Rochester Academy of Science

BULLETIN

"An organization of people in the Natural Sciences"

April 2021; Vol. 75, #3

President's Message

It has been a year since so much of what we take for granted began to close down. Our April 2020 issue announced the cancellation of our annual meeting and everything else. We soon learned how to pursue our interests in new ways and were back up with good programs for our members. This included the Annual Meeting held in July. Most sections mastered the art and science of virtual meetings. Our ASRAS, Fossil, and Mineral Sections continued to offer a full slate of speakers, expanding their scope to bring in nationally known lecturers who never could have made the trip to Rochester. Many of our more remote members are also able to attend, where they could not before. It has not just been our own members—we have also been able to exchange privileges with other clubs, which gives additional lectures to our members while sharing ours with them. Our Anthropology Section still co-sponsored events—now virtual— with the Archaeological Institute of America. Field trips and out-of-doors activities resumed. The Life Sciences Section is still barred from the RMSC Herbarium, but the warmer weather will bring the return of field trips. We have made advances and improvements that will not go away, but which will be part of our process as we go forward. We are emerging into our new world better than ever.

Meanwhile, if you have not cast a ballot for your RAS officers, please do so. Ballots and instructions are in last month's Bulletin and on the website. We have sent, and will send again, instructions on how to use a proxy to make your vote count if you cannot be at the meeting nor mail in your ballot.

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Don't forget the April 13 Annual Meeting and Dr. Sarah Lewis' exciting firefly lecture! I expect to see you there (on my screen).

https://meet.exputo.com/b/mar-sg9-smm-cin

Keep well and we will see you soon enough!

Michael Grenier, President RAS

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Rochester Academy of Science

Spring Lecture

presented by Dr. Sarah Lewis

Head of Tufts University Lewis Laboratory of evolutionary ecology

The Wonderous World of Fireflies

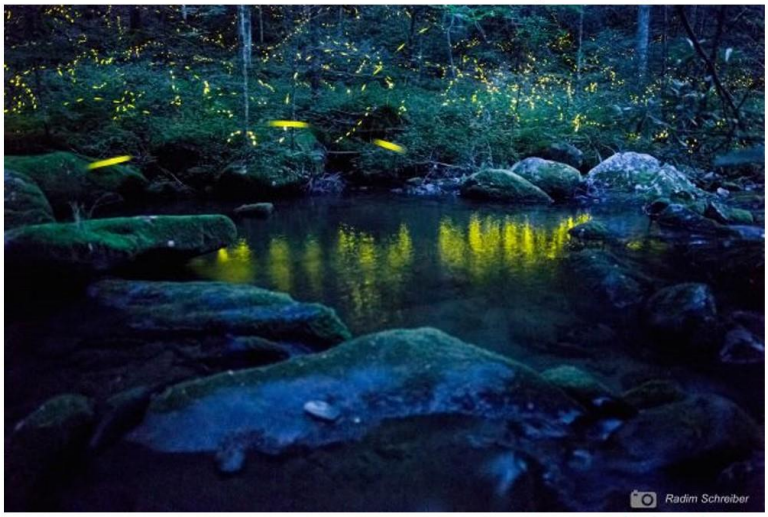

Image courtesy of Tufts University

Virtual Meeting

7:30 p.m. ▫ Tuesday, April 13, 2021▫ Free

https://meet.exputo.com/b/mar-sg9-smm-cin

Rochester Academy of Science Treasurer's Report of April 2021

The Rochester Academy of Science has three categories of funds: the general fund, the endowment funds, and the expendable funds. The general fund receives membership dues and monthly interest from the Life Fund (endowment) and the Memorial Fund (endowment). This financial report does not include income and expenses of the individual sections.

Revenue and Expenses for 2020:

Revenue: Member dues = $4,958, Gifts $831, Interest and dividends = $4,283. Total revenue = $ 10,072.

