ICHM Co-Sponsored Special Sessions on the History of Mathematics

Joint Mathematics Meetings (USA)

8-9 January 2021

This set of lectures comprised a two-day Special Session on the History of Mathematics at the Joint Meetings of the American Mathematical Society and the Mathematical Association of America. Although originally planned to be held in Washington DC, due to the COVID-19 pandemic the meetings were held entirely online, with all presentations being made remotely. This arrangement proved very successful, with an average audience size of 90 and attendance frequently exceeding 100.

The session was organized by Deborah Kent (University of St. Andrews), Jemma Lorenat (Pitzer College), Daniel Otero (Xavier University) and Adrian Rice (Randolph-Macon College), and featured 28 speakers across nine time zones, from the United States, Canada, Italy, and the United Kingdom.

The following talks were presented at the meeting:

The Malthus Library:
The Library as Cognitive Instrument in the Making of the Malthusian Population Principle
Kevin Lambert, University of California Fullerton
Thomas Robert Malthus (1766-1834) is infamous for his argument, made in the first edition of his *Essay on the Principle of Population* (1798) that population growth would always outstrip food production. In this paper, I will investigate how Malthus justified his population principle as a universal bio-mathematical law in the larger and more complex later editions of the *Essay*. Most of the materials Malthus assembled to write the second 1803 edition of the *Essay* are preserved at the Old Library, Jesus College, Cambridge. Malthus used that assembly of books and maps as an instrument with which to look across the early nineteenth European, American and Pacific worlds. Malthus' close friends, William Otter and Edward Daniel Clarke were key figures in the founding of the first lasting Cambridge scientific society, the Cambridge Philosophical Society (CPS). George Peacock, a fellow CPS founding member, would justify his principle of equivalent forms as the foundation for English algebra through the collection of materials and reports from around the world. I will argue that when Malthus assembled his library of materials, he was employing a characteristically eighteenth- and early nineteenth-century Cambridge mixed-mathematical practice.

The Mathematical Papers of R.F.A. Lee
Duncan Melville, St. Lawrence University
In the early 1800s, Rachel Frances Antonina Lee (1774-1829) spent a considerable amount of time and effort in the preparation of a “Course of Mathematics”. Although the work went through three partial drafts covering hundreds of pages over a period of several years, it was never completed

and never published. Its survival, and that of her other mathematical papers, is due to accidental and fortuitous circumstances.
We will explain the background and life of the author and discuss the content, both mathematical and philosophical, of the "Course of Mathematics". Given the absence of any comment on her mathematical education or attainments in other biographical sources, the survival of such subterranean mathematics suggest historians should be cautious in our assessment of the range and depth of female mathematical knowledge and interests in the early 19th century.

Preparing a mathematical translation: Mary Somerville's 1831 *Mechanism of the Heavens*
Brigitte Stenhouse, Open University, UK
Mary Somerville's 1831 work, *Mechanism of the Heavens*, was widely recognised for its importance in bringing analytical mathematics, and its applications to physical astronomy, to wider attention in early-19th-century Britain. The single volume work was ostensibly a translation of Laplace's *Traité de Mécanique Céleste*, which had been published in 5 volumes between 1799 and 1825. One of the many arguments given for the perception of a decline in British mathematics at the time was the small number of British mathematicians sufficiently literate in analysis and algebra to read and understand Laplace's work. Therefore, when producing her translation Somerville was required to act as both interpreter of the French language, and of the mathematical language and methods employed by Laplace; moreover, she incorporated numerous improvements that had been made since their original publication.
I will investigate these changes made by Somerville through a consideration of the work itself, alongside contemporary reviews and correspondence with John Herschel and John William Lubbock. My investigation will illuminate the state of analysis and physical astronomy in Britain during the early 19th century, and the accessibility of mathematical texts published on the continent at that time.

