



## President's Message

My favorite RAS event each year is the Annual RAS Fall Scientific Paper Session. I think that if you came and saw the research being done in your own favorite field(s) of interest, it would quickly become a favorite for you as well! It is exciting to see the research underway across so many disciplines at our local colleges and universities.

We are now less than a month from our 48th Annual Fall Scientific Paper Session. It will be hosted at the **Rochester Museum & Science Center** on Saturday, October 29, 2022, from 8:30 a.m. to 2 p.m. Presentations will be scheduled between 9:15 a.m. and 12:45 p.m. Featured presenters will be area scientists, students, and RAS members, who will share their investigations and interests about scientific topics.

### Present Your Own Work

RAS members may present a poster or talk, or new this year you may reserve a 6' display table. If you are not presenting, admission to the event is free and the Academy provides morning beverages and snacks. Please register at our website to attend.

### Have Lunch & Hear the Annual Larry King Memorial Lecture

Our caterer, Madeline's, will offer a choice of Fajita or Rice Bowl Bar buffet lunch with vegan, diced chicken & ropa beef choices. This must be reserved in advance at a cost of \$16. For details and to order, see our web page.

The Larry King Memorial Lecture is featured after lunch. As announced last month, our keynote speaker this year will be Dr. Bryan Danforth of Cornell University. He will speak on *The Extraordinary Diversity of Solitary Bees*.



Dr. Bryan Danforth

*The lecture is free to the public. I hope you will come!*

\* \* \*

## Latest NY Bee News!

*(The following material is drawn from Dr. Danforth's website.)*

A New York state survey released on August 4, supported by Cornell bee experts, finds that more than half of important native pollinators may be at risk of disappearing from the state – potentially threatening crops, wildflowers and insect diversity. Dr. Danforth's lab led the survey's identification of more than 20,000 bee specimens now housed at the Cornell University Insect Collection, one of the largest in North America, with samples dating to the 1860s.

*(Continued on p. 2)*

## RAS Scientific Paper Session Schedule

**Saturday, October 29**  
**Rochester Museum & Science Center**

For more info:

[www.rochesteracademyofscience.godaddysites.com/paper-session](http://www.rochesteracademyofscience.godaddysites.com/paper-session)

**Parking:** Free, on site.

**8:30 a.m.** Presenters sign in. Refreshments for all attendees.

**9:15 – 11:30 a.m.** Oral Presentations

**11:30 a.m. – 12:30 p.m.** Poster Session. 3rd Floor.

**12:30 p.m.** Lunch – bring your own or prepaid (\$16/person).

**1:00 p.m.** Welcome & Larry King Memorial Lecture. Bausch Auditorium.

The Museum is at 657 East Ave, Rochester, NY 14607

## VOLUNTEERS NEEDED

**We cannot put on our Paper Session without your help.**

Contact Michael Grenier at [mgrenier@frontiernet.net](mailto:mgrenier@frontiernet.net) if you can volunteer.

### Friday, October 28

Set up poster frames. Easy to assemble. 3:00p.m.- 5:00 p.m..

### Saturday, October 29

Help greeting and registration, Monitor morning refreshments, Moderate speaker sessions, Take tickets & assist at lunch, Photograph presenters, Take down up poster frames at end of day.

### Save The Date!

**Saturday, October 29, 2022**  
**RAS Scientific Paper Session**  
**Rochester Museum & Science Center**

Rochester Academy of Science  
 Larry King Memorial Lecture presented by  
 Dr. Bryan Nicholas Danforth  
 Professor, Department of Entomology,  
 College of Agriculture & Life Sciences at Cornell University



## The Extraordinary Diversity of Solitary Bees



*Colletes latitarsis* a specialist of tomatillo Image courtesy of nativebeeology.com



Public Lecture  
 ◻ Saturday, October 29, 2022 ◻  
 Rochester Museum & Science Center -  
 Bausch Auditorium  
 1:00 p.m. ◻ Free

they are extremely important pollinators of native and, in many cases, agricultural plants.

Learn much more about our bees at this year's Larry King lecture.

