in astronomy at an early age when he and his father would lay out in the back yard in the summers and look up at the stars and moon (back when the Milkyway was a bright band across the sky). His father later bought his first 2.5” refractor for his 10th birthday. In his early teens he worked during the summers putting up hay and tilling fields to purchase bits and pieces from Edmond Scientific to build his own 6” Newtonian. That first construction was mounted to a sunken fence post out in the middle of the family pasture on a crude German equatorial mount made from scrap pipe and metal plate welded together. John first joined the IAS in 1976 after urgings from Richard Schlegel (a former co-worker and IAS member) but later rekindled his interest after taking a couple astronomy classes from IUPUI Professor Fritz Kleinhans. He re-joined the IAS in 1998.
If you cannot attend the meeting on Election Night, please vote absentee. We need your participation!

**IAS Absentee Ballot**

**President:**
- □ Bill Conner
- □ ____________________________ (write-in)

**Vice President:**
- □ Ken Magar
- □ ____________________________ (write-in)

**Treasurer:**
- □ John Kramer
- □ ____________________________ (write-in)

**Secretary:**
- □ John Molt
- □ ____________________________ (write-in)

**Board of Directors** (vote for two or less):
- □ Dave Hollinberger
- □ Mike Newberg
- □ Ed Rhoads
- □ John Shepherd
- □ ____________________________ (write-in)
- □ ____________________________ (write-in)

_Signed: _______________________________

Mail ballot to:

John Molt, Secretary  
740 Auman Dr W  
Carmel, IN 46032

Absentee ballots must be *received* prior to the election
Dark Sky Observing Site Information

IAS members may observe at Link Observatory, Prairie Grass Observatories, McCloud Nature Park and Burkhart Creek Park during non-scheduled times if they do not conflict with reserved activities.

The Link Observatory is open for observing during IAS functions at that location. For scheduled events, see the IAS calendar under the “Events Schedule” tab on the website [www.iasindy.org](http://www.iasindy.org) (a monthly calendar is at the end of this newsletter). Impromptu observing opportunities are also occasionally announced on the IAS-Indy Yahoo group by our telescope operators. All observing depends on weather conditions, so please join the Yahoo group to receive the latest information.

For those interested in observing at McCloud Nature Park, call the park office 765-676-5437 before 4 PM on the day you want to go. The administrators will give you permission to be there at night and make arrangements to turn off the lights.

To view at Burkhart Creek County Park, first acquire a copy of the IAS approval letter to show you have permission to be there after dark. Then send an email to both dverley@morgancounty.in.gov and tutterrow8327@att.net, mention that you are with the IAS, and let them know your plans. You may or may not get a reply…don’t worry…just take your approval letter and go.

For those interested in observing at Prairie Grass Observatory, call Hoppe at 765-296-2753.

The Kirkwood Observatory on the IU campus will be closed until late March, 2016.

Celestial Events for December 2015

01 - The International Space Station reaches full illumination as the December solstice nears, resulting in multiple nightly passes favoring the southern hemisphere.

04 - Mercury occults the +3.3-magnitude star Theta Ophiuchi for South Africa at 16:16 UT

06 - The Moon occults Mars for central Africa at ~2:42 UT.

07 - The Moon occults Venus in the daytime for North America at ~16:55 UT.

14 - The Geminid meteor shower peaks at ~18:00 UT, with a ZHR=120 favoring NE Asia.

21 - The December southward solstice occurs at 23:03 UT.

23 - The Ursid meteor shower peaks at 2:30 UT with a ZHR variable from 10-50 favoring Europe and the Middle East.

23 - The Moon occults Aldebaran for Europe and central Asia at ~19:32 UT.

29 - Mercury reaches greatest evening elongation at 19.7º east of the Sun at 00:01 UT.

