



Regulus



The Newsletter of the RASC Kingston Centre

2000 March-April

Astro Week 2000: May 8-13



Galaxy Cluster Abell 2218

HST • WFPC2

NASA, A. Fruchter and the ERO Team (STScI, STECF) • STScI-PRC00-08

Scanning the heavens for the first time since the successful December 1999 servicing mission, NASA's Hubble Space Telescope has imaged a giant, cosmic magnifying glass, a massive cluster of galaxies called Abell 2218. This "hefty" cluster resides in the constellation Draco, some 2 billion light-years from Earth.

The RASC Kingston Centre Display (Saturday May 13th) will be on display at: The Cataraqi Town Centre. Our coordinator is Don Mastrianni. We will have telescopes, poster displays, special displays, and lots of free handout material on astronomy for the public!

Weather permitting (no rain, no snow, maybe a little cloud), come out and observe the sun and/or the night sky with binoculars and telescopes provided by Kingston Centre members. We will be at the Murney Tower Museum Park (King & Barrie Sts).

Astronomy Week Events

Solar Observing from 12:00-1:00pm Monday - Friday

Stellar Observing in the evenings Monday-Friday

Don will be looking to sign you and your scope up for these events.

Submissions from Members

A *StarFest 97'* Story from Dave Pianosi:

It was a decent 10 pm mid summernight sky as I wandered near my campsite at Starfest '97. I was just heading off to meet a couple of friends when I was approached by a couple of local campers. They spoke of how every year they come to camp during Starfest weekend because they love to learn from people who love the night sky. Just a few minutes into the conversation their young daughter asked me about a star cluster that she had heard called "The Hercules Cluster." She asked me where the constellation Hercules was. No problem, I love pointing out these mythical figures to others. I confidently craned my neck back and found Ursa Major and seconds later I was scanning in confusion looking for the dim constellation in the vast clutter of stars. I had not looked at the whole sky for a couple of years now. I had completely forgotten my memory trick for Hercules : the sword shape of Bootes cutting through the orange slice (Corona Borealis) and swinging past to cut Hercules in the knee. I was embarrassed and luckily my wife was able to point out Hercules for them.

That episode combined with my reduced number of trips to the backyard observatory told me something. The past two years or more I've spent most of my observing hours looking through a small guidescope tracking some small dim star for many minutes. All on a few tiny arcminutes of sky, repeatedly. My dream of astrophotography has cost more than the 1,000 or so extra dollars of knick knacks, what nots, and gadgets. It has cost me in terms of looking too narrowly at such a vast universe. The awe and wonder of the entire night sky, the immensity which first attracted my interest was taking second place to my narrow field photographs. You'll know what I'm taking about if you've ever sat crouched looking through a guiding eyepiece in the cold fall air making tracking corrections every few seconds for more than an hour. It seemed to be more a lesson in perseverance than astronomy. Don't get me wrong, I've learned a lot and had fun, and actually had moderate success (in my eyes). Astrophotography is just one of the many facets of astronomy that you can investigate, as your interests change in the hobby. But I think I'll let the Hubble, and the likes of David Malin impress me with astrophotography. Now I've stripped my little Newtonian back to original. I can be scanning the heavens within minutes, no cameras, film, cords, batteries, control boxes' etc... I think I'll sell my knick knacks and gadgets at the swap table of Starfest, and pick up where I left off on my Messier list which I left more than two years ago with only some 15 objects left to log for my certificate. I'm glad to be back to the skies with my eyes.

What's going on in Sudbury?

From Dave Pianosi:

I love astronomy. I love the still, quiet, cold nights under the stars trying to understand astronomy. Luckily I am not the only one who feels this way. Recently on a trip home to visit my family in Sudbury, I got up the nerve to call Stargazer Steve Telescopes which is based in Sudbury. I spoke with Steve Dodson (the owner) and with friendly manner I was invited to meet at a local coffee shop. Next thing I knew I was sitting with two perfect strangers, Steve Dodson and Harold Healy of the Sudbury Astronomy Club talking about what we love. In our conversation I mentioned that I had read about their club's new observatory in a SkyNews article. Without any hesitation they graciously offered to give me a tour of the grounds. After a half hour drive we arrived at the site and without doubt this club has put together a first class observatory based right on the grounds of a youth group camp so that youth education is part of their program. I took some photographs and we talked further as we drove back to town. I thanked them for the hospitality and we parted company.