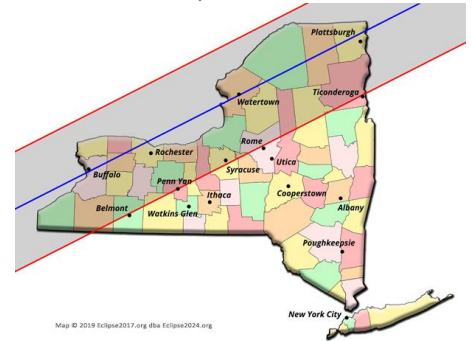
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### 2024 Eclipse Watch

On September 30th, 2022, it will be just **556** days until the total solar eclipse that should be visible from Rochester on Monday, April 8, 2024. Eclipse2024.org has a page that gives information on 75 possible viewing locations on the path of totality in the U.S. See

[https://eclipse2024.org/eclipse\\_cities/blog-posts/eclipse-viewing-information-for-locations-all-along-the-path.php](https://eclipse2024.org/eclipse_cities/blog-posts/eclipse-viewing-information-for-locations-all-along-the-path.php).

So what do they show for Rochester?



Map © 2018 Eclipse2017.org the Eclipse2024.org

Most of western NY is in the band of totality (grey on the above map). They also have a more detailed map showing that the center of totality (blue line) with the longest viewing time (fractions of a second extra) passes through Corfu, Elba, Brockport, and Hilton. Braddock Bay might be a great viewing spot!



**Michael Grenier, President RAS**

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### RAS Car Magnets



This handsome oval magnet will hold papers to your refrigerator door, of course. But affixed to the rear of your car it not only identifies you as a member of the RAS, but it also helps promote our organization. The cost is only \$3.00, and the money is a donation to our Education Outreach Fund. You can pick one up at the Paper Session October 29. They will be available at future in-person section meetings. If you need to have it sent by post, please contact Past President Jutta Dudley at [juttasd@aol.com](mailto:juttasd@aol.com).

(Continued from p.1)

The survey found that at least 38% – and as many as 60% – of the pollinators targeted by the survey are at risk because they are rare or declining. For bees, up to 24% of the species may be at risk and an additional 11% are considered possibly extirpated or known only from historical records. The survey is among the most systematic conservation status assessments of pollinators conducted by any state, according to its authors.

Bees comprise a monophyletic group of over 20,000 species worldwide. At least 416 of these bee species are in New York State. The genus *Apis*, to which the common, domesticated honeybee belongs, comprises just 8 of the 20,000 species of bees in the world. The vast majority of bees are solitary, ground or stem nesting, and do not produce honey. However,

# Events for October 2022

## **4 Tue: Fossil Section Meeting**

7:30 p.m. Meeting will be held in the community meeting room at the NEQALS building, 1030 Jackson Rd., Webster 14580. It will also be broadcast on Zoom and is open to all RAS members and guests. Speaker: Dr. Lisa Amati, the New York State Paleontologist and Curator of Invertebrate Paleontology at the New York State Museum in Albany. Topic: "New York's Finest Fossils," slide show and exhibit of actual fossil specimens from the NYS Museum collection. For meeting details and login info see the *FossilLetter* or contact Michael Grenier at [paleo@frontier.com](mailto:paleo@frontier.com).

## **5 Wed: Astronomy Board Meeting**

7:00 p.m. UR, Bausch & Lomb Hall, 4th floor Chart Room, room 408. Also Zoom meeting. ASRAS members are welcome. Contact: Mark Minarich at [mminaric@rochester.rr.com](mailto:mminaric@rochester.rr.com).

## **7 Fri: Astronomy Members Meeting**

7:30 p.m. – 10:00 p.m. RIT Carlson Center for Imaging Science, CAR-1125. Parking Lot F. Speaker: Brendan Curry, The Planetary Society, Chief of Operations – will be remote. Contact: Mark Minarich at [mminaric@rochester.rr.com](mailto:mminaric@rochester.rr.com)

## **9 Sun: Astronomy Open House**

Open House: 12:00 p.m. - 4:00 p.m. Observatory tours and work parties. Members may bring guests. Farash Center for Observational Astronomy, 8355 County Road 14 Ionia, NY 14475. For weather related cancellations or changes contact Mark Minarich at [mminaric@rochester.rr.com](mailto:mminaric@rochester.rr.com) or see [www.rochesterastronomy.org/calendar-of-events](http://www.rochesterastronomy.org/calendar-of-events).

## **12 Wed: Life Sciences - Herbarium Workshop**

1:00 p.m. – 4 p.m. The Life Sciences section will hold a workshop at the RAS Herbarium, located in the basement of the Rochester Museum and Science Center (RMSC). At RMSC go to the front desk to meet other participants. No special experience required. We encourage attendees to be fully vaccinated. If you plan to attend, please send RSVP or any inquiries to Elizabeth Pixley, herbarium curator, at [evpixley@gmail.com](mailto:evpixley@gmail.com), or call (585) 334-0977.

