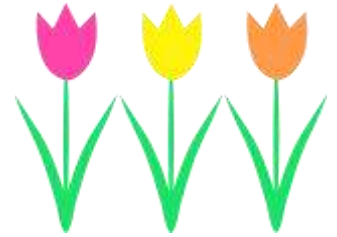


Cigar Box Bulletin



Darkness in Distress

J. Kelly Beatty

Senior Editor, *Sky & Telescope*

Reporter: Bill Beebee



Mr. Beatty talked to us about the adverse night-time effects of man-made light and how to deal with them. He is an award-winning expert at communicating astronomy issues to the average person, with efforts going back to 1974. He has appeared on National Public Radio and The Weather Channel. As part of his background for today's presentation, he has a decade-long experience on the Board of Directors of the International Dark-Sky Association. He also grew up on a farm, far from city lights in rural CA, and learned early to appreciate dark skies. (Reporter Comment: Once on I-8 on a clear, dark night near Yuma, AZ, I pulled off, shut off the car, and saw The Milky Way laid out above me in all its glory.

If the stars could have talked, they would have screamed: "We are here all the time but you never see us!")

Kelly's discussion of adverse night-time lighting problems is summarized in one of his slides, which lists:

Loss of the starry sky due to Sky Glow; Visual Impairment due to local light glare, etc.; Environmental Consequences; Human Health Consequences; Energy Waste in creating the light.

Let us take each one of these issues, in turn, and to understand the problems and possible solutions.

As for creating *Sky Glow*, much light is not harmful at all. For light going straight up, most of that, called Up-

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May Meeting Minutes Ship's Bell Rang at 10:00 AM

Reporter: Bill Tafuri

Chris Hammer called the meeting to order and asked that cell phones be silenced. He then led members in the Pledge of Allegiance followed by the singing of The Star Spangled Banner, accompanied by **Ken Watson** at the piano.

Nick Veeder noted that there were no new members at the meeting and proceeded to announce that there is one guest at the meet-

ing who is sponsored by Jim Latimer. Jim introduced his long-time friend and former resident of Sudbury, William Buckley. He has been married for 50 years, has two children and one eleven-year-old grandson. He is now retired and resides on the Cape in Wellfleet where he enjoys boating. He is a mechanical engineer, served in the Peace Corps in Peru, and has since worked in a number of companies in this area.

Continued on Page 5

UPCOMING
MEETINGS

Friday, June 14

No July Meeting

Thursday, August 15

Speaker — Continued

light, is harmless. Uplight goes from straight up, down to 90 deg below vertical, and does not contribute to sky glow. On the other hand, the worst light, Glare, happens at angles between from 90+ (just below horizontal) to about 110 deg below vertical. (Since the atmosphere and particle pollutants in it scatter Glare, it can appear as sky glow many miles away from the source.) Below Glare, Useful Light (the reason for installing the light fixture) is also harmless to sky glow; it falls nearly straight down, at angles 120 - 180 deg below vertical.

During the Great Northeast Blackout of 8-15-03, some large cities like Toronto, Canada, had little illumination; so little sky glow occurred there that The Milky Way could be clearly seen in the suburbs. Under normal conditions, manmade light illuminates the US, strongly, east of a longitude line roughly from the southern point of Texas to the northwest corner of Minnesota. West of that roughly-98 deg west longitude line, there is little manmade light until you reach the Pacific Coast. Inland exceptions are the Las Vegas and Denver areas.

Some National Parks are relative "light free zones". Examples are the Natural Bridges National Monument in Utah and Yosemite National Park in CA. The latter Park has achieved darkness by installing street and area lights on short poles with careful shading to direct the light to the local ground area. Sadly, other Parks have sky glow due to local cities. The Mojave National Preserve is "lit" by Las Vegas, about 50 miles away. Acadia National Park has a small amount of light coming from the local town of Bar Harbor, although they are trying to keep down their nighttime illumination. The light situation of the Park, itself, has improved with the introduction of new lighting. (The Park cost savings is discussed, below.). The International Dark-Sky Association (darksky.org) has identified Dark-Sky Places in the US. About 15 areas are west of the above 98 deg west longitude line but only 9 areas are east of that line.

