WEST VIRGINIA UNIVERSITY
EBERLY COLLEGE OF ARTS AND SCIENCES
THE DEPARTMENT OF PHYSICS
TOMCHIN PLANETARIUM AND OBSERVATORY

Mountaineer Skies

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From the Editor's Desk

We're Back!

This is our third quarter issue. It covers July-September and will be mailed in late June. The fourth quarter issue will be mailed in late September for October through December, and so on.

We are still working on the best way to get the most useful information to you in the quarterly format. Please note the enclosure that includes a sky chart for August and September 2004.

Our new planetarium show, ***Oceans in Space***, is scheduled to open on Friday, August 25.

Specific information about the total lunar eclipse of October 27/28 will in the next issue.

INSIDE THIS ISSUE

In The Sky This Month

Visible Planets in the Night Sky

Beginning of July, 2004

	Const	Rise	Transit	Set	Mag
Sun		5:53	13:24	20:55	- 26.8
Mercury	Gem	7:02	14:27	21:58	- 0.8
Venus	Tau	4:04	11:11	18:21	- 4.4
Mars	Cnc	7:51	15:10	22:27	1.8
Jupiter	Leo	11:06	17:40	0:10	- 1.9
Saturn	Gem	6:20	13:48	21:13	2.2

Middle of July, 2004

	Const	Rise	Transit	Set	Mag
Sun		6:02	13:26	20:50	- 26.8
Mercury	Leo	8:07	15:07	22:09	0.0
Venus	Tau	3:27	10:35	17:45	- 4.5
Mars	Cnc	7:42	14:50	21:58	1.8
Jupiter	Leo	10:22	16:53	23:20	- 1.8
Saturn	Gem	5:33	13:01	20:25	2.2

End of July, 2004

	Const	Rise	Transit	Set	Mag
Sun		6:16	13:26	20:37	- 26.8
Mercury	Leo	8:35	15:07	21:37	0.7
Venus	Tau	3:04	10:17	17:31	- 4.4
Mars	Leo	7:30	14:27	21:23	1.8
Jupiter	Leo	9:33	16:00	22:24	- 1.8
Saturn	Gem	4:40	12:07	19:30	2.3

Cnc	Cancer, the Crab
Leo	Leo, The Lion
Gem	Gemini, The Twins
Tau	Taurus, The Bull

About: Black Holes

The term black hole has been part of our popular culture for some time, often being used (and misused) in science fiction stories or movies. What exactly is a black hole?

First a little background. If you were to throw a baseball as hard as you could straight up, it would go up to a certain height, pause momentarily, and then fall back to earth. If you had a really good arm you might be able to throw it fast enough to escape Earth's gravity. (A professional baseball pitcher can throw a ball just over 100 miles per hour.) On Earth, escape velocity is about 25,000 miles per hour or 7.0 miles per second. If you tried it on Pluto, you would only have to throw it 0.7miles per second. Escape velocity, as you can see in the chart below, is dependent on mass of the planet or body from whence the baseball is thrown. The larger the mass, the higher would be the escape velocity.

Solar System Body	Escape Velocity (miles/s)	Mass (10^{21}tons)	Surface Gravity ft/s^2
Pluto	0.7	0.0138	1.9
Mercury	2.7	0.364	12.1
Mars	3.1	0.708	12.1
Venus	6.4	5.37	29.1
Earth	7.0	6.58	32.1
Saturn	22.1	627	29.4
Jupiter	37.0	2093	75.9

NASA

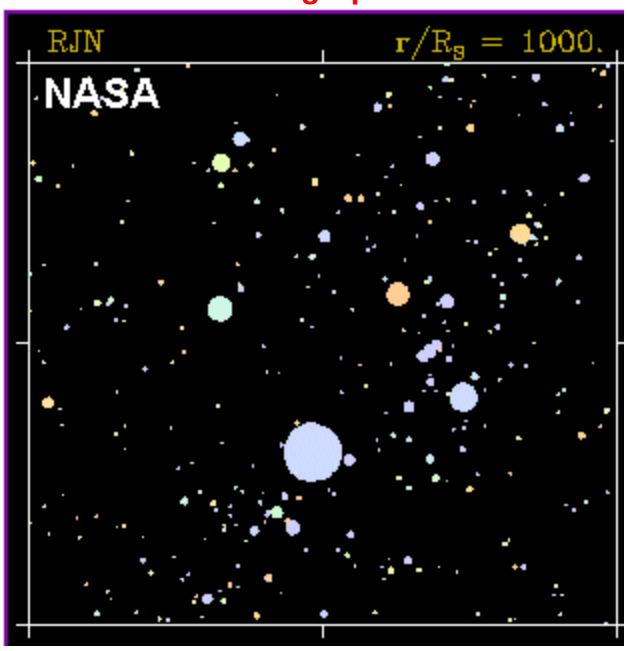
If a star of 10 to 15 times the size of our sun were, in the last stage of its life, to explode in an unimaginably huge and bright fire ball, the explosion would be called a supernova.

