The Reviewer

by Dave Knisely

(Review of Deep-Sky Objects for Binoculars continued from last month)

Chapter three is the catalog of deep-sky objects and is probably the best part of the book, but it does have a few problems. The descriptions of many of the objects are often rather misleading. For example, the author describes M31 as a "huge milky ball of light in a 7x42". NOTHING is huge in a seven power pair of binoculars except mabye the Milky Way starclouds. Obviously, the author was only seeing the nuclear region. Even in a pair of 7x35's, M31 is noticably elongated, with a pair of 10x50's easily showing the extended haze where the spiral arms curve around. Several other descriptions misuse the words "bright" and "large" too often for my taste. The author also missed including a couple of my favorite binocular objects: the Great Sculptor Spiral NGC 253, and Collinder 399 in Vulpecula (the Coathanger). Still, the catalog is a good starting point for people who want to see just how deep a pair of binoculars can go. After the catalog are two appendices, the first containing a good description on how to properly clean a pair of binoculars, and the second providing a list of good star maps for binocular users.

As a whole, Deep-Sky Objects for Binoculars is a fairly good reference for those wishing to do deep-sky on a budget. But the beginner should probably get a good pocket atlas or field guide and learn the constellations before trying to use this book as a guide.

The Prairie Astronomer

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The Prairie Astronomer

A Star Is Born...

by Carolyn Collins Petersen

Imagine life without the Sun.
No sunrises.
No phases of the moon.
No seasons.
No people, or animals, or plants.
No Solar System.

That's right. No planets, moons, asteroids, or comets. Nothing, perhaps,except diffuse clouds of gas and dust, swirling around in space. Come to think of it, though, that's a pretty fair description of the state of our Solar System around five billion years ago. It didn't exist as we know it. In its place was a cloud of interstellar 'stuff' that we'll call the 'solarnebula.'

What was this 'stuff' in the nebula? Well, since hydrogen is the most abundantelement in the universe, it makes sense that there would be a great deal of it in the cloud. Along with the hydrogen was a smaller amount of helium gas, and probably very small amounts of other gases. Grains of dust -- smaller than pinpoints -- mixed in with these gases to form a swirling mass of interstellarmatter. The whole nebula -- in motion within itself -- rotated slowly. Imagine a toy top or a gyroscope in slow rotation around a center of gravity. This is what the motion of the solar nebula would have been like.

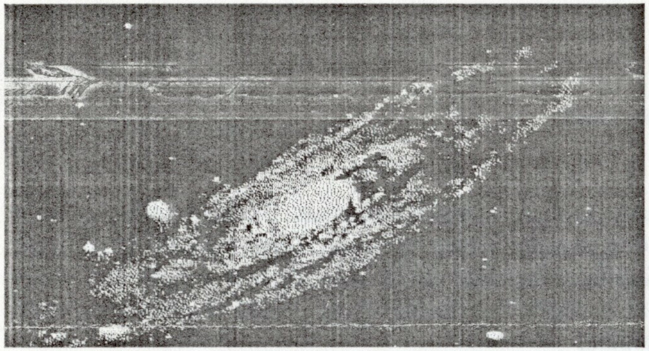
Because of this rotation, the cloud of gas and dust started to pull in on itself -- to contract into a thicker 'blob' or globule at the center where the gravity was strongest. The gravitational attraction at the center pulled more material into a steadily-thickening, dense ball of gas and dust. As the density increased, pressure on the gas and dust caused the temperature to rise. The heat tried to radiate away from the center, but it was trapped by theincoming gas and dust.

There was no where for heat to radiate except back into the center, and so the temperatures rose even higher. Material continued to fall into the center, increasing the pressure and temperature. Finally, the temperature was high enough -- 18 million degrees Fahrenheit -- that the center began to glow. Our star was shining for the first time.

Yet, if you had been able to observe this stellar 'lamplighting', you probably would not have seen anything for a few million years. The newly-born star was still contracting, surrounded by a cloud of incoming dust that blocked most ofits light and heat. The star -- our Sun -- was not yet radiating *enough* heat to push away these outer regions of gas and dust. It was still shining from the action of gravitational contraction.

At some point, though, the Sun contracted far enough to allow nuclear reactions in its core. Under the tremendous heat and pressure, atoms of hydrogen began to fuse to form helium, and the heat of that reaction became the primary source of the Sun's energy. The infall of material slowed down. The pressure of heat escaping out was finally strong enough to evaporate the nearest parts of the original solar nebula. What remained was a young star, surrounded by a flat, rotating disk of gas and dust.