## **15 Sat: Anthropology Section**

International Archaeology Day celebration at the Rochester Museum and Science Center. Come join the Anthropology Section in celebrating the day with a scavenger hunt, stone tool making, crafts for the kids, and conversations with archaeologists. We will be tabling from 11:00 a.m.-3:00 p.m.

## **16 Sun: Anthropology Section**

Family Archaeology Day at the Cumming Nature Center. Come excavate at the archaeological site of Frost Town alongside the Anthropology Section. Open to all ages. For registration and more information, see <https://rmsc.org/cumming-nature-center/nature-center-programs-and-events/item/345-family-archaeology-days>.

## **19 Wed: RAS Board Meeting**

7:00 p.m. [Warner Castle](#). For details, contact Michael Grenier at [mgrenier@frontiernet.net](mailto:mgrenier@frontiernet.net).

## **21 Fri: Astronomy Public Observing**

7:30 p.m. – 11:00 p.m. Deep sky observing. Open to the public. Farash Center for Observational Astronomy, 8355 County Road 14 Ionia, NY 14475.

For weather related cancellations or changes contact Mark Minarich at [mminaric@rochester.rr.com](mailto:mminaric@rochester.rr.com).

## **22 Sat: Astronomy Member Observing**

New moon deep sky member observing, starting at dusk till last person leaves. Farash Center for Observational Astronomy, 8355 County Road 14 Ionia, NY 14475. For weather related cancellations or changes contact Mark Minarich at [mminaric@rochester.rr.com](mailto:mminaric@rochester.rr.com)

## **25: Tue Mineral Section**

7:00 p.m. Zoom virtual meeting with Canadian geologist David Joyce. He plans to tell us about collecting in the Grenville. For questions, ask Jutta Dudley at [juttasd@aol.com](mailto:juttasd@aol.com).

## **Other Events**

### **15 Sat: Telescope Q&A at RMSC**

10:30 a.m. – 2:30 p.m. Are you considering a telescope as a holiday gift? Or are you looking for help in operating a telescope you already have? Knowledgeable volunteers from the Astronomy Section, Rochester Academy of Science, will be here with various kinds of telescopes on display, ready to answer any questions and provide helpful advice about astronomy as a hobby. Come when you can, leave when you must, and feel free to bring your telescope!

### **Sat: Strassenburgh Telescope Observing**

Saturdays, weekly from 7:00 p.m. till 9:30 p.m. through December 12<sup>th</sup>, featuring Saturn and Jupiter. Be prepared to walk up 61 steps to the roof. Free. Cancelled if cloudy. Call Jim Seidewand at (585) 703-9876.

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## Featured 2021 RAS Paper Session Poster

Lucas Deland and Gabrielle Waters, SUNY Oswego.

### ***The Infection Rate of Ophryocystis Elektrosirrha Upon Danaus Plexippus In Oswego County and The Western Adirondack Park In New York State***

#### **Abstract**

Eastern monarch butterflies (*Danaus plexippus*) are a charismatic insect species famous for their long migration route from central Mexico to southern Canada. In recent years, their numbers have significantly dwindled to the point that they are under consideration by the United States Fish and Wildlife Service for listing as an endangered species under the Endangered Species Act. Though several factors may be contributing to their decline, the role of the protozoan parasite *Ophryocystis elektrosirrha* is poorly understood. In New York, the impact of *O. elektrosirrha* is unknown as there has been little data collection in this region. This ongoing study culminates six years of surveying