Now at events like Starfest I have a couple of more familiar faces that are no longer considered strangers. The love of astronomy brings all sorts together

YOG

by Hank Bartlett

Feb. 2000

Youth Observing Group continues to meet 1st and 3rd Wednesday of each month 6:30pm - 8:00pm in room 108 at Holy Cross Secondary School. With two new youth signing in on the 16th of this month we now have 12 members.

The meeting on Feb. 2nd was cancelled as the school was closed. On the 16th we started the evening with various handouts and informal chat about the night sky. We spent a little more than the last half hour observing. After learning the Winter Circle in the classroom all attending went out to find these stars in the night sky. Sharing the available scopes the youth observed Jupiter, Saturn, the Moon and M42. Our viewing area was limited by clouds on all horizons and some haze. It was pure luck that we happened to be looking up to the Moon when an Iridium Satellite came out of its glare at approximately the brightness of Sirius and quickly diminished. For our youth this was their first Iridium flare, they were impressed.

So far I feel this group has been very successful and beneficial not only to the youth but ourselves as well. Hopefully we are grooming future members and who knows, future astronomers. If you are in the Kingston area and know youth who would be interested in joining us call Hank at xxx-xxxx or email xxx@xxxxxx

RASC (Kingston Center) Observing Programs

This program is a WORK IN PROGRESS. The complete arc of programs will be fleshed out over 2000.

Many members have asked for lists of objects to observe, to help them learn the night sky and to give them a goal and motivation to observe more often. The Messier List is not the easiest thing in the world for some, yet others have completed it and do not have a lot of alternative choices. With that in mind we have undertaken to create an Observing Program that stretches from naked eye beginner observing to some of the most difficult objects in the sky.

Certificates progress from easily observed objects with minimal observing logs to more challenging objects and more detailed log requirements. There is no required order in which to obtain the certificates, merely a suggested order for beginning observers. The observer may pursue the certificates in whichever order he or she desires.

The following table lists the programs. Local programs are annotated as (KC) while national programs are annotated as (RASC). This chart is on our web site with hypertext links to the actual lists

Logging requirements fall into three categories:

1. Simple Logging. The date of observation. The minimal

documentation to qualify for certificates at this level is a list of each object and the date on which it was observed. When an observing session extends past midnight to the next day, the date may be recorded as the date on which the observing session began, or may be recorded using a combined format. For example, observations made between 9:00 pm March 3, 1999 and 2:00 am on March 4, 1999 could be recorded as March 3/99 or as March 2-3/99.

2. Intermediate Logging. The minimal documentation for certificates at this level of logging is a list containing the object, the date and the details of the instrument. The instrument details must identify either the size, focal length (or focal ratio), or it may be the size of the instrument and the power of magnification. The two national awards need only the size and focal length of the instrument.

3. Advanced logging. The minimal requirements are the object, the date of the observation, the seeing conditions at the time of the observation and the details of the instrument. Some of the certificates at this level of logging may require sketches.

* The Beginner's Observing Guide: An Introduction to the Night Sky for the Novice Stargazer, by Leo Enright, published by The Royal Astronomical Society of Canada, Toronto, Canada, 1996.

| Difficulty | Simple Logging | Intermediate Logging | Advanced Logging |
|--------------|--------------------------------------------|-------------------------------------------|-----------------------|
| Beginner | BOG* Stages 1,2 and 3 (KC) | BOG*, Stages 4 and 5 (KC) | |
| | | Binocular Messier(KC) | |
| Intermediate | Binocular Messier Marathon(KC) | Double Stars (KC) | Lunar Watch(KC) |
| | | Solar Observing 1(KC) | Solar Observing 2(KC) |
| Advanced | Messier Marathon (KC) | Messier (RASC) | |
| | | Finest NGC (RASC) | |
| | | Herschel 400 (KC) | |

Welcome New Members!

