Star Gazer News

Newsletter of the Delmarva Stargazers
www.delmarvastargazers.org

From the Prez….

The Gazeless Winter of 2010

I have often wondered what it would be like to live in a snow covered environment and attempt amateur astronomy, ie, star gazing. No longer will I have to contemplate how that might fit into my way of life. For the past eight weeks and for probably another 5 or 6 weeks to come we will have a snow covered terra firma. I have been amazed at how bright the nighttime is…that snow is REFLECTIVE. It is also a nasty base on which to set up a telescope. So, I have come to the conclusion that if I want to do astronomy, ie, star gazing, from the snow covered environs of the Delmarva Peninsula, there may have to be a covered observatory in my future – and maybe some heat in the observatory. Otherwise I will never remove my carcass from the Lazyboy. Some Polaroid shades might help reduce the brightness of the snow.

Enuf of the snow…Spring is coming! Every day is longer and the sun is higher and brighter. Spring is coming…have faith, Brothers and Sisters. I predict a very warm Spring to compensate for this harsh Winter. Watch for the daffodils as they poke thru the melting snow…and watch for the red-breasted robins as they gobble up meals from the protected warmer spots in the next few days.

Our next meeting will concentrate on evaluating the new crop of telescopes offered by several companies…are they really better and worth the extra dollars? We will also review the new Ultra-wide FOV eyepieces, ie, those boasting FOV's greater than the 84 degrees of the Nagler era. Cancer will be the constellation reviewed. We will also do a preliminary review of preps for the Delmarva Star gaze #16…yes, this will be Number 16! And of course, we will go over final preps for MidAtlantic Mirror making #10.

We need people to consider serving as officers of Delmarva Star Gazers…nominations will be taken at the April meeting, published in the May newsletter, the voting will take place at the June meeting and new officers take over for the coming year at the close of the June meeting. We will have a discussion of the positions open this year and the overall process during the March meeting.

So, find a fellow Star Gazer or someone interested in stargazing and put the March 2, 2010, meeting on your calendar. As always, the meeting will be at Mallard Lodge, 7:00 PM. See you there. Don…

Astronomical TidBits for March 2010

Don Surles

First, let me comment on this Winter from Hell…or maybe from Mars or some other very cold and snowy part of the Universe.

For those Star Gazers who are not privileged to live on Delmarva, the weather since mid December 2009 combined, with my busted hip, has not been kind to this amateur astronomer. Hopefully, and I do mean very hopefully, the snow will cease, then rapidly melt – all three feet of it, the sun will shine brighter and hotter, Ol Man Winter will handoff the weather control to a Kinder and Gentler Spring Maiden that will bring warm nights, flowers, budding trees, robins, and a general re-birth of outside activity…along with the elimination of my cane. Let's cross our fingers and HOPE. We have had enuf SNOW for a whole decade.

So here goes with some tidbits of astronomy info…these may already be resident in your Astro Knowledge Library…if they are then just consider this a refresher.

Inferior and Superior Conjunction…**Inferior** refers to the point in a planet's orbit when it is exactly between the Sun and Earth. **Superior** refers to the point when the planet is positioned directly opposite Earth on the other side of the Sun and thus hidden from our view. My question for you…which of the 8 or 9 (I still consider Pluto a planet because Clyde Tombaugh said it was a planet) planets experience Inferior and Superior conjunctions?

Where is the Zenith? It is the point on the celestial sphere directly above an observer. That was EASY!
Where is the "Terminator"…nope, this is not the one played by Arnold Schwarzenegger…it is the one found on the crescent moon or planet that divides the sunlit side from the dark side.

(see Tidbits on page 2)

Upcoming Events:

Meeting !	**Mar 2nd**	**7 PM**	**Mallard Lodge**
Observing !	**Mar 12th**	**Dusk**	**Equestrian Cntr**
Mirror Making	**Mar 12th to 14th**		**Mallard Lodge**

(*Tidbits* from page 1)

Libration…again, this is not the “Good Vibrations” from the Beach Boys or the “libations”, ie, drink poured for the gods…this is the apparent wobble of the moon as it goes around the Earth in it’s orbit. Due to the “good librations” we can see a bit more than half of the Moon’s disc.

