Does Understanding Diminish Beauty?

The galaxy M51 imaged with the MIRA telescope.

An Oncidium/Odontoglossum orchid. Plant and image by Bruce Weaver.
The previous newsletter showed the deep snows of the 2019 winter at the Oliver Observing Station. Our total accumulated precipitation, from November through a surprisingly wet May, was over 44 inches. Since we collect our water from our roofs, all our reservoirs started the summer full, which is good and cost-saving.

Along with the rain came a very windy season. Winds frequently exceeded 80 mph, which puts them well into the hurricane level. Prepared as we are for high winter winds, we had some minor damage in some surprising places, like inside the observing area. The bottom layer of our multi-layer roof is composed of insulation panels. Many of them were torn from their moorings. We appreciate the winter rains and the cost savings from having to truck less water to the OOS, but would appreciate more of it arriving falling down rather than blown sideways and uphill by gale-force winds.

Wild Winter on Chews Ridge

Welcome to our new Friends

Kelly Productions
Swati Menta
Kara Pham
Sachi Phillips
Jim Whitney

Thanks!

MIRA Newsletter in Color

The MIRA Newsletter is available in color on the MIRA website (www.mira.org)
Does Understanding Diminish Beauty?
by Dr. Wm. Bruce Weaver

The MIRA 36-inch telescope is of modest size but it is appointed as are all modern telescopes with electronic controls managed by a number of computers. When we first built it, in the 1970s, observing was much more of a manual operation: telescope motion and focus controls linked directly to motors, we manually positioned photographic plates as detectors, and guiding the telescope during hour-long exposures - often in sub-freezing temperatures - was done with the astronomer’s eye glued to an eyepiece.1

When used to make spectroscopic observations, our telescope requires only occasional corrections to its tracking, so much of the time during long exposures on the Oliver Observing Station deck could be spent, standing or seated, admiring the night sky. Personally, watching the beauty of the night sky glide overhead holds me in rapture – an experience I’ve had since childhood and the reason I endured many years of physics and math to become an astronomer. One aspect of my emotions was captured by Ralph Waldo Emerson in an essay on nature:

If the stars should appear one night in a thousand years, how would men believe and adore, and preserve for many generations the remembrance of the city of God which had been shown! But every night come out these envoys of beauty, and light the universe with their admonishing smile.

Emerson doesn’t mention constellations and, since astronomers use a coordinate system analogous to the terrestrial system of longitudes and latitudes, we don’t need constellations to describe the position of celestial objects. Lacking that requirement, I have not learned any of the many impositions of mythical figures on the sky. I just soak up the gestalt of it all. Hundreds of cold nights under the magic tapestry of the sky, made dynamic by the whirling revolutions of the Earth, never diminished my awe of it.

But with the desktop computer revolution, computer-control of the telescope and its instruments came within our financial reach and system by system came under computer control. This now posed a dilemma. Once most functions are computer-controlled and guiding is performed with digital cameras, the astronomer need not be tied to the telescope and the task of observing can be performed at a distance. We could then move out of the wind and cold into the third floor of the OOS warm north building – always intended to house what astronomers call “the warm room.” But moving to a well-lit room with glowing computer screens meant giving up the city of God for creature comforts in just another room filled with computers.

I did what any sensible person faced with this dilemma would do, I procrastinated. But all procrastinations must come to an end and we (I, reluctantly) moved into the warm room. Observing is more efficient, astronomers are more comfortable, paper notes don’t fly across the room, and bulky observing clothes burrow deeper into the home closets. Occasionally one has to go out to the telescope to make a manual adjustment but, for that brief visit, the cold doesn’t seep into your bones, and the sky is static and seen with vision washed out by lost night adaptation.

What we have done with this move to the warm room is to trade some of our time with the stark drama of the near-perfect Chews Ridge skies for a better chance to more

1. Literally, in one case, when a MIRA astronomer’s eye got too close to the cold eyepiece and stuck. The eye took a few minutes to recover, providing the astronomer the dilemma of continuing to guide with the remaining working eye or letting the star drift out of position.
fully decipher “how the sky is made.” To me, these two symbiotic esthetics blend smoothly from one to the other.

American Nobel laureate Richard Feynman (pictured below) expressed this symbiosis well:

Poets say science takes away from the beauty of the stars - mere globs of gas atoms. I too can see the stars on a desert night, and feel them. But do I see less or more? The vastness of the heavens stretches my imagination - stuck on this carousel my little eye can catch one - million - year - old light. A vast pattern - of which I am a part... W hat is the pattern, or the meaning, or the why? It does not do harm to the mystery to know a little about it. For far more marvelous is the truth than any artists of the past imagined it. Why do the poets of the present not speak of it? W hat men are poets who can speak of Jupiter if he were a man, but if he is an immense spinning sphere of methane and ammonia must be silent?

Putting aside his rebuke of the scientific timidity of most poets, his most resonant idea to me is ‘For far more marvelous is the truth than any artists of the past imagined it’.