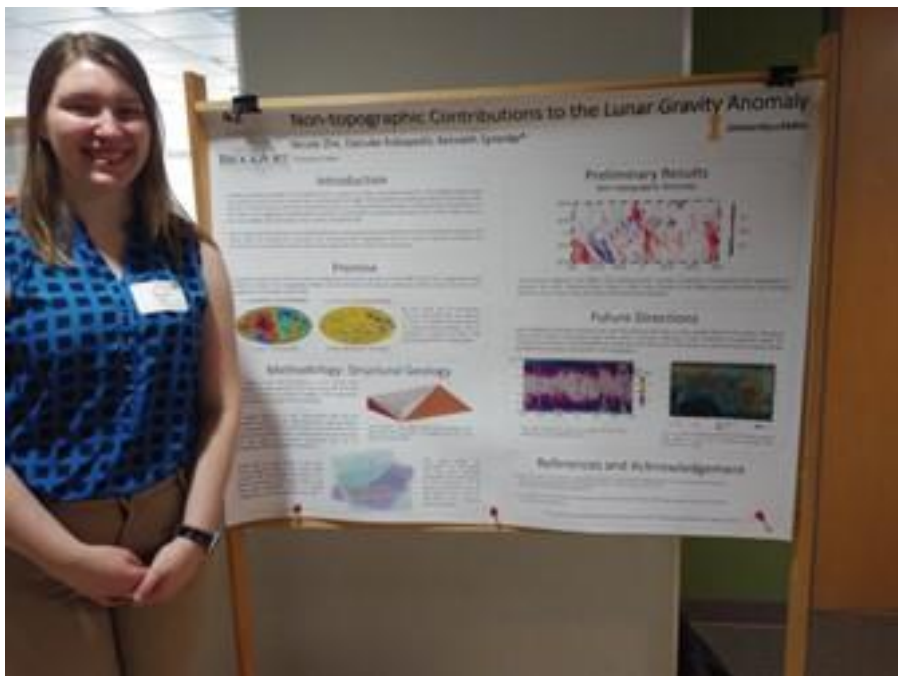


Authors Lucas Deland and Gabrielle Waters in front their poster at the 47<sup>th</sup> Annual RAS Fall Paper Session held November 6<sup>th</sup> at Nazareth College.

monarchs during the fall migration in Oswego, New York, for *O. elektrosirrha* infestation. In 2020, we began also to collect larvae and rear them to adulthood throughout the season. In 2021, an additional location was surveyed in the western Adirondacks, building a wider data set for New York. Throughout the six years of this project, we have found an average infection rate of fall migrants to be 18% as well as

infections within local larvae. This indicates some prevalence of the parasite in the local breeding population. Preliminary results from the Adirondack samples indicate a lower infection rate, around 6%. Overall, there has been a low spore count across most infected individuals at levels suggesting little impact on health and ability to migrate.

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Author Nichole Zhe in front her team's poster at the 47<sup>th</sup> Annual RAS Fall Paper Session held November 6<sup>th</sup> at Nazareth College.

## Featured 2021 RAS Paper Session Poster

Nicole Zhe, Daisuke Kobayashi (SUNY Brockport), and Kenneth Sprende (University of Idaho).

### ***Non-Topographic Contributions to the Lunar Gravity Anomaly.***

#### **Abstract**

There is a strong association between surface gravity and elevation on the Moon, suggesting the gravitational variation is dominated by anomalies associated with surface shape, such as the near side/far side dichotomy, craters, basins, and ejecta piles. Gravity anomalies not connected in any way with surface shape might better reveal, compared to regular

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Bouguer gravity maps, details of uncompensated subsurface structure not previously resolved. This study is the first to present a lunar gravity map showing only disturbances in the free air gravity field that have no correlation, positive or negative, with

topographic relief. We use data collected by the Gravity Recovery and Interior Laboratory (GRAIL). The non-topographic anomalies are located by applying a concept in structural geology. At each point on the Moon, we calculate the horizontal gradient in

the free air gravity that is normal to the elevation gradient. We then construct the anomaly map by integrating these horizontal gradients across the entire lunar surface.

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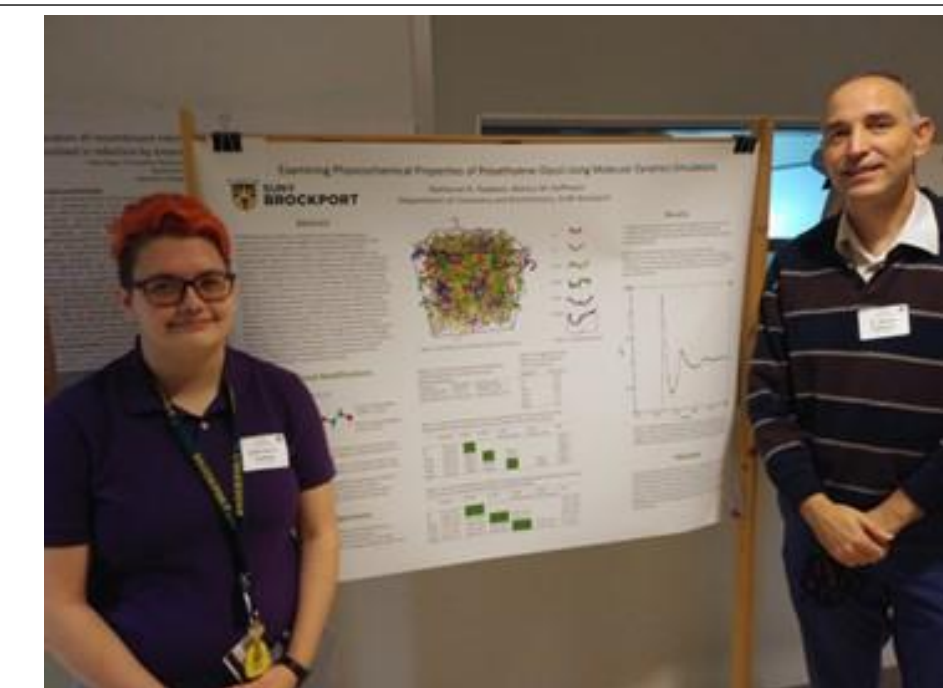
## Featured 2021 RAS Paper Session Poster