- ©Andrew Wojcik (student), Oakridge Ave. Kingston, Ont. K7L 4S9
- © Don Beer, (regular) Oakview, Ave. Kingston, Ont. K7M 6W8
- © LeeAnn Beer (associate) Oakview Ave. Kingston K7M 6W8
- © Cardinal Newman Catholic SS. 127 Gray Rd. Stoney Creek, Ont. L8G 3V3

From: Mike Drew

<xxxxx@xxxxxxxxxxx>

Sent: Monday, January 24, 2000 6:22 PM

Our new E-mail address is <xxxx@xxxx.xxx> effective on February 1st.

New email address for Sue Knight-Sorensen

<xxxx@xxx.xxxxxxxxxxx>

Notes from the Secretary

Regular Meeting of the RASC Kingston Centre Jan 14, 2000

The new year got off to a great start for the Kingston Centre with its first meeting of 2000.

After two failed attempts, we finally got a chance to present Laura Gagne with the A.Vibert Douglas Award. She and Tom Dean shared the award this year. The award recognizes service to the Centre at an outstanding level. Contributions by these members in the areas of public education through seminars, publications and observing have been excellent examples of how the RASC mandate of the promotion of astronomy can be achieved. For more specifics see the Jan / Feb issue of Regulus

Judith Irwin was our speaker for the meeting and her talk was informative and absorbing. The topic for the evening was living and working near Puna, India during a recent sabbatical. The family spent a year in India where Judith worked with a radio telescope called the Giant Metre Wave Radio Telescope, affiliated with the National Centre for Astrophysics. An amazing structure of 30, 45m dishes, it is beginning to show great promise. The design is similar to the VLA in the U.S. and shows signs of perhaps surpassing it in its abilities in some areas. Judith described a project that exists almost completely due to sheer will power.

We were also part of a very small group who have actually seen data from this telescope as none has been published yet.

There was also an excellent assortment of slides to give us a feel for the geography, climate and living conditions in the north of India. If a great talk was not enough Judith and Dieter brought colourful post cards of the G.M.W.R.T. and the 530m long Ooty Radio Telescope at Ootacamund in the south of India, to hand out to the group.

Dieter Bruekner added that amateur astronomy clubs do very well at bringing the public out to star parties, sometimes 6000 people in one night! They have much more enthusiasm than funds and he thought that they may benefit from some

affiliation with the Kingston Centre. This could take the form of a newsletter exchange or perhaps a gift membership to the club, which he asked the exec to consider.

Private Members Observing, weather permitting, will be at David Pianosi's Sat Jan 15th.

Christine Kulyk announced a session being given by the local photography club would feature a talk by Terry Dickinson, Monday night Jan 17th at Walter Light Hall.

The YOG, Youth Observers Group, Hank reports meetings at Holy Cross school continue and members are encouraged to bring out a scope and lend a hand. On cloudy nights the group uses the school computer software or other indoor activities to encourage interest. Meetings are 1st and 3rd Wednesdays of the month

Finance, John reports a balance of \$13,223 in the Centre account and membership falls somewhere between 182 and 196. Will Kingston see a 2nd National Council Rep in 2000?

ATM report, Kendra announced that a plan of attack has been formulated for getting the 24" underway again and a pitch party has been scheduled for Jan 27th at the home of Tom Dean.

Laura is once again doing a great job of arranging speakers for the regular meetings. She has speakers booked up until September and has asked for input. Laura is also making plans this summer for a grade 6 version of last years grade nine resource and activities book for science teachers. She hopes to have the input of the original team that put the first book together. Most of the work will probably be done over the summer. There are also a fair number of requests to have the grade 9 version modified to be used in other areas of the country. The committee will have a look at this and see if it can be managed.

There was no news on the National Council front and the only presentation by the secretary was an invitation from the RASC Niagara Centre to their banquet in Niagara Falls April 8, 2000.

The meeting adjourned at approximately 10 p.m.

Kingston Centre of the Royal Astronomical Society of Canada

Minutes of the regular meeting February 11, 2000
Submitted by the secretary Susan Gagnon

Meeting commenced at approximately 8 P.M.

Our guest speaker was Walter MacDonald, a member and one time President of the Kingston Centre. Walter is now a partner in Winchester Electronics which is the Canadian distributor for Starlight Xpress, a CCD camera from the U.K.

