

# BULLETIN

"An organization of people interested in the Natural Sciences"



February 2025; Vol. 79, #1

## President's Message

### Best Wishes for the New Year!

There are a host of interesting astronomical phenomena to be observed, the woods are full of birds and wildlife, and our local museums are engaging. Our sections will have talks and activities. Do get out with your like-minded RAS friends and enjoy science. I met my last year's resolution to *do two RAS activities that I had not done before*. This year's resolution is to do two more. How about you? See you there.

### Nominations for RAS Board of Directors Now Open

The Nominations Committee (Tim Tatakis, Tony Golumbeck, and Dan Krisher) will present a slate of candidates for office at the February 19, 2025 Directors meeting. If you are interested in running for a position and not already on the slate endorsed by the committee, we encourage you to submit a petition signed by ten endorsing members to Helen Haller (Secretary) by February 1, per the Bylaws. Please include a brief sketch of your qualifications and desire to serve.

All officer positions (1-year term) and two directorships (3-year terms) are up for election each year. A ballot will be provided in the March RAS Bulletin, a month prior to the Annual Meeting in April, when ballots will be counted, and the results announced.

### Undergrad Student Grant Program Results Announced

Our Undergraduate Student Research Grant Review Committee recently selected fifteen students to receive research grants from the Rochester Academy of Science based on the quality of research and presentation.

To the best of my knowledge, this is far away the most we have ever awarded. This important program encourages the scientists of the future currently pursuing undergraduate degrees.

The process we use for this may be of interest to our members. Each September, we send our Request for Proposals to the sciences faculty at the colleges and universities throughout Upstate NY. Undergraduate students prepare their applications with some guidance from advisors but must do all the writing themselves. All submissions had to be in to us by December 19. Then our Student Grants Awards Committee swung into action.

We have four reviewers on the committee. These are Michael Richmond, Karen Wolf, Geoff Lippa, and Zachary Murphy. Thank you to each of them for their diligence in completing this and representing the RAS to the students and schools.

All student proposals had identifying information stripped out by a member who had no part in the scoring or selection. The reviewers did not know who the student or advisor was, nor ethnicity nor sex, not even what school they attended. Further, reviewers recused themselves if they recognized the project.

Every proposal was scored by each reviewer, then the scores were combined and ranked. The reviewers reconsidered the results and came to concurrence. Award amounts were proposed, adjusted, and agreed upon. I believe that our reviewers have done an outstanding job with this difficult task.

If you think you would enjoy doing this, please contact Michael Grenier at [mgrenier@frontiernet.net](mailto:mgrenier@frontiernet.net).

The money awarded principally comes from three endowments: the Katherine H. Jensen Memorial Research Grant Fund, the Thomas F. & Annie A. and Grace Murray Memorial Research Grant Funds, and the Student Grants Endowment Fund. Thanks to the generosity of the Life Sciences Section and other members who made generous donations, we were able to make six additional awards.

These grants are intended to help undergraduate students to purchase expendable materials for use in their projects and for travel expenses to collect data but not for laboratory equipment.

The most highly rated proposal is given the *Dr. William L. Hallahan Award for Excellence in Grant Proposal Writing*, named in honor of our long serving but now retired Corporate Treasurer and chairman of the Student Grants Committee. In addition to a fully funded grant of up to \$750, the student also gets an unrestricted stipend of \$50 to be used as seen fit. Congratulations to this year's winner, Eva Reilly at Rochester Institute of Technology. The full list of winners and their projects follows inside.



**Michael Grenier, President RAS**

## Announcement of the 2024-2025 Undergraduate Student Research Grant Awards:

Our mission was to review all submitted applications, grade them on the quality of the request writing, and to award significant grants. The maximum amount of any grant is \$750. Last year the RAS Grants Committee awarded a total of \$4,762 to nine applicants. This year \$5,750 was awarded for fifteen research projects.

First place: **Eva Reilly**, *Transformation and Expression of Diadenosine Polyphosphatases from Mycobacterium leprae*, Award: \$750 plus \$50 unrestricted to the student. Sponsor: Dr. Suzanne O'Handley.