Nathaniel A. Paddock and Markus M. Hoffmann, SUNY Brockport.

### *Examining Physicochemical Properties of Polyethylene Glycol Using Molecular Dynamics Simulations.*

#### ABSTRACT

Polyethylene glycol (PEG) is a polymer mixture of ethylene glycol compounds of various chain lengths. Over the past 20 years PEGs have been researched as a green solvent in chemical synthesis. PEG is considered a green solvent because it is nontoxic, nonhazardous, and biodegradable. Optimal use of PEG as a green solvent requires a molecular level understanding that is presently lacking because PEG has largely been studied as an ingredient for products related to the health care and beauty industries. Molecular dynamics (MD) simulations were used in this study because they provide such molecular level insights. MD simulations track the movement of molecules over time that can be viewed like a movie. The molecular movements are a result of the present intermolecular



Authors Nathaniel A. Paddock and Markus M. Hoffman in front their poster at the 47<sup>th</sup> Annual RAS Fall Paper Session held November 6<sup>th</sup> at Nazareth College

interactions that are modeled by specified parameters called the force field. Physical properties such as density and viscosity obtained from MD simulations were compared to available measurement values to test and improve the force field parameters. The MD simulations were also used to investigate molecular level properties that are not easily obtained by experimental laboratory

methods such as average structural configurations. We will provide MD simulation results on PEG200, which has an average molar weight of 200 g/mol. These results are new because MD simulations on PEG have to date only been reported in the literature for aqueous solutions. Details on the methodologies we developed for the MD simulation runs and their analysis will be included.

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## ASRAS Monitors Recent Solar Flares and CME's.

The sun has been quite active recently and ASRAS's own Solar Observatory at the Farash Center for Observational Astronomy has been busy imaging. Here is a sampling of recent activity. More info can be found at <https://www.spaceweatherlive.com> and [NCEI](https://www.ncei.noaa.gov).

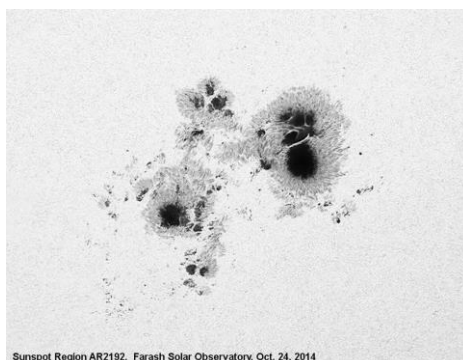


Figure 1. Courtesy: Bob McGovern

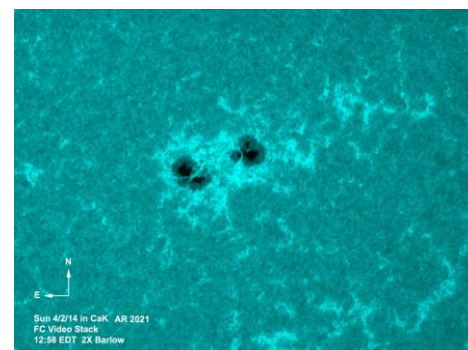


Figure 2. Courtesy Bob McGovern

(Continued on p.8)



## Featured Article

### *Blade Patterns Intrinsic to Steel Edged Weapons, Part 3*

Lee A. Jones, M.D., retired  
Pathologist, Syracuse, New York.

[Editor's Note: This article is a continuation of the featured article from the March and May 2022 RAS Bulletins.

