WASP

Warren Astronomical Society Paper

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JOURNAL ROUNDUP

Cosmology And The Rest Of Time

By Scott Jorgensen

When last we looked, our universe was 1 million years old; a mere pup but growing nicely. Having started as just a point of Incredible density and temperature, It has Inflated, expanded and cooled to the point where atoms can form. That was the hard part, now comes the uncertain part. Isn't cosmology easy?

For those who may be coming in the middle, this Is part two of a two column review of modern cosmology theory. The primary source of information is an excellent article published in the October edition of Scientific American. That Is supplemented by out takes from my usual sources, Science and Nature. It should be emphasized again that all of this is theory, and as you will see the major players are not in full agreement. so there is room for change, possibly big change.

In any event, the most accepted models are the GUTs (grand unification theories). Following that model we got to a 1 million year old universe In which gravity and the strong and the weak forces had separated from the others one at a time, leaving a universe not to different from the one we know. Provided of course, that you ignore the fact that there are no stars. planets, dust clouds, or any atoms much heavier than lithium. However a physicist might feel it was quite similar to the cosmos we know, because all the forces we know were operating In that way we are accustom to.

Now given that all those atoms were out there, If there were sizable perturbations in their density. then gravity would cause large areas to collapse into stars and galaxies. The stars would generate heavier elements by fusion and we would end up with a universe that looks just like the one we see. Well maybe.

You would think that we could accurately describe the history of the universe from 1 million years to the present, and predict the future course as well, but you would be wrong. In fact there are still plenty of mysteries left to unravel and most of them have to do with mass; how much Is there in the universe and how is It distributed.

It comes down to this, we could recreate the history of the universe and predict the future of it if we knew how much mass there Is and how it Is distributed because we certainly do know how the physics of the universe works from 1 million years on. The problem is we don't know how much mass there is or where It Is, and we can't "turn to the back of the book" and look up the answer.

If there is just the right amount of mass the universe will be closed, that is it will expand but at an ever slower rate and the geometry of space is as we think it is with parallel lines never meeting. If there is less mass than the universe expands forever. If there Is more mass then the universe will someday stop expanding and start collapsing, resulting in a "big crunch." So it Is important to know how much mass there is, and our most likely way to find out Is by looking at stars.

All we know about for sure Is what we see. We can see bright stars and nearby we can see dim stars. We can "weigh" some near by stars by seeing how much gravity they generate. From this we can more or less guess how much mass the stars we can see have. Then we can ASSUME that there are just as many dim stars in far off galaxies as there are here and add in their mass even though we can't see them. Then

Continued on page 5

Warren Astronomical Society, Inc. The WASP

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Warren Astronomical Society
P.O. Box 474
East Detroit, MI 48021

1991 Officers:

President:	Marty Kunz	477-0546
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2nd V.P.:	Mike O'Dowd	268-7125
Secretary:	Robert Halsall	781-6784
Treasurer:	Jeff Bondono	731-4706
librarian:		

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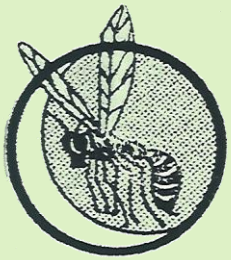


The Warren Astronomical Society, Inc., is a local, non-profit organization of amateur astronomers. The Society holds meetings on the first and third Thursdays of each month, starting at 7:30 PM.

General Meeting on 1st Thursday:
Cranbrook Institute of Science
500 Lone Pine Road
Bloomfield Hills, MI

Business meeting on 3rd Thursday:
Macomb Community College
South Campus, Building B, Room 216
14500 Twelve Mile Road
Warren, MI

Membership in the Society is open to all. Annual Dues are:

Student:	$10	College:	$15
Senior Citizen:	$15	Family:	$25
Individual:	$20		

Along the many benefits of membership are:
Discount magazine subscriptions:

Sky and Telescope:	$16.00 (12 monthly issues)
Astronomy:	$14.00 (12 monthly issues)
DeepSky:	$ 8.00 (4 Quarterly issues)
Telescope Making:	$ 8.00 (4 Quarterly issues)
Odyssey:	$12.50 (12 lonthly issues)

Free copy of each WASP newsletter.
Free use of Stargate Observatory.
Special interest subgroups. (see subgroup chairperson)
Call list - don't miss unexpected events.
Free membership in Astronomical league.
Free Reflector (Astronomical League Newsletter)
Free use of W.A.S. Library. (see librarian)
Rental telescopes (see observatory chairperson)

Warren Astronomical Society Paper. The Wasp is the official publication of the Society. Each new issue of the WASP is made available at the Macomb meeting on the third Thursday. Non-members will be charged $1 for each new issue. Back-issues, when available, are free. Requests by other clubs to receive the WASP and other correspondence should be addressed to the editor. Articles for inclusion in the WASP are strongly encouraged and should be submitted to an editor on or before the first Thursday of each month.