The star would then collapse upon itself, creating a very small, nearly zero, volume that contains so much mass that it essentially has infinite density. This object has such an immense gravitational pull that nothing, including light, can escape from it. This infinitely dense residual of a star is called a Black Hole.

The center of our galaxy is located in the direction of the tail of Scorpius, The Scorpion, and is thought to contain a super massive black hole.

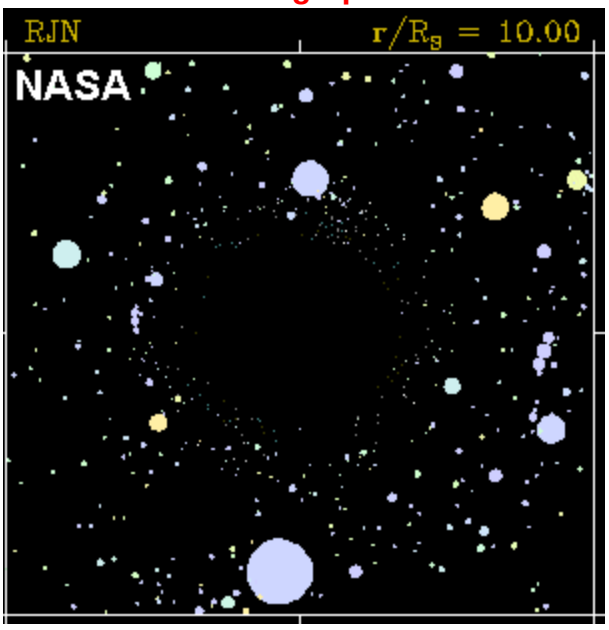
What would a black hole look like? If you look at photograph 1 below, you see a typical section of space.

Photograph 1



However, if there were a black hole in the center of the field, the photograph would look like photograph 2.

Photograph 2



2004 Planetarium Shows

July, 2004 **Closed**	August 27, 2004 ***Oceans in Space***	September 10 & 24, 2004 ***Oceans in Space***
October 8 & 22, 2004 ***Oceans in Space***	November 12 & 19, 2004 ***Oceans in Space***	December 3, 10, & 17, 2004 ***'Tis the Season***