This was a great introduction to CCD imaging for the novice, with some basic camera comparisons such as the multiple one shot imaging vs. multiple exposures using a filter wheel and the use of user friendly software to process these images. Walter's emphasis was more good photos, faster and easier. Other aspects covered were, resolution, signal to noise ratio, and spectral sensitivity. As you may have guessed there were many nice photos, many taken from Oshawa, not exactly dark sky country which made it even more impressive.

The second portion of the presentation was a video that Walter and his Winchester Electronics partner Doug Clapp had made of a trip to Florida to visit Jack Newton's astronomical Bed and Breakfast site. It had great shots of the facility, Jack and Alice as well as more terrific astrophotos. They were there for 11 nights, 10 of which were clear. Walter and Doug answered many questions and there was much discussion. The web site address is <http://www.starlightccd.com>

There were very brief reports from various committees.

In the brochure update department Kevin reports that the Youth Observers Group has been updated and printed.

Local Promotional Items, Peggy circulated a brochure from a local business that could put our Kingston Centre logo on a very nice 3 in 1 jacket. If you have any interest in this type of product please let Peggy know as a minimum commitment is required for this type of order.

Astronomy Day, Don reports that the Cataraqui Town Centre has been booked and that the mall will allow us to sell anything that we have produced that is not in direct competition with the stores. Please contact Don if you can contribute a scope and time for solar or evening observing sessions for the week, May 8 to the 13th.

Secretary, circulation of newsletters from other centres to be enjoyed and make their way to the Librarian. Also in the mail, an amazing publication from NASA regarding the details of the July 2001 eclipse which will be visible in southern and central Africa.. This has been placed in the centre library.

National Council, the next meeting has been changed to March 18th and Susan will attend.

ATM, Kendra reports that the committee has decided to wait until warmer weather arrives to continue with the 24 inch polishing etc. but work will continue on tube design.

At 10:33 the meeting was adjourned to Harvey's.

Editor's Corner

by Kevin Kell

RASC GA2000

Book your vacation days now for the RASC 2000 GA to be held in Winnipeg Manitoba around the July 1st long weekend, specifically Friday June 30th to Sunday July 2nd

Starfest 2000

Starfest is scheduled for Thursday Aug 24th to Sunday August 27th I haven't asked around the Centre yet this year, but expect to see many of our Members there.

Regulus Back Issues Wanted:

Again, I am requesting that if you have any issues of Regulus from 1988 and before, please send them in to me so I can make copies for our archives (and I will send the original back to you).

Observing Group:

There is an effort underway to have one of our Observing Group Meetings held at Bon Echo Provincial Park (north of Highway 7 and west of Sharbot Lake) sometime this year. At BonEcho Lake, eight group camping areas can accommodate 20 to 30 people each. Bon Echo is open for camping between the second Friday in May and Thanksgiving Weekend, and reservations are accepted beginning the first of May. For the peak season period - mid June through Labour Day and particularly for weekends it is recommended that reservations be made well in advance. More news to follow.

Observatories:

Congrats to Norm Welbanks for actually planning, designing and then building his own rolloff roof observatory last fall! We are expecting a several part newsletter article complete with pictures in the near future :)

This has spurred us into the initial design and costing phase for our own Centre Observatory to house the Venor Dobsonian telescope (ATM work in progress).

Very Rough plans are:

The telescope assembly will be on the order of 10' long. It will have a computer controlled alt-az Dob mount. That the observatory building have a warm room.

Awards:

The Science Fair is April 9 and 10. See
http://www.limestone.edu.on.ca/scifair/flasf_engl.html

National Stuff:

We have sent in all of our required annual reports to National (Treasurer, Secretary and a contact list).

Slide Loan Sets:

To remind you that we have a large selection of 35mm slide that can be loaned out to members for use in giving public talks, talks to schools, etc. In addition to the 165 slides by our members in the sets, we have many commercial sets:

GRAND TOUR OF THE UNIVERSE- 40 slides. From relative sizes of the planets, to individual planet slides, to deep space objects (HST). Along with a 74 page book.