How hot is a meteorite before and after it enters Earth’s atmosphere? If you were fortunate enuf to have witnessed a meteor’s burning trail as it enters our atmosphere you may think you would need asbestos gloves to retrieve the remains. However, before the critter enters our atmosphere it is approx –70C; that’s cold. As it enters the atmosphere it compresses the air ahead of it, which causes the object to heat up and leave the familiar trail of glowing gas and debris behind it. The object’s outside temperature can reach several hundred degrees C and the crust melts into a “black fusion crust”. But because the duration of the fall is so short the interior of the object experiences very little or no heating (it was –70C!!!) and the surface of the meteorite can be quite cool when it finally reaches terra firma. So, when you find the meteorite don’t be afraid to pick it up…unless it is smoking!

How bright is the Sun on Europa? This can be calculated with the same formula used in photography to determine the amount of light reaching the film plane (today we would say the “chip” plane). The formula is 1/d^2 or the “inverse square law”. As you move away from the light source the amount of light reaching you decreases by the square of the distance. So, compared to light reaching Earth, we can calculate the amount reaching Europa by (1/distance to Europa squared)…that is 1 divided by the square of the distance to Europa expressed in AU’s (astronomical units – the distance from Earth to the Sun). We know that Europa is 5.2 AU’s from the sun so…1/5.2^2 = 1/27. So, the Sun is 1/27 or 3.7% as bright on Europa as it is on Earth. But don’t despair…that is still 16,000 times as bright as a full moon on Earth and you will be able to see the tourists sights of Europa very well on your visit.

Rills, rilles, clefts, or rimae...all refer to the long crack-like features on the moon. Johan Schroter, the first great lunar observer, first described them in the 1790’s. Most any good quality telescope greater than 4” diameter will show the features well…so get a Lunar Atlas, locate some rills on the atlas and put them on your next observing list. But, don’t wait for moonless nights to do the observing.

Should filters be used to observe the Great Orion Nebula (M42)? There are several opinions…my personal one is that I want more aperture and less filtration. However, as the Drill Sergeant “used to say about Lucky Strikes”…”Smoke ‘em if you got ‘em”. Deep Sky filters will remove mercury and sodium light pollution created by streetlights. The effect is to darken the sky and increase contrast. UHC filters narrow the wavelengths passing thru…the sky is inky black while the filter allows only the light of emission and planetary nebulae to pass thru – this is good for observing tendrils of the outer portions of the Nebula. OIII filters can be used if you have a large aperture scope. So, “try ‘em if you got ‘em”…you may or may not like what you see.

THE LICK OBSERVATORY

From THE REMINISCENCES OF AN ASTRONOMER by SIMON NEWCOMB **1903**

In the wonderful development of astronomical research in our country during the past twenty years, no feature is more remarkable than the rise on an isolated mountain in California of an institution which, within that brief period, has become one of the foremost observatories of the world. As everything connected with the early history of such an institution must be of interest, it may not be amiss if I devote a few pages to it.

In 1874 the announcement reached the public eye that James Lick, an eccentric and wealthy Californian, had given his entire fortune to a board of trustees to be used for certain public purposes, one of which was the procuring of the greatest and most powerful telescope that had ever been made. There was nothing in the previous history of the donor that could explain his interest in a great telescope. I am sure he had never looked through a telescope in his life, and that if he had, and had been acquainted with the difficulties of an observation with it, it is quite likely the Lick Observatory would never have

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(Lick from page 2)

existed. From his point of view, as, indeed, from that of the public very generally, the question of telescopic vision is merely one of magnifying power. By making an instrument large and powerful enough we may hope even to discover rational beings on other planets.

The president of the first board of trustees was Mr. D. O. Mills, the well-known capitalist, who had been president of the Bank of California. Mr. Mills visited Washington in the summer or autumn of 1874, and conferred with the astronomers there, among others myself, on the question of the proposed telescope. I do not think that an observatory properly so called was, at first, in Mr. Lick's mind; all he wanted was an immense telescope.