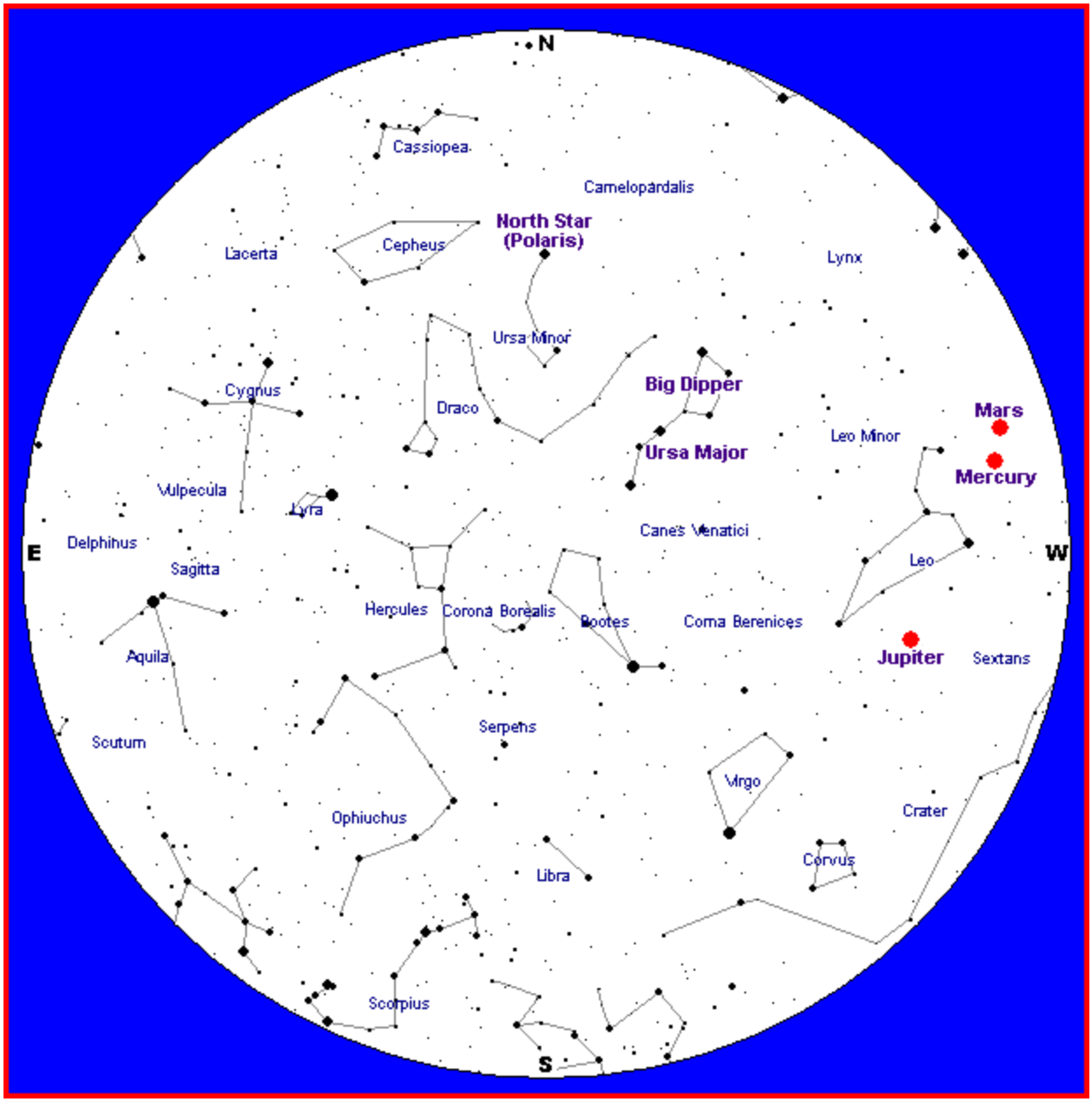
For those who are interested in bringing a group, such as schools or scouts, during the day, please call for more information. These shows are usually given on Tuesday or Thursday mornings.

For further information or reservations, please call John Hopkins at (304)293-3422, extension 1443 or by email at: jhopkins@mail.wvu.edu

Selected Sunrise/Sunset and Moon Rise/Moon Set Times

Date	Sunrise	Sunset	Moon Rise	Moon Set	Moon Phase
Jul 2	5:56 A.M.	8:50 P.M.	9:43 P.M.	5:39 A.M.	Full Moon
Jul 9	6:00 A.M.	8:49 P.M.	12:58 A.M.	2:00 P.M.	Last Qtr
Jul 17	6:06 A.M.	8:45 P.M.	5:52 A.M.	9:26 P.M.	New Moon
Jul 24	6:11 A.M.	8:40 P.M.	1:22 P.M.	12:03 A.M.	First Qtr
Jul 31	6:17 A.M.	8:33 P.M.	9:06 P.M.	5:43 A.M.	Full Moon
Aug 7	6:24 A.M.	8:26 P.M.	None	1:54 P.M.	Last Qtr
Aug 15	6:31 A.M.	8:16 P.M.	5:48 A.M.	8:32 P.M.	New Moon
Aug 23	6:39 A.M.	8:05 P.M.	2:50 P.M.	None	First Qtr
Aug 29	6:44 A.M.	7:56 P.M.	8:08 P.M.	5:53 A.M.	Full Moon
Sep 6	6:52 A.M.	7:43 P.M.	11:53 P.M.	2:48 P.M.	Last Qtr
Sep 14	6:59 A.M.	7:30 P.M.	6:51 A.M.	7:50 P.M.	New Moon
Sep 21	7:06 A.M.	7:19 P.M.	3:04 P.M.	11:57 P.M.	First Qtr
Sep 28	7:12 A.M.	7:07 P.M.	7:24 P.M.	7:07 A.M.	Full Moon

July 2004 Sky Chart* for:
10:00 P.M at the beginning of the month
9:00 P.M in the middle of the month
8:00 P.M at the end of the month



*Sky Chart used with the kind permission of **Heavens-Above** at http://www.heavens-above.com/

The TOMCHIN PLANETARIUM is named in honor of the late Harold Tomchin, of Princeton, W.Va., who made a generous donation to ensure its continuing operation, and whose family continues to support the planetarium for the educational benefit of WVU students, staff, and faculty members, as well as the local community. Contributions can be made in support of the planetarium through the WVU Planetarium Project at the WVU Foundation, Inc., phone (304)284-4000. Thank You.

Edited by John Hopkins
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