The birth of our Sun took place over millions of years of time. It was the first necessary step in the formation of the p73 solar system. The Sun's creation made



possible the formation of the planets in all of their beautiful diversity.

How did we formulate this theory of the sun's birth? Of course, we had no way of being there when it happened. But, we've been able to find other places inthe universe where all stages of starbirth are taking place. By studying these places, we gain an understanding of how our own star was born.

Yet, we also study the birth of our sun for another reason: someday, we hope to understand the formation of the planets. And, if our theories about the creation of the solar system turn out to be correct, we'll have a handle on the births of other stars in the universe. Already we are beginning to seek out stars that appear to have disks of material around them, looking for all the universe like our Sun did, over 4 billion years ago. What will we find in those disks?? Planets?? And, if we do find planets, that discovery will probably raise more questions than it answers, for planets are the mostinteresting by-products of the birth of a star.

The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc., and is free to all club members. Membership status and expiration date are listed on the mailing label. Membership dues are: Junior Members and Newsletter Only Subscribers...$10/yr; Regular Members...$24/yr; Family Memberships...$27/yr; Address all new memberships, renewals, or questions to THE PRAIRIE ASTRONOMY CLUB, INC., P.O BOX 80553, LINCOLN, NE 68501. For other club information contact one of the following officers: Ron Debus (Pres)435-5688, Dave Knisely (V.Pres)223-3968, Kim Ellen Owen (Sec)423-7440, Lee Thomas(Tres)483-5639, Jack Dunn (2nd V. Pres)475-3013. All newsletter comments and articles should be sent to Newsletter Editor JOHN LORTZ, 9255 CADY AVE. #14, OMAHA, NE 68134 no later than 7 days before monthly club meetings. Club meetings are held the last Tuesday of each month at Hyde Observatory in Lincoln, NE.

Observing Chairmans Report

by Dave Knisely

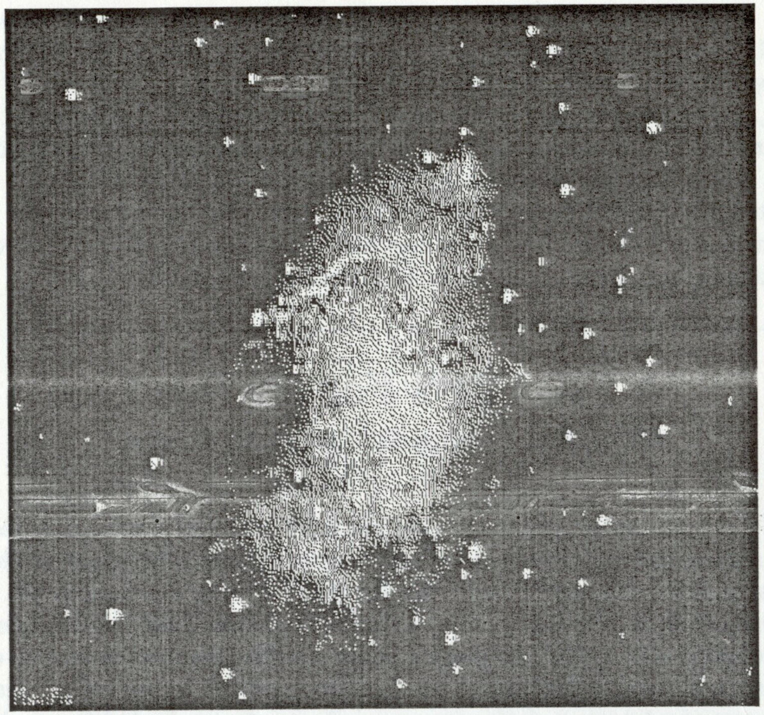
THE NEXT SCHEDULED STAR PARTY WILL BE FRIDAY, JULY 28th AT THE ATLAS SITE. Globular clusters and a few remaining galaxies highlight the mid-summer sky. Probably the best one for northern hemisphere observers is M13, located about 2.5 degrees south and a third west of Eta Herculis. While this object is visible to the unaided eye under good conditions, it takes at least a four inch to even partially resolve it. Larger instruments show a rich ball of several thousand stars with some arm-like chains near the edges. Users of moderate sized apertures should also see the faint spiral galaxy NGC 6207 about half a degree to the north-east. Nearly as good as M13 but often overlooked is the bright globular M92, located three degrees south and 3.5 degrees west of Iota Herculis. A six inch will resolve the outer parts of the cluster, while a ten makes the view superb.