**Emma Lenchenkova**, *Family History of Alzheimer's Disease and Biobehavioral Responses in Young Adults*, Award: \$600. Sponsor: Dr. Elena Fedorovskaya. This award includes the Life Sciences Section Merit Award.

**Emma Thompson**, *Influence of Rising Temperatures and Infection on Salamander Microbial Composition*, Award: \$600. Sponsor: Dr. Elle Barnes.

**Delila MacLeod**, *Characterization of the Nudix Diadenosine Polyphosphatases from Mycobacterium tuberculosis*, Award: \$600. Sponsor: Dr. Suzanne O'Handley.

**Mia Kushner**, *Bacterial Extracellular Vesicles as a Diagnostic Tool for Sepsis*, Award: \$500. Sponsor: Dr. Lea Vacca Michel.

**Catherine Cullinane**, *Phenotypic Studies of a Phosphoglycolate Phosphatase in Staphylococcus aureus*, Award: \$500. Sponsor: Dr. Suzanne O'Handley.

**Nguyen Minh Khoi Tran**, *Photochemistry of Tetrabromopyrrole in water*, Award: \$300. Sponsor: Dr. Nicholas Pflug.

**Gail M. Hooke**, *Polybutylene Succinate Copolyesters with Tunable Biodegradability*, Award: \$300. Sponsor: Dr. Massoud J. Miri.

**Alex Szczepankiewicz**, *Haloperoxidase Biomimicry Toward the Generation of Electrophilic Species Utilizing Xerogel-Based Transition Metal Catalysts*, Award: \$250. Sponsor: Dr. Corey A. Damon.

**Jaclyn Conley**, *Targeted Bacteriochlorin Dyes for Photodynamic Therapy of Breast Cancer*, Award: \$250. Sponsor: Dr. Hans Schmitthenner.

**Alana Modugno**, *Benthic Diatom Community Dynamics in Seneca-Keuka Lake Watershed*, Award: \$250. Sponsor: Gylla Macgregor.

**Gabriella Redman**, *Dual Modal Targeted Probes for Fluorescent Imaging & Photodynamic Therapy of Breast Cancer*, Award: \$200. Sponsor: Dr. Hans Schmitthenner.

**David Lusignan**, *Ammonia Capture and Storage Using Dendrimer-Impregnated Metal-Organic Frameworks*, Award: \$200. Sponsor: Dr. Jian Liu.

**Abigail Garvey**, *Cellular Role of par-1 in the Development of the Caenorhabditis elegans Male Tail*, Award: \$200. Sponsor: Dr. Daryl Hurd.

**Clare vanLieshout**, *Impact of habitat fragmentation on the effective population size of Eastern redback salamanders, Plethodon cinereus*, Award: \$200. Sponsor: Dr. William J. Edwards.

The money for the grants this year was from the Katherine H. Jensen Memorial Research Grant Fund, the Thomas F. & Annie A. and Grace Murray Memorial Research Grant Funds, and the Student Grants Endowment Fund, with the addition of \$250 from Life Sciences Section, and \$1,000 in member donations.

# Events for February 2025

## **Feb. 4 Tues: Fossil Members Meeting**

7:00 p.m. The meeting will be held remotely via ZOOM and is open to all RAS Members and guests. Our featured speaker for our 3rd Annual Samuel Ciurca Memorial Lecture is Dr. Melanie Jane Hopkins Chair, Division of Paleontology Curator-in-Charge, American Museum of Natural History. She will discuss "Hidden in plain sight: how two species stayed one for over 150 years." She will cover the paleoecological problems when species are conflated, causing us to think their geographic and time ranges are larger than actual, and how the trilobite *Flexicalymene senaria* was recently resolved. There will also be a short talk by Dr. Derek Briggs, Professor of Earth & Planetary Sciences at Yale University and Curator at the Yale Peabody Museum of Natural History. For meeting details and login info see the March *FossilLetter* or contact Michael Grenier at [paleo@frontiernet.net](mailto:paleo@frontiernet.net).

