

"Sciences are a factory for innovations, and ultimately also for new categories of knowledge."
Lorraine Daston on the study of sources.



The Observer

Curious? Yes, she certainly is. And also obsessed – with books. This combination happily converged in her profession. As Director at the **Max Planck Institute for the History of Science** in Berlin, US-born **Lorraine Daston**, whose first name is an anglicized version of Urania, the muse of astronomy, researches the history of observation and experiment. Or, in other words, how data was collated and illustrated in the past.

TEXT **UTA DEFFKE**

For some people, Ostwestfalen-Lippe is a place that marks a key turning point in their lives. Lorraine Daston is one such person. In the early 1980s, the young American came over from Harvard to the Center for Interdisciplinary Research at Bielefeld University, as part of an international team assembled for one year by philosophers Lorenz Krüger and Ian Hacking to research the history of the probabilistic revolution: how probability theory has revolutionized our lives – from weather forecasting to the economy – by opening up a spectrum of degrees of certainty between the two poles “true” and “false.”

Then 31 years old, Daston, who had received her doctorate in the history of science from Harvard a few years earlier, had been a junior fellow in the Society of Fellows at Columbia University in New York and was now an assistant professor at Harvard.

And then followed a year at Bielefeld. “It really was a period that changed my life in so many different ways,” she recalls.

GERMAN TAUGHT AS A DEAD LANGUAGE

The first culture shock was the German language. “I hadn’t expected it to be so beautiful,” says Lorraine Daston. Although she had learned German while studying, her teacher taught it as a dead language. In Bielefeld, she was able to speak German without any restraints. “People in Bielefeld were really kind. At the weekly market and in the stores, everyone was very welcoming and patient – ideal for a non-native speaker practicing the language.”

Equally patient, open-minded and capable was Lorenz Krüger, who, together with Ian Hacking, managed to create a true work collective out of the diverse group of scientists from all over the world. “I loved the atmo-

sphere of good will and good humor and the concept of practical wisdom – *phronesis*, to use Aristotle’s term – and benefited hugely from it,” says Lorraine Daston. “It was a kind of existence proof: it is possible for scholars in the humanities to work together. It was a revelation.”

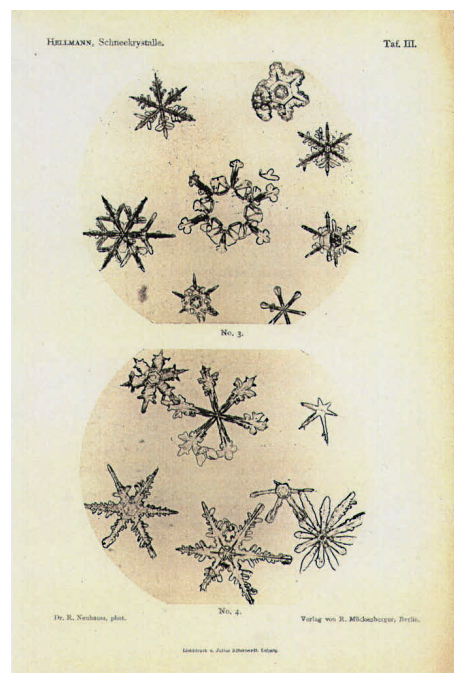
After several years on the move, Daston has now lived in Germany for almost 17 years and, as Director at the Max Planck Institute for the History of Science in Berlin-Dahlem, has also gathered many young scholars around her. She sits in her office, surrounded by nothing but books, looking out over a group of old trees in the quadrangle of a modern, light-filled building. She gazes attentively at her interviewer and talks as though dictating a book: in German, naturally, with a very precise yet lively diction. She talks about her impressive career and the finer details of her work and subject with a ready wit, sprinkled with anecdotes. >

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Nature in images and figures: For academics like Gustav Hellmann, the beauty of snowflakes lay in their symmetry; however, his camera lens exposed this assumption as a fallacy (left). Images like this one of cirrocumulus from ATLAS INTERNATIONAL DES NUAGES from 1896 (center) and data such as that contained in the Berlin weather table from the 17th century (right) form the basis of science, and one of the themes in Lorraine Daston's research.

