



The Dark Sky Observer

A publication of
The North Jersey Astronomical Group

Volume: 2 Number: 9

December 1989



"Look not thou down but up!" — Robert Browning

Auroral Display at West Milford

As darkness fell on the evening of November 17th, I knew that it was going to be a great night for observing. A front had just passed through the previous day and the sky was crystal clear. The only unfortunate thing was that the moon had not even reached third quarter, so it would be in the sky only a few hours after sunset. Seeing that I had not been observing since the end of October though, I decided I would go anyway. A very good decision as I would soon find out.

Ginger and Roger also thought it was worth going, even if only for a few hours of dark skies. Ginger and I arrived at about 7:00 and I immediately noticed a dome of brightness encompassing the entire northern horizon. Jokingly I mentioned to Ginger that perhaps that light was an aurora, something I always wanted to see. Then we just chalked it off to light pollution and started observing.

I had just found the spiral galaxy 6946 and the open cluster 6939 in Cepheus and was showing Ginger how to find them when I looked up and noticed a bright red light in the northeast. For a second I thought it might be a car's back up lights on some fog down by the bar. But I noticed it was too high in the sky for that. I knew it had to be an aurora! I yelled to Ginger; "look at that, is that what I think it is!" She saw it too and concurred that it must be an aurora. For a brief second I had the nasty little picture in my mind of Roger, who hadn't yet arrived, sitting back in the trees with a huge red flashlight shining in the sky. But a few seconds later Roger was pulling in so I knew I wasn't being tricked. I ran over to Roger's car and grabbed onto the door handle while the car was still moving. Roger got out of the car looking quite puzzled and I pointed to the north and asked him to confirm our sighting. He agreed that it was the only possible thing it could be. (You have to understand that the three of us had never seen an aurora before.)

As the initial shock of seeing the aurora wore off, I began to berate myself for leaving my camera, which incidentally was loaded with color film, at home! But the aurora was so beautiful we just sat down and watched. A huge dome of greenish light covered the entire northern horizon from the northeast all the way to the northwest. From this dome, many spikes would rise and fall and on top of this, the reddish color would build and then fade shifting gradually from the northeast then almost into the west. The aurora reached about 3/4 of the way to Polaris in height and at one time a reddish spike reached up all the way into the Cygnus milky way. I was shocked to see how quickly an aurora changes. In a matter of seconds the red color could rise and fade in many different areas. Some wispy clouds came into the area and they were lit up red by the aurora, it was incredible! At one point we actually saw some red color building up in Aquila which was setting in the southwest. It was such a beautiful sight, I can not do it justice in words, you had to see it for yourself. The next day I found out from Mr. Del Vecchio that there had been a large solar flare that caused a geomagnetic storm that evening, creating the aurora. It had been seen in New York state, however they had not seen as many spikes and activity as we did. With solar activity still increasing it is very likely we may be treated to more auroral activity, so don't miss any opportunity to get out on a clear night!

LAST MEETING

The last meeting of the North Jersey Astronomical Group was called to order by President Glenn Burke at approximately 8:15 on November 8th at the Passaic County Department of Parks and Recreation Nature Center/Observatory. The minutes from the previous meeting were read and accepted.

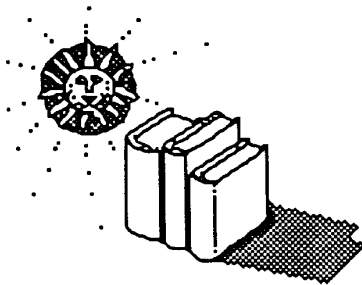
The starting of an annual buffet dinner was discussed and was accepted by a show of hands.

Glenn Burke discussed a league of astronomy clubs that was being formed and that he would be attending a meeting of delegates from all of the clubs in New Jersey. There being no more business, the meeting was adjourned.

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BOOK REVIEW

by Dennis Koenig



DEEP SKY OBSERVING WITH SMALL TELESCOPES

by David Eicher

All of us are aware of the cliché; 'you can't judge a book by its cover.' In the case of "Deep Sky Observing With Small Telescopes", you can't judge a book by its foreward.

According to Walter Scott Houston, in his foreward to this book, we should be able to see all of the Messier objects with a 1 inch telescope and see supernovae in distant galaxies in a two inch glass. Think about that for a moment.