Expenses Summary:

Section & Board Meetings: Room rental	1,270
Bulletin: printing, mailing, labor	1,543
General Office Expenses (PO Box, mail permit & website)	938
Liability Insurance	696
Student Grants	2,737
Lectures (honoraria + room rental)	0
Total (excluding transfers)	$7,184

Endowment Funds: The endowment funds are not spent but generate interest, which is entered as income into the three Expendable Funds. They are reported to the IRS as restricted assets.

Fund	Balance (12/31/2020)	Interest Supports
Fairchild Fund	$10,741.00	Publications
Life Fund (Life Membership dues)	$12,600.00	General Fund
Jensen Fund	$8,275.00	Student Grants
Speakers Fund	$6,550.00	Lectures
Grace Murray Fund	$8,250.00	Student Grants
Memorial Fund (named memorial gifts)	$650.00	General Fund
Grants Program Endowment	$10,000.00	Student Grants
Herbarium Endowment	$2,000.00	Herbarium
Babette Coleman Bequest	$4,958.86	Herbarium
Balance of the Endowment Funds	$64,024.86	

Expendable Funds: (reported to the IRS as unrestricted assets, each are self-supporting and do not receive funds from membership dues or from the General Fund.)

Publications Fund: used to publish the Proceedings and Academy booklets.
Grants Fund: used to award annual research grants to undergraduate college students.
Lecture Fund: used to pay the expenses and honoraria for invited speakers who give lectures at Academy events (the Fall Scientific Paper Session and the Spring Lecture).

Assets and Liabilities: The assets of the Rochester Academy include money held by each of the five sections, as well as the RAS funds in the Pittsford Federal Credit Union (checking, savings) plus investments held by Morgan Stanley/Smith Barney (which pay about 3%; this interest is deposited into the Expendable Funds accounts). The RAS also owns stock in ConocoPhillips and Phillips 66; the dividends received are deposited into the Grants Fund. Finally, RAS has investment money in the UBS Putnam Diversified Income Trust which was a bequest from the Babette Coleman estate.

ROCHESTER ACADEMY OF SCIENCE
BALLOT FOR JUNE 2021 – MAY 2022 OFFICERS

OFFICE	NAME	√	WRITE -IN CANDIDATE
President:	**Michael Grenier**		
Vice President:	**Daniel Krisher**		
Membership:	**Open**		
Treasurer:	**William Hallahan, Ph.D.**		
Secretary:	**Helen Downs Haller, Ph.D.**		
Member, Board of Directors (2021-2024)	**Timothy Tatakis, Ph.D.**		
Member, Board of Directors (2021-2024)	**Michael Richmond, Ph.D.**		

Completed ballots must be mailed c/o the RAS Secretary: Rochester Academy of Science, PO Box 92642, Rochester NY 14692 -0642.

Featured 2020-2021 Undergraduate Student Research Grant Award Winner

Daniel Woodford, Andrew Clark, St. John Fisher College.
Investigation into the Localization of Influenza Polymerase PA subunit with Host Protein AIFM1.
Sponsor: Dr. Jonelle Mattiacio, Ph.D., St. John Fisher College.

Figure 1: Daniel Woodford (left) and Andrew Clark (right).

Abstract

Viruses, such as influenza, hijack the host cellular machinery to perform all aspects of the virus replication cycle. Seasonal influenza epidemics and the pandemic potential with novel virus strains have a major impact on public health and the global economy. While annual vaccination provides some protection, its effectiveness is impaired by antigenic drift and shift. Antiviral drugs that target viral proteins also exist, but drug resistant strains have emerged. It is therefore important to understand more about the viral life cycle and host cellular machinery that is hijacked in infected cells. The heterotrimeric RNA polymerase complex (3P) of influenza is a major contributor in the viral life cycle and interacts with numerous host proteins. The trimeric complex (3P) is composed of PB1, PB2, and PA and was previously shown to interact with the host cell apoptosis inducing factor 1 (AIFM1). The first aim of this project is to confirm results showing an interaction between the trimeric 3P complex and AIFM1 and more specifically determine if PA is the sole mediator for this interaction. In a recent study it was found that there is a reliance of the virus on AIFM1 caspase-independent apoptosis and, therefore, in order to better understand the importance of the viral polymerase interaction with AIFM1, we also plan to determine the location in the cell where this interaction is taking place. This will be accomplished via cell fractionation and co-immuno-precipitation in conjunction with fluorescence microscopy in cells overexpressing the proteins (PA, PB1, PB2, and AIFM1) of interest. These studies we hope will further enhance our knowledge of how this virus manipulates host proteins and aid in identifying host factors involved in viral replication for potential drug targeting.

