

# VIEWPOINT

MAGAZINE OF THE BRITISH SOCIETY FOR THE HISTORY OF SCIENCE



## Epistemological Construction and Destruction

Read about the value of celebrating local heroes in the history of science, the construction of Nanyang natural history, the power of natural history collections, and the discovery of DNA.



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## Editorial

Welcome to the summer issue of Viewpoint!

We start (opposite) with Jörg Matthias Determann's consideration of the positive impact that localised celebratory plaques can have on students, before moving into Grace Exley's write up of the most recent BSSH postgraduate conference. Marie Ngiam then gets us into our theme proper by outlining how Zhang Liqian's natural histories of the Nanyang region and the tensions between colonial and local epistemologies. Kristen Hussey and Clare Hickman build on this by reporting on the fascinating pedagogical interventions they have made in collaboration with the Great North Museum (Newcastle), and how their students have learnt about knowledge production and natural science collections. Kersten Hall and Ralf Dahm then provide a needed corrective to the story of the discovery of DNA and outline the role of Friedrich Meyer through an article and an extract from their latest book. Extending the recent series on key members of the BSSH, we then round out this issue with an interview from Communications Office Alexander Stöger and his work with the society and more broadly.

Let us know your thoughts on this via email. Future contributions should be emailed by Friday 30th October 2026 to [viewpoint@bshs.org.uk](mailto:viewpoint@bshs.org.uk).

Joe Holloway, Editor.



Above: English Heritage blue plaque at the former residence of dentist and anaesthetist James Robinson (1813-62) at 14 Gower Street within walking distance of various colleges of the University of London in 2025 (courtesy of the author).

## Using Places and Plaques to Teach the History of Science

Jörg Matthias Determann encourages the use of urban spaces in connecting students to scientists.

It can be hard for students at any level of education to relate to figures in the history of science. I have certainly found so while teaching undergraduates on Virginia Commonwealth University's Qatar campus. Luminaries from Al-Biruni to Albert Einstein may appear relatively distant in time and space from them. Their original works are hard to understand, although most of my course participants can at least read the script of medieval Arabic texts on astronomy. The portraits of many scientists that my students encounter on the internet are often imaginary and, in Einstein's case, sometimes caricatures.

However, one way to shrink the space between past scientists and current students is to take the latter to places of the former. If you are teaching in a city or town with a long history, chances are that a famous scholar at some point came through there. In many places, they might

even be conveniently marked through commemorative plaques. If you are teaching in central London, for example, you would not have to walk far to spot one of English Heritage's blue plaques. They are simple enough to serve as a conversation starter or prompt for a story that can be enjoyed by almost anyone.

In case you can't find such plaques or you are dissatisfied with them, you can also ask your students to make their own ones. My campus is in Qatar's Education City, an academic hub that was only established in the late 1990s and does not yet have many historical markers. The participants of my course HIST 393 Revolutions in Science II designed plaques that they would love to see erected as memory aids for future generations.

While most of my students are majoring in the arts, designing a commemorative plaque does not require particular skills. Any graphic design software would be able to do a decent job, and there is even an online Blue Plaque Generator (<https://blueplaque.com/>). The simple shapes of most plaques (such as disks and sheets) offer no particular challenge to 3d printers, although creating an object out of metals rather than polymers might require access to a specialized workshop.

Even if no famous scientists ever came close to your school or university, chances are that a street in your city might still be named after one of them. Doha, for instance, has many places named after scholars who never worked there. Ibn Seena Street is named after the philosopher and physician who is more commonly known in the West as Avicenna. Even such a place can serve as a starter for discussions: Is the street appropriate for such a great mind? How does it compare to the places named after political or military leaders?

Finally, in case your neighborhoods are completely devoid of any references to figures in the history of science, you could problematize this absence. You could ask your pupils why scientists (or which ones) have been underappreciated in commemorative practices. You could also invite the students to rectify this situation by suggesting names for streets in new developments. Are there members of underrepresented groups (such as women in physics, for example) that deserve a public place named in their honor? Even if the students' proposals do not actually get realized, working on them might provide them with inspiration to become scientists themselves.

Jörg Determann

Virginia Commonwealth University School of the Arts in Qatar



Left: Plaque on Mohammed Al-Qassabi, inventor of a Football Offside Detection Center, designed by students of the course HIST 393 Revolutions in Science II at Virginia Commonwealth University in Qatar in 2026 (courtesy of the author)



Right: Sign of Ibn Seena Street in Doha in 2021 (courtesy of the author)



# BSHS Postgraduate Conference 2025

Grace Exley tells us about the latest BSHS Postgraduate Conference.

On Friday 25th and Saturday 26th April 2025, the University of Leeds welcomed 44 members of the BSHS's student community for the Society's annual Postgraduate Conference. Organised around the theme of 'interdisciplinarity in the history of science', the two-day meeting saw speakers deliver 37 papers on topics ranging from 16th century silkworms to chess tournaments at Bletchley Park. The meeting also introduced attendees to Leeds's thriving academic community and rich heritage of science, technology, and medicine, with a spectacular keynote from Professor Jonathan Topham and two sessions in the University's collections completing the conference's programme.

## Collections & Keynote

Friday's events began with a welcome address from the conference organisers and Director of the Centre for History and Philosophy of Science, Professor James Stark, before participants moved into two parallel sessions in the University's historical collections.

Kindly facilitated by Dr Mike Finn, the first of these took place in the Centre's Museum of HSTM. Attendees were presented with a mystery selec-

tion of objects and – after donning their white gloves – were asked to identify them. While the vacuum pump and doctor's bag proved easy for our participants' keen eyes, two objects were more mysterious: the x-ray diffraction apparatus used by Florence Bell and Willam Astbury to take the first image of DNA, and the rather alarmingly named 'Tobacco Resuscitation Kit' used to revive drowning victims with tobacco smoke!

Meanwhile, in the Treasures of the Brotherton Gallery, Laura Wilson showcased a selection of material from the University's Cultural and Heritage Collections. With Laura's expert support, this was carefully curated by student organisers Monica Stenzel and Kellie Vernon. The objects ranged from a copy of Nicolas Culpeper's Complete Herbal and Family Doctor (1899) to a lock of Mozart's hair – accompanied, naturally, by an x-ray diffraction image of the composer's curls taken in 1958 by researchers in the Department of Biomolecular Structure.

After a quick tea break, it then came time for our very special keynote lecture. Though some would argue – myself included – that any lecture



Above: Dr Mike Finn oversees conference participants in the Centre for HPS's Museum of HSTM. Credit: Grace Exley

by Professor Jonathan Topham is guaranteed to be special, this one was all the more remarkable for being his inaugural professorial lecture. His address, titled 'Science and Religion from the Ground Up', reflected on a career devoted to the entangled histories of science, religion, and the book – a fittingly interdisciplinary topic for our conference theme.

As an inaugural lecture, this event was organised in collaboration with Leeds's Centre for HPS and School of Philosophy, Religion, and History of Science. The Centre helped to co-ordinate logistics and to advertise the lecture to a wider academic audience, while the School kindly funded a drinks reception for our attendees.