December Meteor Showers

The Geminids are usually the strongest meteor shower of the year and meteor enthusiasts are certain to circle December 13 and 14 on their calendars. This is the one major shower that provides good activity prior to midnight as the constellation of Gemini is well placed from 10 PM onward. The Geminids are often bright and intensely colored. Due to their medium-slow velocity, persistent trains are not usually seen. In 2015 the Moon will set early allowing a good show. The parent object is asteroid 3200 Phaethon.
The Ursids are often neglected due to the fact it peaks just before Christmas and the rates are much less than the Geminids, which peaks just a week before. Observers will normally see 5-10 Ursids/hr during the late morning hours on the date of maximum activity. There have been occasional outbursts when rates have exceeded 25/hr. These outbursts appear unrelated to the perihelion dates of comet 8P/Tuttle. In 2015 this shower is best viewed an hour or two before morning twilight in the 22nd.

— Source: American Meteor Society

**The “Demon Star”**

Algol (β Persei), sometimes called the “Demon Star,” is the most famous of the eclipsing binaries, and the easiest of these variable stars to observe. Eclipses of the primary occur approximately every 69 hours, dipping the total brightness of the system from about magnitude 2.1 to a minimum of 3.4 within a five-hour period. The system takes about 20 minutes to effect this change, which is readily visible to the naked eye.

The constellation of Perseus is favorably placed in the evening sky in late fall and early winter. Mid-eclipses of Algol in December 2015 are listed at right; those which occur during daylight hours in central Indiana have been omitted.

### Minima of Algol

- 12/09 - 07:20 am
- 12/12 - 04:09 am
- 12/15 - 12:58 am
- 12/17 - 09:48 pm
- 12/20 - 06:37 pm

**Comet Catalina in the Morning**

Comet Catalina (C2013 / US10) is currently putting on a decent show in the morning sky. Current estimates suggest that this comet could top out at magnitude 5 or 6 by the end of 2015.

Discovered by the Catalina Sky Survey on Halloween of 2013, this comet was initially thought to be an asteroid with a short-period orbit. Later revisions showed it to be a new interloper from the Oort Cloud.

The Moon will provide some interference from the end of November until around December 3. After that, things should improve substantially. Recent observations posted to the “comets-ml” Yahoo group suggest that it is already brighter than magnitude 6, although the tail remains elusive to visual observers.

On the morning of New Year’s Day the comet passes only 1/2º from Arcturus, and it has another close encounter with Alkaid (the last star in the handle of the Big Dipper) 14 days later.

Those of us at mid-northern latitudes haven’t had a decent opportunity to view a comet since Lovejoy/Q2. So get outside and give Comet Catalina a shot!

Click the image at right for a detailed finder chart courtesy of Sky & Telescope.

**C2013 / US10 may approach naked-eye visibility in late December.**
December Deep-Sky Challenge
Bruce Bowman

[Nobody completed the D-S Challenge for December 2014 so we’re recycling it in 2015. — beb]

Below please find a list of ten (10) objects to view this month. Those who complete the primary objects will receive a certificate via email and be recognized in the News and Views. We’re also providing a challenge object to help push the limits of your observing skills. It’s not necessary to successfully view the challenge object to receive the certificate; we only ask that you try.

Please complete the following list to receive the December certificate:

- NGC788 Lenticular galaxy in Cetus
- NGC833 Spiral galaxy in Cetus
- NGC835 Barred spiral galaxy in Cetus
- NGC936 Barred spiral galaxy in Cetus
- NGC1032 Lenticular galaxy in Cetus
- NGC1055 Spiral galaxy in Cetus
- NGC1087 Spiral galaxy in Cetus
- NGC1090 Spiral galaxy in Cetus
- NGC1022 Spiral galaxy in Cetus
- NGC1052 Elliptical galaxy in Cetus

Challenge object for December 2015: New 1 in Cetus

The above objects are located between 1 and 3 hours of right ascension and are well-placed for evening viewing this month.

In December, we continue with Part II of our tour of deep-sky objects in the constellation of Cetus the Whale (or Sea-Monster or What-have-you). Those owning digital setting circles might want to do an alignment on the bright stars Diphda and Aldebaran, which bracket this month’s target area nicely.

