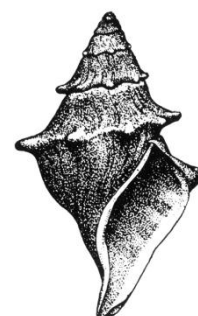


NEWSLETTER OF THE
AMERICAN MALACOLOGICAL SOCIETY



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NEXT MEETING

**AMS 2021
CAPE BRETON, CANADA
JUNE 14-18, 2021**

Submitted by Timothy Rawlings, AMS President

We are still planning for **AMS2021** to be a face-to-face meeting in Sydney, Cape Breton Island, Nova Scotia, Canada 🇨🇦. Given that this meeting is 7 months away, there is still a sliver of hope that life will have returned to normal by then. All information relevant to the meeting will be provided through the AMS website (<https://ams.wildapricot.org/AMS-2021>); any changes to our current plans will be announced through this website and through social media.

AMS2021 is scheduled to run from Monday June 14th – Friday June 18th and will be hosted by Cape Breton University (CBU), a small undergraduate-based university located between Sydney and Glace Bay. Local mollusc-based research programs at CBU focus on the conservation ecology of freshwater mussels, the revitalization of oyster aquaculture in the presence of MSX disease, the development of a sustainable whelk (*Buccinum undatum*) fishery, and the ecology of freshwater and marine snails. The AMS2021 President’s Symposium is being organized by freshwater mussel ecologists, Dr. André Martel (Canadian Museum of Nature) and Kellie White (CBU) and is entitled: **Freshwater mussels of the Atlantic Drainage: Ecology, Evolution, and Conservation**. Other special sessions are also in development. If you are



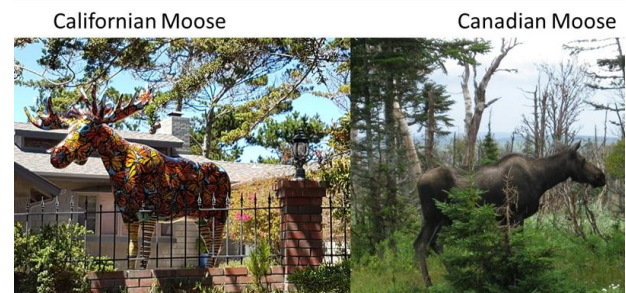
interested in organizing a symposium or special session on a topic related to your research, there is still time! Please contact the local host as soon as possible: Tim Rawlings (timothy_rawlings@cbu.ca).

A number of field trip options are currently being organized for the last day of the conference. These will include: an exploration of freshwater mussels in local lakes, rivers, and creeks, with Kellie White and André Martel; a survey of terrestrial molluscs in Cape Breton Highlands National Park guided by Park scientists; a day trip around the scenic Cabot Trail, with opportunities for whale watching along the way; and a tour of the Alexander Graham Bell Museum, with the chance to explore the beautiful village of Baddeck and Cape Breton’s inland sea, the Bras d’Or lake estuary.

As you can see on the map above, Cape Breton is only a stone’s throw away from Newfoundland (accessible via ferry), Prince Edward Island and the Gulf of St. Lawrence, the Bay of Fundy (including the Joggins Fossil Cliffs, a UNESCO World Heritage Site), and other maritime hotspots such as Halifax, home to Nova Scotia’s Museum of Natural History. Hence, there is great potential to use this conference as a stepping stone to explore other areas of Atlantic Canada.

More information will be provided about AMS2021 in the coming weeks on the AMS website. Early in the New Year, we will provide details associated with conference travel and registration, and a general schedule of events associated with the meeting. Tim Rawlings (timothy_rawlings@cbu.ca) will be happy to answer any questions about the conference. Sydney is accessible via road from Halifax’s Stanfield International Airport (4.5 hour drive) or via air from Halifax, Toronto, or Montreal (seasonal).

The Local Organizing Committee consisting of Tim Rawlings, Kellie White, Rod Beresford, and Jeff Clements looks forward to seeing you in June! And, for those of you enchanted by the ceramic moose at the World Congress of Malacology meeting in Pacific Grove in 2019 (see below), make plans to come and see a real one in Cape Breton! They are waiting...



OTHER UPCOMING MEETINGS



SICB Logo

**MOLLUSK SYMPOSIUM, SICB
CONFERENCE, JANUARY 4, 2021**

*Modified from Molluscalist Submission by
Omera Matoo*

The symposium “**Genomic Perspectives in Comparative Physiology of Mollusks: Integration across Disciplines**” will take place at the Society of Integrative and Comparative Biology (SICB) virtual meeting on Jan. 4, 2021 (<http://burkclients.com/sicb/meetings/2021/site/index.html>). The symposium is organized by Omera Matoo (U of Nebraska-Lincoln) and Maurine Neiman (U of Iowa).

The presentations represent a broad range of efforts to integrate large datasets across levels of biological organization in mollusks, towards the larger goal of linking genomes to phenomes - one of the Grand Challenges identified by the National Science Foundation (NSF). The symposium will be live-streamed with additional opportunities to network. In addition to the main symposium, there will be both oral and poster complementary sessions with speakers selected from submitted abstracts. Participants across disciplines will discuss major gaps, key barriers and leading edges in elucidating mollusk biology. (Abstract submission is now closed.)

Contact Omera B. Matoo (omatoo2@unl.edu) with questions about the symposium.



SBMNH, Host of SCUM XXV

**SOUTHERN CALIFORNIA UNIFIED
MALACOLOGISTS 25TH ANNUAL
MEETING: VIRTUAL SCUM XXV**

Submitted by Vanessa Delnavaz

Southern California Unified Malacologists (SCUM) will hold its 25th annual meeting **Saturday, January 30, 2021, 9 AM – 3 PM PST** (with plenty of breaks in between). This virtual meeting will be hosted by the Santa Barbara Museum of Natural History.

The world has changed drastically since our last meeting, but that doesn't mean we can't get together in 2021, in one form or another.

SCUM is an opportunity for those of us in the Southern California area that are interested and/or involved in molluscan research to come together and discuss our work from the previous year. Meetings are informal, and presenters have a choice of five- or ten-minute slots.

We hope to make the 2021 meeting as interactive as possible over Zoom, with breakout rooms for people to mingle in smaller groups, as well as a virtual tour of our mollusk collection here at the Santa Barbara Museum of Natural History.

Those interested in attending who are not already on the SCUM email list, please contact Vanessa Delnavaz (vdelnavaz@sbnature2.org)



MEETING OF GENERATIONS: AMS-WCM 2022

*Submitted by Kenneth A. Hayes, AMS
President-Elect*

In July 2022, Unitas Malacologia (UM) will host the World Congress of Malacology (WCM) in Munich Germany. UM president Gerhard Haszprunar and the Unitas council and organizing team has extended an invitation to all Malacological Societies across the globe to come together in July 2022 for the WCM, currently themed as a “Meeting of Generations” – emphasizing the need to grow and expand the reach and relevance of our scientific societies across generations.

The location is a destination not to be missed. Munich is the capital of Bavaria, Germany, and the summers are so similar to Southern Europe that it has often been billed as the northernmost city of Italy. At the planned meeting time, the days will be long and warm, with pleasant summer evenings for exploring the city and its numerous parks, gardens, open-air markets, museums, and restaurants. The Unitas organizing committee is sure to take advantage of the surrounding beauty of the location to plan field trips that will certainly be packed with eager visitors – especially after the long isolation of 2020-21.

Ken Hayes, AMS president elect, proposes that AMS accept Gerhard’s invitation and Ken will work with him and the Unitas local organizers to plan an AMS-sponsored symposium and to host our “famous auction” aimed at raising funds to support the next generation of malacologists! While concrete plans have yet to be developed, Gerhard has hinted at making economical accommodations available to maximize attendance by students, postdocs, and researchers from around the globe.

The symposia and related science activities will be engaging and educational, as always, and the opportunity to meet and discuss topics of shared malacological interest will surely attract a diversity of malacologists.

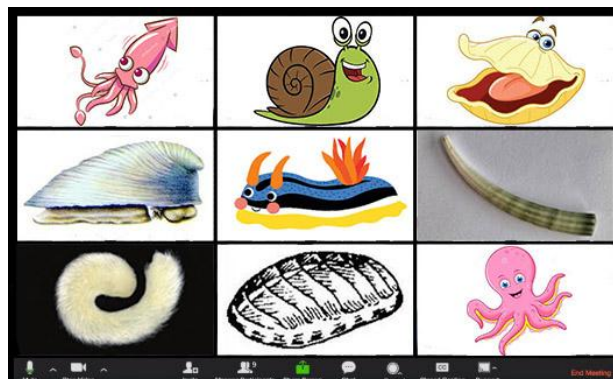
While we may have many more months of pandemic-restricted interactions, we are hopeful and optimistic that by mid-2022, the world will have acclimated enough to a new normal that we may once again have our Meeting of Generations in person. Barring that, there will certainly be plans for virtual interactions if needed. As plans develop, more information will be provided and a proposal for the symposium and joint meeting with WCM will be presented at the AMS 2021 meeting.



MEETING REPORTS

REPORT ON THE AMERICAN MALACOLOGICAL SOCIETY VIRTUAL MEETING 2020

Submitted by Tim Collins, Past President AMS



The 86th annual meeting of the American Malacological Society, and the first virtual meeting, took place on Zoom July 13th and 14th, 2020. Given the situation, turnout was good, with 164 registered participants, and 18 posters and 49 talks presented. There were sessions on Land Snails and Slugs as Species of Concern in Agricultural, Health, or Other Areas; Biodiversity and Conservation; Systematics and Phylogenetics; and Ecology, Environment, and Morphology. Special thanks are due to the session organizers, chairs, and speakers, who showed great skill in dealing with the surprises that cropped up in our first virtual meeting.

There were many excellent talks, some of which were officially recognized with awards. This year's Boone Award winner was **Nick Gladstone** of the School of Fisheries, Aquaculture and Aquatic Sciences, Auburn University, Auburn, AL for his talk entitled, "Spatiotemporal Patterns of Terrestrial Snails and Slugs in the Contiguous United States" (with co-authors T.A. Bordeau, C. Leppanen, and M.L. McKinney) recognized with a cash prize of \$1,500.

There were three honorable mentions for the Boone award, each receiving a cash prize of \$500. These were **Maria Moreno Alcántara** of the Instituto Politécnico Nacional-CICIMAR, La Paz, Baja California Sur, Mexico for a talk entitled, "Atlantidae Mollusks as Indicators of Environmental Change in the Southern California Current" (with co-authors G. Aceves-Medina and B.E. Lavaniegos-Espejo), **Teresa R. Osborne** of the SUNY College of Environmental Science and Forestry for her talk, "Landmark-based Snail Size Measurement Improves Precision and Repeatability of Shell Volume Estimation Over Conventional Shell Size Measures," and **Trevor Hewitt** of the University of Michigan, Ann Arbor for his talk, "Evolution of Diverse Host Infection Mechanisms Delineates a Cryptic Adaptive Radiation of Freshwater Mussels" (with co-authors A. Haponski and D. Ó Foighil). Congratulations to this year's winners!

Finally, Gary Rosenberg of the Academy of Natural Sciences of Drexel University was recognized for his many contributions to molluscan studies with an Honorary Life Membership in the American Malacological Society [ed: see article p. 14]. Congratulations, Gary!

I hope to see you all at Cape Breton University in Sydney, Nova Scotia next summer.



STUDENT AWARDS

THREE NEW AMS STUDENT AWARDS

Submitted by Tom Duda, Chair, Student Awards and Education Committee

The Student Awards and Education Committee is excited to announce three new awards that add to the ways that AMS supports and recognizes student research in malacology. First is the **Charlie Sturm Award for Best Student Presentation on Bivalves**, an award that honors Charlie's devotion to the study of bivalves and contributions to the Society. Charles "Charlie" F. Sturm (1953-2018) was a valued member of AMS and served as President of the Society in 2011 and more recently as Treasurer. This one-time award is to be given to a student who presents an outstanding oral presentation or poster on bivalves at the upcoming annual AMS meeting in Cape Breton in 2021. Students who give an outstanding presentation on any molluscan taxon will also have the opportunity to be awarded the existing **Constance Boone Award for Best Student Presentation**. For more information and eligibility criteria, please see the AMS website (<https://ams.wildapricot.org/>) about these awards.

A second new award is the **Richard E. Petit Student Research Award for Revisionary Taxonomy and Systematics of Mollusks**. This award honors Richard "Dick" E. Petit (1931-2013) and recognizes his taxonomic and systematic accomplishments in malacology and contributions to AMS. Dick served as President of the Society (then AMU) in 1988 and in various other capacities (perhaps most memorably as auctioneer) and was named an Honorary Life Member in 1997. The award will be given each year to support student research that focuses on revisionary taxonomy and systematics of a molluscan taxon. Applications for this award as well as the existing **Melbourne R. Carriker Student Research Awards in Malacology** will be due in the spring. More information on these awards as well as application instructions can be found on the AMS website.

