The Shoreline Observer

Newsletter for the
Shoreline Amateur Astronomical Association

President- Mark Logsdon **Vice President-** Gary Stroven **Secretary/Treasurer-** Phil Sherman

Robert Wade, Editor

April 1993

April Meeting

The April meeting of the Shoreline Amateur Astronomical Association will be held on Thursday April 15, beginning promptly at 7:00 PM in the West Ottawa Middle School Planetarium in Holland, Michigan.

- Refreshments
- The April Night Sky by Sandy Plakke..
- Astronomy Day Planning

Board Meeting

Mark called the meeting in Bill Knapp's to order at 7:00 P.M. on March 25, 1993. Phil, Gary, Larry, and Pete were also present.

Treasure's Report: $ 280.11

Old business: Ongoing preparation for Astronomy day, May 1 was discussed. The display at Westshore Mall will be set up at 9:00 P.M., Friday April and staffed by SAAA members during Mall hours on Saturday May 1, from 10:00 A.M. to 9:00 P.M. The astronomical poster contest is being coordinated by Arlin and Pete. Posters are due at Waldenbooks at Westshore Mall by April 23. Judging will take place on Saturday April 24, and awards will be presented on Astronomy Day.

Westshore Mall has denied permission to set up stargazing in adjacent parking lots.

3882 62nd Street
Holland, Michigan 49423

Astronomy day activities will be reviewed at the April 15 meeting. Club members are encouraged to participate in this once-a-year celebration of amateur astronomy.

New Business: Star parties are tentatively set for the weekend of April 16/17 and Friday May 15. The date in May is a public event at Kollen Park in holland. Particulars will be discussed at the April meeting.

Program Schedule: May 20 is still open; on June 17, Professor Lawrence Oppliger of Western Michigan University will be our guest speaker.
Meeting adjourned at 8:30 P.M

Respectfully submitted by Mark Logsdon

Buying Your First Telescope -- Part 2

A Supplement to Astronomy magazine
(C) 1991 Kalmbach Publishing Co.

Reprinted from the November 1991 issue of *Astronomy* magazine

A telescope buyer's top 30 questions - cont'd

15. *Which is better - an altazimuth or equatorial mount?* Alt-azimuth mounts use simple up-down (altitude) and side-to-side (azimuth) motions to aim the telescope. The best of these mounts are equipped with slow-motion controls to allow you to make fine adjustments to the position of the scope. However, alt-az mounts cannot automatically follow the stars as they appear to arc across the sky from east to west. An equatorial mount is more complex. It can follow the stars across the sky with a single motion around one axis. If the telescope is equipped with a motor, the telescope will automatically track the stars. This is a nice feature because at magnifications of 100x or more, the apparent motion of the sky will cause objects to drift out of the field of view in less than a minute. Having to re-center the image constantly can be distracting, inconvenient, and can introduce vibration that shakes the image.

16. *What about Dobsonian telescopes?* A Dobsonian is a Newtonian reflector. Its unique feature is a simple wooden alt-azimuth mount that rides on Teflon pads. The philosophy of the popularizer of this type of telescope, John Dobson, was to keep the scope easy-to-build and low-cost. The design also lends itself to relatively large apertures. Dobsonians cannot track the stars automatically, but their motions are very smooth - it's easy to nudge the scope every so often to re-center the object. As of 1992, only one manufacturer was selling low-cost Dobsonian telescopes - Coulter Optical Company. Their models offer big aperture for very little money (for example, a 10-inch reflector for under $400). People often wonder if there's a catch. There are a few: Coulter scopes are in such demand that you may have to wait several months to a year for delivery. You must order directly from the factory and pay shipping costs from their plant in California (which may add up to $100 to the cost). You will also need to add a finderscope. The fit and finish of the scopes is nothing fancy - the mounts are painted chipboard, the tubes cardboard. Our opinion? For the money the quality of construction and optics can't be beat. The 8- and 10-inch Coulter models make good starter scopes. The 13- and 17-inch models are best for die-hard deep-sky observers.