THE HUBBLE SPACE TELESCOPE 1996- 30 slides. A collection of HST slides with a 27 page booklet including support captions and Hubble facts.

TERRESTRIAL IMPACT CRATERS- 26 slide set. Crater slides of the Earth and some other planets and the Moon, a 20 page booklet with an introduction to craters and their formation.

THE RADIO UNIVERSE II: The best of The Very Large Array (VLA)- 30 slides with support text.

WOMEN IN ASTRONOMY- 26 slides. Pictures of the women who have helped change our view of the universe in which we live, supported by a 35 page booklet. the booklet provides a historical introduction to women in astronomy as well as multi paragraph captions supporting each slide.

ASTRONOMICAL CARTOONS by SIDNEY HARRIS- 20 slides. A collection of cartoons intended to inject some humour into your slide show. Self explanatory, no supporting documentation.

New!

Astronomy Slide Set, Eric Chaisson and Steve McMillan,- 160 slides. A collection of fantastic comet slides. Donated by Cliff Newman... Thanks! No documentation yet.

New!

"Comets: Fall 1995 Edition, Astronomy Today, - 30 slides Donated by Cliff Newman... Thanks! No documentation yet.

Education Group News

We recently ran a 2nd print run of the "Expanding Their

Universe Companion" Book (1st edition) and did a 2nd duplication run of ETU Slide set 1 and 2, as we had sold out. Orders continue to come in.

Work is underway on the Grade 6 edition as well as thoughts on revisions for the 2nd edition of the Grade 9.

Observing Group News

Tuesday February 15th 7:00-8:30pm EST at the Murney Tower Museum Park (King & Barrie Sts)

Results: 15-20 folks with a little cold haze. Southern clouds moved in around 8:00pm so we packed it up and headed home.

Thursday January 20th EST TOTAL LUNAR ECLIPSE at the Murney Tower Museum Park (King & Barrie Sts)

Total Eclipse starts about 23:05

End total just for 00:23 (Friday Jan 21)

Results: COLD COLD COLD. The snows lifted and the clouds thinned and about 40 people turned out in -15 to -18 weather with a good breeze with gusts.

Tuesday January 11th 7:00-8:00pm EST at the Murney Tower Museum Park (King & Barrie Sts)

Results: CANCELLED due to cloud and (snow and wind) forecasts

Eyepiece Inventory Assigned to Scopes:

(posted here more as a historical footnote more than anything else)

Size Make (assigned scope primary, focal length, fratio, power) comments

32mm Koenig Univ.Opt (douglas pri=254mm, fl=1405mm, f=5.5 x44) 1990

9mm MA Meade (douglas pri=254mm, fl=1405mm, f=5.5 x156)

25mm RKA Edmond Sci (fitzgerald pri=200mm, fl=1385mm, f=6.9 x55) 1998

18mm Plossl Bausch&L (barney pri=200mm, fl=914mm, f=4.5 x51) 1998

30mm Plossl Bausch&L (barney pri=200mm, fl=914mm, f=4.5 x30) 1998

5mm unknown Bushnell (voyager pri=114mm, fl=500mm, f=4.3 x100) 1999

27mm unknown Bushnell (voyager pri=114mm, fl=500mm, f=4.3 x19) 1999

Most of these we class as "low quality". If you are thinking of donating any of your eyepieces to a worthy cause, consider us and this list!

- Barney-the-purple-telescope is our ATM built 200mm f4.5 dobsonian
- Voyager is our commercial "Astroscan style" 114mm f4.3 scope
- The Fitz is our ATM built 200mm f6.9 dobsonian
- The Douglas is our 254mm f5.5 dobsonian

RASC Kingston Centre Meetings

The Kingston Centre RASC meets once a month on the 2nd Friday of each month at 8:00 pm (20:00) in Mackintosh-Corry Hall, Room B-201 on Queen's University Campus **unless noted otherwise**. We have adopted a policy of moving any meeting that is held on a holiday weekend to the **WEEK BEFORE**.