Hans Christian Andersen and the Pythagorean Theorem
Toke Knudsen, State University of New York at Oneonta
Most people will know at least some of the fairy tales of Hans Christian Andersen (1805-75). They have been translated to some 160 languages and include *The Princess and the Pea*, *The Ugly Duckling*, and *The Emperor's New Clothes*. But it is not at all well known that Andersen in 1831 wrote a poem on mathematics. The poem, entitled *Formens evige magie* (*The Eternal Magic of Form*), presents the Pythagorean theorem along with a proof, based on that found in Euclid's *Elements*. While the poem has been largely isolated from the world of mathematics and the history of mathematics, it is nonetheless a fascinating piece of literature, which tells us a lot about Andersen's mathematical education and attitude to mathematics. The talk will present an English translation of the poem along with a discussion of its context, including Andersen's own recollections of his interactions with mathematics when he was in school.

Infinity: A Historical and Cultural Approach
José Contreras, Ball State University
The idea of infinity has been present not only in mathematics, but also in other human affairs such as religion and art. Many scholars have examined the idea of infinity, from the ancient Greek philosopher Aristotle to Newton, to Weierstrass, and to Cantor, the conqueror of infinity. Today, infinity permeates not only mathematics but also the arts and sciences. In this presentation, I will illustrate how I approach the history of infinity, particularly mathematical infinity, in my history

of mathematics course. In the presentation, like in class, I will discuss notable people and cultures' contributions to and conceptions about infinity and how people with a diversity of backgrounds (e.g., ethnicity, economic status, national origin, gender, age, religious viewpoints) have used the idea of infinity on their work or have made contributions to the development of the concept of infinity. I will also discuss how Cantor's religious background and viewpoints gave him the courage to persist on investigating the mathematical infinity as a number in spite of the tremendous oppositions to his revolutionary ideas.

Proving the Converse of Ptolemy's Theorem:
A Case Study of Geometrical Research in the First Half of the 19th Century
Eisso Atzema, University of Maine
In the course of the first few decades of the 19th century, quadrilaterals were the subject of numerous mathematical publications. The cyclic quadrilateral in particular received much attention. Many of the results on this special kind of quadrilateral were only minor variations of earlier findings or simplification of the proofs involved. One exception was the converse of Ptolemy's Theorem, which was a non-trivial extension of a classical result. In this note, I will outline the history of this converse and the context in which its various proofs were formulated. Specifically, I will discuss how this result went from its first rather cumbersome proofs to its inclusion in the standard high school geometry curriculum of the era.

The Influence of the 1856 Stokes Paper on the Mathematics of Divergent Series
Brenda Davison, Simon Fraser University
In a paper published in 1856, G.G. Stokes (1819-1903) introduced, via three examples, a method of using divergent series in order to quickly compute the values of convergent integrals. This talk will examine who responded to this paper in the years immediately following its publication. And which physicists and/or mathematicians adopted this method and what problems that allowed them to solve. The fact that divergent series, while not rigorously understood at this time, were useful focused attention on them in a manner that made it important to understand how to correctly handle them.

Charles Hermite's Publications in non-French journals
William Thomas Archibald, Simon Fraser University
Between his first publication in 1842 and his death in 1901, Hermite had roughly 200 papers in journals (a few were published in two different places). Of these, 117 were published outside France, though all were in the French language. Almost all are research papers, though there are a couple of problem solutions. Many of these are communicated in the older epistolary format, though surely in almost every case the result would have been intended for publication, even if it appears as an excerpt from a letter containing other material.
Thus we have a list of journals, nations or regions with which they are associated, and in some cases individual correspondents. We raise questions about how the journals function in the communities in which they participate, and about Hermite's aims.
In an incipiently international and professional mathematics, we identify some variety and some shifts in the ways the journals function. By thinking about why Hermite places papers where he does, we hope to get some articulated ideas about the ways in which mathematics journals work and interact during the second half of the nineteenth century.