17. *I've heard you can make your own telescope.* The Dobsonian design lends itself to do-it-yourselfers. Plywood for the mount and a cardboard tube like those used for concrete forms are the main ingredients. Few people make their own mirrors these days. It can be done, but ready-made mirrors from suppliers such as Coulter, Meade, Parks and other suppliers don't cost much more than mirror- making kits. You'll also need a focuser and cells to hold the main mirror and the small secondary mirror. For more information about telescope making see the book *Build Your Own Telescope* by Richard Berry, available from Kalmbach Publishing.

18. *What accessories do I need?* Some telescopes come with only one eyepiece. Additional eyepieces for higher and lower powers are the first accessories most first-telescope owners need to buy. An accessory called a Barlow lens can double or triple the power of each eyepiece, but the best Barlow's (the only ones worth buying, trust us!) cost $80 to $100. Colored filters can enhance views of the planets slightly, but the difference is subtle. They are not essential. Nebula or light pollution filters can improve views of some deep-sky objects like emission and planetary nebulae, but they do little to improve star clusters and galaxies. Contrary to what many beginning backyard astronomers believe, these filters are not a cure-all for light-polluted skies. Computerized digital readouts to aid in finding objects have become popular telescope accessories in recent years. They work well but are luxury options for those that can afford their $500 to $1,000 price tags.

19. *Are enhanced coatings worth the extra cost?* Some telescopes are offered with special lens or mirror coatings as optional extras (Celestron's Starbright™ and Meade's MCOG, for example). These increase the light transmission, making images up to 15 percent brighter. They are definitely worth the extra expense.

20. *Can I use setting circles to find things?* Many equatorial mounts are equipped with graduated dials called setting circles. Theoretically, these allow you to find objects by moving the telescope so that the circles' readings match the celestial

coordinates (called right ascension and declination) of the object you're looking for. However, in our experience we have rarely seen a novice amateur astronomer (nor many experienced ones!) who have been able to make effective use of setting circles. Poor alignment of the telescope mount, improperly calibrated circles, and imprecise circle scales usually combine to make circle readings inaccurate. The best method to find celestial targets is to hop from star to star using a good star chart as your guide. Plan on buying such a star chart as an essential accessory.

21. *Can I take pictures with this scope?* Anything you see through a telescope can be photographed, but most objects require exposures of several seconds to an hour or more. Keeping the object perfectly positioned on the film during that time requires a solid equatorial mount and a motor drive. These are essential features if you intend to do astrophotography.

22. *Can I use a spotting scope for astronomy?* Some spotting scopes (such as those sold for birding) have only a fixed-power eyepiece or a variable zoom eyepiece. These models are unsuitable for astronomy. Other models use interchangeable eyepieces but must be placed on a solid camera tripod. Because they lack fine slow-motion controls, camera tripods are difficult to aim precisely, a problem at high power.

23. *But I also want to use my telescope for nature observing.* If your interests mix astronomical and terrestrial viewing, we suggest an 80mm or 4-inch refractor, or a small 4-inch Schmidt--Cassegrain. Don't buy a Newtonian reflector - the position of the eyepiece makes a Newtonian awkward for use as a spotting scope.

24. *How much should I have to spend?* We feel that $400 to $500 is the minimum for a quality starter scope such as an 80mm refractor or 4.5--inch reflector. The next step up is to a 6-inch equatorially-mounted reflector (such as the models from Celestron, Meade, Parks Optical, or Pirate Instruments). These sell for $600 to $900. The next jump up many first-time buyers consider is to an 8-inch Schmidt-Cassegrain ($1,200 to $2,500). No-frills Dobsonian reflectors defy these price/aperture categories by offering much more aperture for the money (see question 16).

25. *What does "1/20th-wave optics" mean?* The deviation of an optical surface (lens or mirror) from the ideal shape is often stated as a fraction of a wavelength of light. The smaller the fraction, the better the optics and the sharper the image. However, to be meaningful for a complete telescope this deviation figure should be provided for the final wavefront reaching the eye, not just for individual lenses or mirrors. When measured in this manner, a telescope with a total error on the final wavefront of 1/4 wave is very good, 1/8 or 1/10 wave is excellent, and 1/20 wave is outstanding but seldom achieved. Manufacturers have no agreed-upon standard for measuring these values - one company's 1/20 wave may be the same as another company's 1/10 wave.