....and I'm sure you'll say to yourself, sure, on

a good night in the middle of the Gobi Desert or in Weeping Waters, Nebraska in winter when all the lights are out.

With that thought in mind, I said, "Oh, no, not another book that's going to pull the wool over the eyes of unwary small scope owners". Not the case with this one, however. "Deep Sky Observing" has been carefully put together by David Eicher and some of the contributing editors of "Deep Sky Magazine" and as I started reading it I could tell very early that they wanted this one to be the best book for new amateur astronomers.

The first chapter is a very basic rundown of the types of telescopes currently in use. It also contains material on star maps, setting circles and finders. And in the case of finders, I was disappointed to find that this author failed to mention the telrad. Guess he's from the old school. Maybe he used copper tubing.

All of the chapters were written by different authors, all old stand-bys in amateur astronomy: Glenn Chapel Jr., David Levy, Alan Goldstein and David Eicher. Subjects such as double stars, variable stars, open clusters, globular clusters, and galaxies are discussed with with observing hints for each. There's also a section on advanced observing techniques in each chapter. I found the section on double stars to be particularly fascinating and it really sparked an interest to do more double star observing in the future.

One thing I thought was quite annoying were countless pages of setting circle data scattered throughout the book. But then again for someone getting into setting circles, this information may prove to be a treasure trove. One word of caution: if you pick this book up off our library shelf and thumb through it, don't let the setting circle data scare you away.

"Deep Sky Observing With Small Telescopes" proved to be, in this writers mind, one of the better books on the subject to date. Even though you may not get to see all the objects the authors claim you can, it'll really make you want to get out there and observe.

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QUESTIONS FOR THE BEGINNER **AMATEUR ASTRONOMER**

by Albert Jensen

I have been an amateur astronomer for the past four years, as a result of being in the aerospace industry. The 10 years of working as a Test Engineer on the Space Shuttle guidance system has made me more aware of space and the universe.

In reading many articles on telescopes and all the subjects there are to look at in the universe, I have found there are few that tell the beginner the basic facts that every beginner needs to know.

I have given lectures to a few Boy Scout groups, and helped set up a display for our club (North Jersey Astronomical Group) on our Astronomy Day outing, where the public was invited to come.

For anyone who has dared to look at the wonder and splendor of a starry sky through a telescope, there is little doubt that you may be hooked for life. Because once you see the wonders of the universe you will be back time and time again.

There are five (5) main questions I always put to anyone interested in astronomy. Facts, not to turn them away from this great hobby, but to give them some important facts I had to ask myself when I started.

Question #1 is Money:

How much money do you have or expect to spend for a telescope? Telescopes range in price from \$50 to \$5000, but there are many \$50 to \$150 telescopes that are not worth the money. Why? Because most of the price is for the tripod stand. This means the lens of the telescope is of very cheap quality and will give a very poor image in return.

Question #2 is Size and Weight:

How far do you have to carry this telescope? Do you live in an apartment house with lots of stairs, etc.? Will it fit into your car trunk? A three inch refractor telescope and tripod for about \$150 is about 10 lbs. A six (6) inch reflector telescope and its base is about 40

lbs. The more expensive and larger telescopes could weigh over 100 lbs. But remember the inexpensive 3 inch refractor telescope on a tripod could wiggle and vibrate, so much so that you would have trouble seeing the features on the moon, let alone see stars and planets.

Question #3 is Distance Traveled:

How far do you have to travel to find a good clear viewing location? A city person might have to travel 5 to 10 miles to get away from the large buildings. You might have to travel another 10 to 15 miles to get away from city smog. So you see that size, weight, and distance are very real facts.

Question #4 is Time:

How much time do you expect to devote to this new hobby? We already looked at one part of the time question, preparation gathering up all the parts, carrying them out to the car and then traveling to a good viewing location. All this takes time. Another important fact of time is the sky itself — city smog and cloud cover could limit your viewing time for days and even weeks. Then there is the summertime when the days are longer — your viewing is much later at night. The winter days are shorter, and the sky is generally much clearer, without the smog. But it gets very cold out there when you are not moving around. Then there is the wind chill factor — at 30 degrees and a wind of 20 miles per hour the temperature is really 10 degrees. Your fingers and toes will soon freeze from lack of movement. So we see that Time is a very big part of this hobby.

