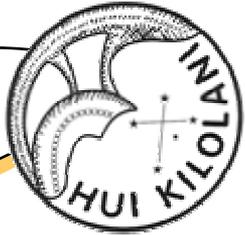


The Astronews



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August 2003

The Great Debate

Kristine Spekkens

We have only known that we live in a galaxy like other spirals that we see for only a relatively short time! A great debate about this topic was held between Harlow Shapley and Heber Curtis in 1920, and is regarded by most as the greatest debate in the modern history of astronomy.

The debate was about the scale of the Universe; at the time it was known that there were "spiral nebulae" in the skies in addition to stars, but their nature was very unclear. Curtis argued that the nebulae represented "island Universes", or galaxies as we know them, and that the Sun itself was part of such a system. If Curtis was right, it meant that the Universe was bigger

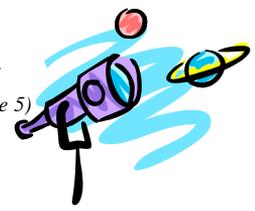
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Upcoming Star Parties

- Public Party** Aug 2
- Club Party** Aug 23
- Public Party** Aug 30
- Public Party** Sep 6
- Club Party** Sep 20
- Public Party** Sep 27



- Kahala Park**
- Dillingham**
- Dillingham**
- Kahala Park**
- Dillingham**
- Dillingham**

Upcoming Events:

- The next meeting is 7:30 on August 5th at the Bishop Museum.
- **Sam Rhodes** next Planetarium show on Mon. Aug. 4th.
- Mars at opposition on August 27th.

President's Message

One of the reasons I like astronomy is that it keeps me in tune with many rhythms of nature. If you stop to think about it, you realize that the cycles that we observe most regularly derive from astronomical events. The day, month, and year relate directly to the movements of the Sun, Earth, and Moon relative to each other.

As I continue to observe the outer planets, I become more aware of the longer cycles associated with their orbits. For example, Mars takes a little less than two years to orbit the Sun, so it repeats its oppositions in our sky in a little over two years. These oppositions occur at different points along the orbits of Mars and the Earth, and this year's opposition will mark the beginning of another kind of cycle, from a very close approach by Mars through increasingly distant oppositions, and back to the closest of the next cycle (about 13 years from now).

If I spend some time observing and thinking, I can always learn something new that deepens my understanding. This time I have noticed that Mars is at opposition while in Aquarius. Since this is nearly as good an opposition as possible, Mars must be near its perihelion and will be each time it returns to Aquarius.

Unfortunately, this is the part of the Martian year during which dust storms begin. On July 1, a dust storm was observed in Hellas basin, a huge impact crater in Mars's southern hemisphere. As I write this, I don't think it has spread to become a global storm, but that could happen. Let's hope we are lucky enough to view an unobscured Mars in late August when it is as close to us as it has been since the telescope was invented.

If our luck doesn't hold, and a global dust storm prevents us from seeing any detail on the surface of Mars near this opposition, we might find that our next opportunity will provide us with better views. Any dust storms that form that time may have subsided by the time of opposition.

All of this is just one more reminder of the first rule of astronomy: You can't control the weather – even on Mars.

Chris

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Planets Close to the Moon

Times are Hawaii Standard Time

- Aug 11, 05h, M 4.9° SSE of Neptune (178° from sun in midnight sky)
- Aug 12, 17h, M 4.2° SSE of Uranus (168° from sun in morning sky)
- Aug 13, 06h, M 1.7° NNW of Mars (161° from sun in morning sky)
- Aug 23, 04h, M 4.3° N of Saturn (50° from sun in morning sky)
- Aug 28, 22h, M 8.4° NNE of Mercury (21° from sun in evening sky)

Venus and Jupiter are closer than 15° from the sun when near the moon in August

Other Events of Interest

Times are Hawaii Standard Time

- Aug 4, 04h, Neptune at Opposition
- Aug 8, Asteroid 29 Amphitrite will be in the Pleiades (About 10th magnitude)
- Aug 11, 18:47h, Full Moon
- Aug 14, 11h, Mercury at greatest elongation (27.4° East of the sun in the evening sky)
- Aug 18, 07h, Venus at superior conjunction with sun (Passes into evening sky)
- Aug 22, 00h, Jupiter at conjunction with sun (Passes into evening sky)
- Aug 24, 00 h, Uranus at Opposition
- Aug 27, 07:25h, New Moon
- Aug 28, 08h, Mars at Opposition (Very close opposition - Mars less than 2 days from perihelion)