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In a world of books: For the Max Planck Director, reading sources and working in the archives are the most important parts of her scientific activity.



Tag	Monat	Jahr	Wetter	Wind	Temperatur	Barometer	Höhe	Beobachtung
12	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia
14	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia
15	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia
16	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia
17	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia
18	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia
19	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia
20	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia
21	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia
22	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia
23	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia
24	Jan.	1661	Wolke	W.	25.5	29.5	10	Wolke aus cumulus, dichte pluvia

Lorraine Daston adopts a very specific approach to her research. She tries to give the fundamental epistemic categories of science – such as observation, experiment, objectivity and truth – a history: categories that now seem so self-evident to us. “Sciences are a factory for innovations – not just inventions and discoveries, but also new ideas, theories, hypotheses and models. And, ultimately, a factory for new categories of knowledge,” says Daston.

Take observation, for example. No other scientific practice is more fundamental or more widely used. Daston and her colleagues have put observation itself under the microscope, discovering how and under what historical conditions it came into being, in which disciplines it first flourished and subsequently diversified. “In the ancient world, and even the Middle Ages, observation was associated primarily with sailors, shepherds and farmers. It was all about forecasting

and searching for correlations, without any need for explanations. For example, when cattle eat more grass in September, the winter will be a hard one,” explains Daston.

OBJECTIVITY AS A RESEARCH OBJECT

It wasn't until the end of the 16th century that people first attempted to make a science out of this country lore and turn it into an epistemic practice capable of generating robust results. “Observationes” coalesced into a learned genre, in which doctors and astronomers in particular set down their observations. This practice subsequently spread to other human and natural sciences as well. Observation developed into a rigorous method and a concept to be reflected upon, not only by practitioners, but also by philosophers.

The researchers have compiled histories of scientific observation from the

5th to the late 20th century in a book. “We don't claim to have exhausted this topic,” stresses Daston. “It's more a question of trying to open up a new field of research.” Other research groups have been devoted to the history of scientific objects, objectivity and experiments. “A Max Planck institute should do something that can't be done elsewhere. It was a privilege to help establish this institute and organize this type of non-hierarchical working group as a new way of conducting research in the humanities,” says Lorraine Daston.

Only a group can cover the long time periods and large number of disciplines involved in these fundamental issues. The researchers here are a motley crew: literary scholars, musicologists and scientists of all kinds, who have somehow found their way to the history of science. “Zigzag career paths are almost the norm here,” explains Daston.



» Lorraine Daston investigates the history of the fundamental epistemic categories of science, such as observation and objectivity.

This is only partly true in Daston's case. She had plans to become an astronomer when she enrolled at Harvard, and the stars still fascinate her today. In a sense, this could be said to be her destiny: her parents, who had Greek roots, named Lorraine after Urania, the Greek muse of astronomy. She was born in East Lansing, home to Michigan State University, where her father was studying for a doctorate. He went on to become a professor of psychology, so thoughts of a career in science came naturally to Daston. It was clear from an early age that she would become a scientist. It merely remained to be seen in which field.

As is common in the US, Lorraine Daston studied several subjects: mathematics, history, philosophy, and later

also the history of science. "I was very lucky in that the introduction to astronomy was presented historically. I was absolutely fascinated – it was all completely new to me." The discovery of this new discipline solved her dilemma: "I quickly realized that the history of science was the ideal answer for people like me, who can never decide whether they prefer natural sciences or humanities – or something in between. In the history of science, everything is possible."