## **Feb 5 Weds: ASRAS Board of Directors Meeting**

7:00 pm - 9:00 pm. Members welcome to attend. Contact Tony Golumbeck for details.

## **Feb 7 Fri: Astronomy Monthly Meeting**

7:30 pm - 9:30 pm  
In-person at RIT Carlson Building Room 1125 (simulcast on zoom)  
Come as early as 7 pm to socialize.  
Speaker: Anna Ho, Cornell. Topic: TBD.

## **Feb. 12 Wed: Herbarium**

12:00 p.m. - 3:00 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). We will be continuing to organize plant specimens in preparation for digitizing the collection. If you plan to attend, please send an RSVP to [rasherbarium@gmail.com](mailto:rasherbarium@gmail.com). At RMSC go to the front desk to meet other participants. For more information, contact herbarium curators, Tim Tatakis and Steven Daniel, by emailing [rasherbarium@gmail.com](mailto:rasherbarium@gmail.com).

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

7:00 p.m. – 9:00 p.m. Zoom only.  
For details, contact: Michael Grenier,  
[mgrenier@frontiernet.net](mailto:mgrenier@frontiernet.net)

## **Feb 25 TUES: Mineral Member Zoom Meeting**

7:30 p.m. – 9:00 p.m. Virtual meeting on Zoom. The gems of ancient Egypt are featured in a lecture presented by Derek Yoost. Members will receive more information in February. Contact: Jutta Dudley, [juttasd@aol.com](mailto:juttasd@aol.com).

## **STRASENBURGH OBSERVATORY:**

ASRAS will operate the telescope at the Strassenburgh Planetarium on mostly clear Saturday nights, dusk until 10:30. For more information, contact: Jim Seidewand at (585) 703-9876.

## Featured Article:

### Plato's Timaeus: Ancient Cosmology and the Intersection of Religion and Philosophy

Jennifer L. Anstey, PhD



Most of us know Plato's *Timaeus* for being one in which the myth of Atlantis is told (with greater detail in the unfinished *Critias*) and, if we encountered it in a college philosophy class, for its difficulty. Rather than a dialog format, *Timaeus* is in the form of a lecture, given by an expert astronomer named Timaeus. He chooses to talk about cosmology rather than astronomy, going into the mysteries of how the universe came to be, how it is made, what it is for, and how humans fit in the picture. A major area of difficulty is Timaeus's use of metaphors and analogies based on the educational background of his audience, in music, geometry, and astronomy. That is, he assumes that we know music theory (intervals, scales) as well as the practical business of playing a stringed instrument; surely, we know how to construct complicated geometrical objects on paper, since we know our Euclid, and to have tried to square the circle; and we are expected to be familiar with the visible planets, the plane of the ecliptic, and the celestial equator. All these approaches

are used figuratively to demonstrate a principle of correspondence, that the symmetry of the heavens can be understood to be reflected in the symmetry of our thoughts (geometry) and senses (music). As above, so below.

Timaeus's cosmology lecture is about some very basic ideas about the nature of the universe, and, since humans are at the foremost of our thought, how human nature and the original scheme of the universe are linked. One of these ideas is about time, and how extensive cycles of time can seem to repeat. The story of Atlantis (*Timaeus* sections 24e-25d) supposes a very ancient (9,000 years previous) rendition of the recent defeat of the Persians by the Greeks, as well as the Hellenic victory over Troy. Just as the myth of Atlantis draws us in today, it drew in Socrates as an eager audience, willing to focus on the theoretical stuff after the first spark of excitement. Socrates is also won over by Timaeus's demonstrating his having thought through his subject matter: most dialogs involve an assumption that Socrates has to examine and refute. Timaeus has taken care of that, he's thought about his assumptions and their opposites.