The Narrative, the Visual, and Material Culture:
Mediating the Humanistic Mathematical Discovery Process of the Nineteenth Century
Brittany Carlson, University of California, Riverside
This paper offers a brief history of the complex, mediated relationships between the narrative, the visual, and the mathematical in material culture to suggest a human-centered approach to mathematical discovery in the nineteenth century. This relationship emerges as a rejection of early nineteenth-century math pedagogy, which was steeped in rote memorization and corporal punishment. As the century progressed, pedagogues recognized the importance of active student involvement in their education, which was facilitated by material culture. Beginning with Friedrich Froebel's *Gifts* and expanding to include Mary Boole's curve stitching, Edwin Abbott's *Flatland*, and Sundara Row's *Geometric Exercises in Paper Folding*, I lay out a nineteenth-century historical overview of the role of material culture and mathematical discovery. Through this historical survey, I conclude that the complex relationships between the learner and their cultural capital, the narrative, and the visual work together to construct a grand narrative of the learner's observations and mathematical understanding. As a result, I argue that it is more productive to think of mathematics in the nineteenth-century as a quantitative literacy with history, culture, and narratives that are shaped by the discovery process.

The Black Mathematician Chronicles: Our Quest to Update the MAD Pages
Edray Goins, Pomona College
In 1997, Scott Williams (SUNY Buffalo) founded the website "Mathematicians of the African Diaspora," which has since become widely known as the MAD Pages. Williams built the site over the course of 11 years, creating over 1000 pages by himself as a personal labor of love. The site features more than 700 African Americans in mathematics, computer science, and physics as a way to showcase the intellectual prowess of those from the Diaspora.
Soon after Williams retired in 2008, Edray Goins (Pomona College), Donald King (Northeastern University), Asamoah Nkwanta (Morgan State University), and Weaver (Varsity Software) have been working since 2015 to update the Pages. Edray Goins led an REU of eight undergraduates during the summer of 2020 to write more biographies for the new MAD Pages.
In this talk, we discuss the results from Pomona Research in Mathematics Experience (PRiME), recalling some stories of the various biographies of previously unknown African American mathematical scientists, and reflecting on some of the challenges of running a math history REU. This project is funded by the National Science Foundation (DMS-1560394).

An abstract definition of the delta function from the 1830s
Sandro Caparrini, Politecnico di Torino, Italy
While today Giovanni Plana (1781-1864) has been forgotten except by specialists, in his time he was considered a leading international expert in theoretical astronomy and mathematical physics. He studied in Paris, at the prestigious Ecole Polytechnique, and during his entire life he remained in contact with the chief exponents of French science. For his achievements, in 1834 he was awarded the Copley Medal by the Royal Society. Late in life, he was given the title of 'Baron' for scientific services rendered to the Kingdom of Sardinia.
The Plana Collection of manuscripts consists of more than 5000 pages of mathematical manuscripts. They are essentially Plana's notebooks. Up to the late 1980s, these documents were stored away, unknown to scholars, in the vaults of the Turin Academy of Sciences. Written over a

period of about half a century, from about 1810 to 1864, they reveal the inner workings of the mind of a representative scientist, and the influences that shaped his thought.
The manuscripts contain a kind of generalized Fourier transform and an abstract definition of the Dirac delta function, invented by the physicist Paul Dirac in 1929. While, from the modern point of view, the mathematics is hopelessly muddled, this was no mean achievement in the 1830s.

On what is called the Dehn invariant
John McCleary, Vassar College
In his solution to Hilbert's third problem Dehn considered various quantities associated to a decomposition of a polyhedron into subpolyhedra. What we call today the *Dehn invariant* of a polyhedron lies in an algebraic object not available to Dehn. I will discuss the contexts of various papers treating scissors congruence from Dehn to the mid 20th-century to follow the evolution of this idea, and in this way consider how the conceptual image of this invariant changed in the hands of various researchers.