NGC788 is located almost directly on the 2h line of right ascension, about 1.7° due north of the 6th-magnitude variable SAO 129624. When I first spotted this object in 2011, I saw a pretty bright, considerably small, round spot of light that was much brighter in the center, as viewed through my 12” SCT. More reputable astro-references suggest that the galaxy is elongated to 1.5’ in the ESE-WNW direction, and the provided photo from POSS-1 appears to bear this out. NGC833 can be found about 10’ to the ESE of the 7th-magnitude star SAO 148231, both of which appear on the provided image. My notes again state that this object is pretty bright and considerably small, and gradually a little brighter in the middle. Ironically, my best astro-references suggest this object should appear round, but it was clearly
elongated in a 2:1 ratio when I looked at it. This time the photo backs me up… and so I feel mildly vindicated. What do you see? NGC835 lies just a couple arc-minutes further east. This galaxy is of similar brightness and size, but is elongated N-S, and is more condensed to a bright nucleus. Two other members of the Arp 318 galaxy group, NGC838 and NGC839, can be found a little further east in the same field. At about 13th magnitude apiece, they shouldn’t be terribly difficult. Give them a try!

NGC936 is a fine barred spiral located about 1.7º west of the Flamsteed star 75 Ceti. At magnitude 11.3, you should have no trouble with this one. Look for a bright, moderately large (4' or so) object that’s a little elongated east-west. I found it to be much brighter in the bar region but detected no discernible nucleus, as viewed in 1989 with my 13" Dobsonian from my semi-rural back yard. It is fairly impressive. About 12' to the east lies NGC941, another “extra credit” object.

Although M77 isn’t on our list this month, there are several other nice galaxies in the immediate vicinity of δ (delta) Ceti. Look for NGC1032 a little more than a degree north of the 4th-magnitude luminary. My notes suggest a pretty bright but very small spot, slightly elongated NE-SW, with essentially even brightness throughout. I was probably able to detect the core region of this tiny lenticular galaxy. From here, pan a degree to the SE to find the 7th-magnitude star SAO 110689, and continue another 8' to land on NGC1055 (if you go too far you’ll run into M77). Brighter than 11th magnitude, this galaxy is theoretically visible in apertures as small as 60 mm. My own experience with a 13" Dobsonian suggests a pretty bright, large object about 4' in the long dimension, elongated E-W. My notes also mention a stellar nucleus. Rumor has it that the dust lane shown in the photograph can be glimpsed with averted vision in scopes of at least 16” aperture.

A little more than 2º to the ESE lies the galaxy pair NGC1087 and NGC1090. The former is the easier object, with a smooth, round halo about 2' in diameter. Note how it forms an equilateral triangle with two 11th-magnitude stars to its NE and SE. Its companion, about 14' to the north, is more elongated and also more than a magnitude fainter, but should be visible in a 10" scope from any reasonably dark Indiana location.

John Flamsteed was the first Astronomer Royal of Great Britain, named to the position in 1675 by King Charles II. Among other enterprises, Flamsteed spent over 40 years making meticulous records for an updated star catalog “for the use of the seamen.” The first star catalog developed with the aid of a telescope, it tripled the number of entries found in Tycho Brahe’s sky atlas.

Flamsteed designations were assigned to 2935 stars. Each star was given a number and the Latin genitive of the constellation it lies in, the numbers being assigned in order of increasing right ascension. This method of designating stars appeared in a preliminary version of the catalog, titled Historia Coelestis Britannica.

Flamsteed opposed publication of the Historia, which had been arranged without his knowledge by his rival, Edmund Halley. So incensed was Flamsteed that he arranged to have 300 copies of the work burned. Authorized publication had to wait until after his death, in 1725, under the title of Stellarum Inerrantium Catalogus Britannicus, from which the numbers had been removed.

Flamsteed’s original names nonetheless became quite popular and are now commonly used for stars that have no Bayer designation.