Dr. Jones has had a lifelong scientific passion about historical swords. He is co-author of the text **Swords of the Viking Age** (© Lee A. Jones, Ewart Oakeshott, and Ian G. Peirce, Boydell Press, 2002), as well as host of the *Mediæval Sword Resource Site*:

<http://www.vikingsword.com>. His materials are used in college anthropology courses, and he analyzes the swords of his own rather large and broad collection using X-Ray Spectroscopy to discover what that methodology can reveal. The result of that project is the subject of a future paper. This article is a reprint from [his text](#), can be found on [his website](#).]

### Pattern Welding

#### (Mechanical twist-core Damascus)

Occasionally a component rod may have been twisted in a Celtic blade and this may also be occasionally seen in Roman iron artifacts. As the Roman Iron Age gave way to the Migration Period and subsequent Viking Age (5th through 10th centuries), swordsmiths manipulated the piled blade structures to create striking decorative effects. The twisted rod technique by which this pattern has been achieved is called 'pattern-welding'. Essentially all of the patterns identified in these weapons may be built up from rods composed of several, frequently seven, alternating layers of varyingly dissimilar irons (varying depending upon trace elements inherent in the cores of origin) welded together. Depending upon the ultimate pattern

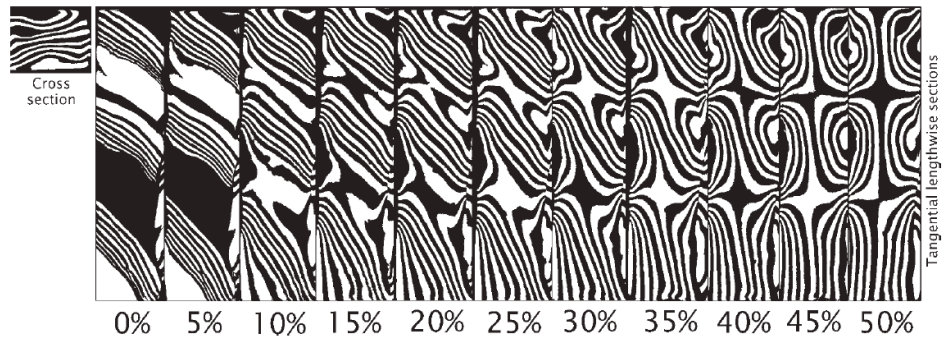


Figure 1: Patterns disclosed by successively grinding a facet along the length of a twisted rod demonstrated in a clay model of a rod composed of sixteen alternating layers. The rod has been mildly squared and joined alongside another rod, shown only focally at the edge. The rod was then progressively ground and photographed at each interval, reduced in overall thickness by the percentage shown in the scale. Further leveling of the rod will reverse this trend, as a mirror image of these patterns.

desired, these rods would then be twisted either to the left or right or allowed to remain straight along the length the rod. Rods with matching or complementary twist patterns were ultimately installed side-by-side into the sword blade. Grinding away the outer surfaces of such rods discloses a predictable evolution of patterns which may be further varied by flattening of the rod before it becomes welded to its neighbors in the fabrication of the central portion of a sword from several such rods.

Many authors have concluded that twisting of rods may have excluded additional slag, allowed a higher carbon content throughout (when the rods were carburized) and distributed strength and weakness throughout a blade in a manner analogous to modern plywood. Earlier blades may

well have a cross section supporting this interpretation, however an evolution seen in later pattern-welded blades towards a thin veneer of pattern welding over a more homogeneous iron core suggests that, while pattern-welding evolved as a consequence of the piled structure seen in the Celtic sword, in the end it was a purely a decorative technique. Use of the process largely vanishes from western European blades beyond the 11th century. A resurgence came about in the 19th Century as European gun barrel makers began to create complex designs from arrays of tiny component rods for so called 'Damascus' barrels. Smokeless powder put an end to that fashion, but the tradition has been maintained by several modern bladesmiths. Nickel

(Continued on p. 7)



Figure 2: A yataghan, probably 18th century, characteristic of Turkey and the areas within the influence of the Ottoman Empire. In addition to laminated (layered) steel on its edge and back, the blade shows three bands of twist core patterned steel running the length of the blade. This pattern, created from a twisted rod incorporated into the blade for each band, repeats itself along each band with slight changes as curved patterns merge into a zone where the appearance is more that of diagonal lines.