The Planets in August

♃ Mercury	♀ Venus	♂ Mars
Mercury is visible in the evening twilight during the first three weeks of the month.	Venus is too close to the sun to be observed in August.	On Aug 28, Mars will be closer and brighter than it has ever been before in recorded history.
♃ Jupiter	♄ Saturn	♅ Uranus
Jupiter is too close to the sun to be observed in August.	Saturn rises about 2.5 hours before the sun and is visible in the pre-dawn sky.	Uranus is at opposition this month and is well placed for viewing most of the night.
♆ Neptune	♇ Pluto	
Neptune is also at opp. this month and is in the sky all night, near the zenith at midnight.	Pluto was at opposition last month, and is well placed for viewing in late evening sky.	

Telescope for Sale (Moving to Colorado):

KONUS 500 electronic, Newtonian reflector, D 114mm, FL 500m f/4.3 equatorial mounting. Asking \$200.
 Contact Patty 732-9450 or pangettes@aol.com

Meeting Minutes

by Gretchen West

The July 1, 2003 meeting was called to order by President Chris Peterson at 7:37 p.m. in the Atherton Halau, Bishop Museum, with twenty-five members and four visitors in attendance. President Chris Peterson welcomed the four visitors to this month's meeting and urged them to visit again.

Old Business

President Chris Peterson is soliciting ideas in the selection of slides / pictures as well as for content members feel should be included for the slideshow we will be putting together for schools. Lists of website locations where slides and/or pictures may be accessed are also requested.

Star Parties

Two special group Star Parties are scheduled for July 3rd at Bellows and on July 5, in Makakilo.

Planetarium New

Mike Shannahan informed the membership that the refurbished Planetarium is again open. The new Mars program show daily at 1 pm. A special celebration is scheduled Tuesday, August 26 and Wednesday, August 27 for 9 pm to midnight to view Mars.

New Business

July 16 through July 24 is Space Week. Events scheduled at the Planetary Data Center, in the Post Building, (UHM) will occur July 22nd. August 28 showcases Peter McGuinness Mark who will speak about Mars, also at the Planetary Data Center.

Sky & Tel magazine has increase its subscription rate to \$32.95/yr as of June 2003. If you subscribe through the club and are unsure if you will be affected, please check with Jim MacDonald.

Don Tucker made his farewells, speaking very eloquently to new members and visitors about his experiences during the three years he has been with us and his warm feelings about the club and its members.

Guest Speaker

Vicki Hamilton, U.H. geologist, held everyone's full attention for the majority of the meeting time, as she spoke at length about the geology of Mars. She acquainted members with known Martian geologic composition and with its many features: polar cap, volcanoes, canyons, mesas and channel and impact craters. Then Ms. Hamilton spoke about various NASA missions to Mars. The current mission for research was outlined and the visual presentation given by Ms. Hamilton was of great interest to all in attendance.

The Meeting was adjourned at 9:04 p.m. and refreshments were served. About 15 members congregated in the newly refurbished Planetarium at 9:15 for a walk through the evening sky for July. A visiting group of students and teachers visiting the Bishop Museum joined us for the half-hour stellar excursion with Joanne Bogan and Nick Bradley.

Respectfully submitted,
Gretchen West, HAS

North of the equator, this is normally Perseid month, with rising sporadic rates, warm weather, and several minor showers on show. Regrettably, even with clear skies, the Perseids are lost to a full Moon.

Monday the 4th, the Southern Iota Aquarids. Radiant 22h12m -15°. This drizzle produces less than 5 meteors per hour and may not even be detectable.

Saturday the 9th, the Northern Delta Aquarids. Radiant 22h20m -05°. For this drizzle again less than 5 meteors per hour. This less active branch of the Delta Aquarids is lost to the Moon this year.

Wednesday the 13th, the Perseids. Radiant 03h04m +57°. This shower produces upward of about 80 meteors an hour. This year the Moon destroys the shower, but if you want to brave the mid-August moonlight for the peak, pick a direction facing away from the Moon to watch in.