As I will be demonstrating, there are a number of parallel concepts between Timaeus and the Judeo-Christian writings. My own view is that these concepts are, if not generally human ideas, then common to the Old World civilizations. Our so-called Western civilization is based mythologically on the Hebrew scriptures, with attached Christian writings and a smattering of Greco-Roman survivals. Indeed, the cultural appropriation of the Hebrew scriptures by Christianity is sweeping and irreversible at this point, since our ancestors eliminated all but traces of the previous European pagan

mythologies and their teachings. However, if the world-wide human idea base has some merit, all is not lost; specific versions are lost indeed, but the general notions will continue to resurface, taking on the local color of new times and areas. That this idea base may have a sort of personality and be an entity of its own, with a purpose and direct involvement with humanity may not be surprising to those with the Judeo-Christian or another religious background; Timaeus assumes and describes a similar kind of divine intervention between heaven and earth as is found in the Bible. For determined non-believers, the idea of an active creator deity is simply one of the notions or givens to keep in mind in order to understand the text.

Before creation, there is only homogenous unity, what Plato calls the One, what Timaeus calls the Same (whichever way you look it's always the same thing), and what modern mystics refer to as the experience of loving union. This unity or oneness is depicted as a circle, a very common symbol for God or heaven. Creation occurs, after an initial decision by the Demiurge (the active creator god, literally, one who works for the common good) to do so. He utilizes the four ancient elements (earth, fire, air and water) to make a complete system of space-time, with its own soul (Greek psyche), spherical in shape. This cosmos, itself a kind of deity, is alive and would remain so for the extent of time. Initially, the Demiurge blended two immaterial forms of being, one from unity and one from all



possible permutations of materiality, to construct a median kind of being that included the initial unified perfection and the possibility of every kind of material expression, along the lines of harmonious proportions. The two original forms of being, unity and multiplicity, conceived of as two circles or spheres, had to be forced together into a third form, which may be visualized as a *vesica piscis*, a pointed oval, as shown in Euclid.

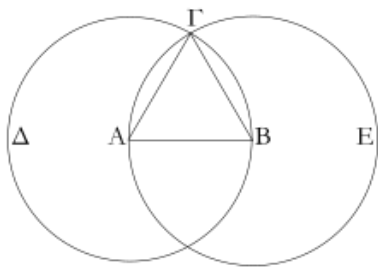


Figure 1: *vesica piscis* from Euclid. Wiki

Once the new kind of being had been synthesized and materialized (35b), the Demiurge began to divide it (35c), a process we also find in Genesis 1 and other mythologies. The delicate work continued as the Demiurge ensured proper proportions (36a-b), along the lines of musical intervals, fourths, fifths and whole tones, to ensure that the cosmos would be beautiful. Once this long line of intervals was arranged, over four octaves on a musical scale [1], the Demiurge divided it down the middle and wrapped the two strips around one another in an X shape, forming the planes of the ecliptic and the celestial equator (36c-d). Creation's soul continued invisible, just as the Demiurge is invisible,

while creation itself became visible.

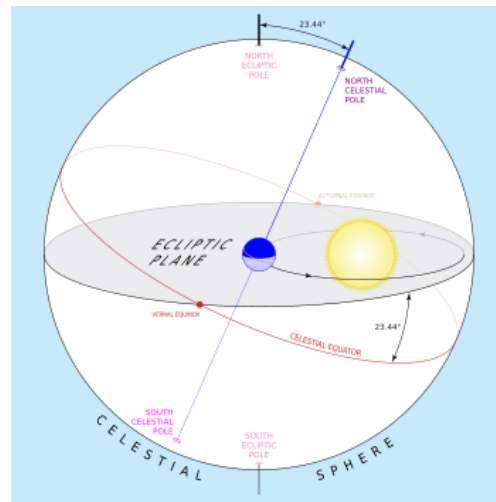


Figure 2: Ecliptic. Wiki

Having got the basics begun, the initial Demiurge stepped back and delegated the further creation and management of the cosmos to younger gods (41a-42d), who initially were inept at managing the elements or holding everything together, much less in balance. The myth of Phaethon, attempting to drive the chariot of the sun comes to mind (22c). Just so, the story of the charioteer and the unruly horses, in Plato's *Phaedrus* (246-254), reminds us that a lot of effort is required to make sense of life and to keep our affairs running smoothly.