He may have been a bit optimistic to believe that science brings us TRUTH but I do believe, for most definitions of the word, science is the optimal method for approaching it. When I sat on the observing deck between trips to the eyepiece to check for the star drifting off the spectrograph entrance window, bundled in my arctic wear, 20-degree weather, and a stiff breeze, mostly I was gobsmacked by what I was seeing.

But that gobsmackedness included what I knew about the tapestry above me: our Milky Way. It is not only the story of the birth, life, and death of generations of stars laid out behind the bright, nearby stars and clusters; but the stratification of the layers of generations approaching the central plane of our galaxy that shows the dynamic, ever-changing (albeit on geologic time scales) character of our local collect of a few billion stars. The older stars reside in the outer edges of the swath of light running from horizon to horizon, closer to the center plane, the current generation, and - to me, the most interesting - the dark band of interstellar dust and gas, making narrow curlicues about that central plane: the placental material for the formation of the next generation of stars.

After a while the darkness of the nearby Taurus-Auriga cloud of obscuring dust and gas makes an appearance, the closeness of this opaque stellar nursery making it a surprisingly large hole the fall sky. It rises and sets on fall nights, as do many of the stars I study that are the first-born of what will be nearby star cluster in a few million years. What I see in the sky is what geologists see when they look at the Earth: a dynamic, constantly-changing panorama - mountains/stars coming and going - some rapidly, some slowly; some young; some old; some ordinary; and some, the most interesting, yet inscrutable. I’ve helped chip away at those mysteries, helping, in a team effort, to making the sky even more beautiful in the eyes of the next generation of dreaming astronomers.

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2. A literal translation of a line in Galileo’s letter to the grand duchess Christina describing what he proposed should be the relationship between religion and science is “The Bible tells us how to go to heaven, not how the sky is made.”

3. Chesley Bonestell, whom we honor each year with our memorial lecture, always updated his paintings as new astronomical observations changed our perceptions of the object of his art.
Unfortunately, this view is not shared by all poets, the folks we depend on to resolve any conflicts between knowledge, understanding, and beauty. For example, there seem to be (at least) two opposite ways to interpret Walt Whitman’s poem, *When I Heard the Learn’d Astronomer*:

> When the proofs, the figures, were ranged in columns before me,
> When I was shown the charts and diagrams, to add, divide, and measure them,
> When I sitting heard the astronomer where he lectured with much applause in the lecture-room,
> How soon unaccountable I became tired and sick,
> Till rising and gliding out I wander’d off by myself,
> In the mystical moist night-air, and from time to time,
> Look’d up in perfect silence at the stars.

One interpretation – something like the one I’d prefer – is that after Whitman hears the lecture, he goes outside with a new appreciation of the beauty of the stars above him. But, try as I might, I find no ambiguity in these lines. He sees no connection between what he learn’d in the part of the lecture for which he stayed and what he sees above him in the moist night air. That’s a shame. Most scientists are so enraptured with the apparent beauty of Nature and even more so in the astounding underpinning of that beauty that they devote their lives to uncovering one more tiny bit of the seeming magic that makes it work.

When I see an orchid, I see it is obviously (usually) pretty. It is always irresistibly beautiful to the insect or other pollinator who, seeing a much more dramatic vision in ultraviolet light that I cannot see, is drawn inescapably to it. Most orchids, the most common type of flower in the world, are custom-designed for only one specific species of pollinator. Special passages are exactly the right size, smell, taste, shape to accommodate just that species. For 150 years, we’ve been standing on the shoulders of Darwin and can see how the insect and the plant evolved together, a very co-dependent couple, so that each had only eyes for the other. This, and many other details, puts the orchid flower in an aesthetic context far more beautiful than its simple appearance. The added fullness of that context does not diminish the beauty of its simple appearance.

I am firm in my belief that understanding enhances beauty.
MIRA Library Telescope Program

The MIRA Library Telescope Program is now two years old and doing very well. Both the participating libraries and library patrons are enthusiastic. Any library patron 18 years old or older can check out a telescope, just like checking out a book, for three weeks. These telescopes are simple and easy to use. They come with an instruction manual in English. Spanish language manuals are available. Also included is a red and white head lamp for use outdoors. These telescopes are tabletop instruments, lightweight and easy to carry and transport. Library patrons are instructed by the librarians in the basic use of the telescope, how to carry it and transport it. MIRA Volunteer Bruce Neben trains the librarians and acts as telescope and astronomy consultant to the participating libraries, as well as doing semi-annual servicing of the telescopes.

We now have telescopes in the Seaside, Marina, King City, Big Sur, Carmel Valley, and Monterey libraries. These telescopes are getting a lot of use. All the libraries typically have a waiting list (library holds) for the scopes. Borrowing telescopes from libraries has proved popular. Bruce sees this as part of MIRA’s role in science or astronomy education or astronomy literacy for the community.