What's more, with BSHS technical support, we also welcomed an online audience and uploaded the address to our YouTube channel afterwards. We are very grateful to the BSHS, Centre, and School for their support, and – above all – we are thankful to Professor Topham for agreeing to share this milestone with us, and for delivering a wonderful lecture.

## Panels & Papers

Friday evening finished with a conference dinner, before our presenters retired to prepare for their paper sessions. Because our gallery visits and keynote had to take place during working hours, Saturday's programme consisted entirely of panel sessions – and, of course, very well-catered breaks to keep everyone going!

In all, eleven panels ran in the University of Leeds's Parkinson Building, ranging widely across the history of science, technology, and medicine. Alongside classic panel topics such as public health, botany, and global histories of science, our participants' varied interests allowed us to curate sessions with a more interdisciplinary flavour: for example, one panel explored the connections between science, literature, and art, and another focused on those between science and activism.

In these panels, we heard about everything from eradicating smallpox in 20th century India to lectures on crocodiles for 18th century English ladies; from 19th century colonial botany (or, 'Flora and the (Imperial) Machine', as one speaker very memorably put it), to a history of the Exploratory museum in Bristol; from the 'secret face of Isaac Newton' to 16th century silkworms. There isn't space in this short summary to do justice to the varied and excellent papers, but suffice it to say that we are very excited to see where this new generation of scholars takes the field.

## Reflections

Overall, the Postgraduate Conference 2025 gave 38 students from 22 universities the opportunity to present their research. A further five people

attended without giving a paper, and our team of eight organisers brought total attendance to 51. Our group hailed from ten different countries (England, Scotland, Wales, Spain, Denmark, Netherlands, Italy, India, China, and USA) and included students at both Master's and PhD level. One of the aims of the Postgraduate Conference is to bring together our student community, and this meeting certainly achieved that. In our feedback, over 50% of respondents named networking opportunities as the best part of the conference.

This was not the only metric by which we measured the meeting's success: we also aimed to give students an opportunity to hone their skills as presenters and develop their ideas in a welcoming environment. Participants reported that this was something the Leeds meeting achieved: 37% of respondents to our feedback form said this was their first academic conference, and 31% used it to give their very first paper. In addition to presenting, attendees practised other key conference skills by chairing sessions. The resulting atmosphere was very friendly, as participants frequently remarked in feedback. Most heartening of all were comments that credited discussions at the meeting with positively impacting their ideas, such as "My dissertation will look different (for the better!) because I attended."

The conference's success is owed to the huge number of people that supported its organisation. We are indebted to various members of the University's

administrative staff, to Laura Wilson and her colleagues at the University's Cultural and Heritage Collections, to Sam Robinson and Alexander Stöger at the BSHS, and to the academic community at the Centre and School for so willingly embracing and supporting the conference, with particular thanks to James Stark, Jonathan Topham, and Mike Finn for their very special contributions.

Above all, however, the tireless work of the fabulous organising committee must be recognised. The postgraduate community at Leeds – Alex King, Stefan Bernhardt-Radu, Richa Desai, Lizzie Schulz, Kellie Vernon, Monica Stenzel, and Aswin VN – pulled together remarkably to carry the event off so smoothly, and it was a privilege to work with each and every one of them.

Finally, what of the Postgraduate Conference 2026? After gathering feedback from our postgraduate community, we are now taking a year to pause and assess how to make our future postgraduate programme even better. The Postgraduate Conference will return in 2027 – but Mika Hyman, our new postgraduate representative, is hard at work in the meantime. For the upcoming joint HSS/ESHS meeting, the BSHS is not only supporting early career scholars' attendance, but also co-ordinating some postgraduate events. So, keep an eye out for us at what promises to be an extraordinary meeting.

Grace Exley  
University of Cambridge



Left: Jon Topham delivering his keynote / inaugural professorial lecture, 'Science and Religion from the Ground Up'. Credit: Aswin VN

Above: The conference photo, taken on the first day. Credit: Aswin VN



# 'Nanyang' Knowledge

Marie Ngiam researches Zhang Liqian and the construction of this body of work 1930-50.

After a sojourn to the Nanyang (Southern Ocean) in the 1930s, Chinese intellectual Zhang Liqian (1900-1955) wrote a curious set of 14 essays, collectively titled 'Fruit of the South Seas' (Nanyang guopin zhi) 南洋果品志. Written between 1940-1951, they deal with a range of fruit, from the commonly known durian and mango to lesser-known varieties such as the astringent persimmon and bullock's heartapple.

These essays elucidate his fascination with, and at times even exoticisation of, tropical fruit, and provide a rare window into the study of natural history and its intersection with colonial science during the first half of the 20th century.

Situated at the interstitial space between histories of the overseas Chinese and natural history, research carried out as part of my MPhil dissertation probes into the intersecting yet largely unexplored histories of Republican Chinese intellectuals in Southeast Asia and the natural history of the region.

Like many Chinese intellectuals in the early decades of the 20th century,

Zhang decided to 'venture south' in the 1930s, teaching in schools in Malacca and Singapore, and eventually co-founding the China South Seas Society (CSSS), an intellectual society comprising primarily of Chinese intellectuals based in Southeast Asia, who were focused on studying and researching the Nanyang, in 1940. Yet, unlike many of his contemporaries whose research interests focused on social and political issues, Zhang was one of a handful of writers of the pre-1949 school of Nanyang Studies scholars who produced works on the natural history, particularly the flora, of the Nanyang.

### Key Findings

A hallmark of Zhang's research is his synthesis of different strands of knowledge, underpinned by a patriotic enterprise to 'save China through academic research' (Xueshu jiuguo 学术救国) by producing knowledge that could, in his view, advance China's geopolitical interests in the region. This was the great animating enterprise of many mainland Chinese intellectuals of his era, who were trying to make sense of China's geopolitical woes in the aftermath of the Opium



Above: Illustration of the *Annona muricata* [Soursop] (reproduced from Zhang Liqian 张礼千, 'Hongmao Liulian 红毛榴莲' [Soursop] *Journal of the South Seas Society* 5, no. 1(1948), 22)

Wars of the 19th century.

One way he endeavored to advance this enterprise was by authenticating aspects of the historical canon that formed the shared basis of the ancient Chinese culture, using European science as an instrument, a tool of modernisation, to establish the accuracy of botanical information contained therein and to lend legitimacy to Chinese historical traditions.

Another key aspect of Zhang's writings was his re-articulation of colonial knowledge to his readers, providing further insight into the multiplicity

of ways that non-European actors translated and reinvented colonial knowledge, appropriating and applying colonial modes of knowledge acquisition for their own purposes. A case in point is his reliance on Henry Burkill's writings, where he extends and repurposes Burkill's material with his own experientially-based 'tried and tested' methods, thereby creating new empirically-grounded knowledge.

### Exoticising Knowledge

Zhang's perception of the Nanyang as a historically important region abounding with economic potential was equally layered with a strong fascination for its people, food and customs. Like many European visitors to Southeast Asia, Zhang's writings about the Nanyang portrayed an exoticised tropics, reflecting what Brian Bernard terms, a type of 'Nanyang Orientalism' – a mode of retrieving and producing knowledge about, while ordering and exerting authority over, a primitive, exotic, Other.