To the new beginner I tell them to start with naked eye observations. Learn more about the sky and universe, read books and ask many questions. Visit an astronomy club in your area to see what kind of telescopes they have and use. Learn the good and bad points about each one before going to a store to buy one. The rainbow, a daylight wonder, and the milky way on a dark night are best seen with the naked eye. The same for a meteor shower, the best optics are your two eyeballs. Why — because with binoculars or a telescope, the field of view is reduced to a very small portion of the sky. Plus to try and track a fast moving object with bin-

oculars or a telescope is impossible. The moon and most planets can be seen with the naked eye. The telescope allows us to see them with much more detail. The last question I ask is, are you thinking or planning to go into astrophotography? If the answer is yes, then you can expect to invest in a very good telescope with electronic timing and drive equipment needed to be able to track the planets or deep sky subjects across the sky.



POD PEOPLE AT CAPE COD

by Leslie A Beebe



Now that all the excitement about Stellafane 1989 is over, and before Glenn starts up on Stellafane 1990, I would like to tell you of another astronomical event that occurred this summer. It happened at Cape Cod National Seashore toward the end of July.

Most of you may know that I was there as a National Park Ranger for the summer. It is a very beautiful place, and I guess that is one of the reason I was visited by this very unique group of explorers. They came there to take advantage of the wide open night sky, but found much more than a view of the Milky Way.

The Pod People arrived in a flurry of activity, all to get ready for an evening with their beloved sky. The first item on their agenda was to set up their living quarters. To my concealed excitement, they chose my backyard as their dwelling place. Needless to say, the other Rangers were quite impressed with their presence.

Pods in place, and having eaten in record time, they prepared for a view, but were sadly surprised. The night sky was indeed beautiful, but not as dark as they had hoped. Lights from nearby settlements, a landing strip, and the

rotating beacons of lighthouses that dotted the shoreline all added to their frustration. Disappointed, they returned to their pods for rest, and a chance to discuss the rest of their visit.

This was my big chance, and I took it eagerly. I persuaded them to deviate from their intended goals, and introduced them to daytime activities which are well enjoyed by other visitors to the Cape. The Pod People were seen on the beach, walking through shops in Provincetown, attending ranger-led programs, and on a whale watch at sea, ALL DURING THE DAY! I am not bragging about the fact that I achieved this amazing feat, nor am I putting these strange, but wonderful people down for being persuaded from their goals. I am however inviting you to open your doors to Pod People you encounter. I am also thanking these visitors for opening my eyes to their world of the night sky. I hope that they enjoyed my world as much as I enjoyed sharing it with them.



ON THE LIGHTER SIDE

by John Miksits



The Sun is the closest star to our planet. A distance of 93 million miles allows us to see it in a way not possible with the stars at night. If a person were to observe the sun today, he or she would see sunspots. In fact, the sun is going through a period called the sunspot maximum. This is a good time for anyone to learn about this heat and light emitting celestial object. There are many ways to observe the sun and many theories about it. Anyone can study the sun. Some of the equipment to observe the sun is available to members of the North Jersey Astronomical Group.

The sun has a radius of 432,500 miles or 109 times the radius of earth, and a mass 333,420 times greater than earth. Furthermore, our star has a general 22 year cycle. There is an eleven year period of inactivity and an eleven year period of increasing activity. The sunspot maximum is opposite the sunspot minimum. A sunspot is the only one phenomena associated with the sunspot maximum. A sunspot is a magnetic disturbance on the sun's so-called surface. The sunspot has a dark central core called the umbra and a less dark border called the penumbra. The prominence and solar flare are phenomena more violent than the sunspot. A prominence can last days while the solar flare a few minutes. The prominence is a concentrated sunspot, but the solar flare is an ejection of particles and radiation into space.

An ordinary telescope or pair of binoculars can PROJECT the sun onto a screen. When viewing the projected image, shade the screen from outside light. The best viewing is in the morning because there is less atmospheric disturbance. Special filters that block harmful ultraviolet light allow observers to look directly at the sun.

It is important to remember that viewing the sun can be dangerous, so never look directly at the sun with or without a telescope unless the proper filter is being used.

