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OCEANS PAST INITIATIVE

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Moving forward

The range of ways in which we learn about the past seems only to expand, with recent studies exploring new resources and novel approaches. For example, in this edition of the Oceans Past News, scientists used information buried in shells to illuminate what past oceans were like. Elsewhere in this issue, a photo from over a century ago demands scientists reconsider their current assessments of species and distribution. Such studies are not just about the past, but as Dr. **Juan Estrella-Martínez** notes in his 10 Questions Spotlight, they are the "key to the future" as well. This sentiment was echoed by **Dr. Gesche Krause**, in her invited presentation to the German Parliament. Yet, **Cristina Brito** reminds us the work still to be done and highlights paths for us to move forward.

Emily S. Klein

Frederick S. Pardee Center for the Study of the Longer-Range Future, Boston University / OPN Editor

Dr. Estrella-Martínez in Mylor Bridge (Cornwall), while working at the University of Exeter (Penryn campus). Photo: Dr. Caroline Coch.

OCEANS PAST SPOTLIGHT*

Dr. Juan Estrella-Martínez *recently completed his PhD in paleoceanography at Bangor University in Wales, U.K., and is the Interim Science Communicator at the Royal Meteorological Society in Reading, U.K.*

Q1*. First – a brief introduction: can you describe your research in two sentences or less?*

I reconstruct past environments by studying changes in the ratios of stable isotopes of oxygen and carbon. The material I normally use comes from marine organisms, but I have also carried out very similar analyses on stalagmites.

Q2*. Why do you find research on the past important?*

There is a saying in Geology that goes "**The present is the key to the past**." It summarises the concept of uniformitarianism which states that processes that we observe today have always acted upon Earth's geology in the same manner. For me, I think the phrase could be expanded to "**The past is the key to the future**." I think that studying the past can shed light on what the future might look like. For example, how would the climate react in a catastrophic melting of the Greenland ice sheet? For that we can look at the 8.2 ka event, when millions of litres of freshwater were released into the North Atlantic Ocean in a very short time causing the return to glacial conditions in the northern hemisphere.

Q3*. Was there a person or event that had a particular influence on your commitment to studying history and historical ecosystems?*

Probably **Indiana Jones**! I never wanted to be an archaeologist, but those films certainly piqued my interest in studying the past. I didn't get a bullwhip, though.

Each issue of Oceans Past News includes a feature article, as either an **Oceans Past Spotlight or as **10 Questions**. If you would like be considered for either, or to nominate a colleague or mentee, please contact Emily Klein at emily.klein04@gmail.com.*

Dr. Estrella-Martínez in the lab, working with the sometimes dreaded micromill.

Q4. *What advice would you give those who want to engage in historical work or collaborate with our community?*
I would advise to have a keen understanding of **organic chemistry**. I would say that the vast majority of the work we do as palaeoclimatologists is dependent on our understanding of chemical processes. A strong chemical base will allow you to develop an intuition on why the archives that we study 'behave' the way that they do and how this behaviour relates to environmental variability.

Q5*. Do you believe the past can help with solving contemporary environmental/social problems, and if so, what is one area we can provide insight on?*
Absolutely. Like I said earlier, the past is the key to the future. Things like rain patterns, ocean currents and fish populations have an effect on society. By studying how these have changed through history and how are they connected to the global climate systems we can predict how they might react under different scenarios of future climates. This in turn allows us to plan and prepare, which ultimately will keep millions of people safe … If we actually plan for it.

Q6*. When you do assess our current environmental and societal challenges, what gives you hope?*
Humankind has had a tendency to stick around. In the past there have been global catastrophes like the Toba super-eruption when it is theorised that the human population was reduced to mere thousands of people. There have been multiple civilisation collapses due to changes in the environment and pestilence wiped out millions of people. Humankind has always recovered. With the introduction of vaccines and developments in agriculture we not only thrived but have welcomed billions of people into happy and comfortable lifestyles. What gives me hope? Those billions of people who are smarter thanks to all of the progress that we have made. Those billions of people that will inevitably join us in coming up with solutions to our current and future challenges. With ideas from people that have historically fought to have a seat at the table of great minds, we will make it.