Timaeus encourages his audience to consider themselves in the same way, to apply their rational mind to their observations through the senses (such as sight and hearing), to come to an appreciation if not a complete understanding of how the cosmos is put together. As Plato says in the *Republic* (530d), we hope to stabilize our own inner wandering when we learn to compute the wandering of the planets (Greek *planeta* means wanderers). How you organize your thoughts is an individual matter; we all have our preferences. Timaeus seems to recommend a straight line

of planets as ideal [2], like the straight line of musical intervals over four octaves. As it happens, in Jewish thought, an evenly spaced setting of planets was preferred as the ideal, 60° apart, covering the entire circle [3].

In the course of Timaeus' cosmology, there are several intersections with what we may understand as religion, a few passages that shed light on some of the more perplexing verses in the Bible. While Timaeus may be shelved among the philosophers, his subject matter and his concerns were much the same as that of religion. One example may be seen on billboards, "For God so loved the world that he gave his only begotten son" (John 3:16); the word *begotten* is used by Timaeus (38b-39d) to describe the work of making the planets, the stars, and time itself. My sense is of a deeply personal involvement, a generation of these new entities out of the creator, and the fond hope of all parents that their children will be like them.

In one of the New Testament parables, referring to the kingdom of heaven, a term that is never defined, we are told that it could be carried off by force (Matthew 11:12); Timaeus refers to the Demiurge forcing (the same word in Greek) the two natures of the Same (the One) and the Other (the Many) together to create the initial mixed state of Being (35b). In biblical terms, the forcing entities are likely to be angels or demons. We are also told that the kingdom of heaven is within us (Luke 17:21); so it seems likely that it is somewhat alien to us, being "of heaven" and closer in nature to the original immaterial

unity, than to our many-sided and confused physical natures. It takes a lot of effort to bring these two natures together, to get those horses in Phaedrus' chariot story to work together as a team. Even so, we have within us that same template or pattern of original harmony, or harmonics, which, if we can attune ourselves, is attainable.

Another verse, "what you bind on earth will be bound in heaven, whatever you loose on earth will be loosed in heaven" (Matthew 18:18), seems to give worldly authority to some of Jesus's disciples, similar to popular notions of God's approval or mandate for kings, conferring their divine right to rule. Timaeus 41b, using the same words for binding and loosing, admits whatever that has been put together can be taken apart, but says that it's wrong to take apart what has been fitted together perfectly. So, far from being a license to rule, I think the bible verse is a cautionary one, because our actions can have consequences that reach much further than we imagine. The same section in Timaeus includes the idea of escaping "the doom of death," addressed to the structures that have been created. Their immortality is due to their being well-fitted, well put together, and to the Demiurge's will that they endure. The literalist anxieties caused by "this generation will not pass away" (Matthew 24:34), then, could perhaps be alleviated by understanding "this generation" not as a specific human generation which did pass away but as what God has generated, the cosmos, which hasn't yet. Interesting, isn't it, what a different perspective will do for you?

In Genesis 1, we're told that God was very pleased with creation and rested when it was accomplished; in

Timaeus 42d the Demiurge gets everything set up and then delegates junior gods to keep working and finish it up. To my mind, when the God of Genesis says some aspect of creation is good, good means it works, what a relief! In Timaeus, the Demiurge backs off and doesn't want to be blamed or feel guilty if things go wrong in the future, and indeed they do go wrong pretty soon afterwards, just as they do in Genesis. There's a strange story in Leviticus 10 about two sons of Aaron the priest who brought strange, foreign or alien fire to the worship service. Disaster ensued. The same word [4] for alien is used in Timaeus 43d where the delegate gods are having trouble with the elements, bouncing around and colliding with fire that was foreign to them. Presumably these junior gods were still of the One/Unity nature and less of the Many/Differentiated nature, so the four elements were alien and frightening, and they didn't know how to control them. So instead of reading the story in Leviticus and in Timaeus as being about entropy, the inevitable decline of perfection as time goes on and generations succeed each other, we could have a little compassion for the new guys being inept because they're inexperienced. Were the younger gods, or Aaron's sons, given proper training, even a briefing?