Finally, the Society will soon announce details concerning a new research award opportunity: **The Dee Saunders Dundee Memorial Research Grants**. Dolores “Dee” (Saunders) Dundee (1927-1985) contributed to AMS throughout her career, serving as its President in 1973 and Publications Editor from 1976 to 1982 and assisting in the organization of annual AMS meetings in New Orleans in 1964 and 1982. Her research largely focused on aspects of the biology of land snails and the spread of introduced species. To honor Dee’s contributions to malacology and the Society, a generous gift from the estate of her late husband was recently given to AMS to be used in supporting malacological research. Details regarding the use and scope of these awards should soon be posted on the AMS website and in the spring 2021 newsletter.



WINNERS OF THE 2020 MELBOURNE R. CARRIKER STUDENT RESEARCH AWARDS IN MALACOLOGY

Submitted by Amanda Lawless, AMS Secretary

The Melbourne R. Carriker Student Research Awards in Malacology provide financial research support for students working in malacology. The grant is named in honor of a leading malacologist, former President of the AMS, and mentor of innumerable students of malacology. Professor Melbourne “Mel” R. Carriker served as research director of 28 doctoral and master’s students and sat on the research committees of more than 150 other graduate students. But his professional insight, malacological expertise, and good will touched so very many more. These grants will help carry on his legacy of dedication to future generations of malacologists.

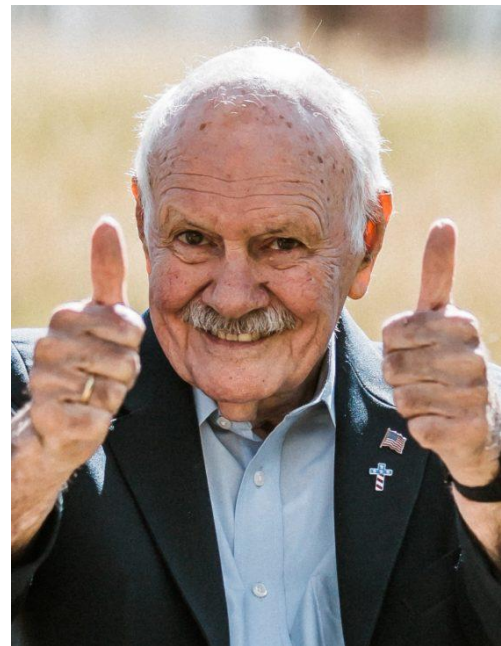
The grants are intended to support thesis or dissertation research involving mollusks conducted by a student enrolled in an advanced degree program, although undergraduate students are also eligible. The sponsored research is expected to result in a peer-reviewed publication.

Two students were awarded Carriker grants this year: **Allison Rugila**, SUNY Stony Brook University, for her research, “Using the Lipidome

to Assess Resiliency to Acidification and Oxidative Stress in Larval and Juvenile Northern Quahogs,” and **Nicholas Gladstone**, Auburn University, for his research, “Phylogenomic Reconstruction of the Ornate Rocksnail Complex (Pleuroceridae: *Lithasia*).”

Congratulations to Allison and Nicholas!

The two 2019 Carriker Award winners, **Michelle Gannon** and **Andrew Villeneuve**, report on their research on pp. 7 and 9.



THE JOHN B. BURCH MALACOLOGY FUND

*Submitted by Tom Duda, Diarmaid Ó Foighil,
and Taehwan Lee (first two are AMS Past
Presidents)*

In recognition of Jack Burch’s vast contributions for more than half a century to the field of malacology, and to the training of malacologists, the Burch family recently established **The John B. Burch Malacology Fund** at The University of Michigan. In order to contribute to or learn more about this fund, please visit this website <https://lsa.umich.edu/umzm/mollusks/burch-malacology-fund.html>.



RESEARCH NOTES

MUDSNAILS (*TRITIA OBSOLETA*) RECORD NUTRIENT LOADING IN BARNEGAT BAY, NEW JERSEY

by Gannon, M.E., Watson, E.B., and Velinsky D.J.

Submitted by Michelle Gannon, recipient of the Carriker Research Award 2019

The Eastern Mudsail, *Tritia obsoleta* (Say 1822; Fig. 1), is commonly found in marine intertidal flats, natively occurring along the east coast of North America (Scheltema 1964). *T. obsoleta* are detritivores, grazing on microphytobenthos, yet populations expand in the presence of the macroalga, *Ulva* (Kelaher et al. 2003). Photosynthetic micro- and macroalgae incorporate dissolved nutrients, such as nitrate (NO_3^-), which is a common nutrient in waterways. Grazing allows *T. obsoleta* to assimilate the chemical signatures of their diet into their tissues, and also into shell-bound organic material, which remains locked in place long after the mudsnail has died.



Figure 1. Shells of *Tritia obsoleta*.

Stable isotope ($\delta^{15}\text{N}$) analyses of mollusks are often used to assess water quality as they act as time-integrated records of their surrounding environments. Values of $\delta^{15}\text{N}$ reveal anthropogenic loading: fertilizers have an average of +0.2‰, while sewage has values up to +25‰ (Kendall et al. 2007). Additionally, N processing, such as fixation, can yield isotopically light values (Casciotti 2016) or denitrification, which can result in isotopically heavy nitrate-nitrogen (Kendall et al. 2007). The adage “you are what you eat” now takes on a new meaning as $\delta^{15}\text{N}$

values of *T. obsoleta* can reflect local nutrient sources and cycling.

Tritia obsoleta are found in abundance throughout Barnegat Bay (BB). Due to enhanced N loading, BB has experienced significant nuisance, harmful algal blooms, and eutrophic conditions, which have worsened since the 1970s (Fertig et al. 2014; Velinsky et al. 2017). This has resulted in habitat loss for critical species, like eelgrass, which are often outcompeted by macroalgae (*Ulva*) in shallow waters (Fertig et al. 2013; Kennish and Fertig 2015). A result is increased food sources for *T. obsoleta*, thus sustaining their status as an environmental indicator in BB. Previous studies suggest *T. obsoleta* are ideal candidates to record local N loading as this approach has been successfully applied to estuaries in New England (Peterson et al. 1986; Pruell et al. 2006), and New York (Watson et al. 2018). Here, we test the hypothesis that *T. obsoleta* can record anthropogenic change in N loading in BB by measuring the long and short-term shift in $\delta^{15}\text{N}$ values in tissues and shell-bound organic material.

Historical shells were obtained from the Malacology Collections of the Academy of Natural Sciences and Delaware Museum of Natural History. Live specimens of *T. obsoleta* were collected from BB in the summers of 2018

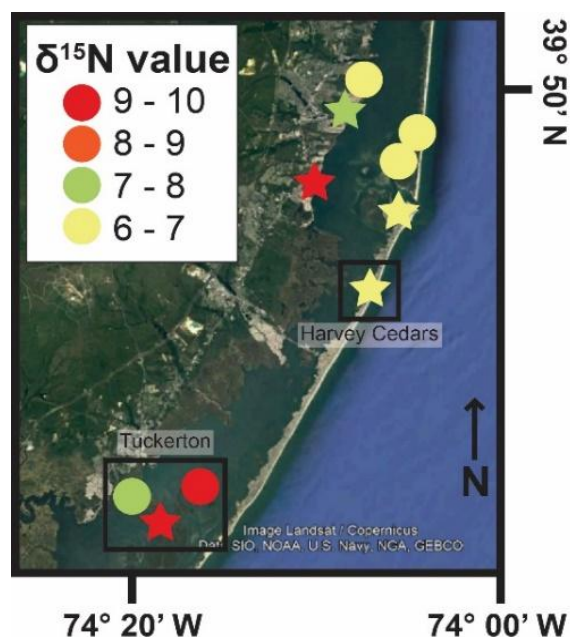


Figure 2. Sampling locations in Barnegat Bay, New Jersey. Collection in 2018 is represented by stars and 2019 by circles.

and 2019 and immediately frozen. Samples were analyzed with a Pyrocube interfaced with an Elementar Isoprime100 for $\delta^{15}\text{N}$ values.

Overall, there is not a significant shift between $\delta^{15}\text{N}$ values from tissues between 2018 and 2019 ($P = 0.32$). Although some sampling locations differ between 2018 and 2019, a visual assessment of $\delta^{15}\text{N}$ values from tissue samples do not appear to have a drastic spatial shift (Fig. 2).

There is not a significant difference in $\delta^{15}\text{N}$ values between the tissue and shell-bound N in specimens collected in 2018 ($P = 0.21$). This suggests shell-bound N can act as a proxy for $\delta^{15}\text{N}$ values of NO_3^- in ambient water (Fig. 3). Due to restrictions on lab work imposed by the Covid-19 pandemic, the shell-bound $\delta^{15}\text{N}$ values have not yet been obtained from the 2019 collection but it is expected to follow the same trend.

Values of $\delta^{15}\text{N}$ in historical specimens from Harvey Cedars and Tuckerton (Fig. 2) generally show trends towards ^{15}N depletion (Fig. 4). These trends may be due to anthropogenic N loading from historical fertilizer application or repression of NO_3^- removal due to an increase in sewage NH_4^+ (Xuan et al. 2020), among other possibilities. Harvey Cedars shows a stark shift between 1912 and 1962 although there is not a drastic swing after that. Meanwhile, Tuckerton experienced a shift toward ^{15}N enrichment between 1880 and 1932, followed by sharp depletion. The differences in these locations are likely due to localized hydrography and geochemical conditions. *Tritia obsoleta* offer a

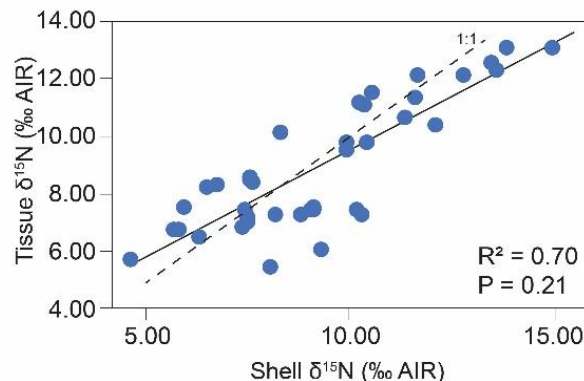


Figure 3. Comparison of $\delta^{15}\text{N}$ values from tissues and shell-bound organic material in live collected *T. obsoleta* from 2018.

unique, time-averaged insight to local water quality. We suggest that shell-bound N can be used to monitor changes in anthropogenic N loading. A replication of this study in years to come will be beneficial to determine successes in the reduction of fertilizer pollution in localized areas of BB, NJ.

Acknowledgements: Funding for this project was graciously provided by a Melbourne Carriker Research Award in 2019 from the American Malacological Society.

References

Casciotti KL (2016) Nitrogen and oxygen isotopic studies of the marine nitrogen cycle. Annual Review of Marine Science 8:379-407
 Fertig B, Kennish MJ, Sakowicz (2013) Changing eelgrass (*Zostera marina* L.) characteristics in a highly eutrophic temperate coastal lagoon. Aquatic Biology 104:70-79

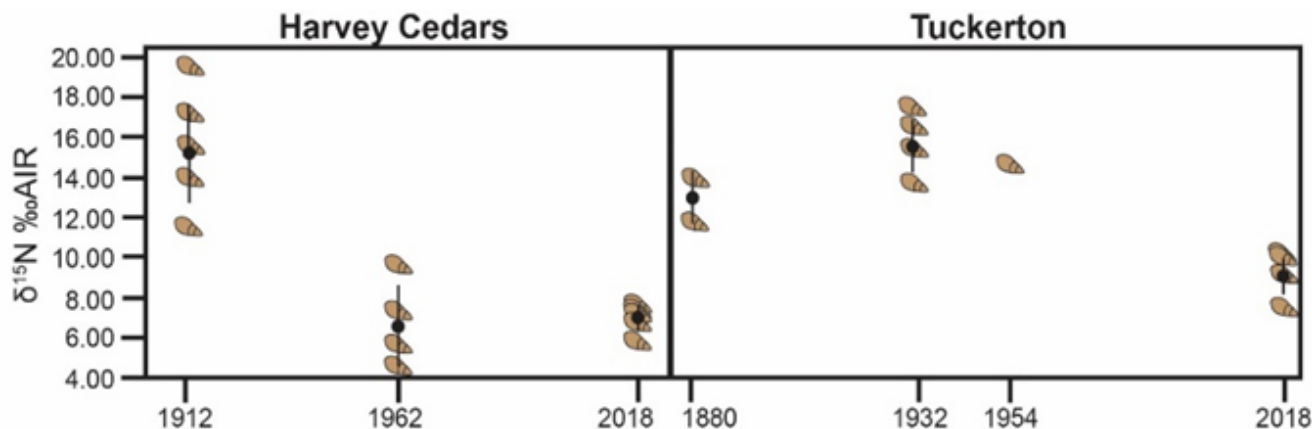


Figure 4. Historical *T. obsoleta* specimens reveal the general shift in $\delta^{15}\text{N}$ values in BB.