Event Horizon 2000

- ! **Friday March 10th** Regular Meeting. Regulus Newsletter available. Guest Speaker: Roger Hill (Hamilton Centre) - How to build an observatory for \$500
- ! **Friday April 14th** Regular Meeting. Guest Speaker: Randy Attwood (National President) on the Apollo Program
- ! **Friday May 12th** Regular Meeting. Guest Speaker: Kathy Perrett (Queen's University) on the Queen's New Observatory at Ellis Hall.
- ! **Friday June 9th** Regular Meeting. Guest Speaker: Ray Berg (Kingston Centre) - A Southern Odyssey This accounting of a month long journey through New Zealand, Fiji and Australia describes the author's observations of the wondrous night skies at these locations, meeting with southern amateurs and a visit to famous Siding Springs Observatory. Comments are presented on southern variable stars

observed, including recently publicized Eta Carinae. David Malin's astrophotos obtained with the Anglo- Australian- Telescope illustrate some of the most impressive deep sky objects in the southern heavens.

- ! **Friday July 14th** Regular Meeting. Guest Speaker: Richard Schmude (Kingston Centre) (tentative booking)
- ! **Friday August 11th** Annual BBQ & Observing session, no regular meeting

2000 Officers and Executive Council

PO Box 1793, Kingston, On K7L 5J6
Infoline & answering machine xxx-xxx-xxxx

President: Doug Angle
Vice President: Laura Gagne
Secretary: Susan Gagnon
Treasurer: John Hurley
Librarian: Don Mastrianni
Editor: Kevin Kell
National Council Rep: Susan Gagnon

Standing Committee Chairs:

Observing Group: Tom Dean
ATM Group: Kendra Angle
Youth Group: Hank Bartlett
Astronomy Day: Don Mastrianni
Publicity: Kim Hay
Awards: Dave Pianosi

Changes to the Web Site in the last 2 months <http://members/kingston.net/rasc>

* The password to the secure section was changed Friday January 14th, 2000

2000 Feb 10: moved and updated slide loan list, added eyepiece inventory page, updated calendars for march and April

2000 Feb 02: added 6 spacecraft models to PDF Library

2000 Jan 31: added in RASC KC Observing Program

2000 Jan 27: installed new and improved Search Engine

2000 Jan 26: updated Education page, Education

Resources page, added Textbook errors page

2000 Jan 18: updated Awards page

2000 Jan 16: updated Internet Link page, added GMRT link

Observing Group Meeting

Saturday March 11th 2000 at dusk at the home of Doug Angle

From Sydenham Road and the 401 Highway head north on Sydenham Road. Go north past Railton and a short while later turn right (east) on Keeley Road. Just before the road turns sharply to the north, the house is the last one on the right side (south) #1910 Keeley Rd.
Phone: 376-3908

April TBA

From The Net

compiled by Kevin Kell

February 17, 2000 RELEASE: 00-28
NEAR BEGINS LOOKING CLOSELY AT EROS



Only a few days into the first close-up study of an asteroid, data from NASA's Near Earth Asteroid Rendezvous (NEAR) mission indicate that 433 Eros is no ordinary space rock.

Since the NEAR spacecraft met up with and began its historic orbit of Eros on Feb. 14, NEAR team members at the Johns Hopkins University Applied Physics Laboratory in Laurel, MD, which manages the mission for NASA, have pored over images and other early scientific returns. It will take months to unravel the deeper mysteries of Eros, but data from NEAR's final approach and first days of orbit offer tantalizing glimpses of an ancient surface covered with craters, grooves, layers, house-sized boulders and other complex features.

"Work is just starting, but it's already clear that Eros is much more exciting and geologically diverse than we had expected," says Dr. Andrew Cheng, of the Applied Physics Laboratory, who serves as the NEAR mission's lead scientist.

Scientists now know that Eros' mass is 2.4 grams per cubic centimeter -- about the bulk density of Earth's crust and a near match of the estimates derived from NEAR's flyby of Eros in December 1998.

"With this new data, it now looks like we have a fairly solid object," says radio science team leader Dr. Donald Yeomans of NASA's Jet Propulsion Laboratory in Pasadena, CA. "There is no strong evidence that it's a rubble pile like Mathilde," the large asteroid NEAR passed and photographed in 1997.