'Logical Fate' and 'Intellectual Freedom':
Cassius Keyser and the Humanism of Mathematics
Ellen Abrams, Cornell University
As historians have shown, mathematicians in the early-twentieth-century United States dealt with an ongoing tension between the 'autonomy' garnered through abstract mathematics and the potential to provide a 'service' through teaching and applications. Columbia mathematician Cassius Keyser, however, essentially collapsed this autonomy-service dichotomy by considering abstract mathematics itself as a service to humanity. In this talk, I offer a close reading of Keyser and his ideas in order to examine the historical value and values of American mathematics. In his 1922 *Mathematical Philosophy: A Study of Fate and Freedom*, Keyser detailed his conceptions of modern mathematics as well as his broader concerns about American culture. On one hand, Keyser worked to defend mathematics from critiques that its modern, axiomatic form had become a lifeless trick of mechanics, detached from both the physical world and human spirit. On the other hand, he used postulate systems and doctrinal functions to define mathematics and to promote its claims to human concern. Perhaps because technoscientific justifications for mathematics became especially powerful in the aftermath of World War II, Keyser's humanistic conception of mathematics, though well-regarded at the time, has since been overlooked.

"Essentially Physical": Deduction, Writing, and the Reflexive Turn in Modern Logic
David Dunning, Mathematical Institute, University of Oxford, UK
Mathematical logic is a paragon of abstraction; and yet, reflecting in 1938 on his discipline's recent breakthroughs, American logician Emil L. Post insisted on its materiality. "Modes of symbolization and processes of deduction are themselves essentially physical," he wrote, "and hence subject to formulations in a physical science." In this talk I explore the physicality of deduction as experienced and exhibited in the classic reflexive arguments of 1930s mathematical logic. I focus especially on Alan Turing's famous 1937 paper that used the metaphor of a "universal machine" to argue for a negative answer to the decision problem for first-order logic. I cast a comparative eye toward the works of Gödel and Church, and put all these texts in dialogue with Post, their forerunner and also an insightful commentator upon them. In all these milestones of modern logic we find a productive tension between soaring heights of abstraction on one hand and, on the other, attention lavished on the mundane facts of the writing of mathematics. By

foregrounding mathematical logicians' efforts to take physicality seriously, we can understand logic's transformation from a discipline that used symbolic systems to one that took such systems as its fundamental concern.

Mathematics within an Engineering Education:
The Second World War US Engineering, Science, and Management War Training Program
Brit Shields, University of Pennsylvania
During the Second World War, the US Office of Education sponsored the education of American citizens to serve the industrial and engineering demands of the war effort. These emergency training programs were run on college and university campuses across the country. Within the broad range of disciplines, mathematics played an important role as a fundamental subject. This talk will explore how mathematics became an important part of this training program and how the mathematics courses taught through this program created new career opportunities and trajectories for both their instructors and students.

Extensive cooperation with rugged individualism:
George Mackey's guide for practitioners of mathematics
Della Dumbaugh, University of Richmond
The mathematician George Mackey (1916-2006) is often remembered for his academic contributions and his methodical, solitary work habits, tempered by an eager affinity for discussing mathematics with all who took an interest. His broad view of the subject inspired his contributions in infinite dimensional group representations, ergodic theory and mathematical physics. He adhered to a disciplined lifestyle that began with focus on his mathematical research each morning. In the afternoons, he would often walk the mile or so to Harvard (to his office or the faculty club for lunch). He ended his days with an early bedtime. He carried a clipboard at all times. He wore a seersucker jacket in warm months and a tweed jacket in cooler ones. For Mackey, the advancement of mathematics hinged on what he described as an "extensive cooperation with rugged individualism." He seemed to protect time for the "rugged individualism" in the morning and foster "extensive cooperation" in the form of teaching and mathematical discussions later in the day. This talk provides an introduction to George Mackey, including the critical geography of his youth that set his mathematical education in motion, and aims to shed new light on the life and contributions of this celebrated American mathematician.

