



The
Webfooted Astronomer

November 2002

Barnard's Galaxy: NGC6822

By George Best

November Meeting

Paul Hodge
Professor Emeritus

University of Washington

Wednesday, Nov. 20
7:30 p.m.

Physics-Astronomy Building
Room A102
University of Washington
Seattle

Come early at 7 p.m. for coffee and
to visit with your fellow members.

Bring your slides to show
after the program.

PAUL Hodge, Professor Emeritus at the University of Washington, will discuss NGC6822 at the Nov. 20 meeting of Seattle Astronomical Society (SAS).

NGC6822 is located approximately 1.6 million light-years from Earth, in Sagittarius. A member of the Milky Way galaxy's Local Group, it was discovered by E.E. Barnard in the early 1880s.

Paul is currently Editor of the *Astronomical Journal*, founded 152 years ago in Cambridge,

Mass. He has published 17 books. His current research is concentrated on nearby galaxies, especially the Local Group and how they have evolved over their lifetimes.

His research is carried out with the Hubble Space Telescope and with the Apache Point 3.5 meter telescope. He has also used the Keck on Mauna Kea and the 1.5 meter telescope at the Cerro Tololo Interamerican Observatory in La Serena, Chile. Specifically, he, his students and collaborators are studying the formation of the Andromeda Galaxy, NGC 6822, M33, the Magellanic Clouds and IC10.

Dark Skies Northwest will hold its monthly meeting prior to the SAS meeting from 6:30-7:30 p.m. in room A216 of the Physics-Astronomy Building.

Seattle Astronomical Society

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My Travels Through 30 Years of the Space Program

By Diane K. Fisher

IN the early 70s, as minor character in the Apollo Program, I worked in the Vehicle Assembly Building (VAB) at Kennedy Space Center. Stepping into the VAB, I felt like the incredible shrinking woman. The space inside accommodated six 45-story office towers with vast open spaces to spare. In the vertical spaces between the office towers, the 363-foot high Saturn Vs were assembled.

From my third floor office in one tower, I often delivered documents to higher floors in other towers. Between riding the stomach-dropping glass elevators and dashing across to other towers on narrow, open catwalks at the 28th or 44th floor levels, I soon overcame my fear of heights.

On these excursions, I would see the Saturn Vs come together in the 500-foot high bays. After hundreds of engineers and technicians had toiled around the clock for months, the morning of high-bay rollout would arrive. Slowly, the Crawler Transporter would bear forth the Mobile Launch Platform and the majestic Saturn V rocket. The morning sun reflecting off its gleaming white form would take my breath away.

The last Apollo mission was 30 years ago. As the Apollo program ended, some thought human missions to the Moon, Mars, and beyond would continue apace. Though they didn't continue, the Apollo program



The Saturn V and Mobile Launch Platform are carried to the launch pad on the Crawler Transporter. Notice the tiny humans below the platform.

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Space Place (Continued from page 3)

remains a single, large step in our technological evolution as a species. It is a great tribute to the intelligence, ingenuity, and dedication of the people responsible for the Apollo missions that they were so successful and the disasters so few. NASA's program today continues to build on the technological and managerial legacy bequeathed us by Apollo.

And just where are we now? Among its other tasks, the International Space Station is teaching people to live in space for long periods. Robotic space missions are studying issues like land use and global warming and discovering the wonders of the universe, its history, and our place in it. With humanity's many other pressing needs, such quests must be done efficiently.

Part of NASA's mission is to develop the technologies to do cost-effectively what has never been done before at all. NASA's New Millennium Program develops and validates new technologies for space. Missions such as Deep Space 1 and Earth Observing 1 carry and test multiple new technologies (such as ion propulsion and advanced imaging instruments) previously untried in space. And, unlike the Saturn V, the ultimate gas-guzzling muscle car of the 70s, the new technologies must be the "zero emission" vehicles of the 21st century—small, efficient, and capable beyond anything done before.