But there is more to it than that. You have to master a wide range of disciplines to make it work – "because history doesn't respect current disciplinary boundaries," as Daston says. At Harvard, she also wrote her thesis on the history of probability theory, its

emergence in the 17th century and its spread in the 18th and 19th centuries. The starting point for such work is usually a study of the relevant original literature – Leibniz for example, as well as Condorcet, Poisson and Laplace. "But that's just the beginning," explains Daston. "You then have to put this literature in context. And that's always the hardest part: Which context is relevant?"

To begin with, the young scholar studied probability theory from the perspective of its early applications. Some of these applications are still obvious to us today, such as games of chance, and insurance. However, she also came across a few real surprises, such as the probability of testimony. A witness in a trial asserts something;

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Among other things, observation as an artistic and disciplined experience requires physical and mental training – and the right tools. This painting by Donato Creti from 1711 shows astronomers observing the moon.

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In-demand discussion partner: Lorraine Daston in conversation with Italian historian and cultural scientist Carlo Ginzburg during an event at Berlin's Humboldt University.

how likely is he or she to be telling the truth? “It’s certainly an interesting question, but can it really be answered using probability theory?” wonders Daston.

That’s why it’s important to examine the intellectual context in which it was possible for leading mathematicians such as Leibniz, Laplace and Poisson to view questions of this type as a legiti-

mate application of probability theory. The net is then widened to include the history of law, the long history of the arithmetic of proofs, the rules of circumstantial evidence and aleatory contracts. “As with all empirical research, the great thing is that you never know where it will lead. You come across so many wonderful surprises! The most difficult question is: When should you stop your research?”

Her research on the history of probability theory is what first brought Lorraine Daston to Germany after completing her doctorate. In addition to the two – positive – culture shocks she experienced in Bielefeld, there was another even stronger one: her meeting with Gerd Gigerenzer. As a scientist who had recently obtained his post-doctoral lecture qualification in mathematical models in psychology in Munich, he brought an extra dimension to the research group.

The two fell in love, and Bielefeld marked the start of a period of commuting, as Daston eventually returned to the US, this time to Princeton, while Gigerenzer stayed in Munich. The typical dual career problem: “It was very complicated. We commuted for a long time, until the birth of our daughter put an end to it,” explains Daston.

NOT EVERYTHING WENT SMOOTHLY AT THE UNIVERSITY

Consequently, she left the US in the early 1990s to take up a professorship at Göttingen University, which used funds from the Volkswagen Foundation to create a history of science chair. She remembers this period as an unhappy and frustrating one, mainly because nothing went right at the university in terms of organization and administration. Childcare was a particularly pressing problem. Finally, the whole family relocated to the Universi-



Photo: Donato Creti, Astronomical Observations: The Moon (1711), Pinacoteca Vaticana



» The new Max Planck institute started life under fairly bizarre circumstances on a historical site in Berlin.

ty of Chicago, where Daston and Gigerenzer took up professorships.

Another turnaround came just two years later, in 1994. Daston was offered a professorship at Harvard University and Gigerenzer one at neighboring Boston University. At the same time, the Max Planck Society offered the two world-class scientists directorships in Germany: she in Berlin, at the newly established Max Planck Institute for the History of Science, and he in Munich at the Max Planck Institute for Psychological Research.

Initially, this meant another geographical separation, which neither of them was prepared to accept for long, and which ended only after Gigerenzer was appointed Director at the Max Planck Institute for Educational Research in Berlin in 1997. "If we hadn't found a way to be together in one place again, we would have returned to Chicago," says Daston.

In Berlin, the new institute started life under fairly bizarre circumstances on a historical site: the former Czech embassy in Wilhelmstrasse, in the old East center of the city. Following the division of Czechoslovakia, the Czech

Republic had premises to rent. "The first time I came, Jürgen Renn was sitting there in a completely empty room, with a telephone on his lap. That was the institute." In summer 1995, when she finally arrived in Berlin, Renn had gotten things up and running: "It was nothing short of heroic, the way he conjured the institute virtually out of nothing."