Background

Viruses are invaders of the biological world and operate by working their way into the cells of a host and then hijacking various elements of that cell's replicative machinery, in order to produce their own viral genome. Influenza is split into three different subtypes: A, B, and C. Each subtype of the influenza virus holds a segmented genome; types A and B have eight segments (coding for up to 14 proteins) while type C has seven segments (coding for nine proteins). The influenza virus has three main integral membrane proteins which are essential to the overall functionality of the virus: hemagglutinin (HA), neuraminidase (NA), and a small number of ion channels (M2). The influenza virus remains difficult to tackle due to its propensity to undergo genome changing events such as antigenic shift and antigenic drift. Both of these events allow key aspects of the virus to change (especially HA and NA), thereby making it extremely difficult to create a vaccine with long lasting immunity against the virus [1]. The influenza polymerase complex is made up of 3 different proteins (PA, PB1, and PB2), and is responsible for both replication of the viral RNA genome and transcription of that genome into viral mRNA for viral protein production. This 3P complex mainly functions in the nucleus of an infected host cell. PB1 plays an important role in viral RNA elongation as well as having endonuclease activity. PB2 recognizes and binds 5'-methylated caps of cellular mRNA. This cap is then used by the viral polymerase in order to prime viral transcription. PA has known protease activity and has been indicated as having a multitude of various binding partners during an influenza infection.

It has been determined that each of the components of the 3P viral polymerase function together in order to replicate and transcribe the viral genome but also function separately with their own unique binding partners. Of all the PA binding partners that have been identified, around 20% of these are mitochondrial proteins. The majority of those mitochondrial partners are associated with molecular transport and membrane potential [2]. Interestingly, AIFM1 is associated with driving a cell towards apoptosis, or programmed cell death. In healthy cells, AIFM1 is found in the intermembrane space of the mitochondria. When the cell begins to move towards apoptosis, AIFM1 relocates from the mito-chondrial intermembrane to the nucleus of the cell where it begins to effect chromosome condensation. AIFM1 is also responsible for the mitochondrial release of numerous apoptogenic genes. Recent studies have suggested that this AIFM1 translocation is associated with a caspase-independent method of

(Continued on p.4)

(Continued from p.3)

apoptosis and plays a very important role in the overall success of viral infection and propagation [4].

The goals of this study are to better understand the interaction between PA and AIFM1 by determining its location since both proteins function in numerous areas in the cell, specifically the nucleus and mitochondria. Knowing where this interaction takes place will help to better understand how AIFM1 plays a role in virus particle production.

Procedures and Methods

Aim 1: We will examine the binding relationship that occurs with AIFM1 and PA, specifically if PA is the sole binding partner for AIFM1. For this process we will use western blot analysis as well as coimmunoprecipitation to confirm the binding interaction. To do this, we will transfect DNA constructs into HEK293T cells to overexpress tagged versions of both PA, AIFM1, and PB2 and PB1. These protein lysates will then be used in coimmunoprecipitation experiments. Furthermore, PA truncations (residues 1-256 and 257-716) are also available and can be utilized in order to understand the exact PA binding domain associated with this interaction.