Many of the New Millennium technologies are described for adults at <http://nmp.nasa.gov> and for children at The Space Place, <http://spaceplace.nasa.gov>.

Diane K. Fisher is the developer and writer for The Space Place Web site. This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Vote at the November Meeting!

Following are the nominations for the 2003 board. If you are interested in joining the board, contact Mary Ingersoll.

- Chairman of the Board: Mary Ingersoll
- President: Stephen Van Rompaey
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The Night the Tektites Fell on Georgia

By Louis Varricchio

THE Moon is not the geologically dead world that most astronomy textbooks claim, according to Hal Povenmire, a Florida Institute of Technology astronomer, long-time meteorite hunter and former NASA Project Apollo engineer.

In February 2002, NASA officials announced new evidence that the Moon has an active, molten core. Additionally, a team of planetologists from Brown University in Rhode Island recently announced evidence showing that a lunar crater, known as the Ina depression, is a volcanic feature and may be less than 1 million years old—and possibly still active. Povenmire concurs with the new findings of both NASA and Brown University; he believes that there are signs of geologically recent lunar volcanism, but he doesn't stop there. Some of the evidence, Povenmire claims, may be right here on Earth.

The most recent eruption on the Moon, he claims, showered a portion of Asia and Australia with many tons of volcanic glass. This so-called Australasian event occurred within the past million years. Povenmire's interest in tektites was aroused long before he discovered both the Upsilon Pegasid meteor shower and a new asteroid, officially named 12753 Povenmire.

In 1970, realizing that 34.5 million year-old tektite stones found in Georgia were extremely rare and that their strewn field had never been mapped, he undertook a monumental effort to learn more about them. To date, thanks to Povenmire's fieldwork, the size of the Georgia tektite zone has been expanded from 500 square miles to over 7,000 square miles. The number of Georgia tektites he discovered increased from 200 to more than 1,300. Povenmire even wrote a book about his Georgia field work and ideas about the disputed lunar-origin theory of tektites, titled "Tektites: A Cosmic Paradox."

Povenmire said thousands of tektites might have fallen on prehistoric Georgia in a single day or night. He believes that these natural glass stones are volcanic material blown off the Moon by eruptions, an intriguing idea championed by the late NASA lunar scientist Dr. John A. O'Keefe. O'Keefe, who discovered the Earth's slight pear-shape using Vanguard satellite data in 1958, worked with NASA's lunar geology program with Eugene Shoemaker beginning in the 1960s.

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Tektites (Continued from page 5)

Many meteorite and lunar scientists disagree with Povenmire's theory, but the Florida astronomer is now convinced that the Moon belches and hurls tons of obsidian-like debris into Earth's gravity well every few million years.

Tektite falls may also cause climate change and extinctions on Earth, he said.

Armed with his Georgia fieldwork data, Povenmire refutes the current theory that tektites were formed when asteroids or comets hit the Earth and melted sediments and rocks. Tektites, a dry homogeneous natural glass, he noted, do not resemble wet inhomogeneous impact glass found around many meteor craters.

Povenmire notes that the slow way tektite glass formed, and the volcanic features some researchers have observed within chunky, layered tektites, can't be explained by the widely accepted terrestrial-impact theory.

Ablation studies also prove that the infall velocities of tektites reached 6 km per second or greater—an unlikely speed for terrestrial ejecta to attain going up through the atmosphere.

Povenmire likes to point out that cosmic-ray traces inside tektites show they couldn't come from beyond the Earth-Moon system implying that they didn't spend a long time in space.

Based on still more evidence—such as the fact that Apollo 12 astronaut Charles “Pete” Conrad found a vein of lunar rock that, chemically, is nearly identical to some tektites—Povenmire believes the space-science community needs to drastically rethink what mechanisms caused the ancient stones to fall to Earth.

The writer: Louis Varrichio is a freelance science writer and a graduate student in Space Studies at the University of North Dakota. He lives in Vermont.