- Fertig B, Kennish MJ, Sakowicz GP, Reynolds LK (2014) Mind the data gap: Identifying and assessing drivers of changing eutrophication condition. *Estuaries and Coasts* 37:198-221
- Kelaker BP, Levinton JS, Hoch JM (2003) Foraging by the mud snail, *Ilyanassa obsoleta* (Say), modulates spatial variation in benthic community structure. *Journal of Experimental Marine Biology and Ecology* 292:139-157
- Kendall C, Elliott EM, Wankel SD (2007) Tracing anthropogenic inputs of nitrogen to ecosystems. *Stable Isotopes in Ecology and Environmental Science*, 2nd edition, Chapter 12, eds. Michener R, Lajtha K. Blackwell Publishing, Massachusetts.
- Kennish MJ, Fertig BM (2015) Evaluating ecological and social impacts on New Jersey legislation regulating fertilizer nitrogen loads to Barnegat Bay-Little Egg Harbor Estuary by using isotopic signatures, seagrass demographics, social response and communications. *New Jersey Sea Grant Consortium*: 15-882
- Peterson BJ, Howarth RW, Garritt RH (1986) Sulfur and carbon isotopes as tracers of salt-marsh organic matter flow. *Ecology* 67:865-874
- Pruell RJ, Taplin BK, Lake JL, Jayaraman S (2006) Nitrogen isotope ratios in estuarine biota collected along a nutrient gradient in Narragansett Bay, Rhode Island, USA. *Marine Pollution Bulletin* 52: 612-620
- Scheltema RS (1964) Feeding habits and growth in the Mud-Snail *Nassarius obsoletus*. *Chesapeake Science* 5:161-166
- Velinsky DJ, Paudel B, Belton TJ, Sommerfield CK (2017) Tidal marsh record of nutrient loadings in Barnegat Bay, New Jersey. *Journal of Coastal Research* 78:79-88
- Watson EB, Szura K, Powell E, Maher N, Wigland C (2018) Cultural eutrophication is reflected in the stable isotopic composition of the Eastern Mudsnail, *Nassarius obsoletus*. *Journal of Environmental Quality* 47:article 1
- Xuan Y, Tang C, Cao Y (2020) Mechanisms of nitrate accumulation in highly urbanized rivers: Evidence from multi-isotopes in the Pearl River Delta, China. *Journal of Hydrology* 587:124924

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INVESTIGATING PATTERNS IN GROWTH ACROSS LOCALLY ADAPTED POPULATIONS OF THE ATLANTIC OYSTER DRILL (*UROSALPINX CINEREA*): PROJECT UPDATE AND RESULTS

*Submitted by Andrew Villeneuve, recipient of
the Carriker Research Award 2019*



Figure 1. *Urosalpinx cinerea* (Atlantic Oyster Drill) juvenile.

Urosalpinx cinerea (Atlantic Oyster Drill, Fig. 1) is a predatory marine snail of oysters with widespread distribution on the Atlantic coast of North America from Nova Scotia to Florida and an introduced range in the Pacific from Washington to California (Carriker, 1955). In my research, I sought to understand the extent of intraspecific variation in growth rate across native and invasive populations of *U. cinerea* and the environmental mechanisms driving patterns of growth rate adaptation across populations.

Local adaptation among populations may confer different reactions to climate change within a single species, necessitating research to understand how genotype is adapted to environment among populations (Peterson *et al.*, 2019). *U. cinerea* is a good candidate for assessing local adapted traits because it is direct-developing, resulting in low dispersal and therefore low potential gene flow among populations. Previous work examining intraspecific variation in growth across latitude in fishes found evidence for northern, cold populations to grow faster than southern, warm populations at common garden laboratory

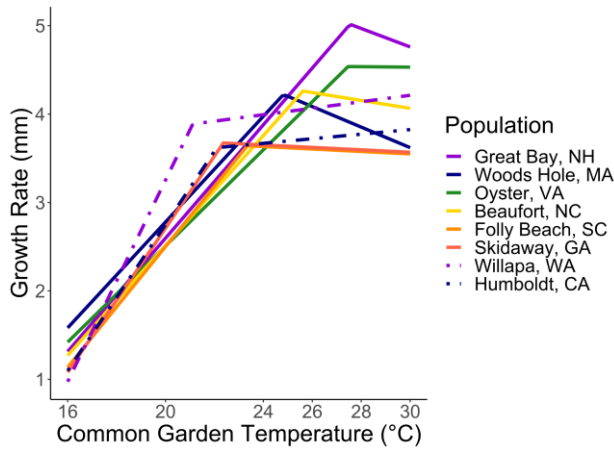


Figure 2. Thermal performance curves of net shell growth for each population of *U. cinerea* over six common garden water bath temperatures. TPCs created using piecewise regression (*segmented* R package).

temperatures in a pattern called *countergradient variation*, but other adaptive patterns are possible including a *cogradient* and a *mixed* model (Yamahira and Conover, 2002; Baumann and Conover, 2011).

In the spring of 2019, I collected broodstock of *U. cinerea* from eight populations, six in the Atlantic and two in the Pacific, and brought

them to the University of Massachusetts’ Gloucester Marine Station. There, I reared a juvenile F1 generation from egg cases. I measured shell length of each recruit before depositing snails from each population within a common garden experiment of six different temperature aquaria. For 24 days, I supplied snail recruits with oyster spat *ad libitum* and recorded consumption rates. At the end of the experiment, I recorded final snail shell length.

With growth and consumption data for each population across the common garden experiment, I fitted piecewise regressions to create thermal performance curves (TPC) for each population (Fig. 2). To statistically analyze differences in these TPCs, I extracted the maximal trait performance (the Y-axis breakpoint of each TPC) and the thermal optima (the X-axis breakpoint) for each population and created linear models between the maximal trait performance and environmental parameters of each population’s site. Using a model selection framework (AIC), I chose which environmental metrics best explained the spatial patterns of maximal trait performance thermal optima.

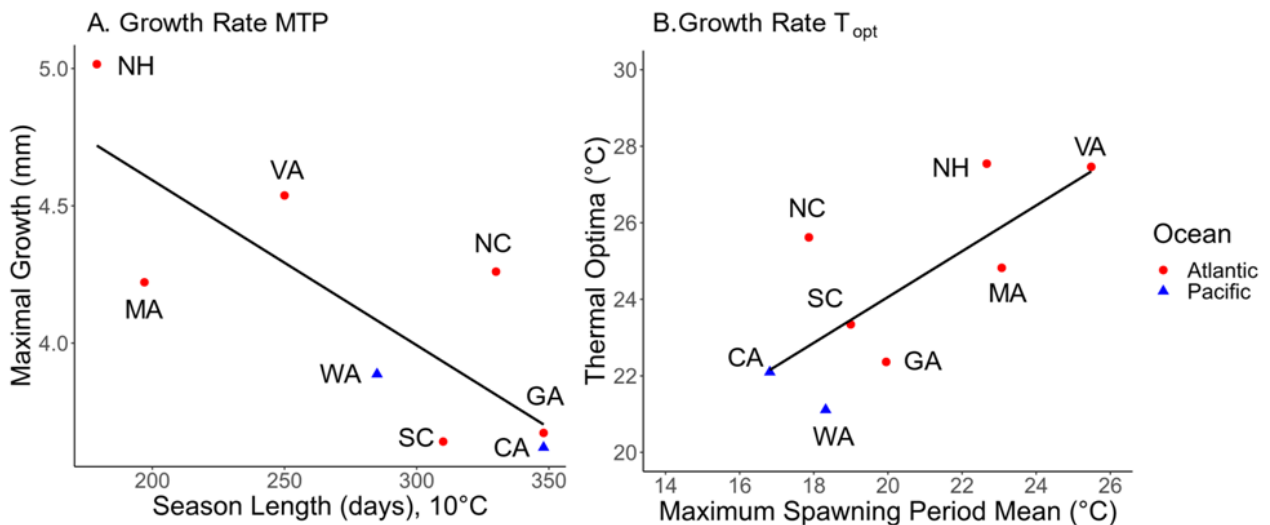


Figure 3. Relationship between maximal growth rate and season length above 10°C (A) and thermal optima and maximum spawning period mean temperature (B). Maximal growth and thermal optima are the X and Y components of thermal performance curve breakpoints, respectively. MTP - maximal trait performance.

I found maximal growth rate in shell length was negatively correlated with season length above 10°C, and thermal optima to be positively correlated with mean temperature during maximum spawning (Fig. 3). Populations with fewer warm days throughout the year tended to grow the quickest in the common garden experiment, while those experiencing most of the year above 10°C grew more slowly (linear model, $F_{1,6} = 9.94$, $P = 0.018$). Interestingly, high latitude populations tended to spawn later in the year than low latitude populations, resulting in warmer spawning periods at high latitude than low latitude. The thermal optima of populations with warm spawning periods was higher than populations with cooler spawning periods (linear model, $F_{1,6} = 7.09$, $P = 0.037$).

My results provide support for a novel *mixed model* pattern in growth rate with environment, such that populations with short growing seasons and warmer, later spawning periods expressed both the highest growth rates at warmer thermal optima. My results support a potential mechanism for rapid growth in seasonally variable habitats (e.g. New Hampshire, Massachusetts); shorter season length selects for rapid-growth phenotypes to take advantage of shorter periods of conducive growth temperatures (Baumann and Conover, 2011) and have optimal growth correlated to the mean temperature in which they develop (Ståhlberg *et al.*, 2001).

U. cinerea from high latitude currently express rapid growth TPCs, but results from populations with longer growing seasons at low latitudes suggests future adaptive pressure to evolve slower growth rates as sites warm due to climate change. Further, introduced populations from the Pacific show slow growth rates, which may aid in the control of *U. cinerea* at these sites. Overall, my results support the need for quantifying the environmental drivers of locally adapted trait performance to accurately forecast adaptation to climate change, especially in species of management concern.

Thanks to the American Malacological Society, in addition to support from the PADI Foundation and UMass Amherst, I have been able to successfully undertake these experiments and prepare a manuscript for publication. Updates on this research is available at villescience.weebly.com and on twitter @villeneuvesci.

Works Cited

- Baumann H, Conover DO (2011) Adaptation to climate change: contrasting patterns of thermal-reaction-norm evolution in Pacific versus Atlantic silversides. *Proceedings of the Royal Society B* 278: 2265–2273.
- Carriker MR (1955) Critical Review of Biology and Control of Oyster Drills *Urosalpinx* and *Eupleura*. U.S. Dept. of the Interior, Fish and Wildlife Service, Washington, D.C.
- Peterson ML, Doak DF, Morris WF (2019) Incorporating local adaptation into forecasts of species' distribution and abundance under climate change. *Global Change Biology* 25: 775–793.
- Ståhlberg F, Olsson M, Uller T (2001) Population divergence of developmental thermal optima in Swedish common frogs, *Rana temporaria*. *Journal of Evolutionary Biology* 14: 755–762.
- Yamahira K, Conover DO (2002) Intra- vs. interspecific latitudinal variation in growth: adaptation to temperature or seasonality? *Ecology* 83: 1252–1262.

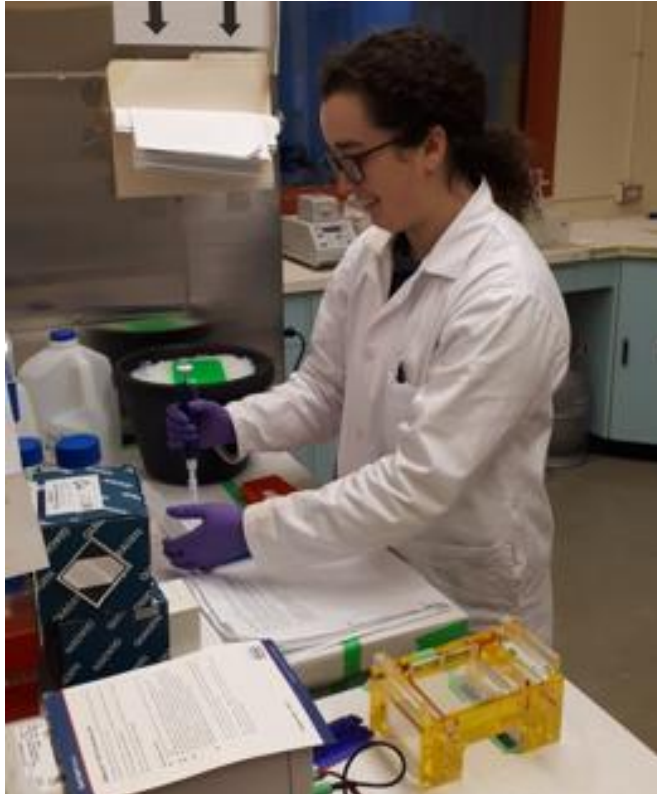


STUDYING THE NOT-SO-BORING CORAL-BORING BIVALVES

Submitted by Sarah MacLean

[Sarah recently completed her BSc (Honours) in Biology at Cape Breton U. and currently undertakes this research through the Clean Leadership Professional Internship program]

The health of coral reefs depends on a network of complex interactions among organisms living within and on the reef, yet many of these



Sarah MacLean working in a molecular lab at Cape Breton University, Nova Scotia.

interactions are not well understood. To enhance our understanding of these reefs and facilitate their protection and restoration, it is important to identify those species directly interacting with corals within these ecosystems and to investigate the nature of the interaction - whether positive or negative.