As for the *Visual Impairment* issue, glare may be caused by the property owner's lights but it may also be caused by a neighbor's lights, called "trespass". In both cases, illuminating a property by a single bright light can make surveillance near the light impossible because of glare. Kelly says, simply, "you don't want to see the bulb". It is much more effective to have several shaded lights, each one covering a limited area. And this improvement also reduces your contribution to sky glow. *Reporter Comment: In the*

case of trespass, it may be possible to put a shade on your property to block the neighbor's light path into a particular window that you like to look through.

The *Environmental Consequences* of light pollution are seen in effects on animals and air pollution. Nocturnal creature activities are affected, including mating, eating, and travelling to safe locations. Migratory birds travel at night and depend on moonlight for their navigation. They use it for sensing their flight direction. When they come to well-lit city areas the moonlight on the ground is obscured by surface lighting. The birds' direction sense is impaired and they go off course. A large, tall, and well-lit building can serve as a "pivot point" that the birds circle, to exhaustion, instead of staying on their proper route. It is thought that between 10 - 40 million bird deaths are partly-caused by artificial light in the US. As for air pollution, research indicates that surface lighting can progress the chemical changes in the pollution gasses when normally those changes only happen in daytime.

In the sea turtle life cycle, the females lay their eggs in the beach sand near the water. When the eggs hatch, the baby turtles head towards the water for safety. They guide themselves to the water with the moon reflections off the waves. If there are manmade lights on land near the beach, they head towards those lights, miss getting into the water, and are killed by predators on the shore.

Human Health Consequences concern the body's levels of melatonin in blood plasma. Such melatonin prevents human cancers, such as is found in the prostate for men and the breasts for women. A sensor in the eye tells the pineal gland to produce melatonin when we sleep or are in darkness. The normal melatonin level at night is about 4x as high as it is during the day. When we are awake at night, the level is only 2x as high. Shift work appears to be part of the problem. As human beings, we are intended to sleep, not work, at night. If we have to temporarily get up at night, the melatonin level is helped by using night lights that produce red-colored light (which does not affect the pineal gland). As noted below, the most harmful light is of the opposite color, the blue-white tint nearing the ultraviolet end of the spectrum.

As for the final topic, *Energy Waste*, the overall situation has improved due to the new types of light sources available today. As an example, looking at the Providence-Worcester-Boston area, 15 KW-hour of electricity was

Minutes—Continued

Chris called for travelers reports and **Nick** called on **Dick Testa** to tell about his recent trip to Sarasota, FL, and Burbank, CA. Dick reported that he and his wife went to Sarasota for two months their van-RV, as they have done in the past. This time, however, after the two months in Sarasota they drove to Burbank to visit their son for a few days. On their way through Houston, Texas they came across an overwhelming dark cloud that was coming from an oil tank farm fire and enveloped the city. They were surprised to find that the locals apparently accepted it as "just another bad day in Texas". Later, they went on to West Texas, New Mexico, and Arizona where they came across much of the desert in bloom, with blue bells, yellow flowers, and orange poppies which was unusual. **Nick** then called on **Bill Ely** to report on his trip to Jupiter, FL. Bill reported that he and his wife enjoy spending some of the Winter in FL; however, he recommended that you should not go there in February as it was cold. He recommended waiting until late March and April for the warm weather in Florida.

Chris thanked the following members for their contributions to the meeting:

Coffee – Sandy Grace
 Refreshments - Donuts from Stop 'n Shop, Thank you – John Iberg
 Badges – John Niggel
 Facilities – Mike Sheff, Jim Latimer, Fred Jungalwala
 Reporting on the Minutes - Bill Tafuri
 Reporting on the Speaker - Bill Beebee
 Bulletin – Bob Diefenbacher, Koby Kobayashi, Stan Wulf
 Sound Equipment – Ron Riggert
 Handling the microphone - Nick Veeder
 Slide Show – Richard B. Smith
 Website – Ken Mattes, Richard B. Smith, John McKinney, Bill Thompson, Bob Diefenbacher, Al Persson
 Photographer - Art Phipps
 Members Support Help Line – Al Persson

Announcements:

Chris announced that there will be no RMA meeting in

Continued on Page 6

The Cigar Box Bulletin

P. O. Box 261

Wayland, MA 01778

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*Published monthly by the Retired
Men's Association of Weston,
 Wayland, Sudbury and
 surrounding communities.*

Let's Get Acquainted—Bruce Porter



Bruce was born in 1951 and grew up in Baldwin, L.I. N.Y., a suburban/urban town 30 miles from Manhattan. It was as a child on L.I., that he developed a love of sports. Every waking minute he was playing a sport, whether it was baseball, basketball, or soccer. He joined the track team and competed in the long jump and 100 yd. dash.

