BRITISH SOCIETY
FOR THE HISTORY
OF MATHEMATICS

BSHM Christmas Meeting, 3 December 2022

Online

Schedule

Zoom link will be sent to registered participants on 30 November

10.00 Welcome by Sarah Hart, BSHM President
10.05 Christopher Hollings (Oxford) *Triangulating Ancient Egyptian Mathematics*
10.45 Break
11.00 Jörg F. Wagner & Maria Niklaus (Stuttgart) *From Bohnenberger's Machine via Aircraft Course Controls to Inertial Navigation*
11.40 Clare Moriarty (Trinity College Dublin), *Byrne and Berkeley: Geometric Philosophy and Mathematically Eccentric Irishmen*
12.20 comfort break
12.30 AGM & lunch
14.00 Sepideh Alassi (Basel), *Scientific challenges and encryption of discoveries in the 17th century rational mechanics*
14.40 Christopher Stray (Swansea), *Success and failure in early 19th-century Cambridge: J.M.F. Wright and his Alma Mater (1827)*
15.20 Break
15.40 Kim Plofker (Union College, Schenectady), *Indian Mathematics and the Role of Astronomy*
16.40 meeting close

Abstracts

Christopher Hollings (Oxford), *Triangulating ancient Egyptian mathematics*

When the details of ancient Egyptian mathematics were being reassembled in the late-nineteenth and early-twentieth centuries, scholars were able to draw upon two distinct types of information within the surviving sources. In the first instance, the growing understanding of ancient Egyptian languages and scripts made it possible for some basic meaning to be

extracted from the texts. Reconstruction of the ancient languages was, however, an on-going process, and so wherever readings were uncertain, it was possible, and necessary, to interpret texts in the light of an understanding of how the mathematical content ought (from a modern point of view) to work. For the most part, these two sources of evidence, the philological and the mathematical, complemented each other. In rare instances, however, they appeared to clash. In this talk, I will examine one such instance, that of Problem 51 of the Rhind Mathematical Papyrus, concerning the area of a triangle, in which philological and mathematical evidence seemed to point in different directions.

Maria Niklaus and Jörg F. Wagner (Stuttgart), ***From Bohnenberger's Machine via Aircraft Course Controls to Inertial Navigation***

The Machine of Bohnenberger is the first gyro with cardanic suspension. It was invented at the University of Tübingen in 1810 by the Astronomer and Geodesist J.G.F. Bohnenberger, a pendant of C.F. Gauß in southern Germany. This apparatus served originally for illustrating the precession of the Earth rotation and was made especially popular by P.-S. Laplace and F. Arago in Paris. In 1816, F. Arago presented the instrument to J. Playfair, who brought it to Great Britain.

It was also F. Arago, who introduced the instrument to the young L. Foucault. As an alternative to his big pendulum, Foucault tried to improve the Machine in order to create a sensor for the full earth rotation rate. He also introduced the name Gyroscope for such instruments. Although Foucault was not successful with this experiment, he initiated big efforts in developing gyroscopes for vehicle guidance and navigation. Following the success of H. Anschütz-Kaempfe and E. Sperry, who built the first usable gyro compasses in the early 20th century, gyro instruments became standard navigation aids for aircraft after the First World war.

Focusing on the 1930s and 1940s the black boxing of gyroscopes for use in aviation is examined in the main part of the presentation. This process is closely linked with the maturing of the technology and its success. Using German aviation examples, the embedding of this material culture into a complex structure of industrial production, university research, government involvement and military use is explained. Looking at the people that were linked to these fascinating objects the post war period in Germany offers starting points of opening the black box via the aspect of disturbances and discontinuities. A priority discourse about the invention of inertial navigation between German experts in the 1970s as well as accidents involving malfunctioning gyros and public debate around the LN-3 platform used in the F104G Starfighter during the so called "Starfighter crisis" in Germany are used as fascinating examples. This overview spanning two centuries is completed with a glance on how a historical gyroscopic collection was used in an interdisciplinary research project on 3D-digitisation that now provides the basics of research in the history of science and technology as well as in the didactics of technology.

The presentation closes with a short interpretation of gyro instruments and platforms as special computers, which are realized no longer mechanically but digitally today.

Clare Moriarty (Trinity College, Dublin), ***Byrne and Berkeley: Geometric Philosophy and Mathematically Eccentric Irishmen***

Oliver Byrne published his ground-breaking and visually remarkable edition of Euclid's *Elements* in 1847. The book is extraordinary: its pages are adorned with generous four-colour diagrams, illustrations and grids, and each proposition begins with an engraved decorative initial. Its aesthetic similarity to various stylistic themes of the Bauhaus and De Stijl movements has been noted, but less attention has been paid to the pedagogical and theoretical insights that shaped Byrne's illustrative choices. In this paper, I explain the pedagogical and philosophical insights that motivated Byrne's unique publication and explore a line of influence in philosophical debates of the previous century. A new connection between Byrne and George Berkeley is revealed, with analysis of the philosophical similarities that motivated both thinkers in their mathematical projects.

Sepideh Alassi (Basel), ***Scientific challenges and encryption of discoveries in the 17th century rational mechanics***

Proposing mathematical questions as contests was already popular among Renaissance and early-modern mathematicians including Huygens and Leibniz. Commonly, a mathematical question was proposed to be solved, and the challenger explicitly invited a few mathematicians to solve the problem in a given period of time. In this talk, I will first present a few interesting mathematical challenges initiated by Jacob Bernoulli in the 17^{th} century and then will continue with a discussion about the communicated solutions that were encrypted as ciphers, the similarities and differences of these ciphers, and the reasons for encrypting solutions.

Christopher Stray (Swansea), ***Success and failure in early 19th-century Cambridge: J.M.F. Wright and his Alma Mater (1827)***

John Martin Frederick Wright's account of his undergraduate career at Cambridge, *Alma Mater*, or, Seven Years in an English University, published in 1827; is the earliest detailed first-hand account of undergraduate life published in Britain. Wright entered Trinity College in 1813 and graduated in 1819; his memoir is largely devoted to a detailed account of his experience as an undergraduate in college and university, ending with his entry into the volatile metropolitan world of Grub Street in 1821. His memoir is a valuable source for the history of the University of Cambridge in the early nineteenth century; yet it has not been drawn on, let alone evaluated, until quite recently. An air of mystery hangs over 'A Trinity-Man', the author of *Alma Mater*. He has previously been identified as a clergyman with prominent social connections who died full of honours just short of his 100th birthday; in fact he was never ordained, and spent the 1820s and 1830s working as a private mathematical tutor and author of a series of mathematical textbooks, beginning in 1822 with an edition of Newton's *Principia*. Wright's life was marked by tragedy, and he died in 1841 on the far side of the world.

Kim Plofker (Union College, Schenectady), ***Indian Mathematics and the Role of Astronomy***

As in most pre-modern literate cultures, astronomy in South Asia was the dominant "applied science" in the use and evolution of mathematics. Beginning at least as early as the first millennium BCE, Sanskrit technical texts on astronomical computation provided challenges and applications for the development of Indian mathematics, as well as preserving records of it. This talk surveys some of these developments in the medieval period and discusses how they helped to shape the history of mathematics.