Editor: Nancy Rowe 544-9081
2005 Hyland, Ferndale, MI 48220

NOTE: The mirrors in the telescope are being collimated so the telescope will be out of service for a few months. lecturers will bring their own telescopes for viewing at the lecture.

Stargate Observatory is owned and operated by the Society in conjunction with Rotary International. Located on the grounds of Camp Rotary on 29 Mile Road, 1.8 miles east of Romeo Plank Road, Stargate features a 12.5 inch F17 club-built Cassegrainian telescope under a steel dome. The observatory is open to all club members in accordance to the 'Stargate Observatory Rules.' Those wishing to use the observatory lust call the Observatory Chairman by 7:00 PM on the evening of the session. The Observatory Chairman is:
Mike O'Dowd 268-7125

The Society maintains a library of astronomy-related books and periodicals at the Macomb County Community College meeting room. See the librarian for library rules or to check out a book.

lectures are given at Stargate Observatory each weekend. The lecture will be either Friday or Saturday evening, depending on the weather and the lecturer's personal schedule. lecturers should check with the ranger at Camp Rotary early in the week to determine whether scouts will be at the camp, and to inform the ranger of the day and time of the lecture. If you cannot lecture on your scheduled weekend, please lake arrangements to switch weekends with another lecturer, or call the chairman as soon as possible. Upcoming lecturers are:

Robert Halsall	11-16/17	12-28/29	
Jeff Bondono	11-23/24	1-4/5	
Francis Stabler	11-30	12-1	1-11/12
Riyad Matti	12-7/8		1-18/19
Scott Jorgenson	12-14/15		1-25/26
Frank McCullough	12-21/22		2-1/2

Subgroups exist for those interested in specialized areas. Those interested should contact the chairperson, listed below:

Solar:	Ed Cressman	645-1837
Lunar/Planetary:	Alan Rothenberg	624-9339
Cosmology:	Mike O'Dowd	268-7125
Deep Sky:	Doug Bock	750-9369
Computer:	Larry Kalinowski	776-9720
Telescope Making:	Jim Houser	294-1952

The Call List is a list of people who wish to be informed of spectacular and unexpected astronomical events. Anyone who notices such an event calls the next person on the call list, who informs the next person, etc. A call list member can specify that he or she not be called at certain times. Any Society member is welcome to join the call list and can do so by notifying Jeff Bondono, 731-4706.

CALENDAR OF EVENTS

Thursday	Dec.	6	7:30	WAS Meeting at Cranbrook
Thursday	Dec.	13	7:00	Cosmology meeting at Al Vandermarliere's home. Topic: Thermodynamics. Contact Mike O'Dowd, 268-7125
Thursday	Dec.	20	8:00	WAS CHRISTMAS BANQUET - WARREN CHATEAU Contact Frank McCullough, 254-8164
Thursday	Jan.	3	7:30	WAS Meeting at Cranbrook
Thursday	Jan.	17	7:30	WAS Meeting at Macomb Community College

CHRISTIAAN HUYGENS

By Steve Franks

Of the many great men in history, one that is to me the epitome of the "Renaissance Man" was Christiaan Huygens. This at once realized from a quote of his; "The world is my country, science my religion."

Huygens was born in 1629 at The Hague, in Holland. From his father Constantijn Huygens, he received the rudiments of his education, which was continued at Leyden. In 1651, he began publishing papers on mathematical subjects.

In 1655, at the age of 26, Huygens, working with his brother Constantijn on the improvement of the telescope, hit upon a new method of grinding and polishing lenses. The immediate results of the clearer definition obtained was the detection of a satellite to Saturn-Titan. He also, because of his superior instruments, finally resolved the riddle of Saturn's curious appendages first observed by Galileo.