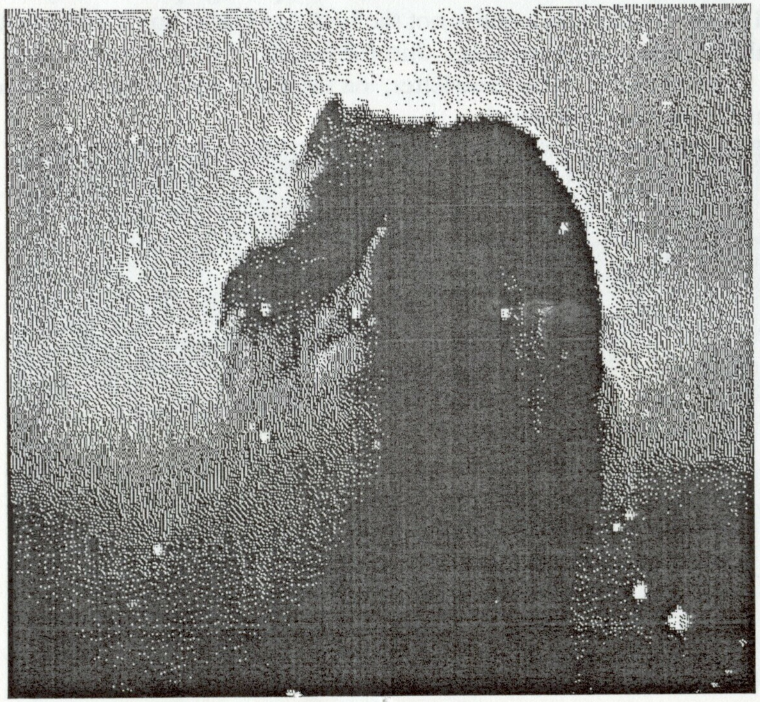
In Serpens is the dense and bright globular M5, located just north-west of the star 5 Serpentis. This is a particularly tight cluster with a small bright center and fairly bright component stars. A ten will show a small bright star-like grouping near the core of this rich cluster.

In Draco is one of the brightest planetary nebulae in the sky, NGC 6543. This one is in a rather blank area of the sky, but equatorial users can look 5.1 degrees east and 3/4 north of Zeta Draconis. This 9th magnitude object is visible even in a three inch refractor, but its 20" of arc size makes it tough to recognize at low power. A six or eight inch will show it as a small bluish oval of light with a faint central star. In a ten inch, the nebula shows a deep blue color and some hints of inner detail. Also in Draco is the "added" Messier object M102, located 3.25 degrees south and 2.5 degrees west of Iota Draconis. Marginal in a three inch, this object shows up as a small fuzzy oval of light in most instruments. An eight inch shows the object's pointed ends and brighter center, but little other detail can be seen.

In the large constellation of Ophiuchus are a variety of interesting star clusters. About a degree north and one-half west of Beta Ophiuchus is the large open cluster IC 4665, a fine binocular or RFT object. It is over a degree in diameter and consists of about 25 fairly bright stars in a rich background field. Not too far away in Serpens is another nice binocular object, IC 4756, located about four degrees west and 1.5 degrees north of Theta. It is slightly oval in shape and large instruments will show some dark nebulosity in the faint background stars. Back in Ophiuchus are a pair of small but interesting globular clusters, M10, and M12. M10 can be found about a degree west of 30 Ophiuchi and can be seen in binoculars as a small faint fuzzy spot. A six inch will show stars near the edges at high power, but it takes a ten inch to make the cluster resolve well. M12 is quite similar to M10, but is a bit easier to resolve. It can be found about four degrees east and four south of Lambda. A ten inch at high power makes this cluster quite spectacular.

In Scorpius about a degree west of Antares is the unusual @43 globular cluster M4. It can be seen easily in binoculars and shows stars in a good four inch. A six inch resolves it fairly well, revealing a line of stars running roughly east-west through the center of the cluster. In an eight or ten inch, it looks a bit like a barred spiral galaxy until high power is used. Then, the sight is glorious, with thousands of faint stars





President's Message

by Ron Debus

A Lunar Review

Starting with a thin crescent of a one day moon in the western sky wasn't very impressive to me, so I let a few days pass. Now the largest feature of, let's call this night a three or four day moon, is Mare Crisium. This sea has dimensions of 270 miles (north/south) by 350 miles (east/west) giving Mare Crisium an area equal to that of the state of Washington.

