W.A.S.  

Warren Astronomical Society  P.O. Box 474  East Detroit, MI 48021  President: Doug Bock  533-0898  
1st V.P.: Frank McCullough  759-8215  2nd V.P.: Ron Vogt  545-7309  Secretary: Ken Kelly  839-7250  Treasurer: John Wetzel  882-6816  

The Warren Astronomical Society is a local, non-profit organization of amateur astronomers. The Society holds meetings on the first and third Thursdays of each month. The two meeting locations are listed below:  

1st Thursday – Cranbrook Institute of Science  
500 Lone Pine Road  
Bloomfield Hills, MI  

3rd Thursday – Macomb County Community College – South Campus  
B Building (b209)  
14500 Twelve Mile Rd.  
Warren, MI  

Membership is open to those interested in astronomy and its related fields. Dues are as follows and include a year’s subscription to Sky and Telescope.  

Student .................. $18.00  
Individual ............... $27.00  
College .................. $22.00  
Family ................. $32.00  
Senior Citizen ............. $22.00  

Stargate  
Observatory Chairman: Ron Vogt 545-7309  

Stargate Observatory is owned and operated by the Warren Astronomical Society in conjunction with Rotary International. Located on the grounds of Camp Rotary, Stargate features a 12½” club-built Cassegrainian telescope under an aluminum dome. The observatory is open to all club members in accordance with the “Stargate Observatory Code of Conduct”.  

Lectures are given at Stargate Observatory each weekend. The lecture will be either Friday or Saturday night, depending on the weather and the lecturer’s personal schedule. If you cannot lecture on your scheduled weekend, please call the Chairman as early as possible or contact an alternative lecturer. Those wishing to use Stargate must call by 7:00 p.m. on the evening of the observing session. The lecturers for the coming month are:  

Dec 17/18......Alan Rothenberg ............. 355-5844  
Dec 24/25......Merry Christmas  
Dec 31/Jan 1...Happy New Year  
Jan 7/8 .........Doug Bock .................. 533-0898  
Jan 14/15......Ken Strom .................. 977-9489  
Jan 21/22 ......John Root .................. 464-7908  
Jan 28/29......Lou Faix .................. 781-3338  
Feb 4/5 .........Dave Harrington .......... 879-6765  
Feb 11/12 ......Frank McCullough ........ 254-1786  
Feb 18/19 ......Ron Vogt ................. 545-7309  
Feb 25/26 ......Alan Rothenberg .......... 355-5844
EDITOR’S NOTES

With this, the final issue of the WASP for 1982, I’m happy to see that this paper’s publication has stabilized and many plans for the future are now in the works. The election of new officers finished, the responsibility of publishing has fallen to myself, Judy Butcher, for those of you who don’t know me. With Frank McCullough’s assistance, I hope to always put out a complete and informative paper. Of course to have a truly complete paper it must reflect the club. Only with club members and their contributions can we publish a paper which really shows the club’s character. I am very grateful to those who have or always do submit articles. Also, I extend my thanks to those who listened to my desperate pleas and helped out after we couldn’t publish December’s issue due to lack of articles. Of course I will always accept any constructive criticism, ideas or advice to help improve the paper. Together we will make this, the Warren Astronomical Society Publication, a club paper. Enough of this pep talk now!

For those members not aware many events have taken place in the club in just the last couple of months. The club’s two subgroups are meeting regularly to advance their knowledge. The deep sky group is tackling constellation by constellation to learn about it and interesting objects in and around the constellation. On November 13 the cloudy conditions forced the meeting to be indoors at Frank McCullough’s. Not a total loss, though, as objects in the constellation Perseus were reviewed and then divided up among those present for further in-depth study. The results of the studies are now being heard and seen in the way of talks and articles.

The meetings of the workshop subgroup at Doug Bock’s have also been a great success. The workshop’s concept is to be an open forum type meeting which members can attend to gain knowledge on various theories and ideas. Besides discussing problems, questions, etc, practical applications have been utilized, such as helping a member grind a mirror, at past meetings. To gain invaluable experience, to have insight as you’ve never had before, and just to have a good, interesting time, attending these sub-group meetings is highly recommended.

