Hubble eyes aging stars
submitted by Lorna Simmons

Everyone knows you can't be older than your mother. But over the past year, observations with the Hubble Space Telescope and several other instruments seem to have contradicted this cardinal rule. On the one hand, measurements of the speed at which the most distant galaxies are moving from Earth suggest that the universe may be no older than 8 billion to 12 billion years (SN: 10/8/94, p.232). On the other hand, astronomers estimate the ages of our galaxy's oldest stars at 13 billion to 16 billion years.

Now, new findings from Hubble may provide a step toward resolving this cosmic conundrum. In viewing the globular cluster M4, the dense grouping of elderly stars nearest to Earth, Hubble has detected more than 200 white dwarfs—the largest community of these old, shrunken stars ever identified. Because they all reside at the same distance and were spawned from stars that formed at the same time, dwarfs in a cluster provide a step toward resolving this cosmic conundrum.

Comet DeVico has just passed perihelion in early October, so its beginning to fade from its maximum brightness of 5.6. It was recovered in its seventy-four year orbit by independent comet observers Nakamura, Tanaka and Utsunomiya. It becomes a sixth magnitude object on the night of the Macomb meeting, October 19. Early reports say it has two tails. A morning object, only, about fifteen degrees above the horizon before twilight begins, it's easily observed as it leaves Leo and enters the Ursa Major-Coma Berenices area of the sky. However, it is quickly moving closer to the horizon and will become increasingly more difficult to observe during the rest of the month. Dee. pSpace program owners can generate their own comet path and star charts, by plugging in the following orbital elements:

**COMET DEVICO (P/1995 S1)**

- Perihelion date (T): 1995 OCT 6.026
- Eccentricity (e): 0.9627
- Perihelion distance (q): 0.6589 A.U.
- Argument of perihelion (Peri): 12.978 degrees
- Longitude of Ascending Node (Node): 79.626 degrees
- Inclination (i): 85.382 degrees
- Absolute Mag.: 7.47
- Mag. Coefficient: 10.0
- Period: 74.37 years
- Epoch: J2000

Carl Sagan's book CONTACT is going to the silver screen. It's about a female astronomer who makes one way contact with another planet. In the book, the contact is very subtle. Radio astronomers receive a video of Adolph Hitler at the Olympics. They seem to think its someone's idea of a practical joke. However, it turns out to be a rebroadcast of that event from an alien race who has captured our ever-traveling TV signals and turned them back on us. Clues about that alien race start to show up in the signal and a whole new look at signal analysis unfolds. The book takes a lot of time showing us how contact with another
The WASP
Published by Warren Astronomical Society, Inc.
P.O. Box 1505
Warren, Michigan 48090-1505

1995 Officers
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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 p.m.
First Thursday meeting: Cranbrook: Institute of Science 1221 North Woodward Ave South campus, Bidg. B, Room 209 Bloomfield Hills, Michigan 14600 Twelve Mile Rd. Warren, Michigan

Membership and Annual Dues
Membership applications and dues to the treasurer:
Glenn Wilkins 4233 Brightwood Drive Troy, MI 48098

Among the many benefits of membership are:
- Free use of the library
- Free use of the Stargate Observatory
- Free copy of the WASP newsletter
- Loaner telescopes (with deposit).
- Call list: don't miss unexpected events.
- Free membership in the Astronomical League, including The Sky & Telescope discount magazine subscription:
  - Astronomy $18.00 (12 monthly issues)
  - Sky & Telescope $20.00 (12 monthly issues)
- Free copy of each WASP newsletter.
- Free use of Stargate Observatory.
- Special interest subgroups. See chairpersons.
- Free use of W.A.S. library. See librarian.
- Call list: don't miss unexpected events.
- Free membership in Astronomical League, including Reflector newsletter.
- More benefits are listed in Member Booklet.

The Warren Astronomical Society Paper (WASP) is the official monthly 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 $1.00 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 the editor on or before the first Thursday of each month. Any format of submission is accepted, however the easiest forms for this editor are files in plain text format and graphics in PCX format. Materials can either be transmitted in person, via US Mail, via direct modem connection to ah314@detroitfreenet.org at the phone number listed below (call using voice first), or E·Mailed on the Internet to ah314@detroitfreenet.org.

For further information, see or call the editor:
Toni Bondono 51064 Kingwood Shelby Twp, Michigan, 48316-4624 810-731-4706

Disclaimer: The articles presented herein represent the opinion of their authors and are not necessarily the opinion of the Warren Astronomical Society or this editor. The WASP reserves the right to edit or deny publication of any submission.

Stargate Observatory is owned and operated by the Society. 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 f/17 club built telescope under a steel dome. The observatory is open to all club members in accordance to the "Stargate Observatory Rules" published in the member handbook. Those wishing to use the observatory must call the 2nd VP by 7:00 p.m. on the evening of the session.
The coordinates for Stargate Observatory are 82° 56' 0.4' W, 42° 46' N.