Cleomedes, a large crater just to the north of Mare Crisium has a diameter of 81 x 92 miles. The next couple of nights the fun starts. Going in to a five and six day moon, Fare Fecunditatis comes into view. With this sea you'll see the crater pair Messier and W.H. Pickering. These are especially notable because of the peculiar ray system extending eastward from the latter, giving the appearance of a comet's tail. Their diameters are 5 x 7 miles and 7 x 8 miles respectively. Just north and a little west of the comet craters is the southern edge of Mare Tranquillitatis where you find an extremely bright crater called Censorinus. Moving almost due west of Censorinus we come to the crater Moltke. A short distance north and slightly west again and we are in the location of the Apollo 11 landing. MOving along north and a little west we run into Mare Serenitatis and yet another Apollo landing (17) between the Taurus mountains and the Littro crater.

Still moving northward we come to crater Eudoxus which is 35 miles across. Just above it is the crater Aristoteles which is some 50 miles in diameter. Straight west of Aristotles lies the Lunar Alps. These mountains contain the famous Alpine Valley, a great gash 83 miles long and from 3 to 6 miles wide. Continuing northward we have the crater Plato which is 64 x 67 miles (elliptical) in diameter. Plato has a smooth floor of unique lava. The floor itself is over 2700 square miles. Plato is conspicuous at full moon and at all other times from sun rise to sunset. Plato is easy to find and well worth inspection every night.

Now we head into the 8, 9, and 10 day moon and then to full moon. Heading west and south from Plato we find the crater Archimedes, 51 miles in diameter. Moving south and west of there is the crater Eratosthenes which is 37 miles across. On the southern side of this crater lies a tail like mountain range extending some 50 miles. Just to the west we have the crater Copernicus, 60 miles in diameter. Moving west again we have the crater Kepler, 22 miles in diameter.

Along the southern edge and in the middle of full moon we have the crater Tycho which is 56 miles in diameter. From the craters Copernicus, Kepler, and Tycho extend long white rays or streaks that travel outward for hundreds of miles. They are thought to be made up of a glassy material ejected when the craters were formed.

I know that I've left out a lot, but if you are interested in the moon this might help get you started. That's it for this month. Thanks for listening!!!

A Note (or two) From The Editor...

I thought I'd finally say hello to all of you out there in astronomy land and pass on to you a few interesting facts that I know you're DYING to know. Such facts as "Why on earth has the idiot changed the size of the newsletter?" and "How does the dork think I'm going to read this teny-tiny print?". Well, loyal newsletter readers, I do have the answers for you.

For the past few months the newsletter has narrowed to letter size paper, from the original legal size. The reason for this was so that I could print all of the newsletters on my laser printer, rather that make one copy and then reproduce them at the copy shop. What this means to you is that you get a nicer, original copy. What it means to me is that I don't have to mess with the copy center anymore.

I've also been printing the aricles in a smaller letter point size. The reason for this is (of course) that the newsletter size is smaller and so to get the same amount of information into it... you guessed it, I had to make the print smaller. My justification is: if you can read a newspaper, you can read the Prairie Astronomer.

So, there you have it. If you have any comments, suggestions, or perchance an article or two, please let me know. I'm only a stamp away.

In other news, one of our long-lost members was finally found. Bryan Schaaf has been moving around a bit, and the Prairie Astronomer being sent to Bryan was being returned. We finally caught up with Bryan in Cecil Field, Florida, and he dropped us a line to say he was alive and well. He has spent the last year attending avionics classes in Navy school, and will soon be moving to Virgina Beach, Virgina, where he will finally settle down. In his spare time he has visited the Marshall Space Flight Center in Huntsville, and attended the May 4th launching of Atlantis. But he has had little time to do any serious observing. Well, hang in there Bryan, and glad to have finally found you!!!

A Few GIF's For the Road

From the Compuserve Astronomy Forum

I'm sure you've noticed by now, that there are a few graphic pictures in this month's newsletter. I've been experimenting with importing graphics files to Pagemaker, and I'd thought I'd try a few for the PAC. The illustrations you see here were obtained from Compuserve's Astronomy Forum, and are examples of what are called GIF's. GIF is a graphic image standard that was developed on Compuserve to allow individuals to pass pictures back and forth. Images can be from any standard drawing device or can originate from scanned photographs. Most of the images in this newsletter are scanned photographs taken by amateurs. I know that the resolution is not the best, but I think you'll agree that it's acceptable for illustration purposes. Just for fun, see if you can name all of the objects pictured earlier in the newsletter, on this page, and on the next page. I'll give you the answers next month...