*On board the Norwegian ship G.O. Sars. The clam Dr. Estrella-Martínez is holding is the dog cockle (*Glycymeris glycymeris*), frequently used in palaeoclimatic studies. Photo: Dr. Alejandro Román-González.*

Q8*. What field of research – besides the one you are working in – do you consider most exciting?*
Number theory. I was never the greatest mathematician, but I find the problems that these people grapple with everyday fascinating. Imagine working on a problem your whole professional life, an answer that has eluded brilliant people for sometimes hundreds of years. Even finding a partial answer is considered a great success. Someone, please, prove the **Reimann Hypothesis** already!

Q9*. What are you reading at the moment?*
We Are Never Meeting in Real Life by **Samantha Irby**. She's hilarious! I love her writing style and honesty in her essays. I'm also in the queue for *Invisible Women* by **Carolina Criado-Pérez** once my wife finishes it.

A summary of recent work by Dr. Estrella-Martínez and colleagues is in the ***Research News*** *section below.*

REFLECTION

Tile mural at the Santa Catarina Federal University Campus, Florianopolis, Brazil: myths, monsters and animals from the sea.

Where's the Marine in Environmental History? This summer, two major events in the field of Environmental History took place in different parts of the globe. First, the **3rd World Congress of Environmental History** (WCEH) convened in Florianopolis, Brazil, in the middle of July. Second, the 10th biennial conference of the **European Society for Environmental History** (ESEH) was held in Tallinn, Estonia, in late August. I attended the WCEH, with colleagues attending the ESEH. At both conferences, we could easily identify the main currents of research and future directions of global Environmental History scholarship - but I had my eyes specifically on Marine Environmental History and Historical Marine Ecology.

WCEH's programme (*https://www.3wceh2019.floripa.br/*) included around 300 papers and posters, with impacts on nature, outcomes of human use and (over)exploitation, altered landscapes, contested territories and spaces, relationships between humans and organisms within natural and artificial environments, and climate changes as key topics. I did the math: about 21% were 'aquatic' (e.g. marine environments, rivers and other water basins, climate change, water management, hydrography), and **only 8% exclusively 'marine'** (e.g. marine animals, whales and whaling, fishing, impacts on and changes in seas, shores and the open ocean). As for ESEH (*https://www.tlu.ee/en/eseh2019/programme*), marine papers were even harder to find; indeed, they were almost absent.

I keep wondering: *where is the 'marine' in environmental history these days*?

On the eve of the **UN Decade of Ocean Science for Sustainable Development 2021-2030** (*https://en.unesco.org/ocean-decade*), the past of marine ecosystems, animals, and related human activities is ever more relevant – to us as scientists and to stakeholders and policy-makers. The humanities and social sciences supply much new and relevant information to that acquired by the natural sciences – and we need to keep adding the oceans to environmental history. All the information and data we need is in the objects and heritage left behind: documents, maps and iconography, correspondence and literature, logbooks and diaries, natural history treaties, as well as in the archaeological and material remains. We can engage the wealth of information more effectively by working together, and together we can more effectively engage in current debates and provide needed policy guidance.

Many venues host researchers and students active from both sides of marine historical ecology and maritime history. Conferences are further vehicles for communication and dissemination that can't be disregarded – one we are not taking advantage of. **We need to step out of our comfort zones**. ~ *Cristina Brito (NOVA FCSH, CHAM – Center for the Humanities, Portugal).*

RESEARCH NEWS

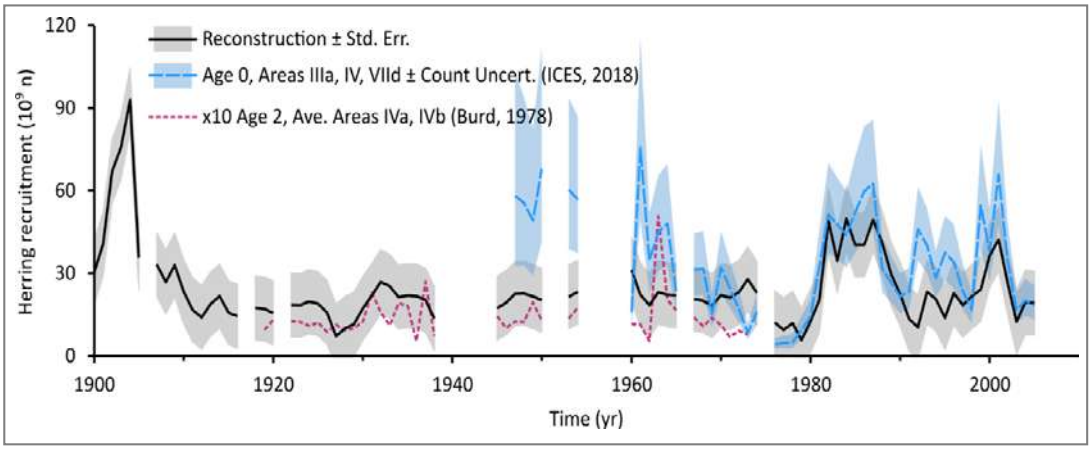
Learning from history: A historical record of Squatina spp. from Corfu, Greece. Angel sharks (*Squatinidae*) are one of the most threatened families of chondrichthyans in the world. Once abundant throughout the Mediterranean, the three species in this region; the Sawback Angelshark (*Squatina aculeata*; Cuvier, 1829), the Smoothback Angelshark (*Squatina oculata*; Bonaparte, 1840) and the Angelshark (*Squatina squatina*; Linnaeus, 1758), are now listed as Critically Endangered on the IUCN Red List of Threatened Species, due to their steep population declines and several local extinctions. Within the Greek waters, angel sharks were historically distributed both in the Aegean and Ionian coast. However, reports from rom the Ionian Sea have always been extremely limited – just five reports are known