Beginning Astronomy Meeting Nov. 9

The next Beginning Astronomy Meeting will be held at Karl and Judy Schroeder's on Nov. 9. The meeting starts at 1 p.m. and generally runs till about 5 p.m. Dinner is provided and followed by evening observing, weather permitting. Bring a chair, something to drink with dinner, and lots of questions. Topics include telescopes, charts, viewing, planning, star parties, clothing. Interested individuals should contact the Schroeders in advance, (206)-362-7605 or e-mail Karl Schroeder, KSchroe225@aol.com.



From the President's Pen . . .

It All Started with a Survey . . .

By Mary Ingersoll

SPRING 2001 the board presented the membership with a survey in an effort to get a fuller representation of the desires of the club. The board wanted to be able to set up a five-year-plan to accommodate the will of the people who were paying the dues.

In the July 2001 club meeting, we presented the results of that survey. The members said that they considered the Seattle Astronomical Society to be a hobby organization; that we were “astro-ambassadors” to the community and that in essence made us an educational organization as well. Sharing our enthusiasm for amateur astronomy is very natural for us. The five most important projects that the club wanted to support are: (1) property acquisition for an SAS facility, (2) a speaker fund to pay for high quality speakers for future club meetings, (3) special member events, (4) a youth club, and (5) to assist the Table Mt. Association in making improvements to the TMSP site (for the benefit of members who wish to use the site both during the official star party and at other times of the year—toilets being the specific issue).

The board felt that the youth club and SAS facility could be incorporated. Our first thoughts were in building an observatory on wheels, but when we assessed the cost of maintenance and who would store this trailer (not to mention tow it) it made more “cents” to put our capital into a piece of property. A little over a year ago the board made it’s first efforts to acquire park property for the use of the club. We found a vacant bunker at Magnuson Park that was available for lease. We had hoped that the park would be open to allowing us to upgrade the bunker into an SAS facility from where we could offer educational programs to the public. It was to be a trade of our talents for their property for the benefit of all. However, when we finally received the lease contract from the Parks Department, it required our programs for no benefit. We would not be allowed to improve the bunker nor would we have any control over the land above the bunker. With this contract, the bunker was nothing more than a useless hole in the ground.

We had meetings with Carkeek Park and Seward Park in October. They are in the process of making improvements (with money from grants and corporate donations), but we would still

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President's Pen (Continued from page 7)

have limited access to the facilities and neither site would allow us to build an observatory. Carkeek's new building (which is still in the bidding stage) could have an "astronomy wing," if we paid for it. The present plan (a 1600 sq. ft. single-story building) was last bid at \$500,000. Ouch! Seward Park's remodel is being largely paid for by the local and national chapters of the Audubon Society. They will essentially "own" the two-story building having their staff working there. We could join the partnership, but we'd only acquire storage space, use of a community classroom, and we would be allowed to make only minor improvements to the amphitheater for public programs.

We are still looking. Our options are not getting worse, but better. With the squeeze on city and county budgets, parks are being closed, and in some parts of town neighborhoods have taken over the management of their local park to keep it open. It is possible that in the near future we may find a small park for sale, or a neighborhood looking for a partner to help them keep a park open. There is also the possibility to build a facility on private land in cooperation with another non-profit organization such as the Boy Scouts or other youth/educational organization.

Loren Busch put it this way: "It's like buying a new car." You have this ideal of what you want, you look around and after awhile you get discouraged because you can't find exactly what fits your needs and budget right now. Then you think you might settle for something less, even though you know you'll be unhappy with the purchase.

This board's term is over next month, and we have opted for patience (after all, we're only 1½ years into this 5-year plan). As chairman of the board I will continue to work with the new board to find that perfect site for an SAS facility. Starting an "Observatory Fund" should be our next step, so that contributions can be put into a separate account and when the property is located, we can have funds readily available. (The end of the year is coming. Do you need a tax write-off? All contributions to the SAS are tax deductible.) Continue to communicate with me regarding this project, and if you find a deal, let me know.