Since 2007, the institute has been housed in its own new building in the quiet, leafy Dahlem district of Berlin, right next to the first Kaiser Wilhelm Institute. The library forms the heart of the three-story building. Wrapping all around the bottom floor of the institute, the bright and airy space is filled with light from a glassed-in inner courtyard. The Directors were involved in the planning, Lorraine Daston's suggestion being that the library be open to institute scholars around the clock, as the 65,000 or so books form the basis of all of their work. Lorraine Daston occasionally sits here reading before 6 a.m. For her, working with books and other sources is still the most important part of her scientific activity. "If I no longer had time

to go to the archives, I'd kill myself," she laughs. She recently met a colleague in Paris who is on sabbatical and thus has a whole year to spend in the archives. "I was so envious! For me, it's oxygen, pure and simple."

DATA ARCHIVING AS THE BASIS OF SCIENCE

She herself spent three days searching the archives of the Académie des Sciences for unusual tabular presentations from the 17th century. A brief trip to the Royal Society of London Archives was next on the agenda for her current project on the history of the sciences of the archives, in this case meteorology.

The sciences of the archives depend crucially on the collection and storage of data. Some fields, such as astronomy and climate research, have objects of inquiry that span centuries or even millennia. They make use today of data that was collected in ancient times, and they are now collecting data for researchers who will need comparative data several hundred or thousand years hence. How was data sorted, classified,



Honored: In 2011, Lorraine Daston was awarded the Pour le Mérite für Wissenschaft und Künste (Order of Merit for Science and Art); the photo shows her in conversation with international law expert Christian Tomuschat. The previous year she received the Bundesverdienstkreuz mit Stern (Federal Cross of Merit with Star).

and displayed – for example, via tables – contextualized? How should data be stored and presented so that it is still available to help future generations?

CAN TRUTH HAVE A HISTORY?

This is just one instance of how history of science is at the cutting edge of current research, and has a direct impact on it. It also plays a reflective role for today's scientists. "The extreme dynamics of their science means that most scientists scarcely have the chance to think about two fundamental questions. First: Where do my research questions come from? Second: If everything we are publishing now will already be obsolete in ten years, why are we doing it? What does it mean to have a concept of truth that is time-dependent?" says Daston.

As an in-demand scholar, Lorraine Daston travels all over the world, and not only to present papers. Working with students is also one of her main interests. She therefore continues to commute to the US, where she teach-

es for several weeks a year at the University of Chicago. Much of her family still lives in the US. Nevertheless, she also feels very much at home in Berlin. "Because the city is such a magnet for young people, there's always a hint of electricity in the air."

Now that her daughter has left home, Daston's full schedule once again allows for an occasional visit to the opera, to see Richard Strauss's "Helena in Egypt," for example, a performance by the Philharmonic, or to one of the many museums. The Max Planck Director also enjoys reading poetry. "I have eclectic tastes: all eras, in all the languages I understand. If I had time, I'd like to learn Polish. Even in translation, 20th century Polish poets are stunning – it's hard to imagine what they would sound like in the original."

She would also like to sing in a choir again, works by Bach, Bruckner, Ives, as she did during her student days. But basically, Daston admits she doesn't need any unusual hobbies. "My vocation is so broad that I don't need to look for

diversions." So broad that even a return to astronomy doesn't appear to be ruled out. "And I still dream about taking up something completely new – Egyptology, perhaps, or crystallography." As always, there are no limits to her curiosity. ◀

GLOSSARY

Epistemology

Epistemology (theory of knowledge) is a sub-field of philosophy concerned with the question of how belief is generated, what knowledge processes are conceivable, how justified belief is under different conditions, and how it is possible to tell that belief is based on knowledge.

Probability theory

Probability theory is a sub-field of mathematics based on the formalization of modeling techniques and the investigation of random events. Along with mathematical statistics, it constitutes stochastics. The key elements of probability theory are random events, random variables and stochastic processes.