For those who missed it, the field trip to the Detroit Science Center to see “Hail Columbia” was literally, a blast! After viewing the film we spent an enjoyable afternoon at the Center. There were exhibits to see, computers to talk to, trying tests of coordination to be taken, video games to play and a fun time to be had by all! After leaving the Science Center, Ken Kelly, Alan Rothenberg, Dave Harrington, Frank McCullough, Steve Franks and myself all met for a great lunch at the Detroit Cafe complete with the background music of a jazz quartet.
At November's general meeting we held officer elections. Our new officers take their positions in January and are as follows: President - Frank McCullough, 1st Vice Pres. - Roger Tanner, 2nd Vice Pres. - Ken Strom, Secretary - Ken Kelly, Treasurer - Bob Lennox.

Congratulations to all!

Until next year, “Happy Holidays to all and Clear Skies ahead”
DOUBLE CLUSTER IN PERSEUS

The Double Cluster in the constellation Perseus is a pair of galactic star clusters, which is described as one of the grandest telescopic sights in the heavens and has made just about every list of the best deep sky objects. The clusters are designated by the NGC numbers NGC 869 (west) and NGC 884 (east). They are also found on star charts as h and chi Persei. The visual magnitudes are about 4.5 for each cluster making them visible to the naked eye on a good, clear night. They’re a lovely sight in binoculars, but overflow the view of most telescopes with a total angular diameter of 1.7 degrees. The number of stars per cluster is reported to be upwards of 350 for NGC 869 and 300 for NGC 884, which gives NGC 869 the edge on brightness.

At some 7000 light-years distant, the clusters lie directly in the Milky Way, situated between Perseus and Cassiopeia. This position in the plane of the galaxy distinguishes them as galactic star clusters which contain relatively young stars. Globular star clusters, on the other hand, are comprised of ancient stars and surround the Milky Way in a halo outside of the galactic plane. The Double Cluster can be found on a line connecting the stars alpha, gamma and delta of Perseus and delta and gamma of Cassiopeia. The map below shows the position of the clusters in the December night sky.

From the distance and angular size, the clusters are about 100 light-years in diameter.

Depending on the size of the telescope in the range between 6 and 10 in., observers report sighting from 1 to 9 red stars along the blue-white stars. Astronomy Magazine (Jan 80) suggests studying the clusters closely to see a curious optical illusion. The fainter stars are at the center of the clusters, surrounded by brighter stars, which gives the appearance of a tunnel of stars.

Galactic clusters, such as h and chi Persei have been studied in detail by astronomers to learn more about stellar evolution. Since the distance to the star clusters is known, the magnitude of the star gives its size and the color gives its spectral class. The Double Clusters contain mostly very hot bright blue-white stars along with a few red supergiant stars. If the stellar magnitude is plotted against the spectral class on a Hertzsprung-Russell diagram (see the figure below), the blue-white stars form an offshoot of the main sequence of stars and the red supergiants form a tight group in the upper right corner of the diagram. The Pleiades and Hyades are also plotted on the same diagram and are further along the main sequence to the right. The position on the diagram gives the age of the stars, with the Double Cluster being the youngest, followed by the Pleiades and Hyades.

All three of these star clusters are in good observing position in the winter sky, so it should be worthwhile to include them on your list of objects for your next viewing session.

Submitted by Ken Strom
Fig. 54. The Hertzsprung-Russell diagram for stars in the neighborhood of the sun. The visual absolute magnitude (right-hand scale) or the visual luminosity (left-hand scale) is plotted against spectral class. Such a diagram was first plotted by H. N. Russell in 1913.