There are two other showers this month which produce less than 3 meteors an hour Monday the 18th the Kappa Cygnids, radiant 19h04m +59°, and Wednesday the 20th the Northern Iota Aquarids, radiant 21h48m -06°.

If you are interested in observing meteors contact Tom Giguere on Oahu at 672-6677 or write to: Mike Morrow, P.O. Box 6692, Ocean View, Hawaii 96737

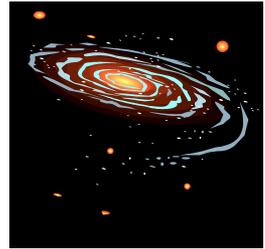
Great Debate (Continued from page 1)
than anybody at that time imagined it could be. Shapley, on the other hand, argued that the spiral nebulae were simply interstellar clouds near the Sun. The stars in the sky were therefore the most distant objects in the Universe, not the nebulae; since all of these stars are in our own galaxy, Shapley's scenario implied that the Universe was no bigger than our own galaxy!

The issue was not resolved fully for another decade; as equipment improved, astronomers were able to resolve stars in the spiral nebulae and compare their properties to the stellar counterparts. The distances inferred

from these studies implied that the nebulae were indeed other galaxies.

For more information about the Great Debate, check out this web site: <http://antwrp.gsfc.nasa.gov/diamond_jubilee/debate20.html>.

In summary, then, that the galaxy is one of a number of such systems in the Universe has been known for about 70 years. This is quite a short time compared to the hundreds of years over which humans have pondered the Universe!



From the Belly of an Airplane: Galaxies

by Dr. Tony Phillips

On April 28th a NASA spacecraft named GALEX left Earth. Its mission: to learn how galaxies are born, how they grow, and how they die.

“GALEX—short for Galaxy Evolution Explorer—is like a time machine,” says Caltech astronomer Peter Friedman. It can see galaxies as far away as 10 billion light years, which is like looking 10 billion years into the past. The key to the mission is GALEX's ultraviolet (UV) telescope.

space. To get it there, mission planners turned to Orbital Science Corporation's Pegasus rocket.

“Pegasus rockets are unusual because of the way they're launched—from the belly of an airplane,” says GALEX Project Engineer Frank Surber of JPL.

It works like this: a modified L-1011 airliner nicknamed Stargazer carries the rocket to an altitude of 39,000 feet. The pilot pushes a button



L-1011 "Stargazer" takes off to carry Pegasus rocket on the first 39,000 feet of its climb to deliver a spacecraft to orbit.

UV rays are a telltale sign of hot young stars, newly formed, and also of galaxies crashing together. By studying the ultraviolet light emitted by galaxies, Friedman and colleagues hope to trace their evolution spanning billions of years.

This kind of work can't be done from the ground because Earth's atmosphere absorbs the most energetic UV rays. GALEX would have to go to

and the Pegasus drops free. For 5 seconds it plunges toward Earth, unpowered, which gives the Stargazer time to get away. Then the rocket ignites its engines and surges skyward. The travel time to space: only 11 minutes.

“The aircraft eliminates the need for a large first stage on the rocket,” explains Surber. “Because Stargazer can be used for many missions, it be-

(Continued on page 8)

Whenever doing sidewalk astronomy or public star parties we are often barraged by questions, some relevant, and some not so relevant. But very often these questions fall along certain lines, and with a few basic facts at our fingertips, we can handle many of the questions which come our way. So here is a list from the Sidewalk Astronomers (slightly modified/updated by your editor).