Common, yet poorly studied, constituents of coral reefs include the “coral-boring bivalves” - a polyphyletic assemblage of molluscs that use mechanical and/or chemical mechanisms to bury into living or dead corals and live within the cavity they create. Since some species can bore into live coral, there is an obvious cost to the coral through bioerosion. Boring bivalves may also increase the propensity for corals to incur disease. However, there are also some interesting and understudied benefits to the coral. For example, coral-boring bivalves may play an important role in breakdown of dead coral rubble, recycling elements back into the

ecosystem. Additionally, they may provide the coral with additional nutrients through deposition of waste products onto the coral.

Over the past year, I have been working with Dr. Rüdiger Bieler (Field Museum of Natural History, Chicago) and Dr. Tim Rawlings (Cape Breton University, Nova Scotia), to assess the identities and species richness of the coral-boring bivalve community in the Florida Keys National Marine Sanctuary (FKNMS) through a combined morphological and molecular approach.



Dr. Rüdiger Bieler collecting chunks of dead coral with bivalve holes in a nearshore patch reef, Lower Florida Keys, Oct. 2020.

To date, much of my work has focused on the molecular characterization of bivalve samples from Dr. Bieler’s coral reef restoration site in the FKNMS using nuclear and mitochondrial genes. However, I have also been working to extend my sampling to other parts of the Caribbean and other coral reefs around the world. Prior to the start of this project, molecular techniques had not been employed for identification of boring bivalves in the Florida Keys; molecular studies are particularly important in my study because they can illuminate the presence of cryptic species in this morphologically conservative assemblage of bivalves.

I have concentrated most of my efforts to date on the family Mytilidae, including three genera of coral-boring bivalves: *Lithophaga*, *Leiosolenus*, and *Botula*. So far, I have found evidence of cryptic species within Floridian populations of both *Lithophaga* and *Leiosolenus*. Preliminary data also show a clear genetic divergence in Atlantic vs. Pacific specimens of *Botula fusca*.



Boring bivalve *in situ* in a chunk of dead coral that was chiseled open, Oct. 2020.

This brings me to another important research question. Some boring bivalve species in the Florida Keys have been recorded from other localities around the world, even as far away as Japan. Do these boring bivalve species really have such huge geographic ranges, or could these represent different species? If the latter, there may be considerably more diversity in this group than currently recognized. Hopefully, our research will shed some light on this.

I would like to extend my gratitude to everyone who is making this research possible, including Paul Valentich-Scott and the Santa Barbara Museum of Natural History for providing specimens, Gustav Paulay and John Slapcinsky at the Florida Museum of Natural History for access to specimens through their General Collections, and Pamela Soltis and Terry Lott for tissue samples from the FLMNH Genetic

Resources Repository. I would also like to thank the Clean Foundation, NSERC, and an award by the Paul M. Angell Family Foundation to Dr. Bieler for providing funding in support of this research, and, of course, Drs. Rawlings and Bieler for their continuous support and guidance. FKNMS research permits have allowed the latter to sample coral-boring bivalves for this project.



CRUISING ANTARCTIC WATERS FOR APLACOPHORA

Submitted by Kevin Kocot, AMS Vice-President

Dr. Kevin Kocot (University of Alabama) and his team are currently on board the [RVIB Nathaniel B. Palmer](#) and underway to study the biodiversity and systematics of the worm-like aplacophoran molluscs in waters off Antarctica.

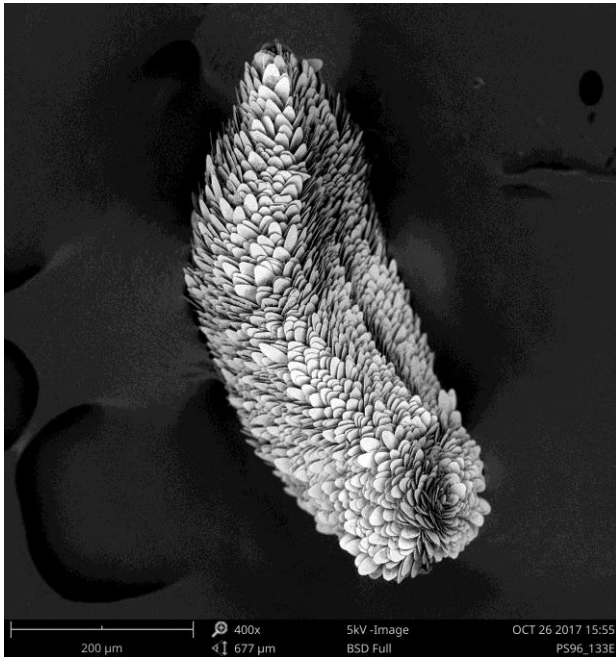


Phyllomenia sp. from the Ross Sea, Antarctica, approximately 2 mm long.

The COVID-19 pandemic made this a difficult year to execute Antarctic research. Instead of flying to a port in the southern hemisphere and taking a ship from there, on September 20th, the team flew to San Francisco and quarantined

in a hotel for several days followed by testing for COVID-19. The team then boarded the ship and quarantined for another two weeks at port with two additional COVID-19 tests during this time. Fortunately, everyone consistently tested negative and, on October 8th, the ship began its long transit south to Punta Arenas, Chile where they arrived on November 2nd.

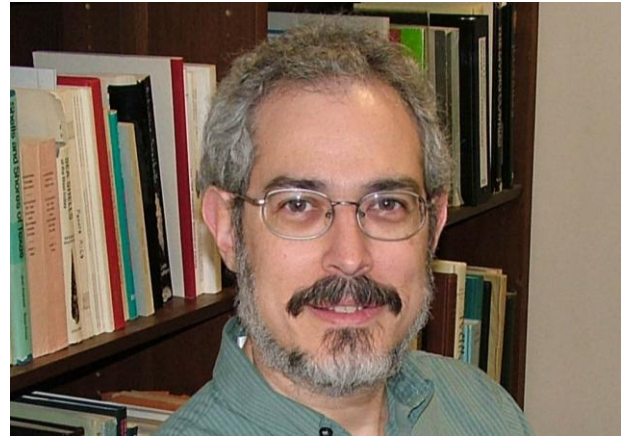
At the time of writing, the ship was being loaded with scientific equipment and the team was preparing to head to Antarctic waters. Once in the Antarctic, Dr. Kocot and his students and colleagues will sample small macrofauna and meiofauna, focusing on aplacophorans, in order to improve understanding of the biodiversity and evolutionary history of this understudied clade, which is particularly diverse in the Antarctic. Learn more about the expedition by reading coverage at [UA News](#) and follow the shipboard blog by visiting www.icyinverts.com. This research was funded by the National Science Foundation ([grant #1846714](#)).



Scanning electron micrograph of *Sandalomenia* sp. (?) from the Weddell Sea, Antarctica.



NEWS AND ANNOUNCEMENTS



GARY ROSENBERG ELECTED NEWEST AMS HONORARY LIFE MEMBER

*Submitted by Paula M. Mikkelsen, Past
President AMS and Chair, Recognitions and
Resolutions Committee*

The AMS Constitution allows for ten Honorary Life Members* at any one time. This title, awarded by AMS Council, recognizes the outstanding professional accomplishments of a colleague (usually, but not always, a long-standing AMS member). Well-known malacologists so honored in the past include Henry Pilsbry, Paul Bartsch, William Clench, R. Tucker Abbott, J. Z. Young, Robert Robertson, Ruth Turner, and Richard Petit. AMS also recognizes one Honorary Life President (there can only be one at a time); our current Honorary Life President is Alan Kohn.

Any member can propose a new candidate for Honorary Life Member. All that is required is to assemble a list of the candidate's accomplishments, with ten supporting signatures of members in good standing. The proposal is then submitted to the AMS Council for a vote. Honorary Life Members receive a

* Note: Honorary Life Membership is distinct from Life Membership. In the latter, a member chooses to prepay 15-30 years' worth of annual dues (depending on age of the member) in one lump sum, and is excused from any further dues payments.

framed declaration, signed by the AMS President and Chair of the Resolutions Committee, and are excused from further annual dues payments.

At the beginning of this year, AMS was down to only three Honorary Life Members (John “Jack” Burch, Eugene Coan, and Carole Hickman). During our Zoom Meeting this past summer, we elected Gary Rosenberg of the Academy of Natural Sciences of Drexel University (Philadelphia) as our newest Honorary Life Member. The text of the resolution is as follows:

“Whereas, **Gary Rosenberg’s** research on molluscan diversity, especially expressed in the abundant landsnails of Jamaica and marine mollusks of the Philippines, has informed our understanding of molluscan natural history and evolution;

“Whereas, **Gary Rosenberg’s** seminal development and leadership of online databases (Malacolog, MolluscaBase, OBIS) and other e-tools, his development of and care for the molluscan collections at the Academy of Natural Sciences, and his participation on the International Commission on Zoological Nomenclature have facilitated the research efforts of a wide range of biologists and other users worldwide;

“Whereas, **Gary Rosenberg** has effectively served the American Malacological Society as President, Council Member, organizer of symposia and workshops, and proponent of cooperation among AMS, COA, and other scientific societies; and

“Whereas, **Gary Rosenberg** has enriched our science and our lives as a colleague, curator, teacher, mentor, and student of all things malacological, with his dedication, professionalism, innovation, and friendship;

“Be it therefore resolved that **Gary Rosenberg** is hereby named **Honorary Life Member of the American Malacological Society** this 10th day of July, 2020.”

Congratulations Gary!



FREE PAGE CHARGES IN AMB FOR AMS STUDENT MEMBERS!

Submitted by Wallace Meyer “Marty,” AMB Editor

The AMS council recently approved that additional society funds be applied to cover page charges for student authored *American Malacological Bulletin* manuscripts in 2021. The only conditions are that students must be the lead author and that the student author must be a current AMS member.

All publication fees will be waived, unless authors would like to include color images/figures in the print version, as printing figures is expensive. Color images in the online version are both welcomed and recommended.

Please let the editor know that the lead author is a student with current AMS membership either in the cover letter, or after the manuscript is accepted. Please do not assume the editor is aware of the status of the lead author, because I assure you, he likely does not.

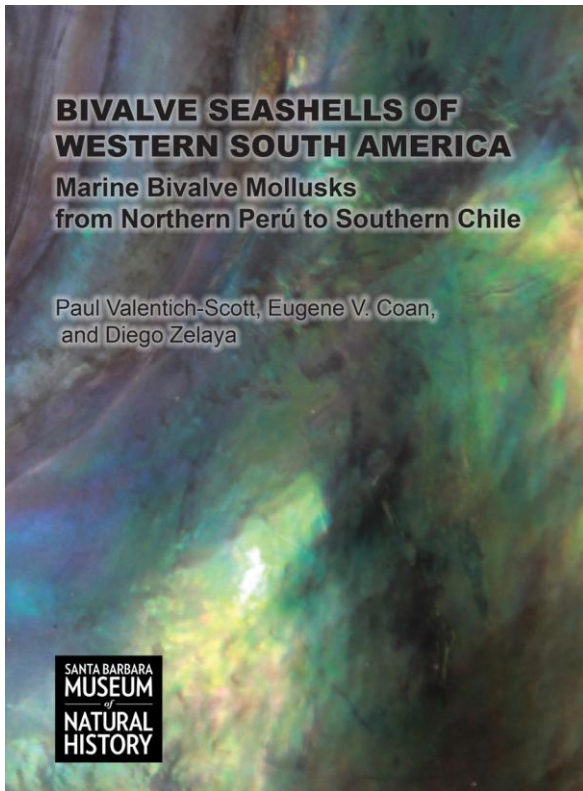


BIVALVE SEASHELLS OF WESTERN SOUTH AMERICA, MARINE BIVALVE MOLLUSKS FROM PUNTA AGUJA, PERÚ TO ISLA CHILOÉ, CHILE

New Book by Paul Valentich-Scott, Eugene V. Coan, and Diego G. Zelaya

Bivalve Seashells of Western South America is the most comprehensive book ever written on southeastern Pacific Ocean bivalves.

The culmination of an eight year study, it treats all bivalve mollusks living from northern Perú to southern Chile. A total of 256 species are described and illustrated with **detailed color photographs** and drawings. **All habitats** in the



region are included from the intertidal splash zone to the bathyal depths of the ocean basins.

The book has more than 5,000 complete bibliographic references to the bivalves including citations on the biology, physiology, ecology, and taxonomy of this commercially and biologically important group. **Character tables** and dichotomous keys assist the reader in identification. Also included in the 593 page book is an **illustrated key** to the superfamilies of the region, and a **complete glossary**.