Nope, it seems that like us they were born, cocky and ignorant, and then had to deal with the mess they made.

I'll finish up with one more similarity, a single word, "chariot," that perhaps connects the thought of Timaeus with the thought of Maimonides, the great medieval Jewish philosopher. Timaeus 41e says that

individual souls were created and paired with stars; each pair was set or placed, as in a chariot, from which vantage point they were shown the nature of the cosmos and told of its fate. Isn't that what modern physicists and astronomers, and a lot of the rest of us, keep working on?

In Jewish tradition we find Enoch taken up in a chariot to the heavens where he learns everything, and returns to inform us [5]. The prophet Elijah was also taken in a chariot up to heaven (2 Kings 2:1-18), while the prophet Ezekiel saw a vision of a chariot descending upon him (Ezekiel 1:4-28). Maimonides tells us that the meaning of Ezekiel's chariot is both secret and foreign to ordinary minds [6]. That kind of thing always attracts my interest, because I immediately want to know all about it. The tradition that Maimonides is faithful to only allows a teacher to convey what he calls the chapter headings of these secret matters to students. Surprisingly, he actually does mention four chapter headings that match some of the topics Timaeus covers.

- Ezekiel's vision includes four living creatures. Timaeus's Demiurge calls the cosmos an animal or living creature; subsequent parts are also called animals or living creatures; they are made of the four elements. Ezekiel's chariot had wheels or spheres in motion. The Demiurge created the cosmos in the form of circles, spheres, and set the whole thing to spinning and revolving.
- Ezekiel saw a human shape in two parts, top and bottom. Timaeus describes human nature as twofold.

- The chariot is directly related to the space-time calendar system. The Demiurge creates time using the stars and planets set in space.

Maimonides concludes by saying that if you combine the headings, and ponder them, you might just come up with something. Wheels within wheels, the circling heavens and our own confused, wandering minds, our reasoning ability based on the perception of opposites and making analogies, and eventually we can come up with an overview, a plan (a calendar), of what it's all about. Basically, they're both saying, that's life!

## References:

- [1] Kalkavage, Peter, *Plato Timaeus*, 2<sup>nd</sup> ed. (Indianapolis: Hackett Publishing Company, Inc., 2016) p. 159
- [2] Gregory, Andrew, "Eudoxus, Callippus and the Astronomy of the *Timaeus*," *Bulletin of the Institute of Classical Studies, Supplement Ancient Approaches to Plato's 'Timaeus.'* (2003) 78: 5-28.
- [3] Cohen, Ariel, "The Changes in Calendars in the Ancient World as a Tool to Teach the Development of Astronomy," *Journal of*