Our last two primary objects are roughly 8º to the south of our current location. First find the wide pair of 6th-magnitude stars 77 and 80 Ceti, then slew about 1.5º to the NE. Here you will find NGC1022.
This is an obvious, generally circular object of 11th magnitude with a prominent core. Now pan your scope 2º to the SSE to land on NGC1052, another obvious galaxy. NGC1052 appears as a bright, small, and round object of about 1' diameter with a brilliant center. There are several other galaxies in the vicinity, all relatively faint and unlikely to match these descriptions. These include NGC991, NGC1035, NGC1042, and NGC1048A and B. By all means check them out if you want to!

Published in 1932 by Harlow Shapley and Adelaide Ames, the Shapley-Ames Catalog of Bright Galaxies is a very useful tool for the amateur astronomer. The original catalog contained 1249 objects, all brighter than magnitude 13.2. The majority of these galaxies were previously known from the NGC/IC, but there were a few additional ones, too. The Shapley-Ames was the primary galaxy catalog used for development of several 20th-century star atlases in addition to the classic three-volume set, Burnham’s Celestial Handbook.

Forty-nine years later Allan Sandage revised the Shapley-Ames, removing a few objects that in the ensuing years had proven to be non-galaxies and adding six new ones that met the magnitude criterion but had low surface brightness. Our challenge object, discovered on plates of the first Palomar Observatory Sky Survey, was named New 1 in this revised catalog. Also known as MCG-01-03-085, it has a relatively high total magnitude of about 12, but individual parts of it are very faint indeed. Look for it about 30' ENE of NGC357, at coordinates RA 01h05m09s and Dec -06º17' (J2000). I’ve attempted this galaxy visually on several occasions but have never met with any success. I don’t expect to have much more luck with the 36" at Link, but let’s give it a shot. Start with low power on this one. Also look for the faint edge-on galaxy MCG-01-03-088, just 5' SSE.

If you complete this list prior to the end of December, contact Bruce Bowman to ensure that you receive recognition. Only IAS members are eligible. Congratulations to the following six IAS members who completed the October Challenge: Mike Birch, Bill Conner, Fred Keller, Laura Keller, Steve McSpadden and Wayne McSpadden. Unfortunately, no one was able to visually detect the challenge object NGC7094.

**IAS Membership Report for October 2015**

On 10/31/2015 the IAS had a total of 154 members.

During October there were seven renewals and four new memberships.

The IAS welcomes the following new members:

- Joel Sawaski Indianapolis
- Brent Sullivan Greenwood
- Karl Therrian Indianapolis
- Mark and Katelynn Healey Danville

Submitted by Jeff O’Dair, IAS Membership Coordinator
Researchers Catch Comet Lovejoy Giving Away Alcohol

Oct. 23, 2015 — Comet Lovejoy lived up to its name by releasing large amounts of alcohol as well as a type of sugar into space, according to new observations by an international team. The discovery marks the first time ethyl alcohol, the same type in alcoholic beverages, has been observed in a comet. The finding adds to the evidence that comets could have been a source of the complex organic molecules necessary for the emergence of life.

“We found that comet Lovejoy was releasing as much alcohol as in at least 500 bottles of wine every second during its peak activity,” said Nicolas Biver of the Paris Observatory, France, lead author of a paper on the discovery published Oct. 23 in Science Advances. The team found 21 different organic molecules in gas from the comet, including ethyl alcohol and glycolaldehyde, a simple sugar.

Comets are frozen remnants from the formation of our solar system. Scientists are interested in them because they are relatively pristine and therefore hold clues to how the solar system was made. Most orbit in frigid zones far from the sun. However, occasionally, a gravitational disturbance sends a comet closer to the sun, where it heats up and releases gases, allowing scientists to determine its composition.