Library: The Society maintains a library of astronomy-related books and periodicals at the Macomb meeting room. See the librarian, Louis Namee, to check out a book.

Special interest groups:
- Computers Larry Kalinowski 810-776-9720
- Deep Sky Doug Bock 810-750-0273
- Lunar/Planetary Riyad Matti 810-548-2322
- Solar Marty Kunz 810-477-0546
- Math John Herrgott 810-548-1442

Book Reviews
LOUIE THE LIBRARIAN'S BOOK OF THE MONTH
by Louis Namee

PLANET EARTH
by Jo Nathan Weiner

Planet Earth is a guide to our living, changing planet. Travel back to 1930 in the icy heartland of Greenland to find out why identical fossils exist on continents thousands of miles apart. Why mountain ranges separated by vast oceans have the same geology is also discussed. Journey to the outer reaches of our solar system, due to the site where sea floor is spreading, watch molten rock erupt from the heart of the earth to form new sea mountains with a new ocean floor. This book examines tales from other worlds, gifts from the earth and the fate of the earth. If you are looking for a good book about the planet Earth, look no further.

Star Rating
***

Snacks, Snacks
Cranbrook 10/19 Angie/Fred
11/2 OPEN DATE 11/16 OPEN DATE
12/7 OPEN DATE 12/21 BANQUET

Sign-Up for snacks available. Contact Toni Bondono.

Speakers Wanted


Please Call John Herrgott 810-548-1442
**Computer Chat continued from page 1**

planet affects our way of life. I hope the motion picture is half as good.

Apple's attempt to get Macintosh clones produced in the market place has flopped. Computer enthusiasts were hoping for an increase in availability and the decrease in prices that compatibles eventually produce. However, no explanation has been given by Apple as to why they couldn't come up with a viable contract with outside manufacturers. Speculation says Apple is still tight fisted when it comes to its operating system. System 8 (Copland) has also been further delayed. 1996 is the new target. Latest rumors say there has been a shakeup in Apple's upper management.

Now's the time to start thinking about the 1995 Christmas Awards Banquet. December 21 will be here before you know it. There's a rumor that says the price at the door may be higher than the prepaid price, so if you're planning to attend our grand and glorious event, which usually occurs on the third Thursday of the month, in place of the MCCC meeting, get your banquet money in to the treasurer as soon as you can. Last year's banquet was a rousing success. It's the best attended club event of the year.

**COMPUTER TIP OF THE MONTH.** If you're shopping for a computer, be wary of the brands that require you to purchase that company's hardware and software, commonly called proprietary systems. The five most proprietary computers available today are Macintosh, Radio Shack, IBM, Packard Bell and Compaq computers. If the salesman says you have to use their memory boards, their hard drives, their monitors or their software ....think hard before plunking down your hard earned cash. It may seem like a trivial point right now but I guarantee it will avoid a lot of upgrading problems later on. If you don't mind getting stuck with "our company only" problems and their inflated prices, then proceed as you were. It may sound unbelievable to the first time buyer the average life of a computer is about three years. After three years, the technology changes so much that a computer must be upgraded to keep up with advancements that keep it mainstream. If you don't believe it, ask someone who has owned one for the last three years. A proprietary computer manufacturer may force you to purchase an entire new computer to stay mainstream. There is only one legitimate reason to force yourself to buy that kind of computer .....if you must take your work home from the office and you must have one of their computers for work at home compatibility.

Now that I've upgraded my computer, I have a 3861 40Mz motherboard (without memory) for sale for $40. I also have four, thirty pin, one megabyte, three chip, memory boards (without parity) for $20 each and my old, one megabyte, ISA buss, VGA video card, 1024 X 760 bit, 256 colors, with Windows software drivers, for $25. (my phone number appears below).

While pushing buttons on my car radio Sunday, I stumbled onto the radio program, ON COM-PUTERS, that used to be on WXYT. The program has now moved to CKLW, 800 on the AM radio dial, Sunday afternoons, starting after the news at 2 o'clock. It's primarily designed to help beginners get started finding the right computer. Gina Smith hosts the show and does a great job.

Computer shows for late October are in Livonia, Saturday, Oct. 21, at the Livonia VFW Post 345, 27345 Schoolcraft, south of I-96and two blocks east of Inkster Road. In Westland, also on October 21, at the Wayne Ford Civic Center, 1645 Wayne Road, one block south of Ford Rd. In Dearborn, Sunday, Oct. 22, at The Dearborn Civic Center, 15801 Michigan Ave., one mile east of the Southfield expressway (M39). In Farmington, on Saturday, October 28, at The Farmington Activity Center, 28600 Eleven Mile Rd., three blocks east of Middlebelt. In Rochester, Sunday, October 29, at the Elks Lodge of Rochester, 600 E. University Dr., one block east of Rochester Rd. November 5 brings a show to Mt. Clemens at The North Gratiot Hall, 47650 Gratiot Ave., north of 21 Mile Rd. and Madison Heights, on Sunday, November 12, at the U. F. & C.W. Hall, 876 Horace Brown Drive, one block east of I-75 and two blocks south of Thirteen Mile Rd. This overabundance of shows means only one thing ....Christmas is coming.