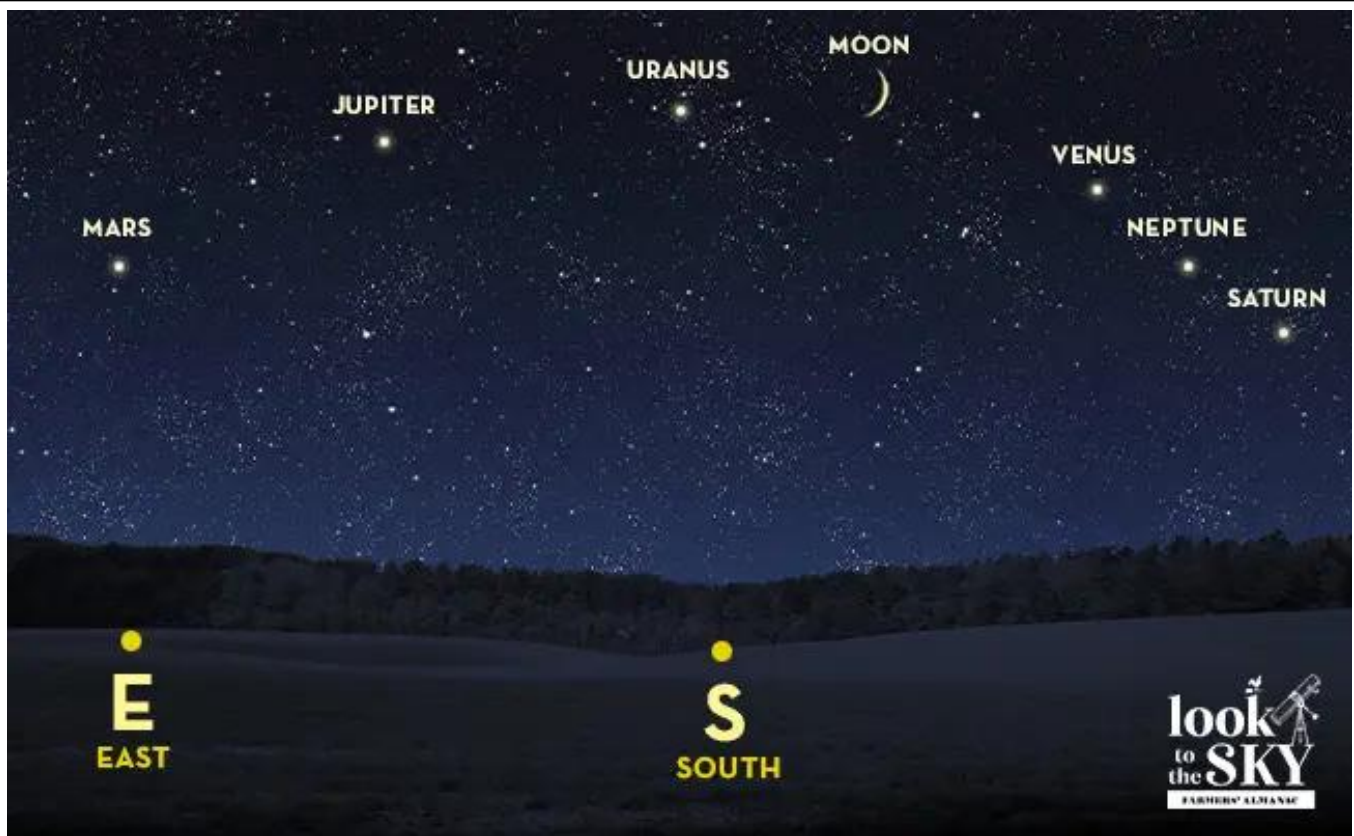
*Astronomy & Earth Sciences Education* 5, no. 1 (2018): 67-84.

[4] The same word in the Septuagint, the Greek version of the Hebrew scriptures

[5] Ginzberg, Louis, *The Legends of the Jews* (Philadelphia: The Jewish Publication Society of America, 1909, 1937) vol. 1, p. 130

[6] Maimonides, Moses, *The Guide of the Perplexed*, Schlomo Pines, transl., 2 vols. (Chicago: Chicago University Press, 1963) vol. 2, p. 415-430

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## Planet Parade 2025:

In February, seven planets will be in alignment – Saturn, Mercury, Neptune, Venus, Uranus, Jupiter and Mars. Most will be visible to the naked eye, but to see Uranus and Neptune, you may need a telescope or binoculars. Those who want to see this event should start looking for the alignment as soon as the sun sets. Some places might have a better view of the alignment on different days. For example, in New York, you might see the event best on Feb. 25. [CBS News/ Starwalk]

# 2025 Rochester Academy of Science, Inc.

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CIRCLE the amount you are paying for an Academy category (shaded column) and for the Section(s) in which you wish membership.

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*R.A.S. dues are a prerequisite for section membership*

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Member (Individual over age 18)	\$10.00	\$2.00	\$25.00	\$2.00	\$10.00	\$5.00	
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Gift (Thank you!) Fill in amount <input type="checkbox"/>							
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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>.

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

## ROCHESTER ACADEMY OF SCIENCE CONTACTS

(585) home//cell

<a href="#">Michael Grenier</a>	President	671-8738
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