This can be seen in his descriptive account of a hawker and the making of rojak, a salad dish commonly found in Indonesia, Malaysia and Singapore, composed of a mixture of sliced fruit and vegetables served with a palm sugar dressing and crushed peanuts:

'There is a kind of hawker in Nanyang who carries varieties of fruits and tubers, such as taro, cucumber, pineapple, mango etc, and displays them on a tray while advertising them for sale at the market. When sold, the seller uses a knife to cut off a few small pieces of various fruits and tubers, puts them in a mortar, then mixes them with syrup, chilli sauce, vinegar etc, stirs it with a spoon, then transfers them to a plate... Natives call this kind of food "Lu Ya", but it can also be made at home.'

Zhang's ethnographical observations of the rojak seller's activities – the ingredients he carries with him, his utensils and cooking method – is likely to have been influenced by British ethnologists such as William Skeat and Richard Winstedt. They were

part of the colonial administration, for whom the field of ethnology was increasingly popularised and pursued in increased efforts to provide what Matthew Schauer suggests was a 'more culturally sensitive' form of empire. Situating Zhang's works within this colonial framework, and his interest and engagement with ideas about empire and governance suggests that colonial modes of engagement with the customs, traditions and people of Malaya were not limited to Europeans.

### Zhang & 'overseas' Chinese

Zhang and his coterie of Chinese intellectuals were not the only ones to be captured by the allure of the Nanyang. Chinese writers and artists from the mainland who were residing in Southeast Asia during the early decades of the 20th century were similarly drawn to its exoticism, which in turn led to the creation of visual and literary works depicting an imagined rural idyllic.

The ability to depict 'local flavour' (Nanyang Fengge 南洋风格) was an attainment to which many aspired. Yet even this was a selective and particularised concept of 'local', featuring the same recurring motifs of everyday symbols of the tropics that were seen to capture the 'soul' of Malaya based on conceptualisations of Nanyang as a rural idyllic and which had taken hold in the imagination of many Chinese.

However, such views began changing in the late 1940s, as many Chinese immigrants remained in Southeast Asia after the end of the war and moved away from this idealised view of the 'exotic' Nanyang, increasingly wanting to become participatory citizens of an emerging Southeast Asian world. By contrast, Zhang's writings about the Nanyang continued to perpetuate such a view of the Nanyang. The Nanyang would forever remain entrenched in Zhang's imaginary as being populated by a weak and vulnerable people, incapable of self-rule and in need of rescuing by colonial 'heroes' like Raffles. This was at odds with the reality of a Nanyang that was



Above: Illustration reproduced from Han Waitoon, 'Hong mao dan 红毛丹' [Rambutan] *Journal of the South Seas Society* 4, no. 1(1947), 28

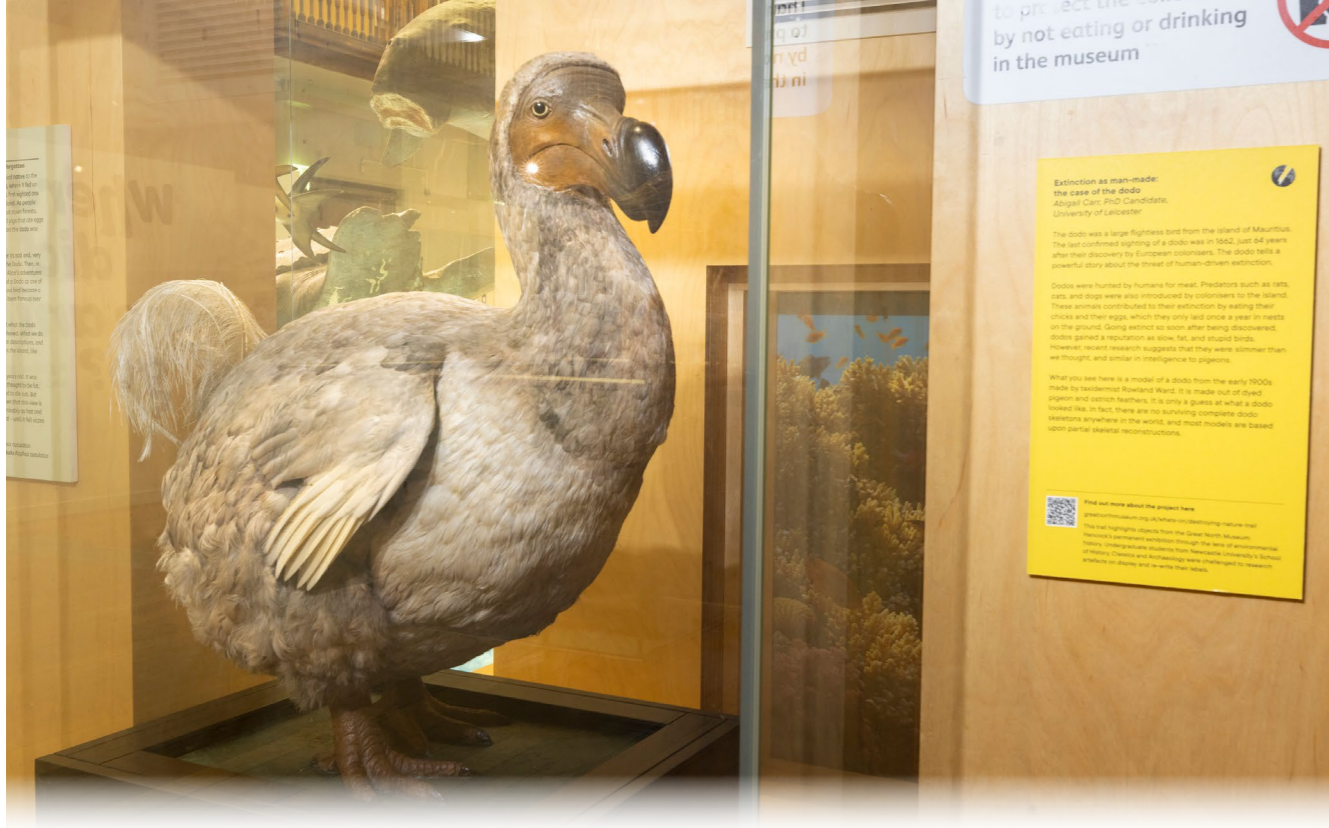
soon becoming an evolving terrain composed of nation states emerging out of their colonial shadows.

### Conclusion

A study of Zhang's writing presents an interesting chapter in the historiographies of natural history-writing in Southeast Asia and republican Chinese-histories. As a Chinese intellectual who set himself the task of forging his own enterprise of producing knowledge about the Nanyang, his writings thread different cultural and intellectual strands of knowledge, intersecting but not necessarily deriving from the larger apparatus of colonial science. As an amateur botanist who wanted to improve Republican China's standing on an international stage, Zhang engaged in the politics of colonial science with the hopes of stirring political interest in Southeast Asia. His views about an exotic Nanyang eventually diverged from many of his countrymen who eventually settled in Southeast Asia, and it also distinguished him from Chinese scientists who were advocating to use science to 'save' China. Nevertheless, his efforts to inscribe modern scientific botany into the geobody of the Chinese nation were no less commendable in their acuity of vision and creativity of execution.