In July of 1659, Huygens' published his celebrated treatise Systema Saturnium. In it he gave particulars of his telescopes and illustrations of their performance. He then gave a full account with drawings and diagrams of all his observations of Saturn and Titan, a table of Titan's motion and an explanation of how its place could be calculated. Huygens then discussed drawings of Saturn made by others during the preceding forty years, stating that some were distortions through poor telescopes of forms with impossible shape. The improved drawings and careful measures from his own observations clearly supported his novel theory that, "Saturn is surrounded by a slender flat ring inclined to the ecliptic, but which nowhere touches the globe." This seeming logical idea brought much criticism from rivals but Huygens' observations and theory were too methodical and well thought out to suffer the war of words which followed for years. Besides, his good nature and skill often turned his opponents' arguments against themselves making his own case even stronger.

Huygens was also in 1656 the first effective observer of the Orion nebula; he delineated the bright region still known by his name, and detected the multiple nature of its illuminating stars, the Trapezium.

we can add in all the dust clouds we know about and assume they are present in galaxies that are too far away to actually see If there are dust clouds. The result does not make sense.

If the big bang model is correct then the original universe should have been mostly hydrogen with some helium and a little lithium. Observations of what Is expected to be primordial material bear this out. But if the proportions observed are correct, then the theory also predicts that the universe is closed and there should be about nine or ten times more mass than we have found so far. Not only that, the mass is not in the "right" places either! Remember that the universe started out very smooth; all the matter and energy was evenly distributed. The mass we see now Is not smooth at all. There are galaxies surrounded by empty space. There are clusters of galaxies surrounded by bigger empty spaces. And there are enormous superclusters strung out across the universe next to huge voids with very few galaxies at all. No one can fully account for this.

That's not to say that there are not lots of theories. One is that neutrinos, particles previously thought to be massless, actually have an extremely small mass. There are lots of neutrinos around, millions zip through you every day. Don't worry, they are harmless. But if they had even just a little mass they could account for much more of the universe's mass than we have "weighed" already. The problem is that no one can show they have mass at all. However, just last month a joint Soviet American project to monitor solar neutrinos has released preliminary data showing that the sun really does generate many less neutrinos of a certain type than It is expected to. One of the best explanations is that neutrinos can change type, but for that to happen scientists believe they must have mass.

This neutrinos theory is often called the Hot Dark matter theory; Hot because the neutrinos move fast, and dark because we cannot see them. The problem Is that fast neutrinos are probably too fast to account for the formation of galaxies in the lumpy distribution we now see.

So, other theorists dreamed up Gold Dark Matter. This matter moves slowly enough to have started galaxy formation, the problem here Is proving enough of it exists. Many galaxies show us only 1/2 the amount of matter needed to account for the way they rotate. The outside of a galaxy moves at a different rate than the inside. The actual speed depends on how the mass is distributed. Thus the motion of the galaxy provides a way to "see" more of the dark matter.

Still this does not account for all the matter predicted by the big bang, nor does it account for the huge voids and superclusters. Thus, unknown particles of tremendous mass have been postulated. These would provide enough mass, and could form a lumpy universe. So far though they have not been detected and do not lead to universes very much like ours in the 15 billion or so year since the big bang.

Finally, there is Einstein's solution. He initially believed in a static universe and introduced a constant in his equations to counteract the force of gravity. Later he called this his greatest blunder. Well, such a constant would lead to the universe looking bigger than It is. Exactly speaking, it changes the red shift and so we think objects such as quasars are further off because they have an "extra" red shift due to the cosmological constant. This would also solve the discrepancy between the age of the universe based on size and the age based on globular clusters. Currently there are globulars that would appear to be older than the universe; a neat trick! Most Importantly it reduces the amount of missing mass for a closed universe because the energy associated with the constant would be equivalent to much of the missing matter. Of course, there is no proof of a constant and some calculations based on quantum gravity predict the constant would be zero.

So where does that leave us? First of all, the scenario I've described which includes the big bang and inflation and then galaxy formation due to normal gravitational forces is the most widely believed. None of the theories fully account for the universe as we see It. And there is always the possibility that the universe Is static and the apparent red shifting with distance is due to some other source. Until the amount, type and distribution of matter is pinned down, there will probably be controversy in cosmology. But regardless of whether the universe will expand forever or someday collapse, knowing even what we do about cosmology provides you with perspective when you look through your own telescope at the glory of the night sky. Till next month…..

..... Clear Skies!

What I Write Down When I Observe Deep Sky Objects

by Jeff Bondono

I take notes about every deep-sky object I view through my telescope. My notes give me a starting point for future observations of an object, allow me to compare what I've seen to what is written in magazines and books, and provide me a way to share my observations with others.