The question was complicated by the result of some correspondence between Mr. Lick and the firm of Alvan Clark & Sons. The latter had been approached to know the cost of constructing the desired telescope. Without making any exact estimate, or deciding upon the size of the greatest telescope that could be constructed, they named a very large sum, $200,000 I believe, as the amount that could be put into the largest telescope it was possible to make. Mr. Lick deemed this estimate exorbitant, and refused to have anything more to do with the firm. The question now was whether any one else besides the Clarks could make what was wanted.

I suggested to Mr. Mills that this question was a difficult one to answer, as no European maker was known to rival the Clerks in skill in the desired direction. It was impossible to learn what could be done in Europe except by a personal visit to the great optical workshops and a few observatories where great telescopes had been mounted.

I also suggested that a director of the new establishment should be chosen in advance of beginning active work, so that everything should be done under his supervision. As such director I suggested that very likely Professor Holden, then my assistant on the great equatorial, might be well qualified. At least I could not, at the moment, name any one I thought would be decidedly preferable to him. I suggested another man as possibly available, but remarked that he had been unfortunate. "I don't want to have anything to do with unfortunate men," was the reply. The necessity of choosing a director was not, however, evident, but communication was opened with Professor Holden as well as myself to an extent that I did not become aware of until long afterward.

The outcome of Mr. Mills's visit was that in December, 1874, I was invited to visit the European workshops as an agent of the Lick trustees, with a view of determining whether there was any chance of getting the telescope made abroad. The most difficult and delicate question arose in the beginning; shall the telescope be a reflector or a refractor? The largest and most powerful one that could be made would be, undoubtedly, a reflector. And yet reflecting telescopes had not, as a rule, been successful in permanent practical work. The world's work in astronomy was done mainly with refracting telescopes. This was not due to any inherent superiority in the latter, but to the mechanical difficulties incident to so supporting the great mirror of a reflecting telescope that it should retain its figure in all positions. Assuming that the choice must fall upon a refractor, unless proper guarantees for one of the other kind should be offered, one of my first visits was to the glass firm of Chance & Co. in Birmingham, who had cast the glass disks for the Washington telescope. This firm and Feil of Paris were the only two successful makers of great optical disks in the world. Chance & Co. offered the best guarantees, while Feil had more enthusiasm than capital, although his skill was of the highest. Another Paris firm was quite willing to undertake the completion of the telescope, but it was also evident that its price was suggested by the supposed liberality of an eccentric California millionaire. I returned their first proposal with the assurance that it would be useless to submit it. A second was still too high to offer any inducement over the American firm. Besides, there was no guarantee of the skill necessary to success.

In Germany the case was still worse. The most renowned firm there, the successors of Fraunhofer, were not anxious to undertake such a contract. The outcome of the matter was that Howard Grubb, of Dublin, was the only man abroad with whom negotiations could be opened with any chance of success. He was evidently a genius who meant business. Yet he had not produced a work which would justify unlimited confidence in his ability to meet Mr. Lick's requirements. The great Vienna telescope which he afterward constructed was then only being projected.

Not long after my return with this not very encouraging report, Mr. Lick suddenly revoked his gift, through some dissatisfaction with the proceedings of his trustees, and appointed a new board to carry out his plans. This introduced legal complications, which were soon settled by a friendly suit on the part of the old trustees, asking authority to transfer their trust. The president of the new board was Mr. Richard S. Floyd, a member of the well-known Virginia family of that name, and a graduate, or at least a former cadet, of the United States Naval Academy. I received a visit from him on his first trip to the East in his official capacity, early in 1876, I believe. Some correspondence with Mr. Lick's home representative ensued, of which the most interesting feature was the donor's idea of a telescope. He did not see why so elaborate and expensive a mounting as that proposed was necessary, and thought that the object glass might be mounted on the simplest kind of a pole or tower which would admit of its having the requisite motions in connection with the eyepiece. Whether I succeeded in convincing him of the impracticability of his scheme, I do not know, as he died before the matter was settled.

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Your 2009-2010 Officers

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Exploring the universe is a bit like groping around a dark room. Aside from the occasional pinprick of starlight, most objects lurk in pitch darkness. But with the recent launch of the largest-ever infrared space telescope, it's like someone walked into the room and flipped on the lights.

Suddenly, those dark spaces between stars don't appear quite so empty. Reflected in the Herschel Space Observatory's 3.5-meter primary mirror, astronomers can now see colder, darker celestial objects than ever before—from the faint outer arms of distant galaxies to the stealthy "dark asteroids" of our own solar system.