Even without in-depth analysis, pictures snapped with NEAR's Multispectral Imager offer several clues about Eros' age and geography. The large number and concentration of craters points to an older asteroid, uniform grooves across its craters and ridges hint at a global fabric and, perhaps, underground layers. In addition to numerous boulders, the digital camera has also captured brighter spots on the surface that NEAR scientists are anxious to study.

NEAR's Near-Infrared Spectrometer has picked up variations in the asteroid's mineral composition, possibly the proportions of pyroxene and olivine, iron-bearing minerals commonly found in meteorites.

A low-phase flyby during last weekend's final approach put NEAR directly between the sun and Eros, allowing the instrument to gather unique data on the asteroid's mineral makeup under optimal lighting. Combined with multispectral images, this information will help form the first mineral map ever made of an asteroid.

"We want to correlate the changes in color with the geologic features," says Dr. Scott Murchie, a science team member from the Applied Physics Laboratory. "If we see a crater, for example, is it different on the outside than on the inside? Is the face of a cliff different than the ridge? This data will eventually tell us about the asteroid's history."

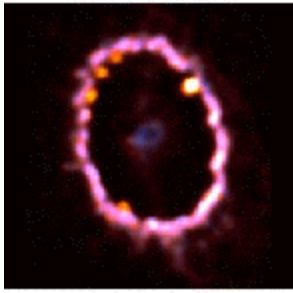
For the next year, NEAR's instruments will continue to examine the potato-shaped asteroid's chemistry, geology, and evolutionary history. The mission also includes a radio science experiment to more precisely calculate Eros' density and mass distribution -- clues critical to determining the asteroid's gravity and refining NEAR's orbit.

NEAR's scientific capabilities expand soon, when its X-ray/Gamma-Ray Spectrometer and Laser Rangefinder are turned on within the next two weeks. The spectrometer will measure important chemical elements such as silicon, magnesium, iron, uranium, thorium and potassium; the laser scans will determine Eros' precise shape.

Images and information about the NEAR mission are available at: <http://near.jhuapl.edu/>

Feb. 16, 2000 RELEASE: 00-27
ONSET OF TITANIC COLLISION LIGHTS UP SUPERNOVA RING

Supernova 1987A



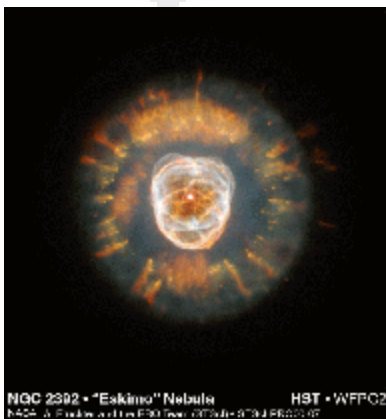
HST • WFPC2

NASA's Hubble Space Telescope is giving astronomers a ringside seat to a never-before-seen, violent, celestial "main attraction" unfolding in a galaxy 169,000 light years away. The knockout event is the collision of the fastest moving debris from an immense stellar explosion seen in February 1987 with the gas ring that circles that site.

This collision is beginning to cause the gases in the ring to glow as they are heated to millions of degrees and compressed by the sledgehammer blow of a 40 million mile-per-hour blast wave. In new pictures taken on February 2, Hubble's sharp view revealed four bright new knots of heated gas at places that had been fading slowly for a decade. Under an observing program called the supernova intensive survey, a team of astronomers has been monitoring SN1987A with Hubble since it was launched in 1990.

One of the first clues to the celestial fireworks came in 1997 when Hubble saw a single knot in the ring shine like a bright diamond as it was first impacted by the shockwave. "That was the opening jab. Now the dancing around is over and the slugfest will begin," says Robert Kirshner of Harvard-Smithsonian Center for Astrophysics in Cambridge, MA.

"The real fireworks show is finally starting and over the next ten years things will get spectacular. It helps that Hubble is giving us an unparalleled view," adds Peter Garnavich of the University of Notre Dame.



NGC 2392 • "Eskimo" Nebula HST • WFPC2

Previous Hubble spectroscopic observations, and radio and x-ray telescopic observations of the expanding supernova shockwave all led astronomers to anticipate that the titanic collision was only a matter of time. As far back as 1992 astronomers predicted

that the ring would become ablaze with light as it absorbs the full force of the crash.