In high school he became interested in the teachings of Ralph Waldo Emerson and Henry David Thoreau and integrated their teachings into his being. He also gained an appreciation for the lessons on life that physics taught him that go well beyond the technical training. The likes of Newton, Einstein, and many others taught him how to think and how to be a truth seeker.

Growing up on Long Island meant he spent a lot of time at the beach. While his childhood home was considered a suburb, anywhere else it would be called a city. As such it offered little opportunity for the outdoors. His first encounter with a forest at age 5 on a family trip to the Catskills prompted him to ask his father who planted all those trees. You see, the only trees he ever saw in his whole life were those the county planted to beautify the residential streets.

Bruce graduated from Oceanside High School in 1969. He then packed his sports paraphernalia and clothes and headed off to Stony Brook University, where he earned a B.S. in physics. With the peace movement on campus in full swing, times were right to do a full implementation of the Emerson/Thoreau way of life that appealed to him. He earned an M.S.E.E. degree in Electro-optics from Northeastern University. This education laid the groundwork for a career as an Optical Physicist.

As is true for many who work in technical fields, he needed to re-invent himself to stay employed. He spent his first 10 years as a research scientist in Ultrasonics at the now out-of-business Foxboro Company. He spent his next 10 years with MIT Draper Laboratory. While there he worked on navigation systems using laser light circulating in a ring made of optical fiber. He was awarded two patents and he wrote a number of peer-reviewed articles.

He caught the dot-com boom while working at Corning. While there, he worked on the design and the manufacturability of wavelength division multiplexers (WDM's), which are optical gadgets that turn a 1 MB/sec fiber optic connection into a 1000 MB/sec connection. It is the overproduction of WDM's and related assemblies that caused the dot-com boom to go bust... That overproduction is also why internet use has grown at a phenomenal rate over the last decade.

For his last 12 years he worked for the Waters Corporation, where he was responsible for maintaining production. Waters manufactures opti-

cal instruments that make sure a drug has the correct potency and chemistry. Waters, like many companies, began off-shoring production of their products. Mindful of the potential impact off-shoring could have on his career, Bruce stepped into a new role training the engineers of the off-shore companies in production support, and getting the new lines into full production quickly. This new role did offer him the chance to visit Japan, Singapore, and Ireland. He retired in 2015.

He has two sons, Warren and Jason, who he raised as an almost full-time single parent. Warren is educated in meteorology at the U. of Maryland and is now an atmospheric scientist at NOAA (National Weather Service) managing the data streams from numerous weather satellites. Jason is just starting his career as a biomedical engineer at Massachusetts General Hospital after recently graduating from Boston University. Bruce is joined by his wife/their stepmother, AnnMarie, who enjoys the great outdoors as well.

Bruce has three brothers. Two live close to his childhood home on Long Island and a third lives in NJ. His parents, now deceased, are Brooklyn-ites. Bruce's grandfather was a lighthouse keeper on Dutch Island in Narragansett Bay, and his father lived his pre-school years at the lighthouse. His father's family can trace their ancestry back to the original Dutch inhabitants of New Amsterdam.

Bruce's love of sports and the outdoors propelled him to get involved in squash, riding bicycle centuries (100 miles), playing softball competitively, sailing, skiing, and hiking. His recent climb up Tucks (Tuckerman's Ravine) to the cone of Mt. Washington is an example. An interest in traveling goes hand-in-hand with his interest in geography and map collecting. While he did run a marathon, he found bike riding to be far less stressful on the muscles and skeleton and soon abandoned long distance running.

Bruce moved to Sudbury in 1987 and has lived here ever since except for 3 years starting in 1995. He lived in three houses in town. has played softball in the town league, basketball at a rented gym, and went sailing.