Aim 2: We will transition to finding the location of the PA and AIFM1 interaction in cells. Previous work suggests that the interaction occurs in the mitochondria, but this was never confirmed. PA in conjunction with the viral polymerase complex functions mainly in the nucleus of infected cells but more recent studies suggest PA could play additional roles in the mitochondria. Determining the location of the interaction will help to further understand the significance of AIFM1 to the viral replication cycle, given recent evidence suggesting AIFM1plays an important role in efficient and effective viral replication [4]. We plan to use cell fractionation in conjunction with coimmunoprecipitation to analyze nuclear, cytoplasmic, and mitochondrial fractions. We would also like to start experiments using immunefluorescence to visualize the location of the proteins in fixed and stained cells and plan to begin work on expressing a GFP tagged version of AIFM1 in HEK293T cells. All of the requested funds will help to purchase essential materials needed to answer questions on this unique and interesting process, particularly from a protein analysis perspective. Both the gels and nitrocellulose membranes will allow us to assess protein expression as well as interaction, by western blot analysis, in order to generate pertinent data. This data will help develop future research questions regarding the role AIFM1-PA interaction plays in the viral life cycle.

Due to the current climate and regulations that surround undergraduate research, especially at our institution, the amount of progress that can be made has been limited. With restricted hours in the lab, limited occupancy, and scheduling for essential equipment, like our cell culture hoods, our team decided that delegating the tasks among two students would aid in the production of key data for this project. With each of us having varying levels of experience, delegating the tasks would allow for our team to become proficient in experiments that involve cell culture and protein interactions. One student will be focusing on cell culture and transfection aspects of the research while the second student will be focusing on the protein analysis aspects.

Expected Outcomes

Following completion of our research we hope to have both confirmed that PA is the sole mediator for interaction with host AIFM1 as well as determined the location where this interaction occurs within the cell. Using previous studies showing the association between these two molecules as well as the viral reliance on the caspase-independent apoptosis set in motion by AIFM1, we view these as attainable goals for our project.

References

[1] Bouvier, N. M., & Palese, P. "The biology of influenza viruses". *Vaccine*, *26 Suppl 4*(Suppl 4), D49–D53, 2008. Available: doi.org/10.1016/j.vaccine.2008.07.039

[2] Bradel-Tretheway, B. G., Mattiacio, J. L., Krasnoselsky, A., Stevenson, C., Purdy, D., Dewhurst, S., & Katze, M. G. "Comprehensive Proteomic Analysis of Influenza Virus Polymerase Complex Reveals a Novel Association with Mitochondrial Proteins and RNA Polymerase Accessory Factors". *Journal of Virology, 85*(17), pp. 8569-8581, 2011. Available: doi:10.1128/jvi.00496-11.

[3] Database, G. (n.d.). AIFM1 Gene (Protein Coding). Retrieved November 20, 2020, from https://www.genecards.org/cgi-bin/carddisp.pl?gene=AIFM1

[4] Qu, X., Ding, X., Duan, M., Yang, J., Lin, R., Zhou, Z., & Wang, S. "Influenza virus infection induces translocation of apoptosis-inducing factor (AIF) in A549 cells: Role of AIF in apoptosis and viral propagation". *Archives of Virology, 162*(3), pp. 669-675, 2016. Available: doi:10.1007/s00705-016-3151-x

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Snowdrops (*Galanthus nivalus*, family *Amaryllidaceae)* French Hill, Naples, NY, March 11.
(Photo: John Larysz)

Featured Article

Language Part 2: Misconceptions, Comparative Method, Diversity of Languages

By Donald Bridy, Ph.D.

Common Misconceptions About Language

Myth: Dialects are inferior to languages.
Reality: Many linguists maintain there are only dialects and that non-linguistic factors (political, social, economic, literary, academic, religious, military) cause some to be privileged over others. Here dialects may be thought of as variant forms of a "language" but none of the variants is the "language" based on linguistic criteria alone. Some linguists state that a language is a dialect with an army and a navy. See languages and dialects.

A related point is the concept of a dialect continuum, a chain of dialects or varieties of a language across a geographical region, illustrated in Figure 1a.