26. *What does "diffraction limited" mean?* This is another freely used term in telescope advertising. It means that the optics are so good they are limited only by the wave nature of light and not by any flaws in the surface accuracy of the lenses or mirrors. Specifically, it means the final wavefront error is better than 1/4 wave, a figure known as Rayleigh's Criterion. Again, few manufacturers have the technical equipment to quantitatively support this claim. Most test telescope quality by ensuring units form good star images. Although this is a very sensitive test that will detect small flaws in the optics, it cannot guarantee a numerical specification like 1/4 wave.

More on these topics next month...

Star Catalogues and Charts
A Brief History–Part One

by Bill Gwynne
Cincinnati Astronomical Society

For my purposes, there are three categories of star charts. Scientific/Reference, General Use (amateur), and Historic. For our use here I'm not going to spend much time with the Scientific catalogues unless they have some other outstanding quality besides their completeness. The same goes for the Historic (although completeness was not their problem back in those days).

The General Use publications are widely varying in their scope (pun intended). Some are borderline Scientific and others are just paperback books for folks with a pair of binoculars and a six pack! I will concentrate on the upper end of this scale so that these catalogues can become a known alternative to the usual *Sky Atlas, Uranometria,* etc.

Why always observe Messier objects when you can find a lot of good views in the Herschel catalogue? In fact, the Astronomical League actually sponsors a Herschel Certificate (400 objects), just like the Messier program they have. In 1603 Bayer got the bright idea that the stars in the sky needed some better, more scientific names than that bright one over there. What he came up with was to give the stars in each constellation a letter name from the Greek alphabet. The brightest star in each constellation got the designation Alpha, the second brightest, Beta and so on. Apparently this was a pretty good system because we still use the basic concept today! When someone refers to Alpha Orionis they're talking about Betelgeuse, the brightest star in Orion.

However, this system is not without problems. First of all, the telescope was invented a few years after this system was devised. Now there were many more stars to see in each constellation--many more than can be accommodated by the 24 character Greek alphabet. So Bayer decided to use the Roman alphabet next to pick up where the Greek left off. Unfortunately this aspect of the system proved to be rather confusing and certain names ended up belonging to more than one star! Another problem was that under the technical restraints of this system, in certain constellations that covered a lot of area in declination, it was actually possible for some stars to switch names as the Earth's precession progressed through it's 23,000 year wobble cycle.

Any system that allows stars to switch names every now and then is not a good long-term scientific one. Enter the Rev. John Flamsteed, Regius professor of astronomy, at Greenwich & London in 1725 and his *Historia Celestis Britannica.* According to his new system, after the Greek letters were used up, he would number the stars in a particular constellation in the order of right ascension down to the 5th magnitude. This solved the precession problem but as that new upstart invention the telescope evolved, 5th magnitude resolution wasn't quite good enough anymore. Although obsolete now, you still occasionally hear of a star referred to by it's Flamsteed number, designated by the prefix F.

In 1781, a French astronomer named Charles Messier published his catalogue of deep sky objects. The telescope had been around for about 175 years by this time and had evolved to the point where the basic classes of deep sky objects were fairly observable. Essentially, Messier was a comet hunter (like most of his colleagues) and whenever he found a suspected comet (i.e. an unidentified fuzzy blob), he wrote down it's position. If it hadn't changed positions in the sky within a couple of days, it wasn't a comet and therefore a failure. But he made sure he recorded the position to make sure he and other astronomers didn't make the same mistake again later. Little did he know he was compiling what was to become the all-time "Top 100" deep sky objects for small telescopes!

The Messier catalogue was delivered in three separate installments--the first in 1771 consisting of 45 objects and actually was presented as being a catalogue of nebulae, not just failed comets. Not every listing in the catalog was personally discovered by Messier. Many of the objects were discovered by others (notably Mechain) and Messier included them in his list. At the time of his death, Messier had 103 items in his catalog but 7 objects were added posthumously when it was discovered that they were notated on his maps but not entered in his catalog. Officially there are 110 objects in the catalogue ranging in declination from -34° to +69°. However, three of these objects are considered mistakes--M40 is just a double star, and M91 which is just blank space (it was probably a real comet!) and some confusion about the true identity of M102 which he probably confused with nearby M101 and is generally assigned now to NGC 5866. (Many thanks to CAS member Dennis Tribby for the information on Messier from his two-part article from the January & February 1991 issues of *The Sidereal Messenger*).