It looks as though the October computer meeting will revert back to my residence at 15674 Fianagan, in Roseville. You can reach me at 776-9720, area code 810, for further information. I'm located two blocks west of M-97 (Groesbeck Hwy.) and two blocks north of Common RD. (12-1/2 Mi. Rd.). My house is on the south side of the street about seven or eight houses from the corner. Look for a yellow porch light.

**HUBBLE continued from page 1**

provide a unique opportunity theoretical predictions with the actual evolution of these geriatric objects. In particular, notes Hubble investigator Harvey B. Richer of the University of British Columbia in Vancouver, the dwarfs discovered in M4 should help fine-tune predictions about how rapidly these objects cool—a critical factor in attempts to infer the age of the universe from the temperature of white dwarfs. Richer and a team of U.S. and Canadian colleagues detail their work in the Sept. 20 ASTROPHYSICAL JOURNAL LETTERS. Formed by the gravitational collapse of old, sun-like stars that have run out of nuclear fuel, white dwarfs represent the last and by far the longest phase in the life cycle of these stars. Dwarfs start out hot but gradually cool and fade in a highly predictable manner. Indeed, a dwarf cools at such a predictable rate that its surface temperature indicates its age. The coolest, dimmest dwarfs-those that have lived the longest-thus provide an estimate of the age of the cosmos, independent of such parameters as the expansion rate of the universe and the distance to far-off galaxies.

Richer emphasizes that none of the M4 dwarfs see HUBBLE on page 4
detected by Hubble are faint enough, or old enough, to serve as cosmic clocks. But, he adds, "we can use these dwarfs to refine our theories and make sure we understand in exquisite detail white dwarf cooling." Richer estimates that the oldest objects detected during Hubble's 30-hour survey have been white dwarfs for about 5 billion years. The team's ultimate goal—to detect a large group of white dwarfs old enough to date the universe—looms ahead. However, notes study coauthor Roger A. Bell of the University of Maryland in College Park, Hubble will have to detect dwarfs with one-fortieth the brightness of those seen in M4 in order to find the oldest stars.

To pick out such faint stars, Richer recently proposed that Hubble take a much longer exposure—about 100 hours—of a single region in another globular cluster, NGC 6752. This cluster, about 12,000 light-years from Earth, lies nearly twice as far away as M4. However, its position in the sky enables Hubble to stare at the cluster almost continuously as the telescope orbits Earth. In contrast, Earth often blocks the telescope's view of M4. If administrators at the Space Telescope Science Institute in Baltimore approve the 100-hour survey, Hubble might make the observations a year from now, Richer says, perhaps yielding results by early 1997.

R. Cowen

For those seeking information about space-related organizations, contact the addresses listed below:

First Millennial Foundation - Promotes colonization of our galaxy
P.O. Box 347
Rifle CO 81650
orHTTP://WWW.CSN.NET/-MTSavage for instant details

National Space Society - Supports NASA
922 Pennsylvania Ave., S.E.
Washington DC 2003

The Planetary Society - Promotes exploration of the planets
P.O. Box 61270
Pasadena CA 91116-7270

NGC 752 at 01h58m +37_41'

If you saw last month's cluster, you'll have no problem with this one. Located about half way between M33 and m34, NGC 752 is a really large and splashy open cluster of bright stars. Its 50' in size, so use your lowest magnification. The integrated magnitude of the cluster is 5.7, and the brightest star in the cluster is 9th magnitude. It happens to be one of the oldest open clusters known, at about 1.5 million years of age. There's a triple star just south of the center of the cluster that I see as orange, blue and red, from brightest to faintest. In my 8" scope from my backyard in Utica, I counted 75 stars. A prominent central 15' by 8' football-shaped knot of 20 stars was seen, with a 15' round area just southwest of it which contains only 1 11th magnitude star. Other than this over dense and under dense region, the stars are fairly evenly distributed. I saw a nice chain of stars at the southwest edge of the cluster. Since the cluster is so large, remember that you might be looking right at it and not notice. Be sure to look in your finder if you have one, or if you don't, scan the adjacent fields for a much lesser concentration of stars. With 7x50 binoculars, I saw a 45'x30' oval glow aligned east-west, with a few resolved stars. The brightest was at the southeast edge. I have not yet looked at this cluster with my 14 (and 31 8)-inch scope, but for those of you with scopes larger than 8", you might be able to look through the star cluster to the galaxy cluster Abell 262 beyond. Beware, these galaxies are very faint, but if you can see them it should be quite an unusual contrast in distances. For the star cluster to be so large, it must be fairly nearby, and indeed its distance is only 1200 light years, about 3 times the distance to the Pleiades. The distance to the galaxy cluster is, of course, considerably larger.
With the cold weather keeping most of us indoors, it takes a very dedicated person to keep up the star gazing. If you find yours freezing when the temperature drops try dressing in this manner - layering. It has been successful time after time in helping keep the cold away on frigid nights.