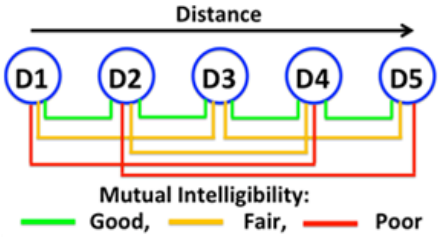

Figure 1A:Dialect Continuum

Nearby varieties have slight variations along with a high degree of mutual intelligibility. The differences accumulate with increasing distance and more widely separated varieties have lower mutual intelligibility and even mutual unintelligibility. In some cases, e.g., the German Dutch, Western Romance and South Slavic dialect continuums, the chain of dialects continues through two or more countries. One can often draw a line across two countries sharing a border with a chain of dialects A1, A2, …, AN through the first country to the border and a second chain B1, B2, …, BN from the border through the second country. The entire first set are considered variants of language A while the entire second set are variants of language B. On opposite sides of the border dialects AN and B1 are often much closer to each other than they are to their respective national standard languages. This somewhat arbitrary and even political nature of a "language" is illustrated in Figure 1b.

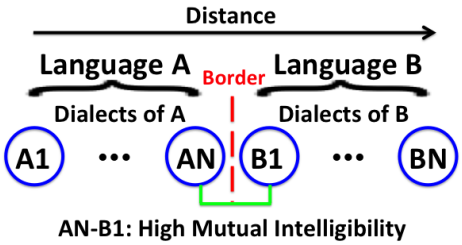

Figure 1b: Dialect Continuum Across Border

Myth: Longstanding rules of grammar capture correct English usage.
Reality: English is, by one estimate [1], primarily a hybrid of Germanic core vocabulary (26%) with an overlay of Latinate largely higher-level vocabulary (58% total: 29% Latin and 29% French starting with the Norman conquest) but up to 85% of everyday vocabulary and a high percentage of written English consist of Germanic words. In the sentence "Most of the words that we *use* in English every day are *Germanic*", only the two italicized words are of Latin origin [2]. This Germanic nature can also be seen in verb forms. Table 1 compares a few first-person singular forms plus the participle in Germanic and Romance languages for "sing" (a strong verb). English verb conjugation follows Germanic and not Romance patterns. English grammar is predominantly Germanic. A number of the "rules of grammar" were created in an attempt to "perfect" English by artificially forcing it into a Latin mold. An example is the prohibition against split infinitives, e.g., "to boldly go", which in Latin would be *ire audacter*. Latin infinitives are single words and so cannot be split, e.g., *ire*, "to go" or *amare* "to love". Earlier grammarians decided this should be modeled in English. Many grammatical "rules" are of this nature. Similar things happened with spelling, introducing anomalies. "Debt" was spelled *dette* in Middle English (c. 1300 CE - no 'b'!). After 1400 CE 'b' was inserted in order (warning: split infinitive ahead) to better reflect its earlier origin in Latin *debitum*, "thing owed".

English	German	Danish	Spanish	Italian
(I) sing	singe	synger	canto	canto
(I) sang	sang	sang	canté	cantai
sung	gesungen	sunget	cantado	cantato

Table 1: Verb Comparison – 1st Person Singular and Participle

The Comparative Method and Reconstruction

The comparative method is illustrated in Figure 2.

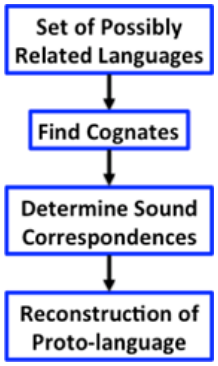

Figure 2: The Comparative method

The first step is to compare words/features among a set of candidate languages and look for correspondences. This can produce a preliminary indication of groupings. Looking up some basic vocabulary items in several European languages might produce something like Table 2.