With retirement he has been able to pursue a number of interests not possible when he was working. He volunteers as a Science Olympiad coach at the Curtis Middle School. He is a sailing instructor at the MIT Sailing Pavilion. In a volunteer role at the Senior Center, he helps others get small home repairs completed.

He is currently a member of the Sudbury Conservation Commission. As a result of his interest in the outdoors he became involved in a number of conservation movements and is now a conservationist. Through conservationism he became curious about how the giant glacier that covered this area 10,000 years ago sculpted the many hills

Speaker—Continued

shown to be wasted in Uplight in the year 1997. That was \$25 million at 2015 utility rates. (By the way, Chicago is much worse than we are.). However, today, there is a multiple in energy efficiency using Light-Emitting Diodes (LEDs). The old incandescent bulbs were very inefficient, and the mercury vapor, fluorescent, and metal halide lights were much better. But, the modern LEDs have outstripped all of the above in lowering energy use, improving performance by 10:1 compared to incandescent. (The new Acadia National Park lights cost \$34 K but the 5-year electricity savings is \$2.4 million.). An added bonus is that LEDs are long-lasting. Today, LEDs are everywhere - in flashlights, car headlights, street lights, etc.

The problem with LEDs is what is known as their "color temperature". In essence, blue light is associated with higher source temperature while red light comes from cooler sources. Blue light from typical LEDs has about 6000 deg K temperature. Healthy light has a temperature of half this, about 3000 deg K, or lower. The latter light is more yellow/red, associated in the past with incandescent light bulbs, and has a "warmer" feel to it. An example of color relating to temperature is comparing the flame from a gas stove to the flame of a candle. The stove flame is blue and very hot, but the candle flame is yellow and much cooler.

The color temperature interacts with eye sensitivity to cause more or less melatonin to be created. (The importance of melatonin to resist cancer is discussed above.) The eye has two types of light sensors - rods and cones. The rods sense light vs. darkness and are more sensitive to the blue light of near-darkness. The cones sense daytime color variations and are more sensitive to the yellow/red daylight. At night, we see with the rods and that is why, for example, the new blue-tinted car headlights are so irritating to look at. The blue-sensitive rods at night react to blue light and shut down the melatonin production. This is the problem with 6000 deg K blue light. The warmer, 3000 deg K light allows the daylight cones to wake up and restarts the melatonin. The conclusion? Use 3000 deg K yellow/red lights at night. (Reporter Comment: Although most common LEDs seem to have blue-white light, I have seen red and yellow LEDs for sale. The lights make the latter colors naturally, without needing any colored shades.)

Today, Boston-area towns are beginning to use healthy, 3000 deg K (or lower), and directed outdoor / street lighting. This is following the American Medical Association recommendation as of June 2016. If you shop for LED lights at retail outlets, you will see the light rated at watts used, lumens light power delivered, and light temperature in deg K. Governments and individuals are beginning to adopt the fundamentals of good lighting: *light when you need it, where you need it, and in just the amount necessary.*

The MA Legislature currently is considering the same lighting bill, in the Senate as S. 1937 and the House as H. 2858. The bill calls for:

1. The full shielding of all new or replacement lighting on all state and municipal properties.
2. Light temperatures of 3000 deg K or less.
3. MA DOT follow best lighting practices, including eliminating high-pole light standards at cloverleaves.
4. DPU adopt low-power-responsive fee structures for their electricity customers.

Kelly Beatty can be reached at www.kbeatty@darksky.org and he gives these organizational contacts:

International Dark-Sky Association: darksky.org

New England Light Pollution Advisory Group:
nelpag.org

Illuminating Engineering Society: iesna.org

**Note that there will be NO RMA meeting in July 2019
due to a church camp using all the facilities at that time.**

Minutes—Continued

July as the church is running a children's camp program.

Chris put up a list of the members who still have not had their picture taken (about 30 members) and reminded them to see Art Phipps to have their picture taken.

Bob Malnati announced that the annual RMA dinner will (again) be at the Marlborough Country Club on October 16th at 5:00 PM. Ken Watson and Bill Ladoulis will be providing music for the evening. Sign-up sheets were passed out at the meeting and members can also sign-up on the web site (emails will be sent out explaining this process which will include using PayPal if desired). Volunteers are needed to help with name badges and other jobs at the dinner. Tables for 4, 6, 8, or 10 can be reserved.

