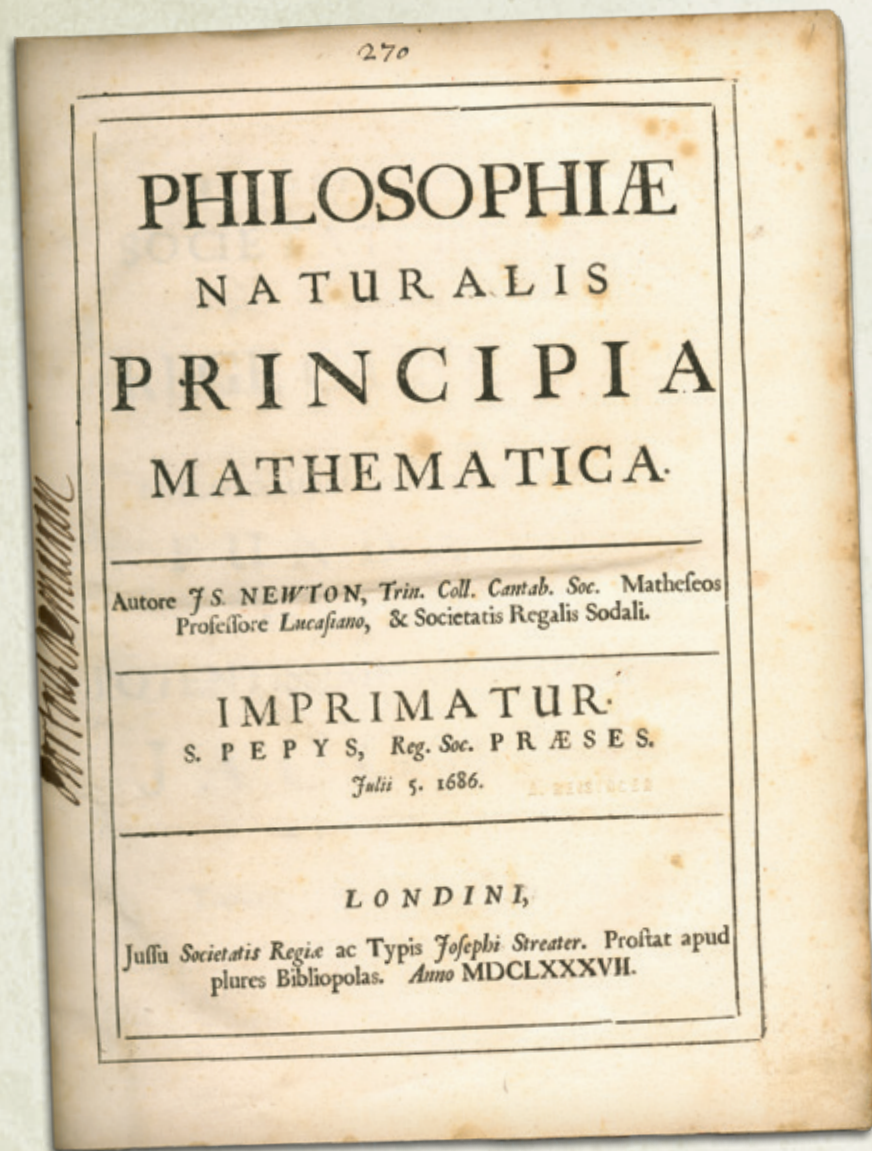


A GLOBAL TREASURE HUNT



The Caltech Archives' copy of *Principia* is seen above; at right, is another copy located at The Huntington Library, in which Newton's own handwriting can be seen in the margins.

How a term paper on Newton's Principia led to a decade-long search for first-edition copies around the world.

by Whitney Clavin

"We felt like Sherlock Holmes."

In a story of lost and stolen books and scrupulous detective work across continents, two Caltech-affiliated historians recently made headlines with their discovery of hundreds of previously uncounted copies of Isaac Newton's groundbreaking science book *Philosophiæ Naturalis Principia Mathematica*, known as the *Principia*.

"We felt like Sherlock Holmes," says Mordechai (Moti) Feingold, Caltech's Kate Van Nuys Page Professor of the History of Science and the Humanities, who, along with his former student Andrej Svorenčík (MS '08), spent more than a decade

tracing copies of the book around the world. Feingold and Svorenčík, who is now at the University of Mannheim in Germany, are co-authors of a paper about the survey published in the journal *Annals of Science*.

The new census more than doubles the number of known copies of the famous first edition, published in 1687. The last census of this kind, published in 1953, had identified 189 copies, while the new Caltech survey finds 386 copies. Up to 200 additional copies, according to Feingold and Svorenčík, likely still exist undocumented in public and private collections.

From Slovakia to South Africa

The project was born out of a paper Svorenčík wrote for a course in the history of science taught by Feingold. Originally from Slovakia, Svorenčík had written a term paper about the distribution of the *Principia* in Central Europe. "I was interested in whether there were copies of the book that could be traced to my home region. The census done in the 1950s did not list any copies from Slovakia, the Czech Republic, Poland, or Hungary. This is understandable, as the census was done after the Iron Curtain descended, which made tracing copies very difficult."