From the Weaver Student Observatory

Dr. Eric Suchanek made this image of the Horsehead Nebula in Orion from the Weaver Student Observatory. He used the MIRA 14” Celestron telescope, Seth Eddy’s QXY CCD camera, and a narrowband hydrogen-alpha filter. Exposure time was 30 minutes.

Donations are invited to enable us to purchase more telescopes to meet the needs that have been clearly established among library patrons.

Anyone who would like to work with Bruce on the Library Telescope Program can contact him at 503-869-2262 or nebenb@gmail.com.

Friends Night at the Oliver Observing Station 2019

In recent years we have scheduled Friends’ Night to coincide with the Perseid meteor shower in mid-August, but the Moon spoils the shower so completely this year that we decided to do something different. On September 28, the Moon is new, and we thought it would be fun to observe deep-sky objects such as clusters, nebulae, and galaxies with no moonlight to spoil the view.

Some of the larger galaxies such as M31 in Andromeda and M33 in Triangulum are well-placed for observation, and some of the larger telescopes may be able to spot faint galaxies such as Stephan’s Quintet. Lots of globular clusters will be available, and die-hard Solar System enthusiasts can enjoy Jupiter and Saturn.

Late September and early October often bring the best conditions of the year. Let’s hope for some great viewing.
Planets

Mercury will be visible in the western evening sky in June. It will be aligned with the Sun (and thus impossible to see) on 21 July. It will be a morning object during most of August. Thereafter it will not be observable until mid-September.

Venus will be visible very low in the morning sky at the start of the quarter. Then it will be lost in the Sun’s glare until mid-September, when it may be seen in the evening sky.

Mars is visible with some difficulty in the evening sky in June. Thereafter, it will be hidden in the glare of the Sun.

Jupiter is easily visible throughout the period. It reached opposition on 10 June, rising at sunset and visible the entire night. It will pass about two degrees south of the Moon on 13 July, 9 August, and 6 September.

Saturn, like Jupiter, will be easily observed this season. It reaches opposition on 9 July. On 16 July, 12 August, and 8 September, it will pass very close (.02-.04 degree) to the Moon. On those occasions, Saturn will actually be occulted by the Moon, but those events will not be visible from the Central Coast.

Uranus at the start of the quarter may be seen in the morning sky. By September, it will rise before midnight as it heads for opposition in late October.

Neptune will rise earlier and earlier throughout the quarter and reach opposition on 10 September.

Meteor Showers

The best meteor shower of late summer, the Perseids, will be washed out by a nearly-full Moon. That leaves the southern delta-Aquariids, peaking on 29 July with a possible ZHR of 20, but visible for several weeks during July and August (this time of year is always fairly good for meteors from a variety of showers).

Comets

I am not aware of any bright comets expected to grace our skies this quarter. Seiichi Yoshida’s Homepage is a good place to get finding charts and check on cometary developments: www.aerith.net.

Eclipses

No eclipses will be visible from the Central Coast during this quarter. There will be a total solar eclipse on 2 July, but it will be visible only from the South Pacific and southern South America.

Interplanetary Dust

The zodiacal light is a faint glow near the ecliptic produced by sunlight reflected by the cloud of interplanetary dust found in the inner Solar System. It is best seen in the half hour prior to morning twilight, when it is sometimes called the “false dawn,” and the half hour following evening twilight. At our latitude, the best time for morning zodiacal light is in late September (evening zodiacal light is seen in March).

To me, the zodiacal light looks like nothing so much as skyglow from a town or small city. Indeed, the first time I saw it (from the mountains north of Los Angeles), I said to myself, “What on Earth is going on in Santa Barbara?” After a few minutes’ reflection, I decided that nothing much was going on there, as usual, and that I was seeing zodiacal light.

There is a brighter “knot” in the zodiacal light called the gegenschein (German for “counterglow”) that is found at the antisolar point, the point in the sky directly opposite the Sun. When the Sun is above the horizon, it is easy to determine where the antisolar point is: with your back to the Sun, look at the ground. The shadow of your head indicates the direction in which the antisolar point lies. Of course, you are looking at the ground, not the sky, so you must imagine that if you could somehow look through the Earth, you would see the antisolar point. Obviously, if the Sun is above the horizon, though, that would do you no good, since the gegenschein would be quite invisible.

Another way of identifying the antisolar point is to look at the full Moon, but that won’t show you the gegenschein either. There are a couple of methods of finding the anisolar point when it is dark out, fortunately, and I’m hoping to explain them in the next issue. The Fall issue of the Newsletter will be published, not coincidentally, during the time of the year best for seeing the gegenschein: the antisolar point at night will then be near the zenith, where the sky is darkest.
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I would like to become a Friend of MIRA and receive the quarterly MIRA Newsletter.

Enclosed is my membership donation of $_____________

In addition, I am making a special contribution of

- $2500 Associates Circle
- $1000 Associate
- $500 Patron
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