BioS Reports

Glimpse into the activities of the
Master's course "Biology in Society"

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EXCURSIONS AND OTHER NEWS

Small insights in student's or professor's points of view, field trips, and other stuff we do.

Sweet 30!

Simon Schäfer

On the 30th of August the Faculty of Biology celebrated its 30th birthday. An event full of activities, get-togethers - and a lot of cake.
We collected some of our students' favorite moments:

Hanna
„The best thing for me was that you could have a cosy chat with lots of people without the time pressure due to work."

Nele
„You could see that there was a lot of attention to detail behind the planning, for example in the display of the doctoral hats."

Konrad
„I really enjoyed the catering. There was so much going on: We had a BBQ, a buffet, cake, wine and beer – that was just really good."

Asude
„What I liked best was the photo box. Luckily it was a bit out of the way, so you could go all in when taking the photos."

Tim
„Olli's bar had really strong cocktails."

ANIMALS AND MONEY

This part of BioS Reports unravels interesting relations between animals and the economy.

Milking Snakes, Saving Lives: Production of Antivenom in Australia

Gabriel Pinto

Australia is home to fauna as varied as they are dangerous: Of the 140 terrestrial species of snakes living in Australia, about 100 are venomous [1]. Every year, around 500 people are hospitalized by snakes in Australia, 61% of the time by brown snakes (*Pseudonaja textilis*), tiger snakes (*Notechis scutatus*), or taipan snakes (*Oxyuranus* spp.) [2]. Mortality from these bites, however, is only about 2.2 cases per year [3,4]. These numbers have been kept low by a number of factors, the most important of which being the introduction of highly specific antivenoms [5, 6].
To obtain a vial of antivenom, small amounts of snake venom are injected into a large mammal, over a period of several weeks or months until enough antibodies are produced by the animal's immune system. This process is called hyper-immunization. The antibodies are then extracted from the animal's blood and purified to create antivenom. The initial stage of this process is complex and often dangerous. To obtain the venom necessary for antivenom development, "the snake's jaws are forced open, the fangs exposed. The fangs are pushed through a plastic/parafilm membrane hooked over the lip of a glass vessel, and venom is squeezed out" [7]. This so-called "milking" of snakes is done manually and presents risks to the health of the worker, which is one reason for the high cost of antivenom.
On average, the commercial cost of each vial of antivenom is €223 for brown snakes, €279 for tiger snakes, and €1,131 for taipan snakes [8]. The sale price of each vial of antivenom is also related to the amount of venom held in the venom glands of an individual at one time as well as the amount of antivenom required to treat the bite. For example, the venom yield of each bite of a wild taipan snake is on average 77 mg, while the average venom yield for brown snakes is 4.41 mg [9, 10]. However, taipan snake bites also require significantly more antivenom to treat. To generate a 50 mL vial of antivenom from wild taipan snakes, about 90 wild individuals would have to be milked. However, cultivated snakes produce 5 to 7 times more venom than their wild counterparts, and so, approximately 15 bred taipan snakes need to be milked [11], reducing the cost per milking of €74.4.
The volume of each vial of antivenom and the number of vials used for the treatment of snakebites vary according to the species: two 10 mL vials are used for brown snakes, up to four 12 mL vials for tiger snakes and up to five 50 mL vials for taipan snakes [12]. Considering the number of vials needed to treat a snake bite, the antivenom needed for a single bite can cost up to €446 for brown snakes, €1,116 for tiger snakes, and a massive €5,655 for taipan snakes. The average base cost of treatment for a snakebite is about €3,700 (AU$6,000) [13]. This cost takes into account hospitalization costs and can even increase to €9,000 due to antivenom costs [13]. Just taking the base cost per snakebite treatment, the average annual cost is €1,850,000, of which €733,728 goes to the purchase of antivenom vials for these three species, about 0.76% of the 2022-23 budget of the hospital system in Australia [14].
One biotech company, CSL Seqirus (Commonwealth Serum Laboratories), is the single source of antivenoms and other necessary products for snake bite treatment in Australia [15, 16]. Although the antivenoms division of this company is particularly small, it has established itself as a critical element within the Australian healthcare system. In fact, last year the Australian government extended a partnership with CSL Seqirus and Papua New Guinea's department of health to share vials of antivenom for snakes and marine creatures with the nation [17]. The production of antivenom is a growing industry that is saving hundreds of lives each year in Australia. Now, as other parts of the world hope to deal with their own venomous snakes, this industry will be spreading far and wide.

EXCURSIONS AND OTHER NEWS

Interview with Professor Brixius

Sophie Merz

Hello Professor Brixius, please introduce yourself and tell us about your research topic.
I've recently been appointed assistant professor in the history of botany and horticulture, a new chair of the faculty of biology. Trained as an early modern cultural historian at the University of Potsdam, I've developed a strong interest in the history of knowledge and medicine, with a particular focus on plants. For my thesis which I completed at the European University Institute in Florence, I've examined the botanical establishment of eighteenth-century Mauritius, which was a French colonial island in the Indian Ocean back then. For my postdoc, I went to Paris to work at the German Historical Institute where I developed a project on the medical practice of the seventeenth-century physician, Noël Vallant. Currently, I have two major fields of research: For one, I'm still working on Vallant's medical practice and, most recently, on facial skin care and cosmetics in seventeenth-century France. For another, and more importantly for my current position, I'm working on the history of Dresden's Botanical Garden in the nineteenth century. The idea is to write a biography of the Garden and to understand its development from its foundation until the 1930s.
What is one important thing you have discovered during your career as a scientist?
For primary sources on plant related knowledge, I was astonished to see that archives are so much richer than published material might imply. So much information and particularly non-European knowledge got lost over the course of publication, when knowledge became official and when it was 'Europeanised'. Working with archives allows one to look 'behind the curtain'. But examining handwritten sources from the past requires a lot of time and patience and it's a privilege to work with them!
What are you looking forward to the most in your new position as assistant professor?
I am really looking forward to developing interdisciplinary research projects. Take my interest in cosmetics: I 'd love to examine historic recipes and remake them in a lab with the expertise of biomedical scientists (similar to the Renaissance Goo Project)! From there, I am dreaming of developing a course on hands-on knowledge and bring together students of history and biology in a lab. A fantastic project was developed at Columbia University and where I contributed as a palaeographer in 2015: The Making and Knowing Project. Check it out!
What do you like most & least about your job?
I like most that I'm paid for my curious and critical mind. I'm paid to think and to stimulate my students' critical mind and to encourage optimism, humanness and civil courage, isn't that great? But I have a feeling that in the natural sciences, (early modern) historians often are misunderstood, maybe even ridiculed, and might seem like 'the odd one out'. We speak different languages and our qualities as academics are measured differently. Luckily, this is not the case at this faculty, where I feel very welcomed and inspired and where I'm having conversations with biologists who are well aware of the fact that we need to find a common language in order to enrich our research and make it truly interdisciplinary!
How does your research challenge traditional narratives in history or biology?
In my recent book, Creolised Science, I write about the cross-cultural contributions in plant knowledge in the eighteenth century, which show that there was no superiority of European knowledge and that similar methods were developed independently in different regions of the world. I believe it is an important contribution to rethink the legacies of colonial botany leading away from binary thinking of plant knowledge (scientific/non-scientific). My book is a call to appreciate and investigate historical plant knowledge in its very own cultural contexts.
Thank you, Professor Brixius and a warm welcome from the BioS students!

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