Observing the sun is a pleasing experience if a day with good weather is chosen. This type of observing will yield the sunspots mentioned above. The earth's atmosphere is transparent to ultraviolet, visible, infrared and radio radiation. Visible radiation is projected by the telescope. The other radiation can be observed as well. For example, a solar flare produces radio waves that disrupt shortwave transmissions on earth. Spectacular solar activity in April of 1989 provided an excellent opportunity for those with a solar flare recorder to measure it. The solar flare recorder is a radio receiver placed some distance away from a transmitting station to record how much the the signal varies during increased solar activity. The activity in April also produced the northern lights display in the nighttime sky.

The Passaic County Department of Parks and Recreation Nature Center has some equipment to observe the the sun which all members of the North Jersey Astronomical Group can use. The Nature Center stores a custom made solar scope. For those who are qualified on the Celestron 8" SCT, there is a sun filter made of

Mylar. Finally, the Nature Center is a receiving station for the American Association of Variable Star Observers and has been operating a solar flare recorder for 10 years. Station A46 has recorded data which has been published in books available at the Nature Center. The sun can be observed by anybody with a simple telescope and some caution. Daily observations will yield information that is used for theories about the sun. Casual observations will yield fun. The sun is the only object in the sky that will give such results for amateur astronomers. There are phenomena which have not been listed which are worth investigating. The sun has made living possible and more interesting.

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Astronomy News

From Science News

Cosmic Cartographers Find --"Great Wall"



Two astrophysicists mapping the locations of galaxies have found the largest structure in the known universe — a thin sheet of galaxies half a billion light-years long. Dubbed the "Great Wall," it lies 200 to 300 million light-years from Earth and challenges the prevailing view on how matter became distributed in the universe, they say.

Astronomers have long assumed that on a very large scale, any place in the universe should contain the same amount of matter as any other location. Just as a choppy sea looks smooth from the space shuttle, the universe as a whole should appear uniform, despite occasional small structures like galaxies.

The astronomical survey, conducted by Margaret Geller and John Huchra of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass., looks at larger slices of the universe than any previous survey. Even at this scale, galaxies group together in surprisingly coherent arrangements, they report in the Nov. 17 SCIENCE.

Guided by a two-dimensional map made in the 1960s, Geller and Huchra have mapped more than 11,000 galaxies in a wedge of the northern celestial hemisphere, measuring the redshift of each galaxy brighter than magnitude 20.5 to pinpoint its location in three dimensions. The redshift indirectly indicates an objects distance from Earth. Their ongoing survey now

covers 1/100,000 of the volume of the visible universe—comparable to a world atlas describing only Rhode Island.

Stretching dramatically across the map is the Great Wall, a galaxy cluster 500 million light-years long, 200 million light-years wide and 15 million light-years thick. The vast bubbles it outlines—nearly empty stretches of space 150 million light-years in diameter—are equally important. “It may make more physical sense to regard the individual voids as the fundamental structures” of the universe, Geller and Hutchra write. These voids threaten one theory describing the nature of dark matter—the hypothetical material that caulks the gap between the amount of material astrophysicists detect in the universe and the much greater quantity they know must exist. Without dark matter to hold up the difference gravity couldn’t hold the stars and galaxies together.

Most astrophysicists believe dark matter is slow-moving, or “cold.” In this standard model, galaxies form at the denser regions of the dark matter, as foam gathers at the tip of a wave. But the vast size of the newly mapped voids doesn’t match the calculated distribution of cold dark matter, they report. Thus, the theory is missing “something profound,” Geller says.

Not so, responds theoretical astrophysicist James E. Gunn of Princeton University. “I think the new finding actually poses no problem at all”, he says. Last summer, Gunn and two graduate students modeled the growth of a universe containing cold dark matter. Their computer models simulated large voids and “remove any doubt” that these structures are compatible with the theory of cold dark matter, Gunn says.

Since Geller and Hutchra reported their first results, nearly four years ago, many other astrophysicists have started their own mapping projects, some scrutinizing different regions of space and others looking at already mapped regions in more detail, Geller says. But until surveyors map a region vast enough to show conclusively whether matter is evenly distributed, she says, they cannot accurately describe the structure of the universe

Quasar illuminates the most distant past

A team of astronomers has identified the most distant object now known in the universe—a quasar that was already emitting vast

quantities of light only a billion years after the Big Bang. The discovery that such an object existed so early in the universe’s history imposes severe constraints on theoretical models of how the universe evolved and how galaxies formed.

The astronomers determined the objects distance by measuring its light spectrum. As seen by Earth-based observers, light from distant objects is shifted to the red end of the spectrum. The more distant the light source, the greater this change in wavelength appears.