Marie Ngiam, University of Oslo

Above: "The Golden Chersonese and the way thither" by Isabella Bird (1883). Copyright free. Source: [https://commons.wikimedia.org/wiki/File:The\\_Golden\\_Chersonese\\_and\\_the\\_way\\_thither\\_\(1883\).jpg](https://commons.wikimedia.org/wiki/File:The_Golden_Chersonese_and_the_way_thither_(1883).jpg)



## Destroying Nature: A Trail at the Great North Museum (Hancock)

Kristin Hussey & Clare Hickman trace environmental histories through natural science collections

The Great North Museum: Hancock (GNM) in Newcastle-upon-Tyne holds the largest collection of natural science objects in the North East of England. Founded in 1884 primarily from the collection of the Natural History Society of Northumbria, today the GNM tells the story of nature in the North East to local audiences. But how critical are the stories they tell? What deeper insights about power, technology, imperialism and extinction might the museum's collections hold?

These questions inspired us to develop a second-year teaching module which included collaborative teaching with the GNM team. As part of this the students were supported to re-interpret the museum's permanent galleries in light of the climate change and bio-diversity crises. In 2025, we were fortunate enough to receive the BSHS's Outreach and Engagement Project Grant to support the development of a physical 'trail' through the GNM. The trail was composed of a new interpretation researched and written by the students – revealing untold stories and exploring critical angles on the historic relationship

between humans and nature. In this article, we will explore the power of museums to reveal new stories, the practicalities of co-production with students, and some of the insights from the trail itself.

### Telling Environmental Stories

Jennifer Newell, in her 2016 collection *Curating for the Future: Museums, Communities and Climate Change*, writes:

'Museum spaces can support creative, helpful and healing meetings, rich with powerful moments that hold the potential for addressing disruption and displacement in a climate changing world.'

In the face of a rapidly changing global environmental context, museums have an important role as sites of conversation, re-imagining and community. Museums with natural science collections (botany, zoology, etc) are particularly powerful reminders of the way that humans have shaped our world. However, most natural history museums (like the GNM) tend to interpret these collections through a purely natural science lens – telling visitors,



Above: Exhibit of wolf at Great North Museum. Credit Mark Savage.

for example, about an animal's ecological context or role. Less often do we see these kinds of displays explicitly acknowledging the interconnection of nature and culture as a historical process. A key exception in the UK is the ground-breaking "Fixing Our Broken Planet" gallery at The Natural History Museum which opened last year.

Above: Exhibit of Dodo at Great North Museum. Credit to Mark Savage.

Below: Exhibit of the ahu' ula at Great North Museum. Credit Mark Savage.



Environmental history as a discipline emphasizes the ways that humans and nature affect each other – and how this relationship changes over time. Viewed in this way, the collections of museums like the GNM can be used to tell more critical environmental stories about empire, resource extraction, pollution, extinction and more. In a time where anxiety about climate change feels ever present but also sometimes intangible – working with objects in museums has the power to make the abstract concrete. This is the process that we hoped to guide our students through as we developed the concept for our project asking them to re-interpret the collections of the GNM for a second-year history module. Crucially, we wanted to give the students freedom to explore their own interests – to give them 'free reign' (at least theoretically) with the museum's collection to investigate themes and stories that were meaningful to them.

### Co-production & Pedagogy

The concept of the project was for students to practice their original research and writing skills by producing new text labels for display in the museum. Students were asked to produce two, 200-word labels each

on different objects that they had identified and investigated, as well as a short reflective piece, which formed a significant amount of their mark for the course. Students were assessed against their ability to write for a broad audience, relate environmental issues to objects, and engage with relevant historiography. To enable them to undertake this work, we ran workshops with museum staff as well as the module leaders on critical skills in museum collections research, storytelling, interpretation, and de-colonising and de-carbonising the museum.

Working in a responsive way with the students often meant we needed to offer individual support for their research process. While some students picked a thematic approach that reflected what was being taught in the environmental history course (for example, colonial hunting or the development of national parks) – others pursued more original research interests. We wanted students to be able to tell the stories that mattered to them and provided additional grounding that would help them to interpret their choice of object through feedback sessions and formative (non-marked) comments on drafts.

The idea to make a 'trail' through the GNM that would tell these critical environmental stories was one that emerged out of partnership – with the students but also with the museum staff. The team at the GNM were incredibly generous with their time – providing talks to the students, giving tours, responding to queries, and managing the production and installation of the trail itself. We were very grateful to the BSHS's contribution to cover costs of design and printing of the exhibition materials.

### Re-interpreting Objects

So what did the students actually make? The breadth of collections selected by the students was enormous and reflected the diversity of the museum's galleries. The students told the story of the Japanese Spider Grab – collected by a Royal Naval captain from South Japan during the Satsuma rebellion; a sacred Hawaiian feathered

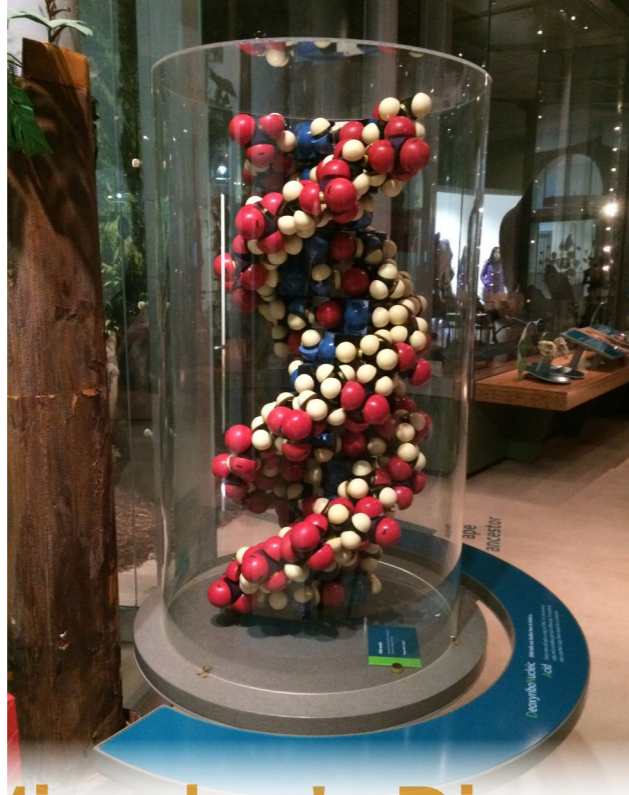
coat (the ahu 'ula) impossible to recreate today as it is made from the feathers of extinct birds; and the red squirrel – facing extinction in the UK after the introduction of the grey squirrel in the nineteenth century. Their labels explored themes such as masculinity and trophy hunting, indigenous relationships to animals, selective breeding, and nuclear disaster.

The final trail was composed of 25 labels, spread throughout the galleries – identified with bright yellow temporary signage. It opened to the public in July 2025 and ran through November 2025 (extended from its initial closing date of September 2025). In the busy summer period, over 65,000 people visited the museum. One visitor wrote in response to the trail: 'I liked the addition of the yellow ecological impact signs throughout. It was a great way to see the emphasis on local history and wildlife.'