This is a **“must have publication”** for malacologists, paleontologists, archeologists, libraries, shellfishery and environmental scientists, and shell collectors.

In USA order online at: <https://bit.ly/2HIPPj2>
 Can also be ordered from Amazon: <https://www.amazon.com/dp/0936494476>
 Outside the USA, order at ConchBooks: <https://www.conchbooks.de/?t=53&u=47637>
 For other ordering options, send email to: vdelnavaz@sbnature2.org



A NEW WEB PORTAL FOR THE BAILEY-MATTHEWS NATIONAL SHELL MUSEUM COLLECTION CATALOG

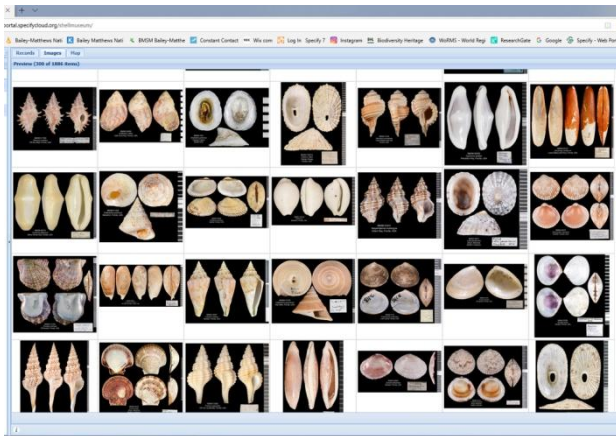
Submitted by José H. Leal, AMS Past President

[José Leal is Science Director & Curator at Bailey-Matthews National Shell Museum]

A new web portal is available for remote searches in the catalog of the Bailey-Matthews National Shell Museum collection (BMSM). A “medium-large” malacological collection, BMSM provides taxonomic, geographic, and temporal data on marine, terrestrial, and freshwater mollusks to a broad range of users in zoology, marine biology, genetics, conservation, geology, and other fields.

The collection currently includes about 130,000 lots, and its catalog was recently transferred to cloud-based Specify 7 software. Our catalog currently includes about 3,000+ composite images of important material, including specimens from southwestern Florida, Florida in general, the Redfern Collection (Abaco, Bahamas), types, and others.

The acquisition, posting, and archiving of images in the catalog follows the latest standards in the field, and results from the effort and dedication of Digital Image Specialists James F. Kelly and Patricia Starkey. The cataloging and imaging projects have been funded in phases through three grants from the Institute of Museum and Library Services. You may search the Collection at <https://webportal.specifycloud.org/shellmuseum>.



IN MEMORIAM



Richard I. Johnson (Nov. 2010), photograph by Karen Johnson.

RICHARD IRWIN JOHNSON (1925-2020)

Submitted by Alan Kabat, Research Associate, Museum of Comparative Zoology

Richard Irwin Johnson, the oldest and longest-serving member of the American Malacological Society (AMS) and its predecessor, the American Malacological Union (AMU), passed away July 1st 2020 at the age of 95. His 135 malacological publications spanned a period of

nearly 75 years, from 1941 at age 16 to 2015 at age 90. He was a volunteer and later a Research Associate at Harvard’s Museum of Comparative Zoology (MCZ) for many years. He published extensively on the systematics and biogeography of the Unionidae of the eastern United States, with a particular emphasis on the south Atlantic Slope, from the Potomac River (Maryland) to Florida. He did much to straighten out the nomenclature and systematics of this highly speciose freshwater bivalve family. He described five new species of Unionidae and one new species of Margaritiferidae. The Freshwater Mollusk Conservation Society awarded its Lifetime Achievement Award to Johnson in 2001 for his “contributions to freshwater malacology through taxonomy, biogeography, bibliography, and biography.”

Johnson also published extensively on the history of malacology, authoring definitive biographies and species catalogues for numerous 19th- and 20th-century researchers, including A.A. Gould, Addison Verrill, Katharine Bush, Jesse Wedgwood Mighels, Temple Prime, and many others. Taken together, Johnson’s publications and his curation of the MCZ’s sizable Unionidae collections have greatly facilitated the research of others, as well as the curation of mollusk collections at other natural history museums.

Johnson was initially mentored by William J. Clench (1897-1984), longtime curator at the MCZ, when Johnson began as a volunteer at the MCZ as a 14-year old high school student in 1939. After serving in World War II, Johnson returned to the MCZ as an undergraduate, and after graduating from Harvard College in 1951, remained at the MCZ for more than a half-century. He mentored several unionid researchers, including Samuel Fuller (deceased), Doug Smith (Univ. of Massachusetts, Amherst) and Dan Graf (Univ. of Wisconsin, Stevens Point).

Johnson joined the AMU in 1941, after having attended his first AMU meeting in 1940 at the Academy of Natural Sciences in Philadelphia. He attended a number of AMU meetings from

the 1940s to the 1960s, and also served as a Council Member for a two-year term in the 1960s. He was also quite active with the Boston Malacological Club (BMC) in the 1950s and 1960s, presenting papers and serving a term as President. He encouraged a number of fellow enthusiasts to join the BMC, some of whom are still members, decades later, including George Buckley and Kristina Joyce.

Over the years, Johnson acquired one of the largest private libraries in malacology, a working library that he used for his own publications and made available to researchers at the MCZ. He donated numerous rare books and reprints to the MCZ's Mollusk Library.

While Johnson was the oldest and longest-serving member of the AMS at the time of his death, it takes not one but two colleagues to fill that position. The oldest current member of the AMS appears to be John (Jack) Burch (born in 1929, and joined AMU as a graduate student in 1954), with Alan Kohn (born in 1931 and joined AMU as a graduate student in 1955) close behind, while the longest-serving member of the AMS is Barry Roth (joined AMU in 1951, at the age of 9).

A full biography, bibliography, and catalogue of species is in preparation and will be published elsewhere.



JOHN STUART PEARSE (1936-2020)

Submitted by David R. Lindberg, Terrence M. Gosliner, & Douglas J. Eernisse, all AMS Past Presidents

John Stuart Pearse, Professor Emeritus in the Department of Ecology and Evolution (EEB) at the University of California Santa Cruz, died on 31 July 2020. John was the consummate invertebrate biologist with far-reaching interests and expertise. He was also an amazing teacher and mentor to a cadre of postdocs, graduate students, and hundreds of undergraduates who took his courses in Invertebrate Zoology, Intertidal Organisms, and Kelp Forest Ecology – all with strong field

and lab components. Although renowned for his work on the reproduction of echinoderms, John also worked on molluscs throughout his career and mentored numerous students who went on to work on molluscs.



John S. Pearse in the field at Pacific Grove, California. Image courtesy of Vicki Pearse.

John's molluscan work is divisible into several areas, including kelp forest molluscs (abalone, trochaceans), molluscan reproduction and development (chitons, bivalves, gastropods), intertidal molluscs (*Mytilus*, trochaceans, *Lacuna*, lottiids), nudibranch distributions and climate change, and terrestrial slugs (*Ariolimax*). Some of this work was associated with his students' research topics, but most were research projects that John initiated and conducted.

His first molluscan paper (Lowry & Pearse 1973) documented the changes in abalone populations and their habitat utilization with the arrival of sea otters. This paper, along with the earlier work of the malacologist Jim McLean (1962), documented the now classic ecological cascade of otters, kelp, and kelp forest herbivores. In addition, this project also produced an annotated checklist of algae and invertebrates found in kelp forests, including coverage of almost 50 species of molluscs (Pearse & Lowry 1974). This work led to other contributions on the distribution of trochaceans in the kelp forests (Lowry *et al.* 1974; Riedman *et al.* 1981) and abalone population dynamics and conservation (Hines & Pearse 1982; Rogers-Bennett & Pearse 1998; 2001).

John next turned his molluscan attention to chitons. In a four paper series on the

reproductive periodicities of Indo-Pacific invertebrates in Gulf of Suez, John focused on chitons and abalone for the final installment (Pearse 1978). Chitons continued to pique John's interest and he ultimately produced his seminal review of chiton reproduction and development in volume 5 of the *Reproduction of Marine Invertebrates* (Pearse 1979); a series in which he edited seven volumes (including Volumes 4 and 5 on molluscs) with his former advisor, Arthur Giese of Stanford University.

In addition to this book series, John also participated with his wife, Vicki Buchsbaum Pearse, and her parents (the original authors) in the revision of the classic *Animals Without Backbones* (Buchsbaum *et al.* 1987), and also an entirely new textbook, *Living Invertebrates* (Pearse *et al.* 1987). One of the unique aspects of the latter was a final color-illustrated chapter on the use of color by invertebrate animals, including molluscs. This was also one of the first invertebrate texts that did not feature an imaginary un-torted but snail-like hypothetical ancestral mollusc (HAM), instead using a chiton as a living proxy for perhaps a more realistic view of molluscan ancestry.

John's kelp forest and chiton work was followed by numerous molluscan publications, co-authored with students and colleagues; most of which dealt primarily with intertidal taxa and include Steele *et al.* (1980), Bosch and Pearse (1988), Lindberg and Pearse (1990), Langan-Cranford and Pearse (1995), Foster *et al.* (2003), and Van De Werfhorst and Pearse (2007). However, inclusion of John on a manuscript was never a prerequisite for being a member of his lab.

John's next molluscan research project moved from the marine realm to the terrestrial with the initiation of a multi-pronged study of banana slugs (*Ariolimax*) – which also just happened to be the mascot of the University of California Santa Cruz and which he encountered daily on the campus' trails. Publications on slug reproductive biology include Leonard *et al.* (2002) and Leonard *et al.* (2007).

John's most recent research project focused on nudibranchs. John was always a strong advocate of the importance of long-term monitoring and enthusiastically joined Terry Gosliner and Jeff Goddard in leveraging historical data of nudibranch species richness collected by a team of citizen scientists including Gary McDonald and continued by Jim Nybakken. Building on the historical studies, changing populations were added over three additional years of data collection. These studies resulted in a publication (Schultz *et al.* 2011) that clearly demonstrated that nudibranch diversity and population numbers increased during El Niño cycles and diminished during La Niña patterns. A second paper (Goddard *et al.* 2011) demonstrated the ecological impact of a predatory nudibranch as its range shifted northward as climate change accelerates.



2019 World Congress of Malacology, Asilomar, California. From left: Douglas J. Eernisse, John S. Pearse, Frank E. Anderson, David R. Lindberg. Image courtesy of Frank E. Anderson

John's malacological graduate students included Phil Murphy (1978) who used electrophoresis to identify a cryptic lottiid in the California fauna, Chris Harrold who studied trochacean escape responses from sea stars, David Lindberg who examined the evolution of brooding in patellogastropod limpets, Doug Eernisse who studied chiton reproductive biology, population genetics, and systematics, and Frank Anderson who investigated phylogenetic relationships and biogeography of loliginid squids. There were

also numerous UC Santa Cruz undergraduates who were inspired or did molluscan senior theses with John and went on to advanced degrees at other institutions [e.g., Ross Dobberteen (Dobberteen & Pechenik 1987) and William Wright (Wright 1988, Wright *et al.* 1996)].

After he retired, John and colleagues organized LiMPETS (Long-term Monitoring Program and Experiential Training for Students) for the National Oceanic and Atmospheric Administration's west coast National Marine Sanctuary program. The program, conceived as an early citizen science program, today engages over 6,000 students, educators, and volunteers who collect data at more than 60 intertidal sites over 600 miles of California coastline. Included in the monitoring are about a dozen molluscan taxa such as chitons (*Mopalia* spp., *Nuttallina* spp., *Tonicella* spp.), *Lottia gigantea* and other *Lottia* spp., *Haliotis cracherodi*, *Tegula* spp., whelks (*Acanthinucella* spp., *Nucella* spp., *Ocenebrina* spp., *Urosalpinx* spp.), and *Mytilus* spp.

John was also a great supporter and advocate for museums and their collections serving on boards and committees associated with the Santa Cruz City Museum, Pacific Grove Museum of Natural History, and the California Academy of Sciences. At the Academy, John served as Trustee, Vice President, and ultimately President. His leadership and guidance were pivotal during the planning of the new Academy. In recognition of his scientific contributions and service to the Academy, John received the Academy's highest honor in 2011 – the Fellows Medal.

As mentioned above, John Pearse was the consummate invertebrate biologist and although his first love was the echinoderms, he could not pass up an interesting question or observation involving molluscs. This behavior was an outgrowth of his immense curiosity as well as his vast and deep knowledge of invertebrates and their communities. In his research practice, John combined the best aspects of a rigorous experimentalist (e.g.,

Pearse *et al.* 1986) with the traits of a modern integrative biologist.

John himself called for the resurrection of the naturalist and the construction of a new framework in which to operate (Pearse 2003). John went on to say that the foundation for this resurrection should be "...in the training of biologists to again be naturalists who think in synthetic ways, incorporating an appreciation of widely different disciplines, approaches, techniques, and taxa, in the context of well-defined fundamental questions" (Pearse 2003: 276).