Chris announced that the discussion group will meet next Thursday, May 16th, at noon at Conrad's Restaurant on route 20 in Sudbury. The discussion topic will be "the high cost of secondary education".

Doc Harrel announced that the trip to the PawSox game will be on Friday, July 12th. The PawSox will be playing the Buffalo Bisons. The cost which includes the bus ride and tickets to the game is \$45 per person. Those attending will meet at the church at 4:00 PM and the bus will leave at 4:30 PM. Doc passed out sign-up sheets at the meeting.

Bill Ely announced that **Bob Lenington** has had a heart valve problem and is at home recovering after a stay in the hospital. **Frank Lyons** is in the Leonard Morse hospital in Natick.

Harold Wilkinson told several Spring-related jokes, about things rising, to the lighten day.

Jim Latimer announced the 11 member birthdays in May.

Gerry Brody announced the 3 member anniversaries in May.

Eric Lind announced that all residents of Sudbury can sign-up for Green Energy, which means that that your electricity will be partially-purchased from wind and solar sources at a slightly increased cost and that will reduce your carbon footprint.

In honor of Mother's Day, **Ken Watson** and **Bill Ladoulis** played "I Have a Dream" and "Winner Takes it All" for the enjoyment of the members present. These songs are from the musical "Mamma Mia".

Bob Malnati announced that the ROMEO lunch will be at the Aegean Restaurant on route 30 in Framingham.

Let's Get Acquainted—Continued

and valleys in Massachusetts. Therefore, he became a self-taught glacial geologist (glaciologist) and now leads walks through Gray/Haynes Meadow Reservation in Sudbury explaining how the glacier shaped many of the land features one sees there. Hundreds of people from the AMC, SVT, Boston College, town residents, and numerous middle schoolers on class trips have gone for the walk. To extend his reach he created a self-guided tour of Gray and Haynes Meadow while continuing with the very popular annual guided walk

He has become actively involved in preserving Sudbury's outdoor appeal. He has become involved in the movement to push back on Ever-source's proposal to install high power electrical cables through Sudbury. He is currently requesting the Town of Sudbury to install traffic signs advising motorists to be mindful of bicycle traffic on Sudbury roads. He continues to play squash and do centuries.

Anniversaries in May

Member	Spouse	Anniv.	Yrs.
Michael	Sheff	Marilyn	05/19/1984 35
Lou	Petrovic	Judy	05/06/1967 52
Charles	Pross	Geri	05/30/1965 54

Average Years Married—47



Birthdays in May

Member		Birthday	Age
Paul	Kudirka	05/21/1947	72
Francis	DiPace	05/06/1946	73
James	Metcalf	05/29/1945	74
Robert	Joseph	05/10/1943	76
A. Bradford	Conant	05/17/1941	78
William M.	Carleton	05/13/1940	79
Larry	Vifquain	05/14/1940	79
Robert	Allard	05/14/1937	82
Edwin E.	Larsen	05/09/1937	82
Morton L.	Brond	05/02/1935	84
David	Macklin	05/02/1930	89
Milton A.	Jones	05/10/1929	90

Average Age— 80



Watch City Steampunk Festival, May 11, Waltham



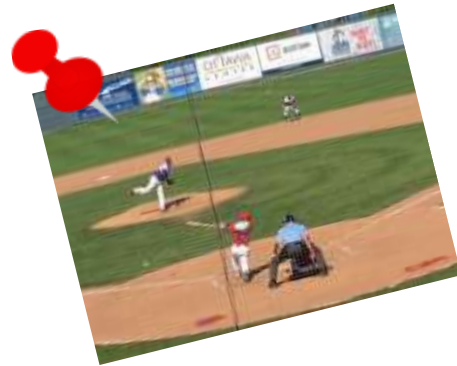
Steampunk fashion is a subgenre of the steampunk movement in science fiction. It is a mixture of the Victorian era's romantic view of science in literature and the industrialization in most parts of Europe. The aesthetics of the fashion are designed with a post-apocalyptic era in mind. At the first steampunk convention, "SalonCon", in 2006, steampunk enthusiasts dressed up in costumes reflecting that era. The costumes included clothing, hairstyling, jewelry, body modification and make-up. Steampunk fashion has later gone on to include gadgets and contrasting accoutrements.