Comet Lovejoy (formally cataloged as C/2014 Q2) was one of the brightest and most active comets since comet Hale-Bopp in 1997. Lovejoy passed closest to the sun on January 30, 2015, when it was releasing water at the rate of 20 tons per second. The team observed the atmosphere of the comet around this time when it was brightest and most active. They observed a microwave glow from the comet using the 30-meter (almost 100-foot) diameter radio telescope at Pico Veleta in the Sierra Nevada Mountains of Spain.

Sunlight energizes molecules in the comet’s atmosphere, causing them to glow at specific microwave frequencies (if microwaves were visible, different frequencies would be perceived as different colors). Each kind of molecule glows at specific, signature frequencies, allowing the team to identify it with detectors on the telescope. The advanced equipment was capable of analyzing a wide range of frequencies simultaneously, allowing the team to determine the types and amounts of many different molecules in the comet despite a short observation period.

Some researchers think that comet impacts on ancient Earth delivered a supply of organic molecules that could have assisted the origin of life. Discovery of complex organic molecules in Lovejoy and other comets gives support to this hypothesis.

“The result definitely promotes the idea the comets carry very complex chemistry,” said Stefanie Milam of NASA’s Goddard Space Flight Center in Greenbelt, Maryland, a co-author on the paper. “During the Late Heavy Bombardment about 3.8 billion years ago, when many comets and asteroids were blasting into Earth and we were getting our first oceans, life didn’t have to start with just simple molecules like water, carbon monoxide, and nitrogen. Instead, life had something that was much more sophisticated on a molecular level. We’re finding molecules with multiple carbon atoms. So now you can see where sugars start forming, as well as more complex organics such as amino acids — the
building blocks of proteins — or nucleobases, the building blocks of DNA. These can start forming much easier than beginning with molecules with only two or three atoms.”

In July, the European Space Agency reported that the Philae lander from its Rosetta spacecraft in orbit around comet 67P/Churyumov -Gerasimenko detected 16 organic compounds as it descended toward and then bounced across the comet’s surface. According to the agency, some of the compounds detected play key roles in the creation of amino acids, nucleobases, and sugars from simpler “building-block” molecules.

Astronomers think comets preserve material from the ancient cloud of gas and dust that formed the solar system. Exploding stars (supernovae) and the winds from red giant stars near the end of their lives produce vast clouds of gas and dust. Solar systems are born when shock waves from stellar winds and other nearby supernovae compress and concentrate a cloud of ejected stellar material until dense clumps of that cloud begin to collapse under their own gravity, forming a new generation of stars and planets.

These clouds contain countless dust grains. Carbon dioxide, water, and other gases form a layer of frost on the surface of these grains, just as frost forms on car windows during cold, humid nights. Radiation in space powers chemical reactions in this frost layer to produce complex organic molecules. The icy grains become incorporated into comets and asteroids, some of which impact young planets like ancient Earth, delivering the organic molecules contained within them.

“The next step is to see if the organic material being found in comets came from the primordial cloud that formed the solar system or if it was created later on, inside the protoplanetary disk that surrounded the young sun,” said Dominique Bockelée-Morvan from Paris Observatory, a co-author of the paper.

— Bill Steigerwald, NASA press release

The 36" telescope at Link. Photo by Scott Pavlock.
Novice/Urban Observing List – December 2015
Phil Dimpelfeld

The objects in this month’s observing list lie between the celestial coordinates of Right Ascension = 2h and RA = 4h. This section of the sky includes the zodiac constellations of Aries and Taurus. The Milky Way runs through the constellations Perseus and Cassiopeia. This slice of sky has three Messier objects – M34, M77, and M45.

This month’s list is divided into three levels. The brighter objects, which are relatively easy to find, are in Level 1. The fainter, and more challenging objects, are in Levels 2 and 3. You need only observe 6 objects from any of the levels to qualify for a Certificate of Achievement. Even if you do not have a telescope, being able to identify a double or variable star counts as an observation.