Malacology has long been an integrative research endeavor, but it also has experienced provincialism and specialization in which specialty journals and societies have multiplied. And while we cannot return to the malacology of the last century, we would do well to embrace John's vision of the modern naturalist regardless of the taxon, habitat, time period, or method of investigation.

References

- Bosch, I. & Pearse, J. S. (1988). Seasonal pelagic development and juvenile recruitment of the bivalve *Laternula elliptica* in McMurdo Sound, Antarctica. *American Zoologist* 28: A89-A89.
- Buchsbaum, R., Buchsbaum, M., Pearse, J. S. & Pearse, V. B. (1987). *Animals Without Backbones*. Chicago, University of Chicago Press.
- Dobberteen, R. A. & Pechenik, J. A. (1987). Comparison of larval bioenergetics of two marine gastropods with widely differing lengths of planktonic life, *Thais haemastoma canalicula* (Gray) and *Crepidula fornicata* (L.). *Journal of Experimental Marine Biology and Ecology* 109: 173-191.
- Foster, M. S., Nigg, E. W., Kiguchi, L. M., Hardin, D. D. & Pearse, J. S. (2003). Temporal variation and succession in an algal-dominated high intertidal assemblage. *Journal of Experimental Marine Biology and Ecology* 289: 15-39.
- Goddard, J. H., Gosliner, T. M. & Pearse, J. S. (2011). Impacts associated with the recent range shift of the aeolid nudibranch *Phidiana hiltoni* (Mollusca, Opisthobranchia) in California. *Marine Biology* 158: 1095-1109.
- Hines, A. H. & Pearse, J. S. (1982). Abalones, shells, and sea otters: dynamics of prey

- populations in central California. *Ecology* 63: 1547-1560.
- Langan-Cranford, K. & Pearse, J. S. (1995). Breeding experiments confirm species status of two morphologically similar gastropods (*Lacuna* spp.) in central California. *Journal of Experimental Marine Biology and Ecology* 186: 17-31.
- Leonard, J. L., Pearse, J. S. & Harper, A. B. (2002). Comparative reproductive biology of *Ariolimax californicus* and *A. dolichophallus* (Gastropoda; Stylommatophora). *Invertebrate Reproduction & Development* 41: 83-93.
- Leonard, J. L., Westfall, J. A. & Pearse, J. S. (2007). Phally polymorphism and reproductive biology in *Ariolimax (Ariolimax) buttoni* (Pilsbry and Vanatta, 1896) (Stylommatophora: Arionidae). *American Malacological Bulletin* 23: 121-135.
- Lindberg, D. R. & Pearse, J. S. (1990). Experimental manipulation of shell color and morphology of the limpets *Lottia asmi* (Middendorff) and *Lottia digitalis* (Rathke) (Mollusca, Patellogastropoda). *Journal of Experimental Marine Biology and Ecology* 140: 173-186.
- Lowry, L. & Pearse, J. S. (1973). Abalones and sea urchins in an area inhabited by sea otters. *Marine Biology* 23: 213-219.
- Lowry, L. F., McElroy, A. J. & Pearse, J. S. (1974). The distribution of six species of gastropod molluscs in a California kelp forest. *Biological Bulletin* 147: 386-396.
- McLean, J. H. (1962). Sublittoral ecology of kelp beds of open coast area near Carmel, California. *Biological Bulletin* 122: 95-114.
- Murphy, P. G. (1978). *Collisella austrodigitalis* sp. nov.: a sibling species of limpet (Acmaeidae) discovered by electrophoresis. *Biological Bulletin* 155: 193-206.
- Pearse, J. & Lowry, L. (1974). *An annotated species list of the benthic algae and invertebrates in the kelp forest community at Point Cabrillo, Pacific Grove*. Santa Cruz, CA, University of California, Santa Cruz. Technical Report Number 1: 1-73.
- Pearse, J. S. (1978). Reproductive periodicities of Indo-Pacific invertebrates in the Gulf of Suez. IV. The chitons *Acanthopleura haddoni* Winckworth and *Onithachiton lyelli* (Sowerby), and the abalone *Haliotis pustulata* Reeve. *Bulletin of Marine Science* 28: 92-101.
- Pearse, J. S. (1979). Polyplacophora. Pp. 27-86 in A. C. Giese & Pearse, J. S. *Reproduction of Marine Invertebrates. Molluscs: Pelecypods and Lesser Classes*. Vol. 5. New York, Academic Press.
- Pearse, J. S., Eernisse, D. J., Pearse, V. B. & Beauchamp, K. A. (1986). Photoperiodic regulation of gametogenesis in sea stars, with evidence for an annual calendar independent of fixed daylength. *American Zoologist* 26: 417-431.
- Pearse, J. S. (2003). The promise of integrative biology: resurrection of the naturalist. *Integrative and Comparative Biology* 43: 276-277.
- Pearse, V. B., Pearse, J. S., Buchsbaum, M. & Buchsbaum, R. (1987). *Living Invertebrates*. Palo Alto, CA, Blackwell Scientific Publications.
- Riedman, M. L., Hines, A. H. & Pearse, J. S. (1981). Spatial segregation of four species of turban snails (Gastropoda: *Tegula*) in central California. *The Veliger* 24: 97-102.
- Rogers-Bennett, L. & Pearse, J. S. (1998). Experimental seeding of hatchery-reared juvenile red abalone in northern California. *Journal of Shellfish Research* 17: 877-880.
- Rogers-Bennett, L. & Pearse, J. S. (2001). Indirect benefits of marine protected areas for juvenile abalone. *Conservation Biology* 15: 642-647.
- Schultz, S. T., Goddard, J. H., Gosliner, T. M., Mason, D. E., Pence, W. E., McDonald, G. R., Pearse, V. B. & Pearse, J. S. (2011). Climate-index response profiling indicates larval transport is driving population fluctuations in nudibranch gastropods from the northeast Pacific Ocean. *Limnology and Oceanography* 56: 749-763.
- Steele, B., Harrold, C. & Pearse, J. S. (1980). Territorial defense, dominance hierarchy, and space utilization in the limpet, *Lottia gigantea*. *American Zoologist* 20: 726.
- Van De Werfhorst, L. C. & Pearse, J. S. (2007). Trampling in the rocky intertidal of central California: a follow-up study. *Bulletin of Marine Science* 81: 245-254.
- Wright, W. G. (1988). Sex change in the Mollusca. *Trends in Ecology & Evolution* 3: 137-140.
- Wright, W. G., Kirschman, D., Rozen, D. & Maynard, B. (1996). Phylogenetic analysis of learning-related neuromodulation in molluscan mechanosensory neurons. *Evolution* 50: 2248-2263.



REPORTS

2020 AMS CONSERVATION COMMITTEE REPORT

Submitted by Jay Cordeiro, Chair,
Conservation Committee

Conservation Activities for U.S. Mollusks

The AMS Conservation Committee Report was delivered remotely during a virtual meeting held July 10. An expanded and modified summary of that report follows. This year saw a surprising (or not surprising depending on whom you ask) number of proposed removals of animal and plant species (all taxa) from listing under the U.S. Endangered Species Act (ESA). At the time of the meeting, six animal and plant species were removed from listing and seven were proposed for removal. Reasons for removal include recovery and availability of new information (twelve) and revised taxonomy (one). At the time of the AMS meeting, activity involving ESA rulings for mollusks was minimal. Since then, however, several proposals and rulings have been announced. They are summarized here for those of you not regularly reading the U.S. Federal Register reports on the train on your way to work (like I do...).

The Morro shoulderband snail (*Helminthoglypta walkeriana*) was proposed for reclassification from Endangered to Threatened on July 24th. Justification for the proposal is based on taxonomic revision, the result of which indicates the species is more secure in parts of its range than once believed. Surveys conducted since the time of listing indicate that numbers now occur in the thousands rather than the hundreds. Good news for this quarter-sized California endemic.

The longsolid (*Fusconaia subrotunda*) and round hickorynut (*Obovaria subrotunda*) mussels were each proposed as Threatened under the ESA on September 29th; however, listing of the purple lilliput (*Toxolasma lividum*) was not warranted. Some 1,115 river miles of Critical Habitat in Pennsylvania, Kentucky, West Virginia, Virginia, Tennessee, and Alabama were designated for the longsolid. Another 92 river miles were designated in Pennsylvania, Ohio, Indiana, Kentucky, West Virginia, Tennessee, Alabama, and Mississippi for the round hickorynut. So why did the longsolid and round hickorynut make the cut while the purple

lilliput did not? Good question, I'm glad I asked. Although all three species have experienced range reductions, the decline of the purple lilliput has not been as steep as the other two. The longsolid has lost 63% of its populations, the round hickorynut has lost 78%, while the purple lilliput has lost 47%. In addition, the purple lilliput is still found in all six major river basins where it was known to occur. Comment period for this proposal is open until December 28th. Text for the proposal and information about commenting are available online: <https://www.govinfo.gov/content/pkg/FR-2020-09-29/pdf/2020-17015.pdf>. PLEASE SUBMIT YOUR COMMENTS BEFORE THEN.



Round hickorynut

Five-year reviews were initiated for several mollusk species, including the Virginia fringed mountainsnail (*Polygyriscus virginianus*), James spiny mussel (*Pleurobema collina*) (October 13th); Curtis pearly mussel (*Epioblasma florentina curtisii*), scaleshell mussel (*Leptodea leptodon*), and white cat's paw pearly mussel (*Epioblasma obliquata perobliqua*) (August 31st). Although the comment period has closed, the agency will accept new information anytime <https://www.govinfo.gov/content/pkg/FR-2020-08-31/pdf/2020-19083.pdf>.

The canoe creek clubshell (*Pleurobema atearni*) was proposed as Endangered on November 3rd and 36.3 river miles in St. Clair and Etowah Counties, AL, were designated as Critical Habitat for the species. Fortunately, some of the above species' current distribution overlaps with other listed

aquatic species that share some of the same habitat requirements. This includes the Atlantic pigtoe, James spiny mussel, Tar River spiny mussel, dwarf wedgemussel, yellow lance mussel, Roanoke logperch, shortnose sturgeon, and the Atlantic sturgeon. Approved listing protection, therefore, can be extended to more than one species in the same location. Comment period for this proposal is open until January 4th, 2021. Text for the proposal and information about commenting are online <https://www.govinfo.gov/content/pkg/FR-2020-11-03/pdf/2020-22007.pdf> . PLEASE SUBMIT YOUR COMMENTS BEFORE THEN.

maintained its Endangered status under the ESA. Proposed removal from listing it was prompted by a study by Miller et al. (2000) indicating one of the three populations was potentially part of a different species or subspecies taxonomically. The publication of a larger more comprehensive study of the genetics of the species prompted the proposed listing which contends the taxon is not a valid species or subspecies.



James spiny mussel, photo credit USFWS



Kanab ambersnail (and Eisenhower dime), photo credit AZ Game and Fish



Atlantic pigtoe, photo credit USFWS.

One of the species removed from the list was a mollusk, the Kanab ambersnail (*Oxyloma haydeni kanabensis*), known only from three populations in Utah and Arizona. In 1992 the Kanab ambersnail was listed as Endangered under the ESA. Critical habitat was not designated due to a danger of over-collection or molestation (“please do not molest the snails”). A formal Recovery Plan was drafted in 1995. A five year review published in 2011

On August 12, 2019, the U.S. Fish and Wildlife Service (USFWS), re-organized under the Donald Trump administration and under acting director Margaret Everson, announced drastic changes to regulations set forth in the U.S. Endangered Species Act (50 CVF Part 24 Endangered and Threatened Wildlife and Plants; Revision of the Regulations for Listing Species and Designating Critical Habitat). “The best way to uphold the Endangered Species Act is to do everything we can to ensure it remains effective in achieving its ultimate goal—recovery of our rarest species. The Act’s effectiveness rests on clear, consistent and efficient implementation,” **said Secretary David Bernhardt**. “An effectively administered Act ensures more resources can go where they will do the most good: on-the-ground conservation.”

“The revisions finalized with this rulemaking fit squarely within the President’s mandate of easing the regulatory burden on the American public, without sacrificing our species’ protection and recovery goals,” **said U.S. Secretary of Commerce Wilbur Ross**. “These changes were subject to a robust, transparent public process, during which we

received significant public input that helped us finalize these rules.”

Major changes were already underway for the Environmental Protection Agency; the agency that oversees the U.S. Fish and Wildlife Service. As of 2020, the agency cut 19% of workforce (3,200 employees), through staff buyouts and layoffs. The mission of wildlife conservation was refocused on clean air, clean water, and other responsibilities. Enforcement of illicit wildlife activities and ESA violations was delegated to states, while decreasing money was given to states by 30%.