**THE FINE ART OF LAYERING**

(reprinted from the Girl Scouts of Macomb County-Otakita Council Leaders' publication, the SALT SHAKER.

Layering is the best way to dress for cold weather. The thin layers of air that exist between the clothing are warmed by body heat and provide insulation against low temperatures. Here are some suggestions on how to dress for the cold months to come:

- **Hat** - the most important layer. Heat rises and therefore escapes from the body through an uncovered head. One that covers the ears is best to prevent frostbite.

- **Outer Jacket or Shell** - to protect inner layers from wind, snow or rain. The best are water repellant fabrics (including wool) that have points to close off incoming wind: high collars, sleeve tighteners, and drawstring waists.

- **Scarf** - an uncovered neck can also release body heat, or worse, allow cold wind to enter and chill.

- **Long Underwear** - cotton is out, high tech synthetics are in. Cotton absorbs perspiration and holds it next to the skin, leaving you cold after an extended time. The latest materials serve as a "wick"; that is they absorb the sweat and pull it away from the skin.

- **Legging** - a water repellant pair of pants over your long johns and jeans will protect your legs from wetness and wind burn.

- **Mittens** - keep your hands warmer than gloves because they don't restrict movement of the fingers. Thin gloves under mittens will work doubly well.

- **Socks** - are very important! Cold feet become painful to walk on. Be sure to layer these too. Socks are also made with the newer "wick" materials and should be worn under a heavier pair of wool socks.

- **Waterproof Boots** - will keep your socks and feet dry. Be sure to break them in well before venturing out for the day.
<table>
<thead>
<tr>
<th>Date</th>
<th>Lunar Phase</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov 1</td>
<td>8th New Moon</td>
<td>Macomb Meeting. Election of club Officers</td>
</tr>
<tr>
<td>Nov 2</td>
<td>9th Waning Crescent</td>
<td>Computer Club at Larry Kalinowski's home</td>
</tr>
<tr>
<td>Nov 3</td>
<td>10th Waning Crescent</td>
<td>Cranbrook Meeting.</td>
</tr>
<tr>
<td>Nov 4</td>
<td>11th Waning Crescent</td>
<td>Macomb Meeting.</td>
</tr>
<tr>
<td>Nov 5</td>
<td>12th Waning Crescent</td>
<td>STARGATE - near new moon</td>
</tr>
<tr>
<td>Nov 6</td>
<td>13th Waning Crescent</td>
<td>STARGATE - near new moon</td>
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<td>Nov 7</td>
<td>14th Waning Crescent</td>
<td>STARGATE - near new moon</td>
</tr>
<tr>
<td>Nov 8</td>
<td>15th Waning Crescent</td>
<td>Cranbrook Meeting</td>
</tr>
<tr>
<td>Nov 9</td>
<td>16th Waning Crescent</td>
<td>Annual Holiday/Awards Banquet - Warren Chateau</td>
</tr>
</tbody>
</table>

Detroit, MI

Key to times:
SunRise          MoonRise
SunSet           MoonSet
You and your guests are cordially invited to the annual Holiday Award Banquet of the Warren Astronomical Society on Thursday, December 21, 1995. The social and cocktail hour with cash bar is from 7:00 until 8:00 and includes hot appetizers. Dinner will be served at 8:00. Meals offered are sliced beef tenderloin with au jus, gourmet chicken with special sauce, and a vegetable plate. Dinner costs $17.00 per person if payment is made on or before December 7th, or $20.00 if later.

Reservations and payment: Held at:
Glenn Wilkins The Warren Chateau
4233 Brightwood Dr. 6016 E. 10 Mile Rd.
Troy, MI 48098 (just east of Mound)
810-528-9235

COME ONE, COME ALL!
ENJOY THE FESTIVITIES WITH US AT THE WARREN CHATEAU.

Just fill in the information on the tear sheet below and return it to:
Glenn Wilkins
at a meeting or through the mail (by Dec. 7, 1995)

From:

Number of people attending: ______ Amount paid: ______
(number of persons x $17.00)

Names of all those attending with you: (PLEASE print clearly)

_________________________________________
_________________________________________
_________________________________________

Remember to return this reservation form to Glenn by December 7, 1995