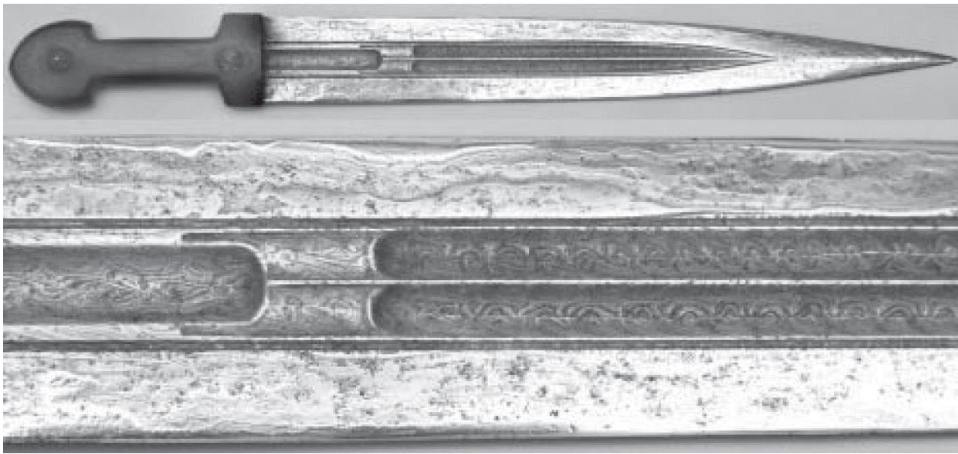


Figure 3: Caucasian kindjal (or Persian qama or quaddara), 18th to 19th century. Like the yataghan blade above, it has a central portion made of patterned steel with four bands into which deep fullers have been cut.

(Continued from p.6)

alloys are most commonly employed to enhance contrast in modern work. Pattern-welding may also be seen in the many blades of the last several centuries from a surprisingly great diversity of Asian cultures and areas once under Ottoman rule.

#### Iron Inlaid Inscriptions and Symbols

Twisted, stacked rods were not just employed side by side at the center of a blade, but could also be employed to form symbols and inscriptions. Modern recreations of this feature usually begin with channels being chiseled into a nearly complete blade where the inlay is to be set, followed by forging of the twisted rod that

comprises the inlay into the channel. Such inlays may be seen laid over a background of pattern-welding, however, this technique is best known for having survived to be incorporated into somewhat later blades of homogenous steel. Perhaps the most

famous application is that of the +ULFBERHT+ inscriptions (usually opposite a geometric lattice on the opposite face). Many authors have interpreted this as a Frankish name and the early appearance of a 'trademark.' If so, the mark was widely counterfeited, based upon numerous variations in spelling. One group, inscribed +ULFBERHT+, is associated with superior high carbon steel and it has been hypothesized that this steel was imported from Asia via Viking Age trade routes.

#### Indian Chevron Patterned Blades

Perhaps the most unlikely of any multicomponent blade construction is the chevron patterned Indian blade. The bold chevrons are full-thickness alternations of material, with weld boundaries between the areas of brighter patterned metal and darker non-patterned metal. The pattern



Figure 5: Details of an Indian chevron patterned talwar, likely 19th or 20th century. Clearly made for show, but fully serviceable if the welds are well made.



Figure 4: A European sword of the mid to late Viking Age, mid 10th to early 11th century, bearing a variant of the +ULFBERHT+ inscription on one face of the forte and a geometric pattern on the opposite face. The inlay is composed of twisted rods made from stacked steels of varying composition likely forged into grooves in the face of the blade and then dressed flat. Though contemporary with the Vikings, the brazil nut pommel suggests mounting nearer the origin of the blade, speculated to have been in what is now Germany. The steel surrounding the inscription has been brightened by polishing to increase contrast.

seen in the brighter areas is developed from a blade surface very nearly parallel to the planes of layered contrasting alloys, with minor variations in forging of less than a millimeter causing a bold random surface pattern. Such a construction would predispose to failure if any of the many welds between chevrons are defective. Two swords of similar construction are illustrated in Figel (1991), p. 104 – 107 and a dagger of similar construction is illustrated in Sachse (1994), p. 98.

#### References:

<http://www.vikingsword.com/ethsword/erefs.html>.