from Greek waters. The earliest dates back to 1984 and the most recent in 2000. Since then, there have been no reports of *Squatina* spp. from this area.

Yet important evidence is often found in unexpected places. **Rudolf Eder** visited Corfu between 1908-1910. Among the photographs taken during his stay (which are available online), one of the old port of Corfu was captured and depicts fishmongers selling their catch (*image at left*). Surprisingly, in this picture a dead fresh individual of *Squatina* spp. is visible as it's waiting to be sold. Identification to species level is impossible, but the picture depicts the oldest known angel shark occurrence from the Greek side of the Ionian Sea.

Recently, the **Angel Shark Conservation Network** (*https://angelsharknetwork.com/*) developed a conservation strategy for the Eastern Atlantic and Mediterranean (*angelsharknetwork.com/#action*), and initiated the "**Mediterranean Angel Sharks: Regional Action Plan**" (*https://bit.ly/2nbDMkf*). In this context, effort is being made to collect observations of the three species from the basin. Reporters can go online and submit their observations in the **Angel Shark Sighting Map** (*angelsharknetwork.com/#map*) to help us unravel the contemporary and historical distribution of these species in the Mediterranean Sea. ~ *Ioannis Gasteratos (Department of Forestry of Corfu), Cat Gordon (The Shark Trust, UK), Ioannis Giovos (iSea, Environmental Organisation for the Preservation of the Aquatic Ecosystems, Greece). We thank* ***Nikos Desillas*** *for informing us about the picture; a high quality image is available at* ***https://bit.ly/2oB5wip****. For more information, contact: info@isea.com.gr****.***

Clam shells tell the story of centuries of herring recruitment in the North Sea. In fisheries science, recruitment variability, i.e. the number of juvenile fish that survive from egg production to join the stock, is a crucial contributor to stock productivity. Understanding the recruitment variability of the North Sea stock of Atlantic herring (*Clupea harengus*) remains a key objective of stock assessment and management. Although many efforts have been undertaken linking climatic and stock dynamic factors to herring recruitment, there has been no major attempt to estimate recruitment levels before the 20th century. In a paper published in *Fish and Fisheries* in May, **Juan Estrella-Martínez**, **Bernd Schöne**, **Ruth Thurstan**, **Elisa Capuzzo**, **James Scourse**, and **Paul Butler** set out to reconstruct herring recruitment levels based on the ratios of stable isotopes of carbon contained in the shell of the longevous clam, *Arctica islandica*. Estrella-Martínez et al. took advantage of the fact that the isotope ratios observed in the clam shells are proportional to the isotope ratios in the dissolved inorganic carbon (DIC) in the water column where the clams lived. The DIC, in turn, is partly controlled by phytoplankton and juvenile fish in the water. In modern marine carbonates, isotope ratios also contain the imprint of anthropogenic carbon emissions. Estrella-Martínez et al. first mathematically



Section of the reconstruction showing the last 105 years (black). The reconstruction picks up the recruitment failure of the late 1970s and the very low recruitment levels of the early 2000s. The blue curve shows the most accurate age-0 recruitment estimates done by ICE while the pink curve shows the scaled age-2 recruitment estimates for earlier in the 20th Ce.