Women as data and as individuals:
Public dialogues on sexism in mathematics during the 1970s, 1980s, and 1990s
Laura Turner, Monmouth University
The Association for Women in Mathematics (AWM) came of age in the 1980s, emerging by the early 1990s as a serious mathematics organization which sought to engage members in a shared effort to improve the status of women in mathematics. The same period saw ongoing resistance to affirmative action measures within the mathematical establishment; controversial conclusions regarding gender and science, most notably those of Benbow and Stanley on sex differences in mathematical reasoning ability; and high-profile claims of sexism in mathematical practice, including the widely-publicized tenure case of Jenny Harrison. Through the public dialogues surrounding these episodes and against the backdrop of feminism, we will explore aspects of how the AWM and its members addressed the complex issue of sexism within mathematical practice, and how deeply-held and widespread belief in the inability of women to do mathematics,

exacerbated by the myths of the canonical feminine woman and the possibility for objectivity in mathematical practice, simultaneously emphasized the importance of treating each woman mathematician as an individual, instead of as a representative of her sex, and left her vulnerable to the very same discrimination the AWM sought to combat.

A New Resource for the History of Mathematics:
***The Educational Times* Online Database of Mathematical Questions and Answers**

Robert Manzo, University of North Carolina-Chapel Hill
Sloan Despeaux, Western Carolina University

The *Educational Times* (*ET*) began in 1847. While it initially focused on pedagogical themes, mathematical questions soon infiltrated the monthly journal. The format of the *ET*, in which mathematicians posed questions for others to answer, proved to be a highly dynamic form of communication between mathematicians (both male and female) with diverse backgrounds and training. By 1918, the *ET* had published over 18,000 questions. While these questions and their answers provide an invaluable window inside the inner workings of mathematical communication in Britain, it has been difficult for historians of mathematics to search the journal in any systematic way. However, Jim Tattersall has painstakingly catalogued the contents of the *ET* in spreadsheets. A team then embarked on a multiyear project that converted these spreadsheets into a searchable, online database, now available for use: http://educational-times.wcu.edu. In this talk, we will describe the capabilities of the database and give examples of the types of questions this tool can help historians of mathematics explore.

The Students' Lament: Three Multi-Tasking Problems in the *Suan shu shu*, a Western Han Dynasty Mathematical Work from Ancient China

Joseph W. Dauben, Lehman College and the Graduate Center, CUNY

In 1983-1984, a mathematical work dating to the second century BCE was discovered in the tomb of a government bureaucrat excavated from a burial site near Zhangjiashan, in Jiangling county, Hubei Province, China. Archaeologists and historians of mathematics, however, agree that the contents of the *Suan shu shu* in general reflect the state of mathematics in the pre-Qin and primarily that of the Warring States period (475-221 BCE). The *Suan shu shu* is not a printed book but an ancient work written on bamboo strips, which when tied together originally formed a bamboo roll. The recovered pieces thus constitute an authentic document from the very time at which it was created. This presentation will begin with a brief discussion of certain special features of ancient Chinese bamboo texts in general and the challenges researchers face in dealing with these ancient materials. It will then focus on three closely related problems in the *Suan shu shu* that exhibit some especially interesting features, particularly in the methods applied for their solution. In conclusion, questions related to the possible pedagogical significance of these three problems will also be considered.

As shown in the diagram

Eunsoo Lee, Stanford University

A formulaic phrase, as shown in the diagram, is a typical channel in modern mathematics through which the text invites the reader to see the visual. This deictic phrase traces back through early modern science at least to the late Middle Ages when some authors pointed out the visual through a similar Latin phrase, "sicut patet in hac figura (as manifest in this figure)." Can we find a corresponding phrase in ancient Greek mathematical science? If so, to what extent did the phrase play a similar role as its modern correspondent? This paper explores how ancient Greek mathematical science convened the visual in the text. To this end, the paper analyzes some spots where ancient mathematical texts incorporated the visual through the phrase, "as in the figure." The case studies in this paper show various aspects of the relationship between the text and the visual in ancient science. Thus, the paper confirms different mindsets in using visuals between ancient and modern mathematics but at the same time questions the simple dichotomy between *mentalité par les yeux* and *par l'oreille*.