Many celestial objects are too cold to emit visible light, but they do shine at much longer infrared wavelengths. And Herschel can observe much longer infrared wavelengths than any space telescope before (up to 672 microns). Herschel also has 16 times the collecting area, and hence 16 times better resolution, than previous infrared space telescopes. That lets it resolve details with unprecedented clarity. Together, these abilities open a new window onto the universe.

"The sky looks much more crowded when you look in infrared wavelengths," says George Helou, director of the NASA Herschel Science Center at Caltech. "We can't observe the infrared universe from the ground because our atmosphere blocks infrared light, and emits infrared itself. Once you get above the atmosphere, all of this goes away and suddenly you can look without obstruction."

Herschel launched in May from the Guiana Space Centre in French Guiana aboard a European Space Agency Ariane 5 rocket. Since then, it has expanded the number of distant galaxies observed at far infrared wavelengths from a few hundred to more than 28,000. And with the instrument testing and system check-out phases finally completed, the discoveries are only now beginning.

Beyond simply imaging these dark objects, Herschel can identify the presence of chemicals such as carbon monoxide and water based on their spectral fingerprints. "We will be able to decipher the chemistry of what's going on during the beginnings of star formation, in the discs of dust and gas that form planets, and in the lingering aftermath of stellar explosions," Helou says.

And those are just the expected things. Who knows what *unexpected* discoveries may come from "flipping on the lights?" Helou says "we can't wait to find out."

Herschel is a European Space Agency mission, with science instruments provided by a consortium of European-led institutes and with important participation by NASA. See the ESA Herschel site at sci.esa.int/science-e/www/area/index.cfm?fareaid=16. Also, see the NASA sites at herschel.jpl.nasa.gov, www.herschel.caltech.edu, and www.nasa.gov/mission_pages/herschel. Kids can learn about infrared light by browsing through the Infrared Photo Album at The Space Place, spaceplace.nasa.gov/en/kids/sirtf1/sirtf_action.shtml.

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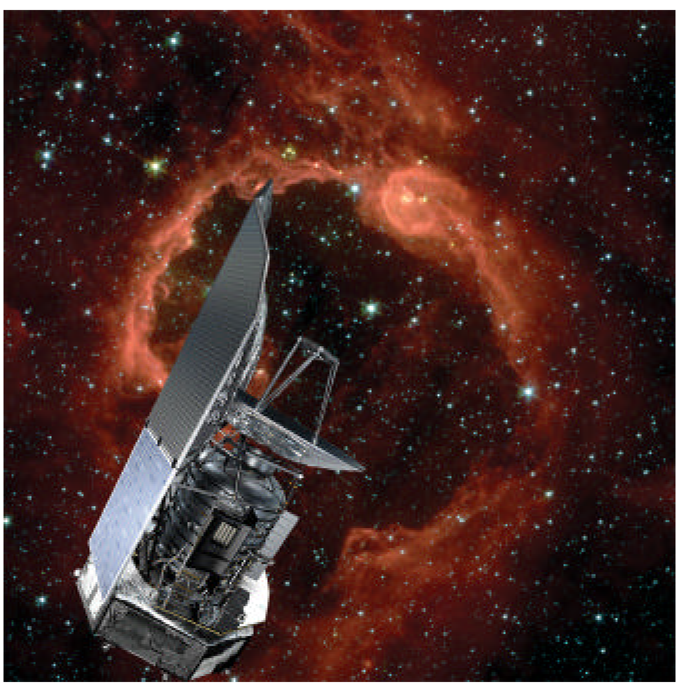

The Herschel Space Observatory has 3.5-meter primary mirror, allowing astronomers to see colder, darker celestial objects than ever before.

Sharpen, Steady and Clarify Your View

Tom Koonce **Antelope Valley Astronomy Club, Inc.** **Lancaster, California**

There are at least three important elements affecting your telescope that if improved, can make a dramatic improvement in the views you'll get this springtime. You've probably heard a lot about the first element – collimation. If you are using a Newtonian or Schmidt-Cassegrain telescope, accurate optical collimation can make a huge difference in your views. How much? From personal experience I can tell you that with an eight inch Schmidt-Cassegrain, it makes the difference between being able to make out the main bands on Jupiter and being able to see the curly festoons *between* the main bands on clear, steady evenings. There are many fine articles about the proper way to collimate your telescope. One can be found here, and another example can be found here, but a Google search will reveal dozens more.