removed this influence before carrying out a calibration exercise to calculate herring recruitment levels back to the 1550s. Their reconstruction suggested that there have been five extended episodes of low recruitment levels before the 20th century. These results are supported by measured recruitment estimates and historical fish catch and export documentation from different countries. *Related publication: Estrella-Martínez J, Schöne BR, Thurstan RH, Capuzzo E, Scourse JD, and Butler PG (2019). Reconstruction of Atlantic herring (*Clupea harengus*) recruitment in the North Sea for the past 455 years based on the δ13C from annual shell increments of the ocean quahog (*Arctica islandica*).* Fish*, 20(3), 537-551. https://doi.org/ 10.1111/ faf.12362.*

RECENT PUBLICATIONS

Baeza JA, Umaña-Castro R, & Mejia-Ortiz LM (2019). **Historical demography of the Caribbean spiny lobster *Panulirus argus* (Latreille, 1804) in the Florida Keys, USA inferred using single nucleotide polymorphisms (SNPs)**. *Journal of Crustacean Biology*. 1-9. *doi:10.1093/jcbiol/ruz019*.

Artecona F, De María M, Bergamino L, & Szteren D (2019). **A historical perspective of niche differentiation between two top predators in the Uruguayan coastal area.** *Wildlife Research* 46(2) 136-144. *doi.org/10.1071/WR17188*.

Estrella-Martínez J, Schöne BR, Thurstan RH, Capuzzo E, Scourse JD, and Butler PG (2019). **Reconstruction of Atlantic herring (*Clupea harengus*) recruitment in the North Sea for the past 455 years based on the δ13C from annual shell increments of the ocean quahog (*Arctica islandica*)**. *Fish and Fisheries*, 20(3), 537-551. *doi.org/10.1111/ faf.12362*.

Edvardsson R, Patterson WP, Bárðarson H, Timsic S, & Ólafsdóttir GA. (2019). **Change in Atlantic cod migrations and adaptability of early land-based fishers to severe climate variation in the North Atlantic**. *Quarternary Research* 1-11. *doi:10.1017/qua.2018.147*.

Jiménez-Alvarado D, Sarmiento-Lezcano A, Guerra-Marrero A, Tuya F, Santana Del Pino A, Sealey MJ, & Castro JJ. (2019). **Historical photographs of captures of recreational fishers indicate overexploitation of nearshore resources at an oceanic island**. *Fish Biology* 94(6): 857-864. *https://doi.org/10.1111/jfb.13969.*

McKeown NJ, Arkhipkin AI, & Shaw PW (2019). **Genetic analysis reveals historical and contemporary population dynamics in the longfin squid Doryteuthis gahi: implications for cephalopod management and conservation.** *ICES Journal of Marine Science*, 76(4): 1019–1027. *https://doi.org/10.1093/icesjms/fsz009*.

RECENT EVENTS

History sheds light on the future for German Parliament. Shortly before the recent **Climate Action Summit** in New York, **Dr. Gesche Krause** (Alfred Wegener Institute Helmholtz Center for Polar and Marine Research, Bremerhaven) was an invited Speaker and asked to contribute to an expert discussion in the German Parliament. The meeting was titled "**Can we still be saved? Climate policy before the New York Summit**", and took place in Berlin on 9 September 2019.

The central question was “What are the demands of civil society and how can politics act?”, and Dr. Krause’s presentation worked from three pillars of sustainability: society, environment, and economy. It also drew on a recent study exploring past examples to provide lessons and advice for contemporary Blue Growth Agendas (Caswell et al. *in review with Fish and Fisheries*[†]). Her rationale was that we are *walking backward into the future* (Maori proverb) and thus need to learn from past experiences. History reveals that there are "lessons learned" on the effects of

[†]*This work was referenced in the 12th edition of Oceans Past News (April 2018). For examples of ‘blue growth’ agendas, see that for the European Commission, https://ec.europa.eu/maritimeaffairs/policy/blue_growth_en, and the Food & Agricultural Organization of the United Nations (UN FAO), http://www.fao.org/zhc/detail-events/en/c/233765/*

political prioritization. For instance, new opportunities can be positively exploited if there is a policy framework for innovation and exploration – but this requires responsive policy with a strong set of rules and objectives across sectors as well as continuous and binding participation, combined with strong political steering, research and continuous monitoring. The presentation closed with the recommendation that, drawing from past historical analysis, new transformation models are needed:

- *Develop long-term strategies and visions in a broad participatory process - local / regional contextualization but also cross-functional networking important;*
- *Incorporate the needs of future generations into political representation by creating a council for intergenerational justice in which the three pillars of sustainability are equally represented;*
- *Strengthen research on socio-economic transformation conditions and develop monitoring systems.*