Dr Gregory's Scheme: Reforming the Instruction of Mathematics at Oxford circa 1700

Philip Beeley, University of Oxford, UK

The turn of the eighteenth century witnessed the emergence of a number of initiatives to reform the teaching and examination of mathematics at the University of Oxford. These initiatives responded partly to the success of knights' academies in France and Germany in attracting young members of the English gentry and nobility with a curriculum that included fencing, dancing, law, rhetoric, and mathematics. At the same time, members of Isaac Newton's wider scientific circle such as John Arbuthnot, author of 'An Essay on the Usefulness of Mathematical Learning' contributed to contemporary discussion, while David Gregory devised a scheme for reforming the instruction of mathematics around a sophisticated framework comprising Euclid's *Elements* (Books I-VI, XI, and XII), plain trigonometry, algebra (including Diophantine equations), and mechanics.

The paper will sketch out the largely forgotten background and motivation to these reforms and consider the extent of their success and impact into the early 1700s.

The Emergence of Auxiliary Astronomical Tables in Medieval Europe

Glen Van Brummelen, Trinity Western University, Canada

Auxiliary astronomical tables were a substantial and extensive tradition in medieval Islam, beginning as early as the 9th century. These tables, computing functions that are more complicated than primitive trigonometric quantities but with no direct astronomical application, arise naturally in the context of spherical astronomy where solutions to different problems often share mathematical elements. We are fortunate to have two treatises with the same title — the *Tabulae primi mobilis* — that allow us to trace the gradual birth of the idea of auxiliary tables in the works of their European inventor, the Italian astronomer Giovanni Bianchini, leading to their fullest realization in his *Tabulae magistrales*. Repeating the evolution in medieval Islam, one of these original auxiliary tables evolved into what we now call the tangent function. Regiomontanus copied Bianchini's idea in his *Tabulae directionum* but took the notion much further in his single giant auxiliary table, his *Tabula primi mobilis*, a table whose idea would be rediscovered several times in following centuries. We shall trace the development of auxiliary tables from its European origin in the 15th century through the end of the 16th century.

The Diverse Wits of Man: Multiplistic Numeracy in Early Modern England

Jessica Otis, George Mason University

The Oxford English Dictionary defines a numerate person as someone "competent in the basic principles of mathematics, esp. arithmetic; able to understand and work with numbers." But for the people of early modern England, this definition would have seemed almost trivial; they believed that God had endowed all humans with the ability to calculate, and those who could not were legally condemned as mentally incompetent. While numbers were thus an almost-universal technology of knowledge, symbolic systems for recording and manipulating numbers were far more diverse. There were performative, object-based, and literate options, and people regularly transcoded between multiple symbolic systems as they went about their daily lives. This talk will examine how the various symbolic systems of early modern England functioned in symbiosis with one another before the widespread introduction of Arabic numerals, and demonstrate that early modern patterns in Arabic numeral adoption are consistent with multiplistic numeracy. Over the course of the sixteenth and seventeenth centuries, English men and women did not adopt Arabic numerals wholesale but rather in a context-specific fashion, employing them side-by-side and interchangeably with other symbolic systems.

Early Computations on the Cycloid – Some Interesting Puzzles

Maria Zack, Point Loma Nazarene University

Many well-known mathematicians of the seventeenth and eighteenth centuries studied the cycloid. These include Galileo, Roberval, Descartes, Pascal, Wallis, Huygens, Fermat, Newton and Leibniz and more than one Bernoulli. This talk will consider the quadrature computations of Galileo's student Evangelista Torricelli. The computations were completed sometime before April 1643 when Calvalieri sent a letter to Torricelli congratulating him on the findings. Torricelli's results were published in an appendix in his *Opera Geometrica* (1644). Some of the computations are relatively easy to follow, but one of them provides an interesting puzzle.