The second element to upgrade is your mount. Nothing can ruin a great observing night faster than a shaky, unsteady or oscillating mount. A number of years ago, I recall that a friend of mine had had custom telescope called a Schiefspiegler built for him. This was not a small telescope (at over 4 feet in length), but the planetary and binary star views promised to be superb based upon the indoor optical tests. I went out with him the first night he set it up. We found out that the slightest breath of wind or slight tap to the side of the scope would cause oscillations lasting for many, many seconds. This wasn't only annoying; it nearly made us seasick and it certainly spoiled the view. I remember that he spent several hours later trying to beef-up the mount. Ultimately he sold the telescope because he couldn't get the mount steady enough to be both functional and portable. Always go for 'overkill' when it comes to your mount.

No astronomer has ever been heard complaining that their mount was just *too steady*. A big part of why the great observatories of the world are so expensive to build is because awesome views require rock steady support of the optics. I'm always trying to add stability. Little tricks like hanging a brick from a chain from below the center of your mount's tripod will add stability. Isolation pads under the tripod legs can reduce vibration. Talk to other amateurs at the next event to hear about other ideas you may try.

The third often neglected element is, of course, your eyepieces. Anything that affects the light path coming from the object you want to view contributes to the overall quality of the image your seeing. Spending good money for your telescope but then using cheap eyepieces will result in a disappointing view of the star, galaxy, or planet you want to see. The most obvious improvement to the sharpness, contrast and field of view can be obtained by using better eyepieces in the scope that you already have. Beginners typically will use whatever eyepiece(s) that came with their telescope, so I'm addressing the needs of "intermediate" level amateur astronomers with this advice. I recommend the Meade, Celestron, Pentax and Orion lines of Plossl eyepieces, and strongly recommend *anything* made by TeleVue. The best way to shop for an eyepiece is to go out with other amateurs to a star party and borrow their eyepieces for a few minutes and check out the view they produce using your own telescope. Most of the other folks in the astronomy club will be glad to do this since that's likely how they originally decided on what eyepieces to buy! You may be able to field test two or three "side-by-side". Just remember to treat their eyepieces as if they were gold and return them right after you're done with your assessment.

Photo Used With Permission of Rod Nabholz
http://www.homebuiltastronomy.com/downbino/EyepieceCase.htm

There are trustworthy classified ad sites like those at Astro-Mart.com and CloudyNights.com that can offer you exceptional deals on top quality eyepieces. With patience and knowledge of what you want to buy you can build an eyepiece collection of higher-end eyepieces for relatively little money. If you have used 1 ¼ inch diameter eyepieces for a while, you may consider adding a 2" eyepiece to your collection. This may require that you upgrade your telescope's focuser to accommodate the larger size, but this is the sort of eyepiece change that will make your jaw drop with the spectacular vistas they show.

By considering any one of these elements you'll get the "Wow!" factor back into your viewing when you see the detail that your equipment is really capable of seeing.

Ref websites:

http://www.astromodel.50megs.com/Collimation.html

Magazine Subscriptions

As a paid member of DMSG, you can sign up/renew your S&T or Astronomy mags through the club for a discount over private rate. S&T, reg. $42.95, is $32.95 thru DMSG, Astronomy, reg. $44, is $34. See Michael Lecuyer for details.

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This left the trustees at liberty to build and organize the institution as they deemed best. It was speedily determined that the object glass should be shaped by the Clarks, who should also be responsible for getting the rough disks. This proved to be a very difficult task. Chance & Co. were unwilling to undertake the work and Feil had gone out of business, leaving the manufacture in the hands of his son. The latter also failed, and the father had to return. Ultimately the establishment was purchased by Mantois, whose success was remarkable. He soon showed himself able to make disks not only of much larger size than had ever before been produced, but of a purity and transparency which none before him had ever approached. He died in 1899 or 1900, and it is to be hoped that his successor will prove to be his equal.