English	Danish	German	Italian	French	Spanish	Finnish	Estonian
foot	fod	Fuss	piede	pied	pie	jalka	jalg
two	to	zwei	due	deux	dos	kaksi	kaks
tooth	tand	Zahn	dente	dent	diente	hammas	hammas
father	far, fader	Vater	padre	pere	padre	kylma	kulm
hand	hand	Hand	mano	main	mano	kasi	kasi

Table 2: Basic Words in Several European Languages

(Continued on p. 6)

Language Part 2

(Continued from p. 5)

Tentative groupings are suggested even with 5 words despite the naïve approach. The first three languages belong to one group (Germanic), the next three to another (Romance) and the last two to a third (Finnic), which belongs to a non-Indo-European family, Uralic. The German column appears anomalous until it is realized that 'v' in *Vater* is pronounced similar to English 'f'; and German 'z' is pronounced somewhat like English 'ts'. Since the same letters can represent different sounds, in order to do this correctly phonetic notation is required (IPA: International Phonetic Alphabet) insuring consistent comparison of sounds. Note that one must compare **cognates**, literally "born together", which derive from the same ancestral word but in some cases may not be synonyms - meanings can shift with language evolution. Also, similarities due to borrowing and rarer accidental resemblances must be eliminated. Once a set of potential cognates is established the next step is to work out regular sound correspondences. Selected examples of Grimm's Law (First Germanic Sound Shift) are given in Table 3 (Note: 'c' in *canis* in classical Latin is pronounced as 'k'). These include the sound changes p>f, k>h, d>t, and g>k.

In their textbook Hock and Joseph state "Most historical linguists believe that the ultimate proof of genetic relationship lies in reconstruction, i.e., in reversing linguistic history, as it were, by postulating linguistic forms in an ancestral or PROTO-language from which the attested forms can be derived by plausible linguistic changes." They go on to describe plausible as "beyond a reasonable doubt" and state that to be probative it must be based on a large number of lexical items. Further conditions are that it should be natural, regular, and not violate Occam's razor. Before reconstructing Proto-Indo-European it is necessary to determine which intermediate groups are related, e.g., Germanic, Romance, Slavic, but not Finnic. One must reconstruct proto-languages for the subfamilies, e.g., Proto-Germanic, Proto-Italic, Proto-Slavic, and reapply the comparative method — a few levels of iterated reconstructions are involved. See reconstructions for the words four and hundred by clicking those links — an asterisk indicates a reconstructed word.

	IE Non-Germanic, Unshifted			Germanic, Shifted			
	Sanskrit	Greek	Latin	Gothic	German	English	Danish
foot	pādam	poda	pedem	fōtus	Fuss	foot	fod
dog		kuōn	canis	hunds	Hund	hound	hund
ten	daśa	dēka	decem	taihun		ten	ti
knee	jānu-	gonu	genu	kniu	Knie	knee	knae

Table 3: Some Examples of Grimm's Law in Germanic Languages and Indo-European (IE) non-Germanic Languages [3].

Diversity of Linguistic Features, Evidentiality and Geographic Orientation

Languages manifest a rich and almost mind-dazzling diversity in phonology (sounds), morphology (form) and syntax (word order, sentence structure) and even what constitutes a word. In polysynthetic languages, e.g., West Greenlandic, a single word can express a complete and complicated sentence. See discussion of words and language types (slides 5-19).

A number of languages including Turkish, Korean, Tuyaca (Colombian and Amazonian), Piraha (Amazonian), Eastern Pomo (California), and Fasu (New Guinea) have grammatical evidentiality. They grammatically mark, e.g., with a verbal suffix, the source, nature, or trustworthiness of the information content of an assertion. The number of evidential categories varies from 2 to 6 or more, e.g., sensory modalities, hearsay, rumor, inference, and assumption. In languages where evidentiality is mandatory the grammar of the language itself forces speakers to indicate the source or reliability of their assertions, a habit ingrained since childhood.

A speaker of Piraha, with a tripartite classification, stating "It rained", would indicate via a suffix whether he saw it directly, inferred it, or heard it from another person (hearsay). Table 4 has examples of four categories of evidentiality from Eastern Pomo. Fasu even distinguishes whether hearsay was from a known source. In Tuyaca, evidentiality is mandatory in the present and past tenses but not in the future tense since one cannot attest to the occurrence of an event which has not yet occurred. These examples illustrate the sophistication of these indigenous languages, disproving another myth and showing that indigenous languages are not primitive. In fact, Tuyaca was judged by some to be the world's hardest language to learn.