November 2002

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	● 4	5	6	7	8	9 Green- lake, Cromwell Star Party
10	◐ 11	12	13	14	15	16 Tele- scope Makers at Peter Hirtle's
17	SAS Board	○ 19 Leonid Meteor Shower Peaks	SAS Meeting	21	22	23
24	25	26	◑ 27	28 Thanks- giving	29	30

Sign Up Now for 2003 SAS Banquet and Save!

By Gerald West

THE annual SAS Banquet will be held on Saturday, Jan. 11, 2003, at 6 p.m. at the Yankee Grill and Roaster, 5300 24th Avenue NW Ballard. The menu will include prime rib, salmon, or a vegetarian dish. The speaker will be Jim Evans, Professor of Physics at the University of Puget Sound, who will discuss "Material Culture of Ancient Greek Astronomy." He will talk about ancient instruments, sundials and objects with a symbolic value for astronomers.

If you sign up before Dec. 18, the price is \$28 per person. After Dec. 18 the price will be \$33 per person.

To make reservations, make your checks payable to the Seattle Astronomical Society. Indicate on your check whether you want salmon, prime rib, or a vegetarian plate.

You can give your checks to Gerald West or Judy Schroeder at the regular meetings, or mail them to the following address:

Gerald West
9109 27th NW
Seattle, WA 98117

Be sure to write or print the word "banquet" on the lower left hand side of your envelope. Your reservation must be received by Jan. 6.



Classifieds

For Sale

4.5-inch Deluxe Telescope Orion Skyview Newtonian reflector with EQ mount, 19 months old, hardly used, f/8, 1.25-inch Plössl eyepieces, doubler, 25mm and 9mm, moon filter, 6x30 achromatic finder scope, other stuff, excellent cond., \$300. Paul J. Peterson, Paul2594@oz.net.

Split ring mount for a 10" Coulter dob scope. It isn't assembled, but I'm sure the right person would know how to put it together. It's made out of wood and looks very nice. This is one of the "Fred Phillips Split Ring Mounts" we all made one weekend years ago and it's just taking up space now. \$70 or best offer. Please email me if interested. Debbie Lindstrom, deb10815@hotmail.com.



Minutes

Sloan Digital Sky Survey

By Thomas Vaughan

THE October meeting began with these general announcements:

- Bunker hill project is on hold (lease was unacceptable) possible opportunities in 3 other parks. (*See President's Pen on page 7 for more information—Editor*)
- Nov 18 is supposed to be a good night for the Leonids, probably the best for another 30 years. The Schroeders are trying to coordinate a trip for this, contact them with suggestions.
- Banquet is Jan. 11, 6pm, \$28

Our speaker was Constance Rockosi, post-doctoral at the University of Washington Department of Astronomy. Constance's talk was on the Sloan Digital Sky Survey (SDSS), a large astronomy project that she has been involved with since she was an undergraduate.

The SDSS is chartered with the cataloging of a quarter of the sky, 10,000 square degrees of the northern galactic hemisphere. It expects to find over 10 million galaxies, and at least that many stars. Around one million galaxies and 100 thousand quasars will be selected for more detailed spectrographic analysis. The data from the SDSS will be made publicly available, with the database expected to be online in January.

See the SDSS Web site at <http://www.sdss.org/> for more details.

Constance has worked a lot on the camera and telescope, so most of her talk focused on that. She also talked about how the camera and telescope were used to find new astronomical features such as sparse globular clusters and the evolution of intergalactic hydrogen.

The telescope itself is a 2.5m, f/5 Ritchey-Chretien. It has a 3 degree field of view. They massaged the optics, taking advantage of R-C strengths and compensating for R-C weaknesses to come up with a telescope with:

- Flat focal plane (crucial for CCD imaging)
- Low distortion (crucial for properly tracking moving stars)

- Mall lateral color

There were 30 CCDs dedicated to reading star data, all 2048 x 2048 pixel CCDs carefully mounted in 6 groups. In each group of 5 CCDs, there is one CCD for each of the 5 filters: ultraviolet, green, red, infra-red, z (far-infrared). The CCDs are cooled by liquid nitrogen.