Fig. 60. Schematic Hertzsprung-Russell diagrams for seven galactic clusters: absolute visual magnitude is plotted against spectral class. The heavy line that marks the lower boundary of the main sequence defines what is called the zero-age main sequence (ZAMS).
WARREN ASTRONOMICAL SOCIETY’S COMING EVENTS

January 6 - meeting at Cranbrook Institute of Science

January 13 - workshop subgroup meeting at Doug Bock’s

January 15 - deep sky subgroup meeting at Stargate Observatory (if cloudy meet at Frank McCullough’s)

January 20 - general meeting at Macomb County Community College
  Be sure not to miss this one as the Winter Astronomer makes a comeback!

FOR SALE

Quantum 6 (all accessories), Drive corrector
  Best Offer
  Contact Gary Lyon at (313) 879-8219

Star charts, posters, pictures laminated, dry mounted, matted or framed
  Call Judy Butcher for details (313) 254-1786
  -OR-
  927-1075
WARREN ASTRONOMICAL SOCIETY'S OFFICERS

In ringing out the New Year we bid farewell to those who have served so well...

Our President
Doug Bock

1st V.P.
Frank McCullough

Treasurer
John Wetzel

Secretary
Ken Kelly

2nd V.P.
Ron Vogt
...and extend a welcome to the officers who start in January...

Secretary elect
Ken Kelly was last seen orbiting Saturn

Treasurer elect
Bob Lennox

2nd V.P. elect
Ken Strom

Our President elect
Frank McCullough

1st V.P. elect
Roger Taner
Algol, the most famous star in the constellation Perseus, was always thought to be a dark and dangerous star. Its several names all show us that ancient astronomers may have been aware of its regular variation in brightness. The name comes from the Arabic Al Ra's al Ghul, “The Demon's Head.” In the mythological outline of the constellation, Perseus is holding Algol which is the head of Medusa. Medusa was the one serpent-haired sister of the three Gorgons who was mortal. They say “if looks could kill” but hers really could. Eventually Perseus slain the monster avoiding her poisonous glance by looking at her reflection in his shield. Algol’s other names are equally mysterious. The Hebrews called the star Rosh ha Satan or “Satan’s Head”. Seventeenth-century maps show the star with the name Caput larvae, “The Spectre’s Head”.

It wasn’t until up to a couple of centuries ago that Algol was thought to be an eclipsing binary. In 1667 the first statement was made on Algol’s variability by the Italian Astronomer Geminiano Montanari of Bologna. During the winter of 1782-83 John Goodricke of York systematically studied Algol establishing the variations nature. He suggested two theories: 1. Algol was a rotating globe with dark spots and 2. Algol had a dark companion eclipsing it. Unfortunately Goodricke, being in poor health, couldn’t continue his study of Algol as he died in 1786, not yet 22 years old. Although Goodrickes second theory was accepted, it couldn’t be proven until three advances in astronomy were made. These were: 1. Astronomical spectroscopy 2. Doppler effect – light from a star approaching Earth appears as having a slightly shorter (bluer) wavelength than light emitted by a stationary star. Light receding Earth has a longer (redder) wavelength. This was important because astronomers could now measure a star’s radial velocity. 3. Photography - to accurately measure Doppler shifts you need a permanent photographic record of the spectrum.

In 1889 H.C. Vogel proved that Algol was eclipsed by using spectroscopic analysis. At Potsdam Observatory he photographed Algol’s spectrum and found that the spectral lines shifted sometimes to red and sometimes to blue. This showed Algol was in motion, orbiting a common center of mass in a two star system.

In binary or multiple star systems two or more stars are revolving around a common center. As in the Algol system the plane of mutual revolution is such that we see it edge on. In eclipsing binaries one star partially or entirely passes behind the other, eclipsing it. When the light of the eclipsed star is cut off it appears dimmer to us. A second magnitude star, Algol passes behind its dimmer companion every 2 days. 20 hours, & 49 minutes, diminishing its brightness to less than one-half its normal light. --Judy Butcher
Algo is an eclipsing binary in which the eclipses are only partial — the stars do not cover each other completely.

**Algol**, photographed with the 13-inch camera at Lowell Observatory on January 27 and 28, 1965. The star appears at normal light (top) and at primary minimum (below).