ANNOUNCEMENTS: UPDATES FROM OPI

The **Oceans Past Initiative** (which oversees OPN) is delighted to announce the launch of our new website at **www.oceanspast.org**. There, you will find information on becoming an OPI member and upcoming conferences, constitutional documents, and the OPN archives. OPI members can also create website accounts to access member-only content, including research mailing lists and networking information, features which will be developed as our online community invariably grows. Details on Oceans Past VIII and a payment portal will be released in the coming weeks, so check the website regularly. Updates will also be announced on the OPI Twitter page, **@oceans_past**.

For more information about joining the OPI, creating an account, or membership payment information please visit **https://oceanspast.org/about.php#join** and follow the steps on the page. For the first year of operation, membership dues are €20 for people in full employment in OECD and BRICS countries, €5 for students, retired people, and people from non-OECD/nonBRICS countries, and €500 for institutional members. Individuals who pay dues covering the period 1 Nov 2018-31 Dec 2021 may do so at a discounted rate. Individual life membership are €500.

If you are unsure about this process, or for any general queries, please send an email to **info@oceanspast.org**.

ANNOUNCEMENTS: CONFERENCES

The call for papers is open for **Oceans Past VIII: Historical perspectives on marine ecosystems, fisheries, and future**. OPVIII will convene 10 –13 May, 2020 at VLIZ in Ostend, Belgium, and welcomes researchers, practitioners, policy-makers and students of all disciplines under the unifying view of our oceans as networks of social-ecological or coupled human-nature systems. Paper submissions are due 15 December 2019, Early Bird registration is 15 February 2020, and there are discounts for OPI members, students, and participants from non-OECD countries.

OPI is particularly interested in encouraging the participation of Early Career Researchers (ECR) at OPVIII. First, OPI is pleased to announce strong support from the **International Council for the Exploration of the Sea** (ICES) to support Early Career Researchers at OPVIII, including an ECR event during the conference and a limited number of **travel awards for Early Career Researchers** from ICES Member Countries to attend OPVIII. OPI is actively searching for additional funding opportunities that will enable ECRs and attendees from more countries to attend. If you are an ECR from a non-ICES member country, please apply and we will do our best to find additional funding to subsidise your attendance. Suggestions for additional sponsors are also encouraged, or if you are a sponsor, please get in touch at info@oceanspast.org. Finally, OPI warmly welcomes **ideas from ECRs on conference events or activities** they would find useful; please contact info@oceanspast.org to provide feedback.

More can be found on the website at ***https://oceanspast.org/opviii.php***.

The **North Atlantic Fisheries History Association (NAFHA): Re-visiting Fisheries History – Re-visiting Iceland** Conference will take place 17-19 October, 2019, University of Iceland, Reykjavik, Iceland.

The **2nd CONCHA Workshop – Sea and Animals: History, Culture, and Marine Conservation** will take place 21-23 October 2019 in Lisbon, Portugal. *http://www.cham.fcsh.unl.pt/ext/concha/concha_2workshop.html*. A video from the 1st CONCHA Workshop can be viewed at *https://youtu.be/8Amc8cNt9dU*.

Down By The Water, an interdisciplinary symposium on the role of water transport points in past societies, will take place in Helsinki, Norway, 6-8 November 2019. More information at *https://blogs.helsinki.fi/downbythewater/.*

Applied Marine Environmental History in the Indo-Pacific: Problems, Sources and Opportunities, Murdoch University on 16 December 2019. The workshop provides an opportunity to consider the problems, sources, and opportunities for marine environmental history in the Indo-Pacific, broadly defined. More information at ***https://docdro.id/9NwqjS3***.

CONTACT

Oceans Past News is a quarterly newsletter that aspires to both unite and inform the worldwide community interested in historical perspectives of marine social-ecological systems by providing insight into the wide-ranging and excellent work being done and the resources available. If you would like to propose work for OPN in the future, please contact **Emily Klein** (emily.klein04@gmail.com).

*The next Oceans Past News will be out mid-January 2020. We **warmly welcome submissions** through the end of 2019.*

RESOURCES

The Oceans Past News Archive is available online: **https://oceanspast.org/newsletter.php**
More on the Oceans Past Initiative: **http://oceanspast.org**
OPI on Facebook: **https://www.facebook.com/groups/122288493384/**
OPI on Twitter: **@oceans_past**