Anyone planning to try for their Messier Certificate or Herschel Object Certificate MUST have written records Which are submitted as proof of observation.

When one begins taking notes, the question "What do I write down?" quickly arises. I have wrestled with this question for years, and my notes show it. Many of my earlier notes are virtually worthless because they do not say enough to describe the object at all. With many of the fainter clusters I observed, I can now look right at piece of sky which contains the cluster and find several groupings which all could match the minimal information I wrote down.

The goal of your notes should be to describe the object well enough that someone who has not seen it can get a mental picture of If by reading your notes. This is a tall order, indeed.

However, over the years, I have come up with the following list of features and attributes which I attempt to write down for each object I now observe. Each line begins with 5-characters, which indicate which type(s) of objects that line applies to:

o = open clusters p = planetary nebulae
g = globular clusters x = galaxies
b = bright nebulae -= means this line does not apply to this type of object

ogbpx	What is the size of the object, in arc minutes or seconds.
ogbpx	What is the shape of the object? If not round, how is it oriented in the sky?
ogbpx	Note any nearby bright stars, double stars, or unusual objects.
ogbpx	Are the edges of the object ragged, smooth, hard, soft?
ogbpx	What is the magnitude and color of the overall object
ogbpx	What is the best power for observation?
ogbpx	What other object(s) is this object similar to?
ogbpx	What earthly things might the object remind you of?
ogbpx	Sketch the object. One picture is worth 1000 words. (But still write a description).
ogbpx	How did you find the object?
ogbpx	Was the object difficult or easy to find
ogbpx	How difficult or easy was it to see the object once It was found
ogbpx	Did the object require averted vision or could direct vision be used?
ogbpx	Is there anything unusual or peculiar about the object?
ogbp-	What are the magnitudes and colors of the constituent or internal stars?
ogb--	Are there any dark areas, possibly indicating the presence of a Dark Nebula?
og---	Are there any chains of stars?
og---	How many stars can you resolve?
0----	Are the stars evenly spread out or concentrated toward one or more rich cores?
0----	Is the cluster densely packed or loose?
0----	Is the cluster well or poorly detached from the rest of the field?
0----	Do you see any nebulosity? Does it remain, resolve, or disappear at higher powers?
0----	Does a nebula filter suggest there may be a bright nebula associated with the cluster?
-g---	How centrally concentrated are the resolved stars?
-g---	Compare the size of the unresolved glow against the distribution of the resolved stars.
--bp-	Are there any embedded stars? What are their colors and magnitudes?
--bpx	Is the surface mottled or smooth?
--bpx	Do filters improve contrast and/or expand apparent size?
--bpx	Are some parts brighter or darker than the rest?
---p-	Is there any trace of an outer ring?
---px	How does the brightness change with distance from center?
----x	Do any dust lanes show?
----x	Do any spiral arms show?
----x	Do you see any bright spots outside the nucleus (possible star clusters or nebulae)?
----x	Does a nucleus show? If so, what is its size, shape, and brightness?

I welcome any additions to this list.

CRANBROOK - October 4, 1990
The meeting began at 8:00.
Bob stood in for Marty.
Remember the Star Trek Convention October 13 and 14. Anyone setting up a telescope for public viewing will be admitted to the convention without charge.
Returning guest, Malcom Goodwin, was welcomed.
There will be a board meeting at the Stabler's home Thursday, October 25 at 7:30.
The election is coming up. Anyone who wishes to run or nominate someone for office please let it be known. To date, Marty is running for president, Frank for 1st vp, Bob for secretary, and Jeff for treasurer.
Mars globes, jackets, tee shirts, golf shirts, and sweat shirts are available to order. Please see Alan.
There will be observing on the west side at the Power Station site, weather permitting.
Magazine rates will be going up. Anyone wishing to renew at current rates must do so before January. Please see Jeff.
"The" Starry Messenger" is now available in the WAS library each month.
The Christmas Party is December 20 at the Warren Chateau. Get your reservations in now. For further information or questions contact Frank.
Roger gave a talk on his trip to Astrofest.
Bob did a "show and tell" on the new Stargate setting circles.
Alan showed a video on "the Star Hustler"
The meeting ended at 10:05.