Guugu Ymithirr refers to a group of about 1400 indigenous Australian people, and also to their highly endangered language, which lacks relative terms such as left, right, in front of, and behind. These terms are referred to as egocentric because they are relative to the speaker.

Evidential Category	Verb with Evidential Suffix	Gloss	Interpretation
Nonvisual Sensory	pha-be'kh-**ink'e**	"burned"	speaker felt the sensation
Inferential	pha-be'k-**ine**	"must have burned"	speaker saw circumstantial evidence
Hearsay (reportative)	pha-be'kh-**le**	"burned, they say"	speaker reporting what was told
Direct Knowledge	pha-be'k-**a**	"burned"	speaker has direct evidence, probably visual

Table 4. Evidentiality in Eastern Pomo [4]

(Continued on p.8)

Events for April 2021

For updates to events, check the Academy website http://www.rasny.org and section websites.

No Mineral Section Meeting This Month.

See you at the virtual Mineralogical Symposium April 17th.

1 Thu: Anthropology Thursday

7:30 p.m. Lecture by Dr. K. Anne Pyburn (Indiana University Bloomington): "Grassroots Resource Preservation and Management in Kyrgyzstan: Ethnicity, Nationalism and Heritage on a Human Scale." To register, visit: https://hselaw.zoom.us/webinar/register/WN_vWPun-pASeWUDbBzjsb8kw

2 Fri: Astronomy Section Meeting

7:30 p.m. Meeting held remotely via BigBlueButton. Speaker: Larry McHenry, member of Kiski Astronomers of Pittsburgh and Oil Regional Astronomical Society. Topic: "Planetary Nebulae – Messier to Abel." Meeting details will be shared via email. Contact: Mark Minarich at mminaric@rochester.rr.com.

6 Tue: Fossil Section Meeting

7:30 p.m. The meeting will feature a presentation by Dr. William Ausich, Professor Emeritus of Earth Sciences at The Ohio State University on the topic of "Extreme Crinoids." Prof. Ausich is a leading authority on crinoids and has authored over 225 papers. Meeting will be held remotely via ZOOM and is open to all RAS Members and guests. Contact Michael Grenier at paleo@frontier.com for meeting details and logon info.

7 Wed: Astronomy Board Meeting

7:00 p.m. Meeting to be held remotely via BigBlueButton. Meeting details will be shared via email. Contact: Mark Minarich at mminaric@rochester.rr.com.

10 Sat: Astronomy Public Open House

12:00 p.m. - 4:00 p.m. (or later, if skies are clear). Observing from dusk till ?. Outdoors only. Observing social distancing and masks as appropriate. Specific rules for bathroom are posted at the facility. Members may bring guests, but all must sign in at Wolk Building to facilitate contact tracing. Farash Center for Observational Astronomy, 8355 County Road 14 Ionia, NY 14475. For weather related cancellations or changes contact Mark Minarich: (585) 257-6042 or see www.rochesterastronomy.org/calendar-of-events.

13 Tue: RAS Annual Meeting and Spring Lecture

7:30 p.m. RAS Annual meeting to be held remotely via BigBlueButton. See poster on page 1. Spring Lecture by Dr. Sara Lewis on *The Wonderous World of Fireflies*. Election of RAS Officers; see bottom of p. 2 for ballot. For meeting , contact: Michael Grenier at mgrenier@frontiernet.net.

17 Sat: Rochester Mineralogical Symposium

The virtual program will feature "What's New in Minerals" and a lineup of short talks. The schedule and access details will be posted on rasny.org when received. Mineral section contact: Jutta (juttasd@aol.com) or Paul Dudley (pdudley@frontier.com). You may request program notification directly from the symposium leaders by writing to contactrms@hotmail.com.