Upon seeing the new Hubble pictures, Kirshner remarked, "It's about time. We saw that first hotspot two years ago, but I was getting nervous that we might have been

mistaken about its location. It's great to see the shock wave start to light up the ring."

The supernova, called SN 1987A, has long puzzled astronomers. They believe the ring is made up of old gas that was ejected by the star 20,000 years ago, long before it exploded. The ring's presence was given away when it was heated by the intense burst of light from the 1987 explosion. The ring has been slowly fading ever since then as the gas cools.

The initial supernova flash only lit up a small part of the gas that surrounds the supernova. Much of it is still invisible. But the light from the crash should illuminate this invisible matter for the first time, and help unravel the mystery of a pair of outer rings seen around the supernova as well.

"Now as the central ring begins to light up again, we can see how this old material is arranged around the star. We can map its distribution," Kirshner says. "This event gives us another chance to see the true structure of the gas around the supernova and to puzzle out how it got there."

Kirshner and colleagues plans to use Hubble to do follow-up observations later this year to track the ongoing drama of one of the biggest celestial collisions ever witnessed by astronomers.

Images to accompany this release are available at: <http://www.stsci.edu/>

**January 24, 2000 RELEASE: 00-16
HUBBLE REOPENS EYE ON THE UNIVERSE**



NASA's Hubble Space Telescope is back in business, as made dramatically evident in stunning new celestial pictures of remote galaxies and a colourful dying star released today. The images were taken January 10 - 13, 2000, as part of the activities to recommission the earth-orbiting telescope.

The pictures are a culmination of the successful Space Shuttle servicing mission (STS-103) last December, which restored NASA's premier optical space observatory to full capability beefed-up with new electronics and critically needed replacement gyroscopes. Hubble has now resumed probing the Universe's many mysteries with a crystal-clear view.

To verify the telescope's refurbishment, astronomers

resumed operations by aiming it at two scientifically intriguing and photogenic celestial targets. One object is an intricate structure of shells and streamers of gas around a dying sun-like star 5,000 light-years away.

Designated NGC 2392, it is dubbed the "Eskimo Nebula" because, as seen through ground-based telescopes, it resembles a face inside a furry parka. In Hubble's sharp view, the "furry" features resemble giant comets all pointing away from the central star, like the spokes of a wheel. "The clumps that form the comet heads all seem to be located at a similar distance from the star. This fact will be important in developing a theory of why the clumps formed in the first place," said planetary nebula expert J. Patrick Harrington of the University of Maryland, College Park, MD. He adds, "Of all the planetary nebulae imaged by the Hubble Space Telescope, this new image is unsurpassed in subtle beauty."

A second target is a massive cluster of galaxies called Abell 2218, which acts like a giant zoom lens in space. The gravitational field of the cluster magnifies the light of more distant galaxies far behind it, providing a deep probe of the very distant universe. The cluster was imaged in full colour, providing astronomers with a spectacular and unique new view of the early universe.

"For the first time we can view the internal colour structure of some very distant galaxies. This gives us new insight into details of what young galaxies are like," says Professor Richard Ellis at the California Institute of Technology, Pasadena, and a co-investigator on the original (black-and-white) Hubble image of Abell 2218 taken in 1994. "The colour of a distant source is preserved by gravitational lensing. By matching images of the same colour, families of multiple images produced by the lensing process can be identified."

Spacecraft operators report that all the new equipment installed on the telescope in December is working perfectly, including the new computer, solid state recorder, and fine guidance sensor. In particular the new gyroscopes are allowing Hubble to reliably point with exquisite precision at celestial objects.

Two key science instruments, the Wide Field and Planetary Camera 2 and the Space Telescope Imaging Spectrograph, are now being used for routine science observations by astronomers worldwide to probe everything from planets, to black holes, to far flung galaxies.

Images are available on the Internet at:
<http://oposite.stsci.edu/pubinfo/latest.html> and
<http://oposite.stsci.edu/pubinfo/pictures.html>



07-FEB-2000 -- New commands have been sent to lander to investigate a possible signal detected by the Stanford antenna. No new signal has been detected, but data analysis is in progress. Radio telescopes from California, The Netherlands and England continue to listen.

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