1. The Moon is approximately 250,000 miles from the Earth.
2. Jupiter averages 450 million miles from the Earth.
3. Saturn averages 750 million miles from the Earth.
4. Mars averages 40 million miles from the Earth.
5. The Sun is 93 million miles from the Earth. The distance between the Earth and the Sun is called an astronomical unit, abbreviated A.U.
6. A light year is about 5.6 trillion miles. Light travels at 186,000 miles a second.
7. Light can travel around the Earth $7\frac{1}{2}$ times in 1 second!
8. The moon is $1\frac{1}{4}$ light seconds away.
9. Jupiter is about 45 light minutes light away. (That means you are watching Jupiter as it was 45 minutes ago.)
10. Saturn is about $1\frac{1}{2}$ light hours away.
11. Jupiter is a big ball of Hydrogen gas and is surrounded by 61 moons or satellites. Four of which are easily seen from Earth: Io, Europa, Ganymede, and Callisto.
12. Saturn is a big ball of Hydrogen gas and has 29 moons or satellites. Through our telescopes, we can see 5, maybe 6 of these moons from Earth. The biggest moon, Titan, can almost always be seen.
13. Mercury, Venus, Earth, and Mars are all rocks. Jupiter, Saturn, Uranus, Neptune are all gases. Pluto is a ball of ice?
14. If Jupiter were a pumpkin and you could take off its lid, you could put 1,500 Earths inside.
15. You can put 1,500 Jupiters inside the Sun.
16. Saturn can hold about 1,000 Earths inside.
17. Stars are light years away. Our closest visible neighbor is the star Alpha Centauri which is 4.4 light years away, or a whopping 24.6 trillion miles away.
18. Our sun is an average sized, average brightness, middle aged star. All of the stars we can see with our eyes are much brighter than average.
19. The North Star is only the 48th brightest star in the sky, Sirius is the brightest.
20. The largest (mass) and brightest star is the Pistol star near the center of our galaxy (but we can't see it). The largest (diameter) star we can see is Herschel's Garnet Star (μ Cephei), also known as Erakis.

The lights from the parlour and kitchen shone out
Through the blinds and the windows and bars;
And high overhead and all moving about,
There were thousands of millions of stars.
There ne'er were such thousands of leaves on a tree
Nor of people in church or the Park,
As the crowds of the stars that looked down upon me,
And that glittered and winked in the dark.

The Dog, and the Plough, and the Hunter, and all,
And the star of the sailor, and Mars,
These shone in the sky, and the pail by the wall
Would be half full of water and stars.
They saw me at last, and they chased me with cries,
And they soon had me packed into bed;
But the glory kept shining and bright in my eyes,
And the stars going round in my head.

From the Belly of an Airplane

(Continued from page 6)

comes a re-useable first stage and makes the launch system cheaper in the long run.” (To take advantage of this inexpensive launch system, GALEX designers had to make their spacecraft weigh less than 1000 lbs—the most a Pegasus can carry.)

A Pegasus has three stages—no counting the aircraft. “Its three solid rocket engines are similar to the black powder rockets used by amateurs. The main difference is that the fuel is cast into a solid chunk called a ‘grain’—about the consistency of tire rubber. Like black powder rockets, once the

grain is lit it burns to completion. There’s no turning back.”

In this case, turning back was not required. The rocket carried GALEX to Earth orbit and deployed the spacecraft flawlessly. On May 22nd, the UV telescope opened its cover and began observing galaxies—“first light” for GALEX and another success story for Pegasus.

Find out more about the GALEX mission at: <http://www.galex.caltech.edu/>. Kids can read and see a video about Pegasus at <http://spaceplace.nasa.gov/galex/pegasus.html>.

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



Maksutov-Gregorian 10x30 monocular

Orion 8x32 Eagle Eye monocular

A previous article in the *Astronomers* informed readers how to build a little telescope from 35mm camera telephoto lenses. This equipment report will feature already built, commercially available ‘tiny telescopes.’ or to be more precise, monoculars.

1. Orion 8x32 “Eagle Eye”

Roughly 4½" long x 1½" in diameter, this bronze colored aluminum bodied monocular is made in Japan. It has emerald green color multicoated optics and a large ¾" diameter eyepiece. It offers a bright field and near focus to about 2 feet. It has a fold-down rubber eyecup to accommodate those wearing eyeglasses. Orion sells it for \$129.

2. Little Mak 10x30 monocular

About 4¼" long x 1¼" in diameter, the black pebble finish monocular is made in Russia. It is a mirror-type of scope of the Maksutov-Gregorian* design, and is billed as the smallest

commercially sold Mak in the world. It also offers upright images and being of the mirror scope variety, it does not have chromatic aberration. It has a flat field to the edge of it’s multicoated ½" diameter eyepiece. It’s closest focus is about 5 feet. Edmund Scientific sells it for about \$60.