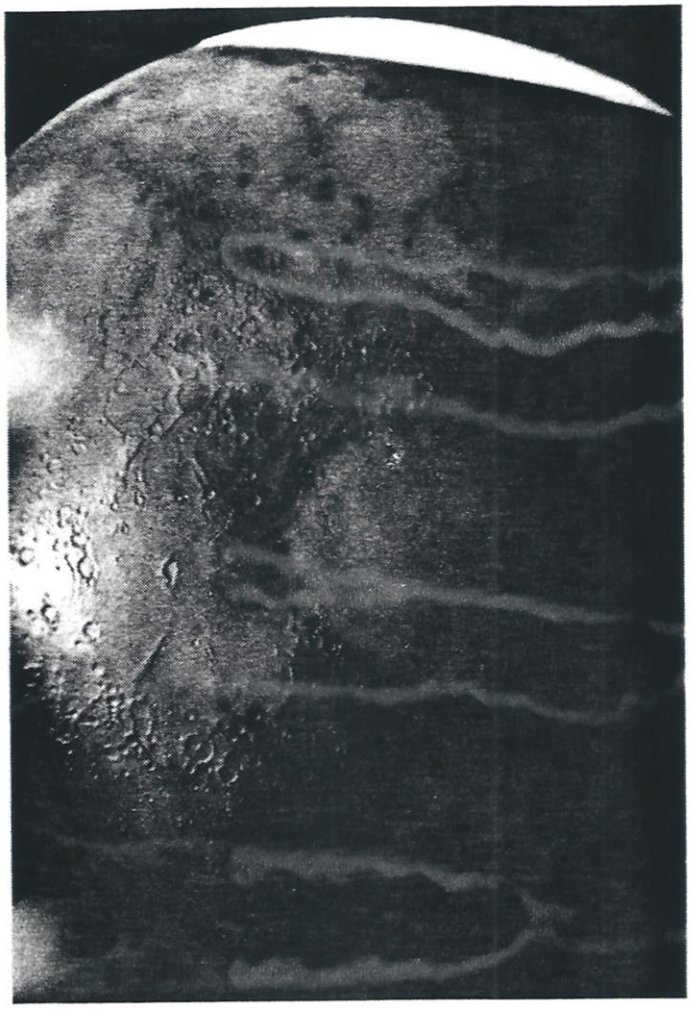
Elizabeth Stabler
Secretary

MACOMB- October 18, 1990
The meeting began at 8:00 p.m.
Guests and new members were welcomed.
Year end reports were made by club officers. Our treasury ends in good standing, several additions have been made to our club telescope, and a historical record is now being kept of club meetings.
Frank reminded everyone to get reservations for the big Christmas banquet in soon.
Marty held the election. The results were:

President	Marty Kunz
1st VP	Frank McCulLough
2nd VP	Mike O'Dowd
Treasurer	Jeff Bondono
Secretary	Bob Halsall

Congratulations to all. Tom MacLaney is stepping down as librarian. Someone is needed to fill this position.
Ed Love has a group going down to Hidden Hollow conferences in Springfield, Ohio. Two cars are now being planned. Anyone else interested should contact him.
Sky and Telescope is offering club members a discount on Mars globes. There will be about a $10.00 savings.
There was a raffle for the book Space Places by Roger Ressmeyer, Ed Love was the winner.
Roger Civic showed slides of his Mars globe. There is an ad in the newsletter for anyone wishing to purchase one.
Joady Ulrich from the Royal Astronomical society gave a talk on astronomy in music.
The meeting adjourned at 10:30.

Elizabeth Stabler
Secretary.



Syrtis Major

Isidis Planitia

Argyre Planitia

the planet Mars!

Two years of effort have rendered a display model with amazing scientific value!

This model is a carefully detailed, full color full relief, scale model, 20 inches in diameter of the planet Mars.

This scale model has more than ten thousand individual craters and hundreds of complex topographical features such as channels, mountains, smooth plains, the largest volcanos known in the Solar System and the three thousand mile long canyon, Valles Marineris.

The polar caps on this model appear a brilliant white in contrast to the ruddy, red orange color of the rest of the planet. The surface colors are carefully rendered with an air brush, showing the classic albedo markings. The finished globe is sprayed with a protective coat of clear acrylic film.

The 20 inch globe is a two-piece, hollow casting carefully fitted together.

The 20 inch Mars can be displayed in several ways. When the globe is fully illuminated the classic albedo markings can be clearly seen. When placed in front of a dark field and lite with a parallel light source, (placed to the left or right of the globe) hundreds of craters or other surface features along the terminator are sharply defined and thereby producing the effect of viewing the Sun lite planet Mars from space.

The price for the 20 inch Mars display model is $300.00.

If you wish more information about this model, please call Roger Civic at 776-8735.