LEVEL 1

- Alpha Piscium or ”Alrescha”, double star in Pisces, 02h 02.0m, +02° 46’, mag = 4.2, 5.1, sep = 1.7”
- Gamma Andromedae or ”Almach”, double star in Andromeda, 02h 03.9m, +42° 20’, mag = 2.3, 5.5, sep = 9.8”
- Iota (”6”) Trianguli, double star in Triangulum, 02h 12.4m, +30° 18’, mag = 5.3, 6.9, sep = 3.9”
- NGC 869 / NGC 884, the famed ”Double Cluster”, two open clusters in Perseus, 02h 19.0m, +57° 09’, mag = 5.3 / 6.1, size = 29.0’ / 29.0’
- Alpha Ursae Minoris, ”Polaris”, double star in Ursa Minor, 02h 31.8m, +89° 16’, mag = 2.0, 9.0, sep = 18.4”
- Beta Persei, ”Algol”, variable star in Perseus, 03h 08.2m, +40° 57’, mag = 2.1-3.4
- Alpha Persei Cluster (Mel 20), open cluster in Perseus, 03h 26.9m, +49° 07’’, mag = 1.2, size = 185’
- M45, the ”Pleiades” or ”Seven Sisters”, open cluster in Taurus, 03h 46.9m, +24° 07’, mag = 1.2, size = 110’ (M45 is by far the brightest object in the Messier catalog.)

LEVEL 2

- Stock 2 (the ”Muscleman Cluster” or “Stick Man”), open cluster in Cassiopeia, 02h 15.0m, +59° 16’, mag = 4.4, size = 60.0’
- M34, open cluster in Perseus, 2h 42.0m, 42° 47’, mag = 6.0, size = 35.0’
- ”Kemble's Cascade”, nearly linear asterism in Camelopardalis, 03h 57m, 63° 00’, mag = 5 to 10, size = 120’ (Look for NGC 1502 if you are using GoTo.)

LEVEL 3

- Tr 2, open cluster in Perseus, 02h 37.3m, +55° 59’, mag = 5.9, size = 20.0’
- M77, galaxy in Cetus, 02h 42.7m, -00° 01’, mag = 8.8, size = 6.9’ × 5.9’
- NGC 1342, open cluster in Perseus, 03h 31.6m, +37° 20’, mag = 6.7, size = 14.0’

NOTES:
To qualify for the Novice/Urban Observing List, you must observe at least six of the objects. Members are encouraged to find at least one of these objects without the use of GoTo so that they become more familiar with the night sky.

If you successfully observe at least six of the objects, please contact Phil Dimpelfeld (philip.dimpelfeld@yahoo.com). Let Phil know how many of the objects you were able to observe. You will be e-mailed a certificate recognizing your accomplishment.

Image credits: Jeremy Perez (beltofvenus.com)

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**Equipment Loan Program**

Did you know you could borrow a scope or piece of astronomy equipment from the Society and take it for a test drive? Members trying to determine what kind of equipment to buy are welcome to borrow one of the Society’s scopes for a month or two and see how they like it. Steve McSpadden is the program coordinator and can arrange for pickup and training. We have several scopes, eyepieces and binoculars to loan.

We will also consider donations of equipment appropriate for this program. The IAS is a public charity under section 509(a)(2) of the internal revenue code. We would be happy to provide acknowledgement suitable for documentation as a tax deduction.

Please contact the Equipment Loan Coordinator at equipment@iasindy.org.
Our Solar System Is *Almost* Normal, But Not Quite

It was just over 20 years ago that the very first exoplanet was found and confirmed to be orbiting a star not so different from our own sun. Fast forward to the present day, and the stellar wobble method, wherein the gravitational tug of a planet perturbs a star's motion, has been surpassed in success by the transit method, wherein a planet transits across the disk of its parent star, blocking a portion of its light in a periodic fashion. Thanks to these methods and NASA's Kepler spacecraft, we've identified many thousands of candidate planets, with nearly 2,000 of them having been confirmed, and their masses and densities measured.