To Svorenčík's surprise, he found many more copies than Feingold had expected. The summer after the class, Feingold suggested to Svorenčík that they turn his project into the first-ever complete, systematic search for copies of the first edition of the *Principia*. Their ensuing detective work across the globe turned up about 200 previously unidentified copies in 27 countries, including 35 copies in Central Europe, and others in such far-flung locales as the Vatican, South Africa, Norway, Ireland, and Japan.

Feingold and Svorenčík even came across lost or stolen copies of the masterpiece; for example, one copy found with a bookseller in Italy was discovered to have been stolen from a library in Germany half a century earlier.

"We contacted the German library to let them know, but they were too slow to make a decision to buy back the copy or apprehend it somehow, so it ended up back on the market," says Feingold.

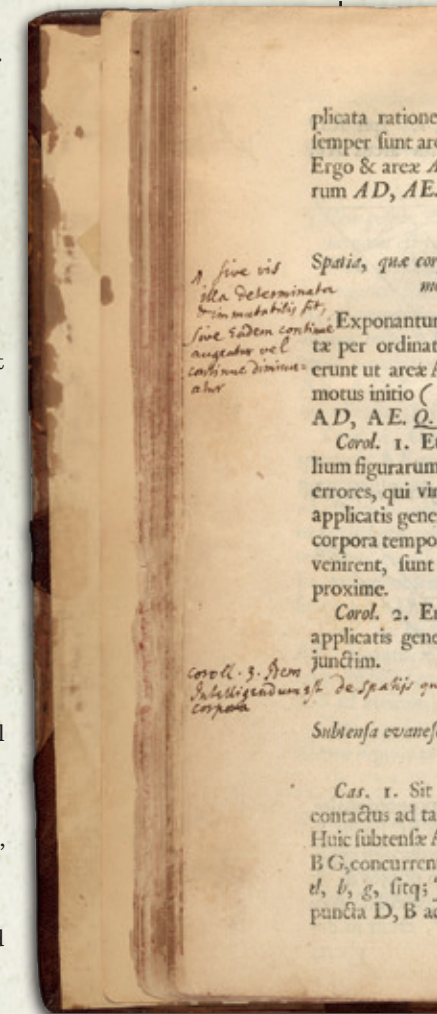
A masterpiece, with a mystique

The primary person behind the book's publication was Edmond Halley, a well-known English scientist who made several discoveries about our solar system, including the periodicity of what later became known as Halley's Comet. Feingold explains that, before the *Principia* was written, Halley had asked Newton for some calculations regarding elliptical orbits of bodies in our solar system. When Halley saw the calculations, "he got so excited, he rushed back to Cambridge and basically forced Newton to write the *Principia*," says Feingold. In fact, Halley funded the publication of the book's first edition.

In the *Principia*, Newton introduced the laws of motion and universal gravitation, "unifying the terrestrial and celestial worlds under a single law," says Svorenčík.

Soon after its publication, the book was recognized as a work of genius. "Because Halley had already prepared the public for what was to come," says Feingold, "there was a widespread recognition that the *Principia* was a masterpiece." Later, a "mystique" about Newton started to develop, according to Feingold, exemplified in a story about two students walking in Cambridge and spotting Newton on the street. "There goes a man," one of them said, "who wrote a book that neither he nor anybody else understands," says Feingold.

"By the 18th century, Newtonian ideas transcended science itself," says Feingold. "People in other fields were hoping to find a similar single law to unify their own



respective fields. The influence of Newton, just like that of Charles Darwin and Albert Einstein, exerted considerable influence on many other aspects of life, and that is what made him such a canonical figure during the 18th century and beyond.”

Copies of the first edition of the *Principia* sell today for between \$300,000 and \$3,000,000 via auction houses like Christie’s and Sotheby’s as well as on the black market. Feingold and Svorenčik estimate that some 600, and possibly as many as 750, copies of the book’s first edition were printed in 1687.

In the margins

By analyzing ownership marks and notes scribbled in the margins of some of the books, in addition to related letters and other documents, the researchers found evidence that the *Principia*, once thought to be reserved for only a select group of expert mathematicians, was more widely read and comprehended than previously thought.

“One of the realizations we’ve had,” says Feingold, “is that the transmission of the book and its ideas was far quicker and more open than we assumed, and this will have implications on the future work that we and others will be doing on this subject.”

“When you look through the copies themselves, you might find small notes or annotations that give you clues about how it was used,” says Svorenčik, who has personally inspected about 10 percent of the copies documented in this new census. When traveling to conferences in different countries, he would make time to visit local libraries. “You look at the condition of the ownership marks, the binding, deterioration, printing differences, etc.”

Even without inspecting the books up close, the historians could trace who owned them through library records and other letters and documents, and learn how copies were shared.

“It’s harder to show how much people engaged with a book than simply owned it, but we can look at the notes in the margins and how the book was shared,” says Feingold. “You can assume that for each copy, there are multiple readers. It’s not like today, where you might buy a book and are the only one to read it. And then we can look for an exchange of ideas between the people sharing copies. You start to put together the pieces and solve the puzzle.”

Svorenčik and Feingold hope that their census, which they call preliminary, will yield information about other existing copies tucked away with private owners, book dealers, and libraries. Continuing this line of research into the future, the historians plan to further refine our understanding of how the *Principia* shaped 18th-century science. 