21 Wed: RAS Board Meeting

7:00 p.m. Meeting to be held remotely via ZOOM. Meeting details will be shared via email. Contact: Michael Grenier at mgrenier@frontiernet.net.

24 Sat: Fossil Section Field Trip

The Gulf at Lockport. The section will visit a railroad cut west of Lockport which exposes the Middle Silurian Rochester Shale Formation. This is a family-friendly site with small fossils simply lying on the surface ready to be picked up. There will be an optional visit to another nearby roadcut which does require a hammer and chisel. We will be meeting on-site at 10:00 a.m. If you wish to attend or would like additional information, contact Dan Krisher at DLKFossil@gmail.com.

Figure 1: Crocus (*Crocus vernus*, family *Iridaceae*) French Hill, Naples, NY, March 11. *(Photo: John Larysz)*

Figure 2: Winter Aconite (*Eranthus hyemali*, family *Ranunculaceae*) French Hill, Naples, NY, March 11. *(Photo: John Larysz)*

Nothing Gold Can Stay

Nature's first green is gold,
Her hardest hue to hold.
Her early leaf's a flower;
But only so an hour.
Then leaf subsides to leaf.
So Eden sank to grief,
So dawn goes down to day.
Nothing gold can stay.

Robert Frost

Language Part 2

(Continued from p. 6)

The Guugu Ymithirr instead use geographic orientation terms such as north, west, northeast, etc. (see last portion of NYT article). They always know their orientation and have been described as having perfect pitch for orientation. They will say things like "he's east of me" or "there is an ant on your northwest foot". An unusual feature of their culture is that in recounting a past event they remember the orientations of the participants.

An experiment was conducted with tables against the east and west walls of adjoining rooms, with results shown in figures 1 and 2. The subjects were shown a table with two objects, say a block and a tree. In Room 1 with the table along the west wall the tree was to the left of the block, which was also to the south of the block. They were taken into the Room 2 and asked to duplicate the arrangement.

Speakers of most languages would have used an egocentric or person-centered coordinate system, which rotates with the person, and again placed the tree to the left of the block in Room 2 (Figure 3a). The Guugu Ymithirr used a geographic coordinate system and placed the tree to the right of the block in Room 2 (Figure 3b), preserving its geographic orientation south of the block. Their language apparently affects their notion of equivalent arrangements of objects.

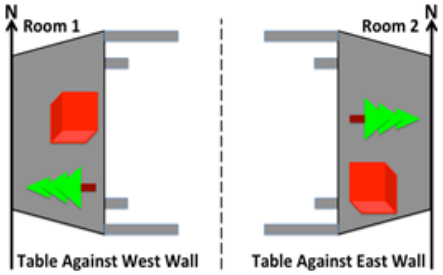

Figure 3a: Maintain Tree to Left of Block [5]

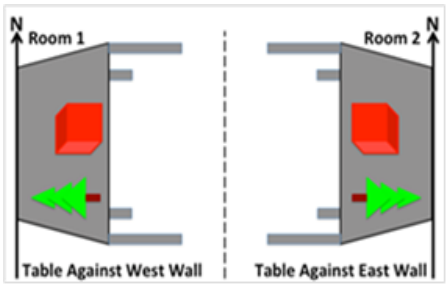

Figure 3b: Maintain Tree to South of Block [5]

Language loss, in addition to the cultural implications, can also entail a loss of diverse ways of representing reality (see unusual languages). Many generalizations one may wish to make about language will be disproven by another language. This can make for a sometimes head-scratching, but always interesting and often mind-expanding study.

References

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[3] Table 3. Based on Language History, Language Change and Language Relationship, Hock and Joseph; An Introduction to the Indo-European Languages, Philip Baldi; and various dictionaries.

[4] Table 4. Based on "Evidentials in Eastern Pomo with a comparative survey of the category in other Pomoan languages" by Sally McLendon, Chapter 5 of https://amerindias.github.io/referencias/aikdix03evidentiality.pdf

[5] Based on Chapter 7 of Through The Language Glass by Guy Deutscher.

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