### Future Directions

Since the exhibition's closure, the GNM's learning team have asked to be able to use the student's labels in their educational programming. Our cohort of environmental history students has jumped from 15 to 120 in just one year – a result, we think, of student interest in this kind of 'real world' collaboration. Whether we will undertake another physical exhibition trail with the museum is uncertain. The museum has indicated that it would be open to working with us and our students again and we are looking for other funding streams. What we hope people might take away from our experience of the project is firstly, that you can do quite a lot with a little (our BSHS grant was just under £500) – particularly if you do it with enthusiastic collaborators. Secondly, that academic historians collaborating with museums can be a 'win-win' scenario – in which museums are able to gain new voices and perspectives on their collections, while academics can explore new routes into research, engagement and pedagogy.

Dr Kristin Hussey Newcastle University  
Dr Clare Hickman Newcastle University



## Friedrich Miescher's Discovery

Kersten Hall & Ralf Dahm explore Miescher's early research into the discovery of DNA.

As titles of scientific papers go, 'On the Chemical Composition of Pus Cells' was never going to have readers on the edge of their seats. Published in 1871 by Swiss scientist Friedrich Miescher, it described – in exhaustive detail – his chemical analyses of white blood cells obtained by rinsing pus from old bandages.

Although Miescher's paper mostly reads like a dry biochemical cookbook, it is nevertheless a landmark in the history of science. For, buried amidst Miescher's meticulously detailed account of the concentrations of solutions used or how many times samples were washed in a particular solvent, was a hidden gem: a discovery that would change our understanding of life.

### The Discovery

His discovery was that of a novel substance which was chemically distinct from anything already known. As it was localised exclusively to the cell nucleus, Miescher gave it the name 'nuclein' but today it is known by the more familiar name of deoxyribonucleic acid, or DNA. And whether it's thanks to cinema blockbusters about theme parks full of cloned dinosaurs, or scenes of forensic labs in TV crime dramas, most people have heard of it. That a semi-final entry by Dr. Sybira Yusoff in the 2022 hit TV show 'Great British Bake-Off' depicted a dou-

ble-helical DNA molecule baked in Swedish krokan pastry is a testament to the status of DNA as an icon in pop culture.

But if asked who discovered DNA, most people – (including most scientists!) – would struggle to give an answer. This is something that my co-author, Dr. Ralf Dahm (Institute of Molecular Biology, Mainz, Germany) and I are hoping to put right in our new book 'The Dawn Fisherman: Friedrich Miescher and the Discovery of DNA.' And to give full disclosure, we must confess that, despite having trained and worked as molecular biologists for many years, we spent many days at the lab bench, chopping and changing DNA sequences without ever having had a clue as to who had discovered DNA in the first place.

Does it matter whether scientists know anything about the history of their subject? Having long since hung up my white coat, put down my Gilson pipette and turned to writing about the history of science, it probably comes as no surprise that I certainly think it does. And perhaps even more so now that we've gained the power to manipulate the material that Miescher discovered.

As Ralf explains in our introduction, Miescher made his discovery working in conditions that were starkly differ-



Above: Portrait of Friedrich Miescher (circa 1878). Photographer: Jakob Höflinger. University of Basel Library, Portr BS Miescher F 1844, 5b

ent from a state-of-the-art modern molecular biology lab. And when Miescher's discovery was published in 1871, it was met with scepticism. But, having returned to his home town of Basel that same year, Miescher had a new preoccupation to take his mind off disputes over whether he had indeed discovered a novel substance.

This was the sperm of the Rhine salmon, the cells of which, with the fish having swum to their spawning grounds in the upper Rhine, were stuffed full of DNA in preparation for mating. So, rising in the dark and cold of early winter mornings, Miescher made trips down to the river to catch fish for his work – which must have been a welcome alternative to rinsing pus from old bandages.

But the return to Basel also brought problems. Despite working with such focus and intensity that, on the day of his own wedding a group of friends had to drag him away from his experiments to attend the church, there were other demands on Miescher's time and attention. Along with commercial studies of salmon migration, nutrition and ecology, he begrudgingly accepted a request by the Swiss government to undertake studies of the diet of prison inmates in the hope of improving their nutrition. Added to which, there were the growing administrative burdens that came with having been made director of a new institute. All of which left Miescher feeling so overwhelmed and frustrated that he compared himself to Sisyphus who, in Classical mythology, was doomed to spend eternity rolling a boulder up a mountain only to have it slip from his grasp and roll back down. Eventually the metaphorical boulder rolled back, crushing Miescher and his health collapsed.

### Miescher's Legacy

With the onset of tuberculosis in 1890, Miescher began to make regular visits to a sanatorium in Davos, where he eventually died in 1895. He went to his grave burdened by a sense of missed opportunities and had once described himself as feeling like a schoolboy who goes to bed each evening knowing he has not done his homework.

Reflecting upon the legacy of Miescher's achievements, one of his former students later compared him to a ship that returns to port laden with treasure only to sink to the bottom of the sea just as it is entering the harbour. But one of Miescher's own mentors, the physiologist Carl Ludwig, had offered him some words of consolation as he lay sick in Davos – '...however often the cell will be studied and examined during the centuries to come, the grateful descendants will remember you as the ground-breaking researcher.'

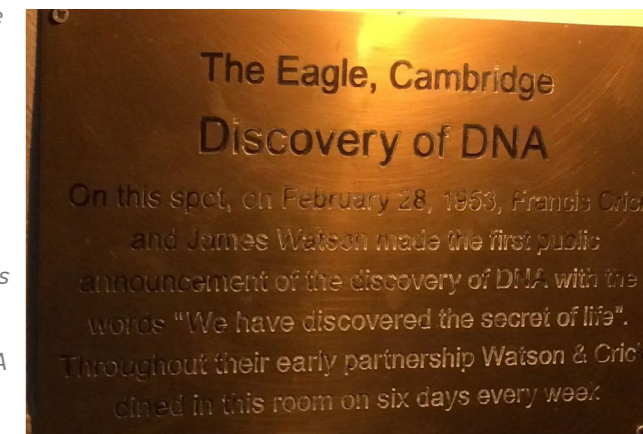
Ludwig was only partly correct in his prediction of Miescher's legacy. DNA may have become a cultural icon, but it is more likely to be associated today with the names of James Watson and

Francis Crick who discovered its molecular structure. Since 2003, the NIH have even celebrated 25th April each year as 'DNA Day', this being the date on which Watson and Crick's famous 1953 paper appeared in the journal *Nature*, when in fact Miescher first reported the discovery of DNA on 26th February 1869 in an excited letter written to his uncle Wilhelm His.

### Cultural Eclipse

How is it then that Watson and Crick have come to eclipse so many other names in the story of DNA, including that of its very discoverer? It could well be related to two important cultural changes that had taken place since Miescher's time in how scientists communicate their findings. The first of these is that, unlike Miescher's 1871 publication, the title of Watson and Crick's famous 1953 paper 'A Structure for Deoxyribonucleic Acid' told a reader straightaway that they had found something of great importance. But secondly, Watson and Crick had another tool for communication at their disposal that Miescher did not. This was the power of an iconic image thanks to a photograph taken by Barrington Bayley Brown which shows the duo with their DNA model – the elegant double helix.