As of the start of 2020, 80 bills and Executive Orders by the President had been introduced to skirt, hamper, or undermine endangered species protections. Updates enacted were designed to ease the burden of regulations and increase transparency into decisions on whether a species warrants protections. Changes, however, were drastic and far-reaching. Major revisions include:

- (1) Put economic costs on saving species (to add or remove); removal of “best available science without reference to possible economic or other impacts of such determination”;
- (2) Consideration of Critical Habitat for listing only for *currently occupied* habitat (can still designate unoccupied Critical Habitat);
- (3) Removal of blanket protection of Threatened species (formerly like Endangered Species) such that species be assessed on an individual basis;
- (4) Removal of threat in “foreseeable future” to assess Threatened spp. (e.g. climate change);
- (5) Removal of ability to consider climate change when making listing assessments.

On this last point, climate change was removed from listing consideration of the aforementioned Kanab ambersnail or stated to not impact the species negatively. An extensive section of a few paragraphs of the review proposal was included warranting the exclusion of climate change in the listing process; and hence removal of the Kanab ambersnail from the U.S. Endangered Species list.

Critical habitat was designated back on June 4, 2019 for snuffbox (*Epioblasma triquetra*), spectaclecase (*Cumberlandia monodonta*), sheepnose (*Plethobasus cyphus*) and rayed bean (*Villosa fabalis*) freshwater mussels — ranging from Wisconsin and New York to Alabama and from Kansas to Virginia. The USFWS designated

190 miles of Critical Habitat on November 26, 2019, for the formerly believed extinct but recently rediscovered Suwannee moccasinshell (*Medionidus walkeri*) in Florida. Critical habitat includes portions of the Suwannee River, Upper Santa Fe River, and Withlacoochee River. Following 10 years of advocacy and litigation by the Center for Biological Diversity, the U.S. Fish and Wildlife Service proposed on February 5, 2020, to protect 319 river miles of critical habitat for the threatened yellow lance (*Elliptio lanceolata*) freshwater mussel in North Carolina, Virginia, and Maryland.



Photo credit USFWS

Designation of critical habitat allows for protection of specific geographic areas that contain features essential to the conservation of an endangered or threatened species and that may require special management and protection. It is a key to survival of endangered species.

Contrary to popular opinion, designating an area as critical habitat does not preclude that area from development. Critical habitat designation affects only actions on behalf of Federal agencies and such actions can be circumvented for federally funded activities by acquiring a federal permit. Revisions (1) and (2) above now make it much easier to avoid critical habitat violation penalties or circumvent designation altogether. One such example is the approval of incidental take of two endangered mussels, false spike (*Fusconaia mitchelli*) and Texas fawnsfoot (*Truncilla macrodon*), during a development project by the Brazos River Authority in Texas. The USFWS approved exclusion of ESA act penalties on October 6, 2020 (<https://www.govinfo.gov/content/pkg/FR-2020-10-06/pdf/2020-22063.pdf>).

Other Conservation Actions:

Canada completed its assessment of terrestrial gastropods in their Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Canada's equivalent of the U.S. Fish and Wildlife Service, in 2019. Two snails, toothed globe (*Mesodon zaletus*) and shagreen (*Inflectarius inflectus*), were assessed as Endangered with Carolina mantle slug (*Philomycus carolinianus*) assessed as Threatened. Within the U.S., from eastern Oklahoma and northeast Texas into neighboring Arkansas and Missouri, as well as east to Alabama and up the Appalachian Trail into New York across Lakes Ontario and Erie to southern Michigan, finding a toothed globe, with some persistence, is difficult but not impossible. The global range is very wide; area of occupied habitat over 1 million square miles. Number of occurrences and actual extent of occurrences is only a fraction of this. If that isn't alarming, this species' Canadian buddies are in real trouble. The low elevation forest snail is extirpated from six of its nine known occurrences in Canada and its presence in the remaining three could not be recently confirmed. The species has not been seen alive in Canada since 1994 despite extensive searches over the last 20 years (COSEWIC, 2019 *Mesodon zaletus*)! Lastly, if you, like me, are wondering what the heck a "shagreen" is, you can find out all kinds of useful tidbits of knowledge to use during bar trivia here: <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/shagreen-2019.html>.



Photo credit COSEWIC (2019). C. Goodrich and M. L. Winslow in 1890 in Leamington, University of Michigan Museum of Zoology, Bryant Walker collection, UMMZ 105034; see: COSEWIC. 2019. COSEWIC assessment and status report on the Toothed Globe *Mesodon zaletus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 38 pp.

U.S. House Bill and Other Legislation:

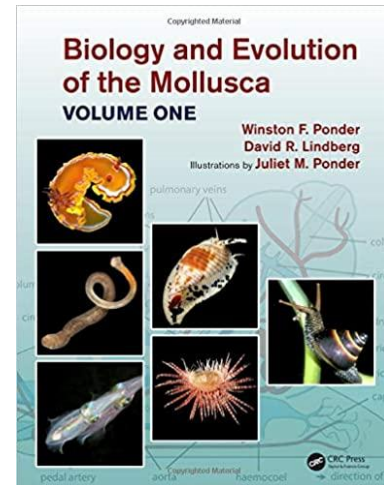
Following up on last year's President Trump Administration's changes in Endangered Species protection, the Center for Biological Diversity in Portland, Oregon, in November 2019 filed formal notice of their intent to sue the Trump administration for blocking the determination of the federal status of 274 species of animals and plants across the U.S. At the time, there was a more than 500 species backlog that should have been considered by the U.S. Fish & Wildlife Service (USFWS) developed in a 2016 plan. Some 21 unionid bivalves and 39 gastropods are included in this list.

President Trump signed Executive Order 13927 to provide federal agencies the foundation to speed up environmental permitting despite existing environmental regulations. Justification for the order was that the COVID-19 outbreak constitutes a national emergency posing a threat to U.S. national security. The Executive Order specifically addresses the following activities: transportation infrastructure projects; civil works projects within the jurisdiction of the U.S. Army Corps of Engineers; delivery of infrastructure and other projects on federal lands; National Environmental Policy Act emergency regulations and procedures; Endangered Species Act emergency consultation procedures; emergency regulations and nationwide permits under the Clean Water Act (CWA), Rivers and Harbors Act, and Marine Protection Research and Sanctuaries Act; and other authorities providing for emergency or expedited treatment of infrastructure improvements.

In response, the Center for Biological Diversity filed a notice on June 9 of its intent to sue the Trump Administration over the executive order directing all federal agencies to exploit the Endangered Species Act's emergency provisions to rubber-stamp the approval of fossil fuel pipelines, oil and gas drilling, and other routine infrastructure projects. This would mark the first time Trump has been sued for violating the Endangered Species Act, under which it is illegal for any person to solicit — that is, cause another person to commit — an act that harms protected wildlife or plants.

Major Conservation-Related Books and Monographs:

- Archambault, J.M., W.G. Cope, and T.J. Kwak. 2018. Chasing a changing climate: Reproductive and dispersal traits predict how sessile species respond to global warming. *Diversity and Distribution* 24(7): 880-891.
- Blevin, E., L. McMullen, S. Jepsen, M. Blackburn, A. Code, and S.H. Black. 2019. Mussel Friendly Restoration: A Guide to the Essential Steps for Protecting Freshwater Mussels in Aquatic and Riparian Restoration, Construction, and Land Management Projects and Activities. Xerces Society, Portland, OR.
- Böhm, M., N.I. Dewhurst-Richman, M. Seddon, S.E.H. Ledger, C. Albrecht, D. Allen, A.E. Bogan, J. Cordeiro, K.S. Cummings, A. Cuttelod, G. Darrigran, W. Darwall, Z. Fehér, C. Gibson, D.L. Graf, F. Köhler, M. Lopes-Lima, G. Pastorino, K.E. Perez, K. Smith, D. van Damme, M.V. Vinarski, T. von Proschwitz, T. von Rintelen, D.C. Aldridge, N.A. Aravind, P.B. Budha, C. Clavijo, D.V. Tu, O. Gargominy, M. Ghamizi, M. Haase, C. Hilton-Taylor, P.D. Johnson, Ü. Kebapci, J. Lajtner, C.N. Lange, D.A.W. Lepitzki, A. Martínez-Orti, E.A. Moorkens, E. Neubert, C.M. Pollock, V. Prié, C. Radea, R. Ramirez, M.A. Ramos, S.B. Santos, R. Slapnik, M.O. Son, A.-S. Stensgaard, and B. Collen. 2020. The conservation status of the world's freshwater molluscs. *Hydrobiologia*, DOI 10.1007/s10750-020-04385-w.
- Haag, W.R. 2019. Reassessing enigmatic mussel declines in the United States. *Freshwater Mollusk Biology and Conservation* 22: 43-60.
- Lydeard, C. and K.S. Cummings. 2019. *Freshwater Mollusks of the World. A Distribution Atlas*. Johns Hopkins University Press, Baltimore. 256 pp.
- Neubert, E., Seddon, M.B., Allen, D.J., Arrébola, J., Backeljau, T., Balashov, I., Bank, R., Cameron, R., de Frias Martins, A.M., De Mattia, W., Dedov, I., Duda, M., Falkner, G., Falkner, M., Fehér, Z., Gargominy, O., Georgiev, D., Giusti, F., Gómez Moliner, B.J., Groh, K., Ibáñez, M., Kappes, H., Manganelli, G., MartínezOrti, A., Nardi, G., Neiber, M.T., Páll-Gergely, B., Parmakelis, A., Prié, V., Reischütz, A., Reischütz, P.L., Rowson, B., Rüetschi, J., Slapnik, R., Son, M., Štamol, V., Teixeira, D., Triantis, K., Vardinoyannis, K., von Proschwitz, T., and Walther, F. (2019). *European Red List of Terrestrial Molluscs*. IUCN: Cambridge, UK and Brussels, Belgium.
- Ponder, W.F., D.R. Lindberg, and J.M. Ponder (eds.). 2019. *Biology and Evolution of the Mollusca Volume One*. CRC Press. 924 pp.
- Ponder, W.F., D.R. Lindberg, and J.M. Ponder (eds.). 2019. *Biology and Evolution of the Mollusca Volume Two*. CRC Press. 890 pp.



Future of the Committee:

I seek new members to join the Conservation Committee to provide updates or stories on regional fauna to include in both the annual committee report and the Conservation Newsletter Report. Although our By-Laws state that “the Conservation Committee shall consist of a chair appointed by the President and at least two additional members appointed by the chair,” we continue as a committee of one. The Committee is charged with promoting the conservation of molluscan biodiversity and coordinating AMS conservation efforts with any other groups or organizations with similar goals. I continue to support the committee as able but I solicit new Committee members. Conservation Committee news should continue to be reported on the AMS Imperiled Species Newsletter (<http://www.malacological.org/conservation.html>) and contributions are welcome from all AMS members. I will continue to provide updates to Federal legislation with respect to marine, freshwater, and terrestrial mollusks as they occur via email to members for discussion. Please contact me directly if you wish to contribute (jay.cordeiro@umb.edu).



MINUTES OF THE ANNUAL BUSINESS MEETING

Presented by Amanda S. Lawless, AMS Secretary
July 31, 2020

Virtual Zoom Meeting

[Minutes also available at
<https://ams.wildapricot.org/Members-Only/>]

The meeting was called to order by President Tim Collins at 3:00pm.

A motion was made and passed to approve the minutes of the 2019 business meeting.

Executive and Committee Reports were presented:

President's Report: Presented by Tim Collins. First, virtual AMS Meeting had 165 registrants with ~25% of those being students. Sixty-five abstracts were submitted with 47 talks and 18 posters. Zoom was used as the virtual platform and, after some issues, worked well. Four students were given the Constance Boone Award. This successful meeting will hopefully set a standard for future meetings with the potential to add a virtual component to in-person meetings. Tim thanked all those that helped him coordinate and run the meeting.

President-Elect: Presented by Tim Rawlings. The 87th AMS meeting in 2021 will take place on Cape Breton Island, Nova Scotia, Canada. The meeting venue will be on the Cape Breton University (CBU) campus. The meeting is scheduled from Monday, June 14th – Friday June 18th, with three days of scheduled talks/symposia, and field trip excursions on the last day. Sydney is accessible via road from Halifax's Stanfield International Airport (4.5-hour drive) or via air from Halifax, Toronto or Montreal (seasonal). Many hotels in the area of varying price ranges are located 15 minutes' drive/25 minutes' bus ride from campus. Accommodation on campus will not be available. The topic of the President's Symposium is: *Freshwater Mussels of the Atlantic Drainage: Ecology, Evolution, and Conservation*, and is being organized by freshwater mussel ecologists, Dr. André Martel (Canadian Museum of Nature) and Ms. Kellie White (CBU). A variety of field trips will be available on the last day of the conference and Tim will check into collecting permits.

- A comment was made to be sure symposia speakers submit manuscripts to the AMB.

A motion was made and passed to accept the 2021 meeting venue.

Vice-President: Presented by Ken Hayes. The 2022 joint UNITAS/AMS meeting will be in Munich, Germany, July 2022. They are still planning on holding the in-person meeting but will make a definitive decision when closer to the date.