The original plan of Mr. Lick had been to found the observatory on the borders of Lake Tahoe, but he grew dissatisfied with this site and, shortly before his death, made provisional arrangements for placing it on Mount Hamilton. In 1879 preparations had so far advanced that it became necessary to decide whether this was really a suitable location. I had grave doubts on the subject. A mountain side is liable to be heated by the rays of the sun during the day, and a current of warm air which would be fatal to the delicacy of astronomical vision is liable to rise up the sides and envelope the top of the mountain. I had even been informed that, on a summer evening, a piece of paper let loose on the mountain top would be carried up into the air by the current. But, after all, the proof of the pudding is in the eating, and Holden united with me in advising that an experienced astronomer with a telescope should be stationed for a few weeks on the mountain in order to determine, by actual trial, what the conditions of seeing were. The one best man for this duty was S. W. Burnham of Chicago, who had already attained a high position in the astronomical world by the remarkable skill shown in his observations of double stars. So, in August, 1879, huts were built on the mountain, and Burnham was transported thither with his telescope. I followed personally in September.

We passed three nights on the mountain with Captain Floyd, studying the skies by night and prospecting around in the daytime to see whether the mountain top or some point in the neighboring plateau offered the best location for the observatory. So far as the atmospheric conditions were concerned, the results were beyond our most sanguine expectations. What the astronomer wants is not merely a transparent atmosphere, but one of such steadiness that the image of a star, as seen in a telescope, may not be disturbed by movements of the air which are invisible to the naked eye.

Burnham found that there were forty-two first-class nights during his stay, and only seven which would be classed as low as medium. In the East the number of nights which he would call first-class are but few in a year, and even the medium night is by no means to be counted on. No further doubt could remain that the top of the mountain was one of the finest locations in the world for an astronomical observatory, and it was definitely selected without further delay.

Sometime after my return Mr. Floyd sent me a topographical sketch of the mountain, with a request to prepare preliminary plans for the observatory. As I had always looked on Professor Holden as probably the coming director, I took him into consultation, and the plans were made under our joint direction in my office. The position and general arrangement of the buildings remain, so far as I am aware, much as then planned; the principal change being the omission of a long colonnade extending over the whole length of the main front in order to secure an artistic and imposing aspect from the direction of San Jose.

In the summer of 1885, as I was in New York in order to sail next day to Europe, I was surprised by a visit from Judge Hagar, a prominent citizen of San Francisco, a member of the Board of Regents of the University of California, and an active politician, who soon afterward became collector of the port, to consult me on the question of choosing Professor Holden as president of the university. This was not to interfere with his becoming director of the Lick Observatory whenever that institution should be organized, but was simply a temporary arrangement to bridge over a difficulty.

In the autumn of 1887 I received an invitation from Mr. Floyd to go with him to Cleveland, in order to inspect the telescope, which was now nearly ready for delivery. It was mounted in the year following, and then Holden stepped from the presidency of the university into the directorship of the observatory.

The institution made its mark almost from the beginning. I know of no example in the world in which young men, most of whom were beginners, attained such success as did those whom Holden collected around him. The names of Barnard, Campbell, and Schaeberle immediately became well known in astronomy, owing to the excellence of their work. Burnham was, of course, no beginner, being already well known, nor was Keeler, who was also on the staff.

In a few years commenced the epoch-making work of Campbell, in the most refined and difficult problem of observational astronomy,--that of the measurement of the motion of stars to or from us. Through the application of photography and minute attention to details, this work of the Lick Observatory almost immediately gained a position of preeminence, which it maintains to the present time. If any rival is to appear, it will probably be the Yerkes Observatory. The friendly competition which we are likely to see between these two establishments affords an excellent example of the spirit of the astronomy of the future. Notwithstanding their rivalry, each has done and will do all it can to promote the work of the other.

The smiles of fortune have been bestowed even upon efforts that seemed most unpromising. After work was well organized, Mr. Crossley, of England, presented the observatory with a reflecting telescope of large size, but which had never gained a commanding reputation. No member of the staff at first seemed ambitious to get hold of such an instrument, but, in time, Keeler gave it a trial in photographing nebulae. Then it was found that a new field lay open. The newly acquired reflector proved far superior to other instruments for this purpose, the photographic plates showing countless nebulae in every part of the sky, which the human eye as incapable of discerning in the most powerful of telescopes.