As politicians have learned, in an age of visual mass media, a well-chosen image offers a powerful means of owning and controlling a particular narrative. And science is no exception. For although the photograph of Watson and Crick with their DNA model was taken shortly after the publication of their first *Nature* paper, its composi-



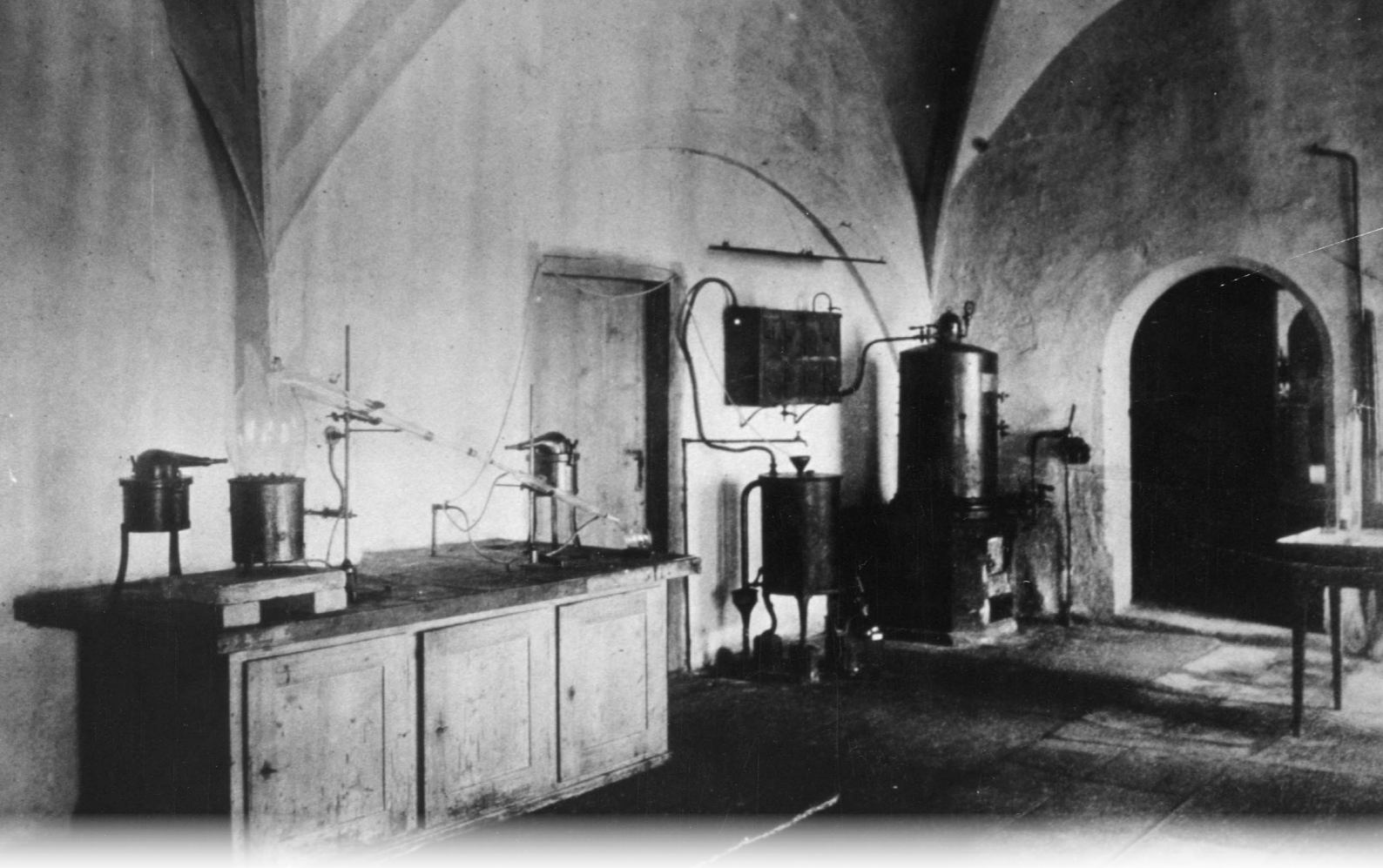
tion gives viewers the powerful sense of being witness to a 'Eureka' moment. The effect is to forge the perception in the popular consciousness that the narrative of DNA belongs to Watson and Crick. Miescher's story, by contrast, has nothing comparable to this image except for a portrait photograph of a brooding, pensive young man – certainly no lasting memorable Eureka moment there.

And it is Eureka moments, coupled with maverick heroes that have come to dominate and define the history of science in the popular imagination. It would have been tempting, therefore, to present Miescher as its polar opposite – that of the forgotten hero. But heroes in the history of science – whether forgotten or not – do more to obscure than to illuminate how science really unfolds. In some cases, the allure of the hero narrative is not just obscurantist, but dangerous – and in the closing chapters of our book we offer a very recent example of a biomedical researcher who was so beguiled by historical accounts of maverick heroes that he crossed an ethical boundary.

With the image of himself as Sisyphus toiling to roll the rock up the mountain, Miescher offered a refreshing corrective to popular tales of maverick geniuses and Eureka moments. And perhaps for this, along with his discovery of DNA, it is that he is well worth remembering.

Dr Kersten Hall, University of Leeds

Dr Ralf Dahm, Institute for Molecular Biology, Germany, and University of Padua, Italy.



## Special Excerpt: The Dawn Fisherman

Kersten Hall and Ralf Dahm provide an excerpt from their latest book.

So how then, did we end up writing a book about him [Miescher]? And perhaps more importantly, why?

**Ralf:** For me, the pivotal year was 2003. This was the 50th anniversary of Watson and Crick's discovery of the structure of DNA—a scientific milestone that was celebrated all over the world. At the time, I was working at the Max Planck Institute for Developmental Biology in Tübingen, Germany – a town, which, as I would soon find out, had an intimate, important, and much overlooked connection with Watson and Crick's achievement.

Watson and Crick's discovery of the double-helical structure of DNA explained how the molecule was able to pass on genetic information from one generation to the next. This was a turning point in the development of molecular biology and certainly worthy of being celebrated 50 years later. But, justified as they were, something struck me as rather odd about these celebrations. Because amidst the countless articles, editorials, and opin-

ion pieces that appeared in scientific journals and popular media, I found no mention of who had discovered DNA in the first place.

A casual reader flicking through these articles could easily be forgiven for thinking that the history of research into DNA had begun only nine years before Watson and Crick's discovery with the demonstration by Oswald T. Avery in 1944 [Figure 4] that DNA could pass on hereditary traits in bacteria. Thankfully, Christiane Nüsslein-Volhard who was my post-doctoral advisor at the time, knew better. From her, I heard the occasional odd snippet about this enigmatic figure, Friedrich Miescher who, some 135 years before my arrival in Tübingen, had investigated the molecular composition of cells in the bowels of the castle there and, doing so, found DNA. Being a curious person by nature, I was naturally intrigued to find out more.