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## ROCHESTER AREA RESEARCH IN REVIEW

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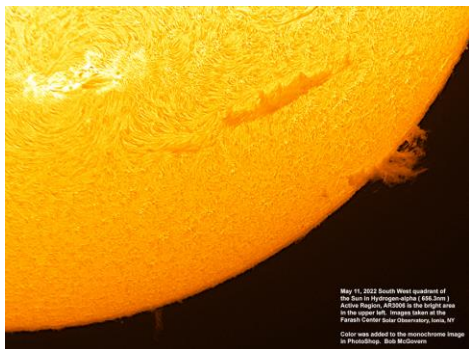


Figure 3. Bob McGovern

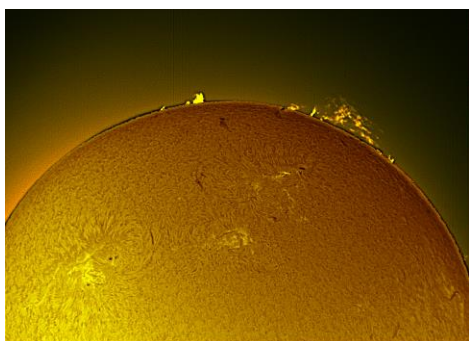


Figure 4. Douglas Kostyk, September 17<sup>th</sup>, 2022

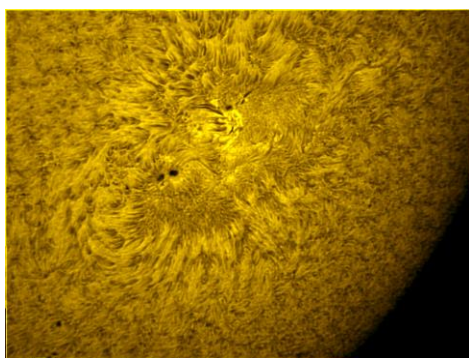


Figure 5. Douglas Kostyk, September 17<sup>th</sup>, 2022

[September 26, 2022, University at Buffalo, Often overlooked, molecules called glycans regulate COVID-19 spike protein function, study finds.](#)

[September 26, 2022, Cornell University, Layering, not liquid: Astronomers explain Mars' watery reflections.](#)

[September 23, 2022, Intestinal fortitude: Gut coils hold secrets of organ formation.](#)

[September 21, 2022, University of Rochester Medical Center, Myths busted: new studies show telemedicine is effective, doesn't reduce access to care.](#)

[September 21, 2022, Cornell University, Smart microrobots walk autonomously with electronic 'brains'](#)

[September 16, 2022, University of Rochester, Researchers go 'outside the box' to delineate major ocean currents.](#)

[September 15, 2022, Syracuse University, COVID-19 vaccination rates at NYC schools varied significantly by race/ethnicity and borough.](#)

[September 13, 2022, University of Rochester Medical Center, Mild traumatic brain injury increases risk of](#)

[behavioral and emotional problems in kids.](#)

[September 13, 2022, Syracuse University, COVID was deadlier for those with intellectual and development disabilities.](#)

[September 7, 2022, University of Rochester, What is the best way to group students? Math model: A new approach to grouping theory uses math to determine how to organize individuals to maximize learning.](#)

[August 23, 2022, Cornell University, Scientists evaluate Earth-cooling strategies with geoengineering simulations.](#)

[August 9, 2022, University of Buffalo, Do 'bouncing universes' have a beginning? Some cosmological models propose that the universe expands and contracts in infinite cycles, but new research finds a crucial flaw in the latest version of this theory.](#)

[August 4, 2022, Rochester Institute of Technology, Cosmic Evolution Early Release Science Survey: Wide view of the early universe.](#)

[August 2, 2022, University of Buffalo, Using light to restore cell function.](#)

### ABOUT THE ACADEMY

The Rochester Academy of Science, Inc. is an organization that has been promoting interest in the natural sciences since 1881, with special focus on the western New York state region. Membership is open to anyone with an interest in science. Dues are minimal for the Academy and are listed in the membership application online. Each Section also sets dues to cover Section-related publications and mailings. We are recognized as a 501(c) 3 organization.

For information, contact President Michael Grenier at (585) 671-8738 or by email [paleo@frontier.com](mailto:paleo@frontier.com).

The Academy Internet website is <http://www.rasny.org> or see us on Facebook at <https://www.facebook.com/Rochester-Academy-of-Science-792700687474549>.

This "BULLETIN" is produced monthly, except July and September, by the Rochester Academy of Science. Submissions are due by the 10th of the month and may be emailed to the editor, Theodore W. Lechman, at [Theodore.W.Lechman@gmail.com](mailto:Theodore.W.Lechman@gmail.com).

**The Academy postal address is P.O. Box 92642, Rochester NY 14692-0642.**

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