In 1892, only four years after the mounting of the telescope, came the surprising announcement that the work of Galileo on Jupiter had been continued by the discovery of a fifth satellite to that planet. This is the most difficult object in the solar system, only one or two observers besides Barnard having commanded the means of seeing it. The incident of my first ac-

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quaintance with the discoverer is not flattering to my pride, but may be worth recalling.

In 1877 I was president of the American Association for the Advancement of Science at the meeting held in Nashville. There I was told of a young man a little over twenty years of age, a photographer by profession, who was interested in astronomy, and who desired to see me. I was, of course, very glad to make his acquaintance. I found that with his scanty earnings he had managed either to purchase or to get together the materials for making a small telescope. He was desirous of doing something with it that might be useful in astronomy, and wished to know what suggestions I could make in that line. I did not for a moment suppose that there was a reasonable probability of the young man doing anything better than amuse himself. At the same time, feeling it a duty to encourage him, I suggested that there was only one thing open to an astronomical observer situated as he was, and that was the discovery of comets. I had never even looked for a comet myself, and knew little about the methods of exploring the heavens for one, except what had been told me by H. P. Tuttle. But I gave him the best directions I could, and we parted. It is now rather humiliating that I did not inquire more thoroughly into the case. It would have taken more prescience than I was gifted with to expect that I should live to see the bashful youth awarded the gold medal of the Royal Astronomical Society for his work.

The term of Holden's administration extended through some ten years. To me its most singular feature was the constantly growing unpopularity of the director. I call it singular because, if we confine ourselves to the record, it would be difficult to assign any obvious reason for it. One fact is indisputable, and that is the wonderful success of the director in selecting young men who were to make the institution famous by their abilities and industry. If the highest problem of administration is to select the right men, the new director certainly mastered it. So far as liberty of research and publication went, the administration had the appearance of being liberal in the extreme. Doubtless there was another side to the question. Nothing happens spontaneously, and the singular phenomenon of one who had done all this becoming a much hated man must have an adequate cause. I have several times, from pure curiosity, inquired about the matter of well-informed men. On one occasion an instance of maladroitness was cited in reply.

"True," said I, "it was not exactly the thing to do, but, after all, that is an exceedingly small matter." "Yes," was the answer, "that was a small thing, but put a thousand small things like that together, and you have a big thing."

A powerful factor in the case may have been his proceeding, within a year of his appointment, to file an astounding claim for the sum of $12,000 on account of services rendered to the observatory in the capacity of general adviser before his appointment as director. These services extended from the beginning of preparations in 1874 up to the completion of the work. The trustees in replying to the claim maintained that I had been their principal adviser in preparing the plans. However true this may have been, it was quite evident, from Holden's statement, that they had been consulting him on a much larger scale than I had been aware of. This, however, was none of my concern. I ventured to express the opinion that the movement was made merely to place on record a statement of the director's services; and that no serious intention of forcing the matter to a legal decision was entertained. This surmise proved to be correct, as nothing more was heard of the claim.

Much has been said of the effect of the comparative isolation of such a community, which is apt to be provocative of internal dissension. But this cause has not operated in the case of Holden's successors. Keeler became the second director in 1897, and administered his office with, so far as I know, universal satisfaction till his lamented death in 1900…..

The March Sky—From Half-Hours with the Stars (1911)

RICHARD A. PROCTOR, F.R.A.S.

The Great Bear (*Ursa Major*) is now nearing the point overhead, the Pointers (α and ß) aiming almost directly downward toward the Pole Star. The line from this star (a of the Little Bear, *Ursa Minor*) to the Guardians (ß and γ) is now in the position of the minute hand of a clock about 13 minutes after an hour.

Cepheus lies north, low down, *Cassiopeia* on his left, the Camelopard above her, *Andromeda* just setting, almost due northwest, on the left. *Perseus* is due northwest, rather low, the Charioteer (*Auriga*) on his left, but higher. Setting between west and northwest we see the Bull (*Taurus*), with the *Pleiades* and the ruddy *Aldebaran*. *Orion* is almost prone in his descent toward his western grave. The Twins (*Gemini*) are due west, in the mid-heavens; the Little Dog (*Canis Minor*) beside them on their left, the Crab (*Cancer*) above, the Greater Dog (*Canis Major*) below, chasing the Hare (*Lepus*) below the horizon. Just behind the Dog the poop of the Great Ship (*Argo*) is also setting.