Treasurer's Report: Presented by Elizabeth Shea. The 2019 AMS finances are strong and the society is on good financial footings. The transition to Wild Apricot has simplified the management of personal and professional memberships including renewals, communication, shipping of AMB, and billing of page charges. We have \$488K in the PNC bank account that is waiting to be moved to a new Vanguard investment account. Most of this money was donated by the Estate of Harold Dundee.

Audit & Budget Committee Report: Presented by Elizabeth Shea. The 2020 Budget will be considerably off from expectations due to complications from Covid-19. The biggest driver of this adjustment is the change from an in-person meeting to a virtual meeting. As a consequence, we did not spend the travel support money for the President's Symposium or for the Editor-in-Chief, Treasurer, and Secretary. We also opted to not award the inaugural Petite, Sturm (one time), or Dee Saunders awards due to the unusual nature of the meeting venue. This year we received \$19,376 from BioOne which is roughly the same as last year but the amount of revenue from page charges is down due to low submission rates.

Motion to pass budget. Motion passed.

Secretary's Report: Presented by Amanda Lawless. Highlights of the report were the launch of the new AMS website and online membership database through Wild Apricot. It was launched the beginning of 2019 with the help of Chris Hobbs (webmaster) and Liz Shea (treasurer). Members can now sign up and pay dues online. This was the first year for renewals using the website and there were a few glitches that we believe we have worked out. We also used the Wild Apricot website for the 2020 meeting registration. Secretary assisted Tim Collins with preparations for the 2020 meeting. Tim Pearce and Christine Parent are co-editors for the AMS Newsletter and have really refreshed the content. It is still a struggle to get members to submit content for the newsletter.

Editor and Publications Committee Report: Presented by Wallace "Marty" Meyer. The last two issues Vol 37(2) and Vol 38(1) were published in December 2018 and July 2019, respectively. The low stream of manuscripts delayed publication of Vol 37(2). Our intent is to print an issue each June

	Budget
REVENUE	
Membership Related	
- Life Membership Transfer from Investment Accounts	\$840
- Dues	\$8,500
Meeting Related	
- Symposium Transfer from Investment Accounts	\$8,000
- AMS Meeting Auction	\$2,000
Publication Related	
- Institutional Subscriptions to AMB	\$3,080
- BioOne – revenue + surplus share	\$19,000
- Page Charges from Authors	\$5,000
Other	
- Royalties: American Fisheries Society - “Common & Scientific Names of Aquatic Invertebrates from the US and Canada: Mollusks” Turgeon et al.	\$50
- Royalties: Universal Publishers – “The Mollusks” Sturm, Pearce & Valdes	\$200
TOTAL REVENUE	\$46,670
EXPENSES	
Membership Related	
- Dues for the Life/Honorary Life Members	\$840
- Wild Apricot	-0-
Awards	
- Mel Carriker - Student Research	\$4,000
- Connie Boone Award – Best Student Paper/Poster	\$4,000
- Charlie Sturm Award – Best Student Bivalve Paper/Poster	\$500
- Dick Petit Award – Best Student Systematics Paper	\$500

and December; however, we continue to get low submissions. AMB impact factor for 2018-19 is 0.714, up from 0.519 last year. Marty expressed two main concerns: 1) Each year AMB is publishing fewer manuscripts, 2) The number of symposium manuscripts, on average our most cited manuscripts, are declining. Discussed establishing a

continuous publishing workflow and how to get symposium speakers to submit manuscripts. Marty is looking into what the AMB would need to do to abide by the ICZN nomenclature rules if we move to continuous publishing.

- Discussed if the AMB went to continuous publishing how would we let people know that something was published (i.e., Facebook, AMS newsletter, AMS website, member email, quarterly announcement on Molluscalist). The manuscripts would eventually be published in hardcopy.
- Members expressed they would like a way to opt out of receiving hard copies of the AMB. We could add a button to the website to opt out, but the membership price would remain the same.

Endowment Committee Report: Presented by Rüdiger Bieler. (Endowment Committee: Rüdiger Bieler, José Leal, and Alan Kohn) Each invested AMS endowment fund (currently: symposium fund, life membership fund) has a targeted 50/50 stock/bond ratio subject to regular rebalancing. **2019 performance:** Total year-end value was \$310,148.95. The funds performed extremely well in 2019 (with an overall gain of \$50,288.84 (19.35%) – compared to a total fund loss of \$6,126.45 in 2018). **2020 performance:** Fund performance has weathered the turbulent COVID-influenced market well so far. The current total fund balance (7/10/2020) stands at \$317,398.35.

- Since AMS promotes conservation, has the Endowment Committee looked into divesting from fossil fuel funds? Rüdiger stated he would look into it.

Membership Committee Report: Presented by Beth Davis-Berg. 2019 Membership: 145 members (14 life members, 13 family memberships, 87 regular members, and 31 students). Facebook networking is strong with 6609 likes as of July 2020 up from 6485 likes in 2019. We are losing a small but relatively consistent portion of students every year. We need to concentrate on keeping full members and keeping members renewed rather than lapsed. Proposed actions: 1) Get a standing membership committee of more than one person; 2) Solicit more memberships from PIs and their students; 3) Consider revising membership categories; 4) Recruit members from shell clubs and other non-traditional sources. Beth is looking for additional people to join the committee.

Nominating Committee Report: Presented by Tim Collins. (Nominating Committee: Tim Collins, Rüdiger Bieler, Ellen Strong, and Marta de Maintenon.) The following nominations were presented: President - Tim Rawlings, Cape Breton University; President-Elect - Ken Hayes, Bishop Museum; Vice-President – Kevin Kocot, Alabama Museum of Natural History; Past President (4-10 years) - Tom Duda, University of Michigan; Councilor at Large – Tricia Goulding, Bishop Museum; Councilor at Large – David Zanatta, Central Michigan University

No nominations were received from the floor, and the slate was approved by motion.

Conservation Committee Report: Chair Jay Corderio. This year saw a number of proposed removals of species (all taxa) from listing under the Endangered Species Act. In total, six animal and plant species were removed from listing and seven were proposed for removal. Reasons for removal include recovery and new information (twelve) and revised taxonomy (one). One of the species removed was a mollusk, the Kanab ambersnail (*Oxyloma haydeni kanabensis*), known only from three populations in Utah and Arizona. No mollusk species were proposed for listing. The Freshwater Mussel Identification Guide is an app that can be downloaded. There are many topics being debated at the government level and it was discussed whether AMS should take a position on some of them. Jay could draft a letter on behalf of AMS and send it to Council for approval before sending. Conservation Committee news will be reported on the AMS Imperiled Species Newsletter (<http://www.malacological.org/conservation.html>) and contributions are welcomed from all AMS members. [Ed: see expanded report p. 22.]

Student Awards Committee Report: Presented by Jeanne Serb. 2020 Melbourne R. Carriker Student Research Awards in Malacology: *Ad hoc* committee - Jeanne Serb (chair), Jessica Goodheart, Tricia Golding, Chris Hobbs. This year had fewer applicants with only 10 (versus 17 applicants in 2019). Winners will be announced soon and posted on the AMS website [Ed: see article p. 6]. Jeanne will also be stepping down as the chair of this committee and a replacement will need to be found.

Systematics Committee Report: Submitted by Charles Lydeard (Chair) and Ken Hayes. Chuck stated that he would be stepping down as the chair of the committee and Ken has agreed to take over the committee.

Resolutions Committee: Presented by Paula Mikkelsen. No activities to report by the committee in 2019-2020. Paula would like to remind everyone that we have unfilled Honorary Life Member posts – seven to be exact. The AMS Constitution allows for 10 Honorary Life Members and one Honorary Life President. Alan Kohn is currently Honorary Life President; however, Honorary Life Members now stand at only three: John B. “Jack” Burch, Eugene V. Coan, and Carole Hickman (last one elected in 2015). Paula encourages anyone interested in nominating a worthy person to consider doing so. This year Gary Rosenberg of the Academy of Natural Science was nominated as an Honorary Life Member [Ed: see article p. 14].

Constitution & Bylaws Committee: Submitted by Paula Mikkelsen. No activities to report by the committee in 2019-2020. Paula, Liz Shea and Beth Davis-Berg will explore if we could have separate positions of a Meeting Organizer and President.

New Business:

Many AMS Committees need additional people (i.e., Student Awards, Membership, etc.). We discussed how to recruit new committee members such as posting ads in the AMS Newsletter, AMS website, or emails to members.

Discussed writing blurbs about what the committees do and their objectives then posting it to the AMS website. This would advertise to the members what the committees do and what help they need.

Discussed creating a flyer/handout describing AMS that could be printed and handed out at Shell Club meetings, COA conventions, etc.

Teresa Rose Osborne sent an email to be addressed at the meeting. She stated, “Currently, there are no grants or awards promoting (human) diversity among malacological researchers. I suggest that AMS take the lead by creating a set of grants and/or awards specifically for under-represented minorities (URMs) working in malacology, particularly researchers of color, at different points in a research career trajectory.” It was discussed that the Student Awards Committee could look into creating an award addressing diversity or potentially using the Dee Saunders funds.

Tim Rawlings thanked Tim Collins for all his hard work on this year’s meeting.

A motion to adjourn was made and passed.

Amanda S. Lawless, Secretary
Chicago, IL November 2020



MEET A MALACOLOGIST



MEET A MALACOLOGIST: PAUL VALENTICH-SCOTT

What do you do?

I work on the ecology, biogeography, and taxonomy of marine bivalve mollusks.

How did you come to be doing that?

My first large project was working on an Arctic benthic ecology survey. I met Frank R. Bernard in British Columbia and he encouraged my work on marine bivalves.

What are your main projects?

I've just completed a three-book series (2000-2020) documenting marine bivalves from the Pacific Arctic to southern Chile [Ed: read about the third book p. 15]. In addition, I've studied endolithic bivalves (not boring!) and bivalves from southeast Asia.

How would you explain to an educated layperson the importance of your work?

Marine bivalves are important commercially as well as ecologically. Globally more bivalves are consumed than any other seafood. They are also "canaries in the sea" as they are constantly filtering the water and tend to store and consolidate pollutants (biomonitors).

What have you done for AMS and what has AMS done for you?

I have served as President, President Elect, Membership Committee and Audit Committee. AMS has given me the opportunity to meet many new researchers and has facilitated collaborations.

Describe an exciting experience in the field.

Perhaps the most frightening is when we were sampling through the sea-ice in the Beaufort Sea.

It was a windy day and the ice started shifting and breaking up under our feet. We had to run to the helicopter and take off before we went into the sea. Later we went back to collect our field gear.



Beaufort Sea in the summer of 1976. Paul is second from right.

What do you consider the biggest unanswered question in your field of study?

What is the molluscan diversity in the deep oceans?

What invention or advancement in Malacology would you most like to see?

Easier sampling access to the deep sea.

If you could chat with any malacologist, past, present, or future, who would it be and why?

Two people, William Healy Dall, and P. P. Carpenter. Both had tremendous contributions to our understanding of the eastern Pacific bivalves.

What's the best piece of advice anyone ever gave you?

"You can do this" (given by the late A. Myra Keen about work on galeommatid bivalves).

What skills do you have that will be useful after the apocalypse?

I know which bivalves are tasty.

Do you have any super powers?

Dissecting 1 mm bivalves.



[Tell the newsletter editors which malacologist you would like to meet in future issues.]



AMS WORD SEARCH

Submitted by Tim Pearce, AMS Newsletter Editor

Locate the given words in the grid, running in one of eight directions: horizontal, vertical, or diagonal. Unused letters contain a secret message.

Words are from July 2020 issue of American Malacological Bulletin, vol. 38(1). See the bulletin if words intrigue you – member access through [AMS website](#).

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E S N D A R D A H U E Y E
N Y E H O M O N Y M T R R
V O M P A P E C O I I D U
I N I O Y W O D S F I L T
R A C T N T A R R S S G A
O I E E A O E I T S D T L
N N P P B V X U I S N N C
M V S P I R R A H L A O N
E A E D V B A E T U L G E
N S O D A T A Z S G D E M
T I Y N L A L B I N O R O
B V C L V S N A I L O O N
U E F E E R S T R A W C M

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| ALBINO | FIRE | REEF |
| BIODIVERSITY | GASTROPOD | SLUG |
| BIVALVE | HAWAII | SNAIL |
| BRAZIL | HOMONYM | SPECIMEN |
| CONSERVATION | INVASIVE | TAXONOMY |
| DATA | NOMENCLATURE | TYPE |
| DISTURBANCE | OREGON | WARTS |
| ENVIRONMENT | PEST | WOODLANDS |
| EUHADRA | | |



NEWSLETTER EDITORS

Contributions to the biannual AMS newsletter are always welcomed. Send articles, short notes, or news items to either **Christine Parent** or **Timothy Pearce**, the newsletter co-editors. Items can be sent to the following addresses:

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“The only thing molluscs do not do is fly”

– David Lindberg, 2001