These monoculars are easier to carry than binoculars, but surprisingly, a tripod attachment is recommended, since hand shake seriously distorts any stellar object or planet being viewed, and of course the view through the 10x Mak is darker, requiring even more steadiness. These tiny telescopes are not to be confused with the equally miniature working astronomical telescopes that are sold for big bucks at astronomy conventions. But with these monoculars, or ‘tiny telescopes’ that can be worn in a case on a belt, or carried in a ladies purse, small is big!

* see page 10

HAS Financial Report as of July 15, 2003 (covers May 15-July15)

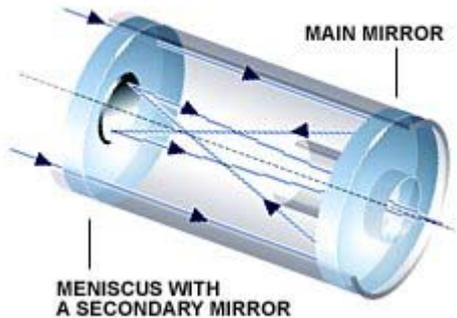
Initial Balance:	\$5,676.42
Receipts:	
Astronomy Payment	58.00
Donations	85.00
Dues Received.....	141.00
S&T Payment.....	32.95
Polo Shirt Fee.....	25.00
Telescope Fees	40.00
Deposit-Telescope.....	20.00
Uncategorized Income.....	2.00
Total Income:	\$403.95
Expenses:	
Astronews	321.30
Magazine Subscription Payment	306.49
Polo Shirts.....	32.30
Refreshments.....	23.92
Uncategorized Expenses.....	50.00
Total Expenses:	\$734.01
Final Balance.....	\$5,346.36

During this period we had four new members join the club. They are **Carol Froese, Jeffrey and Akiko Tash** and **Andrew Vith**. We would also like to thank **Tom Piper** and **Robert Wall** for their donations to the club. For his donation (AKA winning bid), Tom Piper walked away with a second-hand 8" SCT that was donated to the club. Welcome to the new members and many thanks to those renewing their membership. Clear skies to all!

Maksutov-Gregorian

Okay, I didn't know what a Maksutov-Gregorian was either, but I found this illustration. This design does not require the use of additional lenses, mirrors or prisms to give a fully erect image.

Thus, this instrument is made more rugged, because there is no erecting system to come out of alignment. The Maksutov-Gregorian design can be made smaller than any other Maksutov.



Letter to the Editor

Dear Ladies and Gentlemen,

Sorry for contacting you out of the blue. I found your e-mail addresses via a Google search. I hope you don't mind asking you a question.

At the end of August I have a business trip to Hawai'i (on The Big Island). The total stay will last about three weeks with about 10 days of free vacation.

Since I am an amateur astronomer in Switzerland and also an active member in the local astronomy club, I would like to do some stargazing in Hawai'i if possible. Unfortunately, I cannot take along my home-made 10 inch Dobsonian. Is there any opportunity to do some public or commercial ("Stargazing Inn" or rental telescope)

observing at the end of August? Any hints are highly appreciated.

I am also willing to rent a medium size telescope (with about 8 inches) for a couple of days.

Or do you know of any clubs on The Big Island, that offer stargazing for non-locals?

I already know about the Mauna Kea visitor center. I will go there once or twice, but I would still like to do some stargazing during the other nights.

Thank you very much for your time.

Best regards,
Wilfried Noell
<wilfried.noell@unine.ch>
Neuchatel
Switzerland

Sky and Telescope magazine recently announced an increase in their club subscription rate to take effect immediately. The new rate is \$32.95. The only exception is if you have already received a renewal notice citing the old rate it will be honored. In that case, you will need to submit that notice along with your payment to the treasurer. Remember, this magazine only renews subscriptions for one year at a time.



Telescope for Sale Almost new 8" Meade LX200GPS model with the following accessories: soft side case, astrozap dew shield, losmandy dovetail mount plate and counter weight system, 2" diagonal and two eyepieces; Meade super plössl 26mm and 15mm. The scope was purchased in January of this year from Anacortes. I am planning to upgrade to a 12 inch model for CCD imaging. **My asking price is \$1600.**

Gary King: 927-6382 <kingg001@hawaii.rr.com>

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Former HAS VP Mike Gaffey and your editor at the North Dakota Star Party