The Sea Serpent (*Hydra*) now shows his full length, rearing his head high in the south. Observe the darkness of the region around his heart, marked by the star α, *Alfard*, the Solitary One. The Cup (*Crater*) and Crow (*Corvus*) stand on his back.

The Sickle in the Lion (*Leo*) now stands with handle upright, due south. Below the tail stars of the Lion we see the Virgin (*Virgo*), with the bright *Spica Azimech*. The set of five third magnitude stars, above, was called by the Arabs, for reasons not explained, the "Retreat of the Howling She Dog."

Behind the Lion, due east and high up, we see *Coma Berenices*, the hair of Queen Berenice, between which and the tail of the Great Bear we see in the chart one star only of the Hunting Dogs (*Canes Venatici*).

The Herdsman (*Boötes*), still on his back, pursues in that striking and effective position the Great Bear. Below the shoulder stars of the Herdsman we see the Crown (*Corona Borealis*), near which, on the right, low down and due east, the head of the Serpent (*Serpens*) is rising. *Hercules* is also rising, but in the northeast.

Lastly, the stars of the Dragon (*Draco*) can be seen curving from between the Pointers and the Pole, round the Little Bear, then back toward *Hercules*, the head of the Dragon, with the bright eyes, ß and γ, being rather low down, and somewhat north of northeast.

Astrophotos
by Members and Friends

There were no astro pics submitted this month. I guess all y'all were busy with shoveling snow, so I posted 2 APOD pics I like. For more—see http://antwrp.gsfc.nasa.gov/apod/

WISE Infrared Andromeda
Credit: NASA / JPL-Caltech / UCLA

Explanation: This sharp, wide-field view features infrared light from the spiral Andromeda Galaxy (M31). Dust heated by Andromeda's young stars is shown in yellow and red, while its older population of stars appears as a bluish haze. The false-color skyscape is a mosaic of images from NASA's new Wide-field Infrared Survey Explorer (WISE) satellite. With over twice the diameter of our Milky Way, Andromeda is the largest galaxy in the local group. Andromeda's own satellite galaxies M110 (below) and M32 (above) are also included in the combined fields. Launched in December 2009, WISE began a six month long infrared survey of the entire sky on January 14. Expected to discover near-Earth asteroids as well as explore the distant universe, its sensitive infrared detectors are cooled by frozen hydrogen.

Geostationary Highway
Credit & Copyright: Babak Tafreshi (TWAN)

Explanation: Put a satellite in a circular orbit about 42,000 kilometers from the center of the Earth (36,000 kilometers or so above the surface) and it will orbit once in 24 hours. Because that matches Earth's rotation period, it is known as a geosynchronous orbit. If that orbit is also in the plane of the equator, the satellite will hang in the sky over a fixed location in a geostationary orbit. As predicted in the 1940s by futurist Arthur C. Clarke, geostationary orbits are in common use for communication and weather satellites, a scenario now well-known to astroimagers. Deep images of the night sky made with telescopes that follow the stars can also pick up geostationary satellites glinting in sunlight still shining far above the Earth's surface. Because they all move with the Earth's rotation against the background of stars, the satellites leave trails that seem to follow a highway across the celestial landscape. For example, in this wide view of the nearly equatorial Orion region, individual frames were added to create a 10 minute long exposure. It shows Orion's belt stars and well-known nebulae along with many 2.5 degree long geostationary satellite trails. The frames are from an ingenious movie, featuring the geostationary satellite highway.

How to Join the Delmarva Stargazers: Anyone with an interest in any aspect of astronomy is welcome

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Please attach a check for $15 made payable to Delmarva Stargazers and mail to Kathy Sheldon, 20985 Fleatown Rd, Lincoln, DE 19960. Call club President Don Surles at 302-653-9445 for more information.

Moondark is on hiatus this month. The column should return soon. Look here or keep an eye out on the *Moondark web site*).