The record breaking quasar, one of five high-redshift quasars recently found by Donald P. Scheidner of the Institute for Advanced Study in Princeton, N.J., James E. Gunn of Princeton University and Maarten Schmidt of the California Institute of Technology in Pasadena, has a redshift of 4.73. It is so far away that its light takes more than 10 billion years to reach Earth. The astronomers report their discovery in the December *Astrophysical Journal*.

The discovery of a quasar with such a high redshift suggests that galaxies with massive black holes at their cores already existed when the universe was less than 7 percent of its present age. Moreover, the fact that astronomers have so far detected no obvious differences between light spectra from nearby and the more distant quasars implies that the galaxies in the distant past contained roughly the same materials as later galaxies.

“Considering how far away and therefore how far back in time these things are, it tells you that the elements were already in place in abundances similar to those we seem to see in our own neighborhood,” says Patrick Osmer of the National Optical Astronomy Observatories in Tucson, Ariz.

These findings increase the difficulty of reconciling the extraordinary smoothness of the cosmic background radiation—heat left over from the creation of the universe—with the lumpiness of matter as it now appears in the form of galaxies. By shorting the time in which the transition from smoothness to lumpiness must take place, the new observations effectively rule out a variety of theoretical models for the development of structure in the universe. For many cosmologists and astrophysicists, it’s back to the thinking phase.



Looking Ahead

The next business meeting of the North Jersey Astronomical Group will be held on Wednesday, December 13, 1989 at the Passaic County Department of Parks and Recreation Nature Center/Observatory at 8:00 PM.

Business meetings, as always, are open to the public, so bring a friend.

The first North Jersey Astronomical Group Annual Buffet Dinner will be held on February 2, 1990, at the Russian Hall in Little Falls. Time, directions and other details will be announced. There are no public nights scheduled for December.

There will be a regular meeting/observing session on December 6th.

There will be no meetings on December 20th or 27th.



HALLOWEEN OBSERVING Sat. Oct. 28, 1989

by Ruth Koenig



On Saturday, October 28, 1989 we got together in West Milford for our 4th Annual Halloween Observing Night. It was a great night for lots of reasons.

The weather cooperated, it was warm and clear, not a perfect night because of some haze and dew, but as far as the temperature was concerned we could not have asked for better.

We had 20 members, 3 guests and 11 telescopes. Everyone was doing observing and then Roger appeared in costume (if you want to know what it was, ask him) and the fun started. We got the Coleman stove going, put on the coffee pot and the hot dogs. As everyone was gathered round waiting for the hot dogs, I went to the car and put on my witch's hat and black cape. I slowly went back by the gang and gave

a witch's cackle. Maryann almost jumped out of her skin and everyone laughed.

Roger was playing Halloween music from his car's CD player and that was enjoyed by everyone. Tracy passed out Gingerbread Ghosts which were very good. We also had cupcakes decorated with candy corn.

As the night went on, the dew began to settle more and more and finally about 12:30 Den and I decided to leave. We left the diehards there and went home.

For those who did not come, or could not for whatever reason, you missed a good night and lots of fun. We hope you can join us next time. On any clear Friday or Saturday night, use the answering machine to find out if and when we are going to West Milford. If you don't know how, please see me at the park and I will give you instructions.



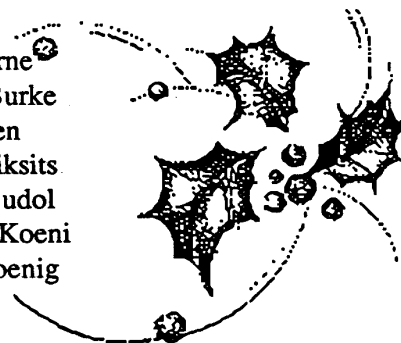
The Dark Sky Observer is a publication of the North Jersey Astronomical Group. All members are invited to write articles for the newsletter. Anyone interested in writing for the DSO, please contact the editor at a meeting or through the mail.

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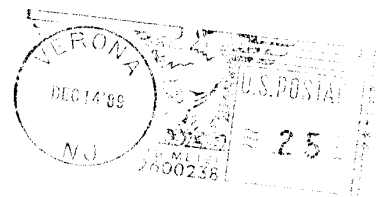
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