RMA Bulletin Board

**The PawSox baseball game Friday, July 12.
The bus leaves the church at 4:30 pm**

This will be the last time RMA members will go to the game in Pawtucket, since the team is moving to Worcester. Contact Chris Hammer chammer6060@gmail.com



Reminder that there will be **No July Meeting** as the church is running a camp that month.

A Members Support Help Line. This is intended to help members or their spouses who are in need of assistance. This could include rides to meetings or helping members in other ways as needed. **Contact Al Persson at 781-235-6910.**

Reserve Your Spot Now!

The RMA Annual Dinner is Wednesday, October 16, 2019 at Marlborough Country Club. Liquid libations at 5:00 pm, followed by a delicious dinner at 6:00 pm. Musical entertainment, dancing, and a good time is promised by chair Bob Malnati.



The Burning Bush

Nearly everyone knows the story of Moses. It is the story of how the sister of the Pharaoh rescued him from the Nile River and raised him in the royal court. Moses's mother was a Hebrew slave who placed him there to avoid the Pharaoh's order to kill every newborn Hebrew male child. The Hebrews had been held in bondage by the Egyptians for four hundred years

Moses discovered his true heritage. It is reported that he killed an Egyptian taskmaster and fled Egypt to the Sinai Peninsula. He married a shepherd's daughter and lived there attending his father-in-law's flocks. After many years, Moses became one of the leaders of the Hebrew people.

According to the story, as told in the Torah, he returned to Egypt and led his people out of bondage toward the Promised Land. They wandered in the Sinai Peninsula for 40 years. During this period, they found themselves at the foot of a mountain

In accordance with Old Testament scripture, on God's instructions, Moses went up on the mountain and there received, directly from the hand of God, the Ten Commandments. Moses spoke directly to God through a burning bush that was not consumed by the fire.

Scholars dispute where this mountain is. However, in the fourth century AD a group of Coptic Christians (Egyptian) founded a small church. Christians (and later Muslims) have revered this as the Mount Sinai mentioned in the Old Testament. Mount Sinai is in the southernmost part of the Sinai Peninsula in what is part of modern Egypt.

The church was named St. Catherine's after a martyred Egyptian saint. Tradition has it that the monastery that stands there today was constructed on the site of the burning bush



A bush still grows there. It is a rare species of the rose family called *Rubus Sanctus*. It is endemic to the Sinai and has an extremely long-life. The monks at St. Catherine believe that it is the same bush that Moses saw. Legend says that it was transplanted in the tenth century to its current location within the monastery.

Over the centuries various improvements have been made to the monastery. Now it encompasses a very large area that is surrounded by granite walls 60 feet high. It not only home of a Christian church but too a Moslem mosque as well.

Today the monastery is the repository of the second-largest collection of ancient manuscripts in the world. The Vatican is the only place with more ancient manuscripts. There are 4570 manuscripts and 7000 early printed books. One of the Monks in the monastery is an American.

Since he joined he has been copying and putting all of the ancient manuscripts and books in digital form. His goal is to make them available to everyone and preserve them for eternity.

He hopes to make all the manuscripts, like The Moses's burning bush, something for everyone to see and to appreciate but not to be consumed at the same time. Too often in their zeal to reveal an ancient discovery, the finders destroy or damage the treasure.

By Al Persson



R.M.A.
Box 261
Wayland, MA 01778

First Class Mail

Next Meeting
Friday, June 14
Web site RMenA.org
E-mail info@RmenA.org



RMA Meeting: Friday, June 14, 10:00 am

Don Eyles

Author, Scientist, Space Expert



Don Eyles is known for his work on *From the Earth to the Moon* (1998), *Moon Machines* (2008) and *NASA's Unexplained Files* (2012)

He will tell the story of the years in the 1960s and 1970s when he worked at the MIT lab where the Apollo guidance system was created. His assignment was to program the lunar landing in the LM's onboard computer. He explains how it worked in accessible language. He profiles astronauts and NASA paladins and the thinkers who led the work at MIT. He describes narrow escapes not widely known. And he makes a connection between the successful space program in that era and the exploration taking place in the culture.

Don't miss this fascinating presentation!

Bring a Guest to this Meeting! **Use the "Be My Guest Card"**