So, I began to dig deeper into the history of the man who had discovered

DNA and whom history seemed to have largely forgotten. Searching a local library, I found a biography of Miescher by his uncle, Wilhelm His [Figure 5] which also contained Miescher's collected publications. The arcane and sometimes convoluted German in which these articles were written hardly made for typical bedtime reading. But I was nevertheless hooked. Having begun to read them, I found myself unable to stop. The more I read, the more I was astounded by the depths of Miescher's finding and insights. Far from having happened to stumble across a new molecule and not understanding what he had found, Miescher knew what he was doing and that he had discovered something of great importance. He had moved to Tübingen only shortly before with no less of an aim than to uncover the molecular basis of life. And, when he had found DNA, he knew that it was an important molecule with key functions inside the cell.

His working conditions seemed an unlikely place in which to make a



**Left:** Glass vial containing nuclein isolated from salmon sperm by Friedrich Miescher while working at the University of Basel. The faded label reads 'Nuclein aus Lachssperma, F. Miescher' (Nuclein from salmon sperm, F. Miescher). Photograph by Alfons Renz, University of Tübingen, Germany. Possession of the Interfakultäres Institut für Biochemie University of Tübingen, Germany. Photographs reproduced with kind permission of the Museum of the University of Tübingen (MUT) and thanks to Professor Ernst Seidl.

discovery of such importance. I still vividly recall for the first time seeing historic photographs of the laboratory Miescher worked in at Tübingen castle [Figure 6] and visiting the place myself in 2003 (when it was little more than a storage facility of Tübingen University's archaeological department): the place looked to be a far cry from the high-tech molecular biology laboratories in which I had worked for the previous ten years. Instead, it conjured up images of knights sleeping off stinking hangovers on the hard stone floor having stumbled from an evening's overindulgence in the nearby banqueting hall. And the tools available to Miescher at the time would have looked more at home in the dank basement of a Prohibition era moonshiner than in a modern biochemistry laboratory.

Few people, even in Tübingen, appeared to be aware of Miescher or the importance of what he had done in their town all those years ago. I decided that I wanted to change this. After having researched the history of the discovery and early characterisation of DNA, I wrote a piece on Miescher and his seminal work for the local Tübingen newspaper, the Schwäbisches Tagblatt, in 2003. It was to be the first of many, including one for a magazine published by the Max Planck Society – the Max Planck Research. The latter was noticed by an editor of the scientific journal Developmental Biology who happened to be visiting our institute at the time, and I ended up writing a more scholarly article on the topic for this journal. Over the years, I published a fair number of articles, both for the general public and for the scientific community, highlighting various

aspects of Miescher's life, work and reception.

In 2015, Tübingen finally recognised Miescher's achievements more broadly and established a museum situated in what had once been Miescher's former laboratory in Tübingen castle [Figure 7]. This museum is now open to the general public, thanks to conversion and renovation of the old castle kitchen being made possible through financial support from Tübingen-based biotechnology company CureVac. Four years later a symposium commemorating the 150th anniversary of Miescher's discovery was held in the former banqueting hall of the castle, next to the new museum at which I was fortunate enough to be invited to give a talk on Miescher's life and achievements.

But despite this success, there was still more to be done. After nearly two decades of writing articles in the hope of restoring Miescher to his rightful place in the history of biology, I felt that the best way to achieve this would be to bring all this disparate information together in a single and, most importantly, an accessible publication.

In taking on this task, I was lucky on two counts. Firstly, I mentioned my interest in Miescher to Stefan Müller-Stach, a mathematician and Vice-President at Johannes Gutenberg University of Mainz, Germany, who suggested that it would make a great subject for a popular science book. Secondly, in 2022 I was invited by Dr. Neeraja Sankaran to take part in a podcast about Miescher for the Consortium for the History of Science, Technology and Medicine. Kersten was a fellow guest on the podcast and although this was the

first time we had met, I knew that in seeking to bring the story of Friedrich Miescher to the wider world, he should be a part of telling it. So, I am very grateful to both, because without either, this book on Miescher's seminal discovery and how it transformed the way we understand life in all its wonderful forms, would never have come about.

**Kersten:** I suspect that most middle-aged men sometimes find themselves shouting at the television, and I am no exception. My outbursts however tend not to be provoked by perceived injustices on the sports field or pronouncements from politicians during the evening news, but instead during the TV show, 'University Challenge.'

My ears pricked up during an episode last year when contestants were asked a question about the scientist Rosalind Franklin whose X-ray studies of DNA were crucial in solving its famous double-helical shape. As we'll see later in this book, Franklin's work was without doubt vital in unravelling the structure of the DNA molecule, but on hearing the question describe her as having done 'important work in the discovery of the DNA molecule' I shouted out loud, 'But what about Friedrich Miescher?'

...

Having studied biochemistry at university, I'd known about both DNA and RNA for a long time and how nucleic acids were one of the four classes of long chain molecules, alongside proteins, lipids and carbohydrates, that were essential to life. During my PhD and subsequent work as a molecular biologist I had spent nearly every day of my working life immersed in the task of isolating, purifying, sequencing and analysing both these types of nucleic acid. But all this was done without the faintest idea of who had discovered them in the first place. And even had I known, I suspect that to my shame I might well have dismissed such knowledge as irrelevant. What, after all would have been the point of being able to recall the name of some long dead scientist

**Above:** The Laboratory in Tübingen Castle Where Miescher Made His Discovery of DNA (1879). Photograph by Paul Sinner. Permission of the Museum of the University of Tübingen (MUT) and thanks to Professor Ernst Seidl.

when professional survival in the hyper-competitive world of research depended upon ever more papers being published and grant applications written?

It was only when I finally hung up my lab coat and turned to writing about science that I came across Miescher whilst researching a book that I was working on at the time about how wool had played a little known, but important role in unravelling the structure of DNA. But – and it pains me to write this – I gave him nothing more than a minor walk-on part as a member of the supporting cast.

A few years later however, I was sitting in a quiet corner of ‘The Eagle’ pub in Cambridge when my thoughts turned to the little that I knew about Miescher. This might have been because the beer I was enjoying was called ‘DNA’ but it was more likely thanks to a group of tourists who had clustered around the wall opposite to point their phones at two commemorative plaques and read the inscriptions upon them with the hushed awe and reverence of medieval pilgrims visiting a holy shrine.

Reading the inscription on the first of these plaques [Figure 8], it took an immense effort of self-restraint not to lean across and gently explain to them that what it said was...well, wrong:

Discovery of DNA: On this spot on 28th February 1953 Francis Crick and James Watson made the first public announcement of the discovery of DNA with the words ‘We have discovered the secret of life’. Throughout their early partnership, Watson and Crick dined in this room on six days every week.

The story of how Francis Crick and James Watson went bounding through the streets of Cambridge and burst into ‘The Eagle’ to announce that they had just discovered the secret of life has taken on the status of legend. It became the climax of the 1987 BBC drama, ‘Life Story’ in which ‘The Eagle’

is packed solid with drinkers as if it were New Years Eve (and not just an ordinary weekday lunchtime), who erupt in jubilation at Watson and Crick’s proclamation that they have just discovered ‘the secret of life.’

While this scene may make for great TV drama, it’s poor history. In a 2009 biography written by the historian of science Robert Olby, Crick said that he had no recollection of ever having burst into ‘The Eagle’ pub to make this announcement and ascribed this entire episode to the poetic license and imagination of James Watson – who later confessed to having made the whole thing up.