The gas giants found in our solar system actually turn out to be remarkably typical: Jupiter-mass planets are very common, with less-massive and more-massive giants both extremely common. Saturn—the least dense world in our solar system—is actually of a fairly typical density for a gas giant world. It turns out that there are many planets out there with Saturn’s density or less. The rocky worlds are a little harder to quantify, because our methods and missions are much better at finding higher-mass planets than low-mass ones. Nevertheless, the lowest mass planets found are comparable to Earth and Venus, and range from just as dense to slightly less dense. We also find that we fall right into the middle of the "bell curve" for how old planetary systems are: we're definitely typical in that regard.

But there are a few big surprises, which is to say there are three major ways our solar system is an outlier among the planets we've observed:

- All our solar system's planets are significantly farther out than the average distance for exoplanets around their stars. More than half of the planets we've discovered are closer to their star than Mercury is to ours, which might be a selection effect (closer planets are easier to find), but it might indicate a way our star is unusual: being devoid of very close-in planets.

- All eight of our solar system's planets’ orbits are highly circular, with even the eccentric Mars and Mercury only having a few percent deviation from a perfect circle. But most exoplanets have significant eccentricities, which could indicate something unusual about us.

- And finally, one of the most common classes of exoplanet — a super-Earth or mini-Neptune, with 1.5-to-10 times the mass of Earth — is completely missing from our solar system.

Until we develop the technology to probe for lower-mass planets at even greater distances around other star systems, we won't truly know for certain how unusual we really are!

— Dr Ethan Siegel, NASA's space place
Astro Ads

Do you have or are you looking for astronomy-related materials and equipment? The IAS, as a service to its members, will publish non-commercial ads at no charge. For sale, exchange, or want ads are all accepted. Each ad runs in the newsletter for four months and may be renewed at the owner’s request.

To place an ad, send an email to editor@iasindy.org. Be sure to notify us when the item sells.

Public Outreach Programs

To schedule a program at the Link Observatory or at your site, please contact the following people:

Public Outreach Programs: To schedule a public event, contact the IAS Events Coordinator by sending an email to events-coordinator@iasindy.org.

Goethe Link Observatory tour: To schedule a tour of the Link Observatory, contact the Link Observatory Manager by email at link-observatory@iasindy.org.

2015-6 Meetings and Events Schedule

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NOTES: Board and general meetings will be at Holcomb Observatory. Deep-sky observing is at Link. December 12 general meeting is the Holiday party and elections.

Miscellanea

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

Training programs are scheduled by the Observatory Manager as instructors are available and time permits, although other requests can override these sessions.

To schedule the use of the 36-inch telescope, two criteria must be met:

- There must be a trained telescope operator and at least one assistant present.
- Send an email to the Observatory Manager (link-observatory@iasindy.org) to confirm availability.

Please plan ahead! Last-minute scheduling requests may not get access.

IAS News & Views — The monthly newsletter can be found on our web site www.iasindy.org. The News and Views welcomes articles of local astronomical interest, follow-up on IAS events, and want/for sale ads. Please submit articles to the editor in an email to editor@iasindy.org.
Membership information — Please send an email to membership@iasindy.org; our membership coordinator will respond promptly. Information is also available under the “Join the Society” tab on our web site…here you will find a fill-in form that you can send in to expedite your membership.

Pay Your Dues by PayPal — The IAS web site has a cart system where you can pay your dues, order magazines, join the Astronomical League, or make a donation. The cart is found in the “Join the Society” section; you will need to establish a PayPal account for yourself to make these transactions.

Requests for Information — You may contact our officers, Board members, and Coordinators via our website at http://www.iasindy.org. Place your cursor on the “Home” tab and then select “Contact us.” Page down to the person you desire to contact and send an email message requesting information or a return telephone call. We will be happy to respond within a reasonable time frame.

Logo Clothing — The IAS has a supply of logo ware using Mid-Central Trophy in Kokomo, IN. Typically T-shirts, sweatshirts, polo shirts, and caps are available. Call Linda (765-453-5494), 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 directly to your home. All major credit cards are accepted.

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