Between Scholasticism and Scholarship:
Figures and Equations in John Wallis' *Treatise on Conic Sections*

Abram Kaplan, Harvard University Society of Fellows

The mathematical investigations of John Wallis (1616-1703) exemplify the productive diversity of intellectual traditions characteristic of seventeenth century learning. I discuss the traditions that inform the innovative figures in Wallis' treatise on conic sections (1655). Wallis wrote the treatise as an introduction to the algebraic study of the conics. Wallis' construction of the conic sections and his reduction of the sections to equations reflect his awareness of contemporary traditions of infinitesimal mathematics and symbolic algebra. They also, I argue, draw on the metaphysical disputations of Francisco Suárez and earlier Renaissance debates about the angle of contact. Wallis used arguments about situs (situation) elaborated by Suárez, and measurement techniques employing it developed by the sixteenth-century algebraist Jacques Peletier, to establish the priority of symbolic representations of the conic sections over their geometric, in-diagram instantiations. In other works he used erudite scholarship to explain why Greek mathematicians preferred geometry and to extract ideals of mathematical practice. He then used these same ideals to justify his own use of symbols on grounds he claimed to share with antiquity.

Bounded in a Nutshell of Straightedge and Compass

Thomas L. Drucker, University of Wisconsin–Whitewater

David Richeson's *Tales of Impossibility* is a recent reminder of the long history of straightedge and compass constructions. Richeson points to the uncertainty surrounding the origin of that practice, but its influence did persist for thousands of years. Even those who came up with constructions that went beyond those tools recognized that this involved 'breaking the rules'. By the time the classical problems were solved in the eighteenth and nineteenth centuries, the limitations were being taken for granted. It can be asked whether there was any philosophical basis for the original selection of those tools, at least based on what we know of Plato's comments on geometry. Then one can speculate on whether there was any residual philosophical basis hundreds or thousands of years later. We shall suggest some philosophical basis for the original specification of those tools and then a time by which that had run its course.

The Lockean Foundations of Newton's Calculus in *The Analyst* Controversy

Julia Tomasson, Columbia University

George Berkeley's (1685-1753) critique of Newton's calculus in his *The Analyst: A Discourse Addressed to an Infidel Mathematician* (1734) provoked many responses, collectively referred to as "The Analyst Controversy." Understandably, the controversy is often discussed in adversarial terms, all being some variation of "Berkeley vs. Isaac Newton (1643-1727)." In this talk, I present evidence that this debate might be better summarized as "Berkeley vs. John Locke (1632-1704)." I argue that: 1) Berkeley is much more sympathetic to Newton and Newtonianism and much more antagonistic towards Locke than has been previously recognized; 2) Berkeley's critique of the product rule does not reject Newton's results, but rather the basis for accepting them; 3) this basis is thoroughly Lockean (and not Newtonian) and contemporary mathematicians realized this. Understanding a Lockean epistemology of mathematics provides insight into the strange character of eighteenth-century British mathematics, between the invention of the calculus and its rigorization over a century later.

Analysis and Synthesis in Robert Simson's *The Elements of Euclid* (1756)

Amy Ackerberg-Hastings, MAA Convergence

In the 18th and 19th centuries, three understandings of the terms 'analysis' and 'synthesis' were particularly influential with the creators and readers of elementary geometry textbooks in Western Europe and North America: as perceived contrasts in styles of mathematical practice in Great Britain and France, as contemporary appeals to ancient methods of proof, and as approaches to mathematics education. One widely-used textbook arose from the attempt by University of Glasgow mathematics professor Robert Simson to restore Euclid's text, which appeared in 1756 as *The Elements of Euclid*, in simultaneous English and Latin versions. This talk will explore what we can learn about the book's preparation and reception by examining it through the lenses of analysis and synthesis.