There were an additional 24 CCDs just for astronomy (figuring out where the telescope was pointed). All of the CCDs are mounted directly on one of the 2 quartz correctors. So that big piece of glass was both a part of the optics and the substrate for the electronics.

The camera is designed to let the stars naturally pass overhead. The CCD scanning electronics are synchronized so that as a star passes over the CCD, all of its light is hitting the same pixel.

Constance talked a bit about the logistics of setting up, testing, and maintaining the telescope. It looks like a big air conditioning unit, with the shell of a Saturn V rocket inside (my non-technical impression).

When they first set it up manually (the telescope drives hadn't been installed yet) it took them 5 hours to find Polaris.

Once they had the telescope set up and properly scanning the sky, they had to find a way to easily sort through the pixels and find interesting objects.

For galaxies, there is a distinctive spectral signature depending on the form and age of the galaxy (young globular cluster vs. old

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University of Washington Colloquia

The University of Washington Astronomy Department holds a weekly colloquium that meets Thursdays at 4 p.m. in PAA A102, unless otherwise noted (the classroom part of the Physics/Astronomy Building complex). Here is the schedule of upcoming speakers. Please check our web page (www.astro.washington.edu) for up to date information.

Nov. 7: "The History of Early Radio Astronomy," Woody Sullivan, UW Astronomy Department

Nov. 12: "Delivery of Volatile Materials to Habitable Planets," John Chambers, NASA Ames (Tuesday, 2:30 p.m. PAA-A114)

Dec. 5: "Gravitational Lensing Studies with Keck and HST," Richard Ellis, California Technical Institute

Minutes (Continued from page 12)

spiral, for instance). So if you observe a galaxy, you can compare its response from each of the 5 CCDs, and find a best-fit to one of the expected spectral signatures. This way you can quickly find out the type of galaxy, its age, and its redshift (velocity).

For stars, you can use color/color diagrams (plotting the ratio of red-to-green light vs. red-to-infrared, for instance) to determine if a point source is a main-sequence star, or a quasar (since quasars look very different from stars on color/color diagrams).

There were other interesting ways to use the data. For instance, once you identified a quasar, you could look at its redshift and how blue light from the quasar was absorbed. They have identified some of the oldest (furthest away) quasars ever seen. Nearby quasars have a lot of ultraviolet light hitting us. But the ultraviolet light from distant quasars has been completely absorbed. Constance said that is consistent with current cosmological models. When the universe was older, hydrogen between galaxies would absorb all of that ultraviolet light. Later, the intergalactic hydrogen was ionized, such that it stopped absorbing the UV.

Another thing to do was to inspect the stars, and find clusters (based on position, magnitude, and age) that weren't obvious to the naked eye. They found several examples of small globular clusters being ripped apart by interactions with the Milky Way.

A third trick was to take advantage of chance overlaps (that is, sometimes small portions of the sky would be sampled multiple times on different days) and identify variable stars.

UW Campus Observatory Public Viewing Nights

The UW Campus Observatory hosts public talks and viewing on the first and third Wednesdays of each month. The 30-minute talks are given at 7 and 8 pm by astronomy undergraduates. Here are the topics for the rest of 2002:

- November 6: Voyagers I and II
- November 20: 7 pm - Gravity; 8 pm - The Big Bang (2 different presentations this evening)
- December 4: Astrobiology and SETI
- December 18: Closed for winter break and the holidays

Weather permitting, visitors will also get a chance to look through the 6-inch telescope.

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Choose from the membership and subscription options listed and mail this form and your check to the address below. For family memberships, please include the names of persons you want to appear in the membership directory. For student memberships, please include verification of full-time student status (such as student ID card). For renewals, please attach magazine subscription renewal cards.

The Seattle Astronomical Society

PO Box 31746

Seattle, WA 98103

_____ Full-Time Student Membership (copy of student ID required)	\$10.00
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_____ 1 year of Sky and Telescope Magazine (<i>optional</i>)	\$29.95
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