So, Watson and Crick didn’t go bursting into ‘The Eagle’ to announce they had discovered the secret of life. But crucially, nor did they discover DNA, as the plaque claims.

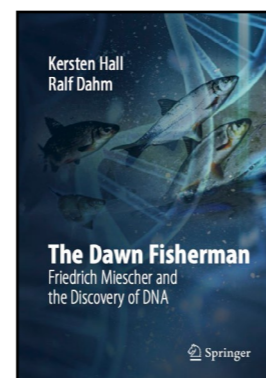
Does any of this really matter? It probably comes as no surprise that as a science historian I would say that it most definitely does. And this is not simply for the satisfaction of academic pedantry. Because, as we hope this book will show, it matters that we get our history of science right. When we get it wrong, the consequences can reverberate far beyond the academic lecture theatre or seminar room and, as we discuss in the closing chapters, can even be tragic.

Thankfully, my discretion prevailed on that afternoon in ‘The Eagle’, and the tourists were spared a lecture about the misleading wording of the plaque and Miescher’s discovery of nucleic acids. But as they moved away towards the bar, I wondered what Miescher might have felt had he known that 150 years after his death visitors would be flocking to see a plaque that ascribed his discovery to someone else. Or even that the very beer I was sipping was named in honour of Watson and Crick legendary entrance into ‘The Eagle’ – and not Miescher’s efforts in Tübingen.

I was still pondering this question when, a few years later, Ralf invited

me to work with him on this book. By this time, having been invited by Dr. Neeraja Sankaran (now at Ahmedabad University, India) to collaborate with her on the first complete translation from German into English of Miescher’s landmark 1871 paper, I was well acquainted with Miescher. And thanks to Ralf’s kind invitation, I now have an answer to the question I had pondered that afternoon in ‘The Eagle’. For now I’m pretty sure that if Friedrich Miescher could have joined me there, the ‘DNA’ beer might well have left him with a bitter taste in his mouth, but seeing the plaque and the tourists clustered around it would not. Rather, it would have brought a smile of relief, satisfaction, and quiet contentment.

By telling his story, we hope you’ll see why – and more importantly why it matters that we get our history of science right. And if, as a result, a future series of ‘University Challenge’ includes a question on Friedrich Miescher, then we’ll know that we’ve been successful. In any case, we very much hope that you will enjoy following us on our little trip back through time to the beginnings of how nucleic acids were first discovered, how this changed our understanding of the living world, and the promise it holds for the future.



*Adapted and excerpted with permission from The Dawn Fisherman: Friedrich*

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# Viewpoint Interviews...

Alexander Stöger, BSHS Communications Officer

## How did you get involved in the history of Science?

Quite by accident, actually. When I began my studies at Friedrich Schiller University Jena in Germany in 2009, I had never even heard of the history of science as a distinct field. I liked history, but I did not want to study wars and politics, so I chose German literature, linguistics and philosophy for my Bachelor’s degree. During my second year, I finished my courses early and began looking for something interesting outside my subjects.

That was when I discovered a history of science seminar on Alexander von Humboldt, one of my favourite natural philosophers. Intrigued by this combination of two of my favourite topics, history and science, I contacted the lecturer and asked whether I could join. I was delighted when they said yes.

Coming from a large subject with crowded classes, I entered a completely different world: the seminar consisted of just four students, the lecturer and me. Over the following years, I took many more courses and worked on projects ranging from cataloguing scientific instruments at the Ernst Haeckel House to co-curating a small exhibition on nineteenth-century map-making. The small classes and wonderful people offered opportunities that would have been impossible elsewhere.

Very quickly, history of science became my intellectual home. It combined my interests in culture, knowledge, science and history in a way no other subject had managed before or since. Looking back, I am deeply grateful to the tutors who welcomed the slightly odd student from another department.

So when the opportunity arose to write my Master’s thesis and later my PhD in the history of science, I did not hesitate.

## How has the field changed since you first got involved?

My impression is that the history of science has become broader and less boxed in by academic boundaries. Today, it engages with a remarkable range of themes, methods and perspectives, often in dialogue with neighbouring fields. What excites me most is precisely this diversity. The

history of science is such a rich field in and beyond academia that I still learn something surprising every day.

## What are you working on currently?

I am currently working on my so-called second book (although it’s technically my two-and-a-halfth book) and my habilitation at Saarland University in Germany, where I also teach the history of science and science communication.

My current research focuses on 19th-century metropolitan museums and their imperial dimensions. I am particularly interested in how some of Europe’s major national museums were built or rebuilt during this period, how they competed and collaborated with one another, and how they sought to establish their own narratives of cultural and imperial superiority.

I love the huge variety of sources I’m working with. Much of my work takes place in archives, where I encounter everything from photographs to floorplans and postcards. These materials allow me to look beyond the museum facades and explore the ideas, ambitions and networks that shaped some of Europe’s most influential spaces of knowledge, culture and public education.

## Do you use any productivity/time management tools/hacks you can recommend?

I’m a huge tech enthusiast; always testing new apps or writing little programs in search of a better workflow. But I usually end up returning to two very simple tools: Microsoft OneNote and UltraSearch to quickly search through thousands of PDFs. I’m also a huge fan of pen and paper – no login required! My main productivity tip is therefore rather boring: Keep your tools simple enough that you actually use them.

## What are some key areas that you would like to see greater investment/attention/engagement?

I would love to see more exchange between the history of science and the fields we research. We don’t just offer a history of the subject, which in itself is



vital to understand the cultures scientists work in. We also offer the cultural insight and communication skills that are needed to bridge the gap between scientists and broader audiences.

## What does your role within BSHS involve?

I am the Communications Officer for the BSHS. Since 2021, I’ve been responsible for the Society’s websites, social media and a range of technical projects, including livestreamed lectures and entire online conferences. Alongside writing posts, I create the accompanying graphics, banners and promotional materials. I am also responsible for the technical side of our conferences, creating the websites and giving support. Most recently, I’ve rebuilt our main website. Go, check it out!

## What’s the best archival trip/field trip that you’ve been on?

I love archival trips! One of my most memorable was a visit to the Royal Society in 2022, where I researched the early history of peer review in the Philosophical Transactions.

It was fascinating to read the reports and see how this now-familiar part of academic life was taking shape nearly 200 years ago. My favourite discovery, however, was a rather desperate note from a reviewer begging the editor to pass the task on to someone else, because they did not have the time to complete the review. Haven’t we all been there?



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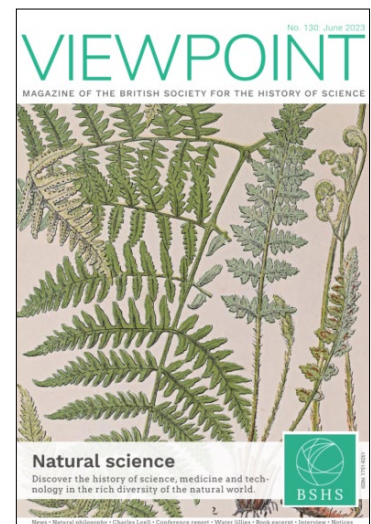
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