HENRY BRIGGS

It is impossible to speak of the invention of logarithms without joining the names of John Napier (1550 – 1617) and **Henry Briggs** (February, 1561 – January 26, 1630). Today, it is Briggs, the person most responsible for scientists' acceptance of logarithms, who is center stage. Briggs, born near Halifax, England, was educated at St. John's College, Cambridge, earning a B.A. in 1581 and his M.A. in 1585. He was elected a fellow of St. John's College in 1588, and in 1596, he was appointed to the Gresham professorship of geometry, the earliest chair of mathematics established in Great Britain. In 1619, Briggs became Savilian professor at Oxford, a post he held until his death.

Correspondence during the period 1610 – 1615 between Briggs and James Ussher, a professor at Trinity College, shows that Briggs was greatly interested in astronomy, in particular the study of eclipses, which required considerable tedious calculations. Briggs became aware of Napier's work on logarithms as an aid to calculation in 1614. Briggs had already published tables before encountering Napier's work, including *Table to Find the Height of the Pole* (1602) and *Tables for Improving Navigation* (1610). Briggs not only was the first after Napier to appreciate the usefulness of logarithms, he also thought of improvements. He suggested to Napier that logarithms should be to base ten (actually this is how the advice would be stated at the present, not quite so at the time). Napier agreed but pleaded his health was not robust enough to undertake the tedious work of preparing the tables of logarithms. Briggs prepared the tables, including them in his *Arithmetica logarithmica* (1624), a work containing logarithmic tables for 30,000 natural numbers to 14 places [those from 1 to 20,000 and from 90,000 to 100,000]. As was his custom, with his *Arithmetica logarithmica* Briggs chose not to put his

name on the work, the author was simply listed as H.B. His logarithms are known today as common logarithms. Briggs then went about the task of interesting the scientific world in the use of logarithms. He convinced Johann Kepler of the advantages of Napier's invention. Kepler used them in making calculations of the positions of the planet Mars that led to the discovery of the laws of planetary motions. Kepler's reputation was instrumental in spreading the use of logarithms throughout Europe. Isaac Newton used Kepler's laws in discovering the law of gravity.

Four years after Brigg's *Arithmetica Logarithmica* appeared; Dutch mathematician and bookseller Adrian Vlacq published a table, filling in the gap in Brigg's work by including the numbers between 20,000 and 90,000. Despite having to calculate 70,000 logarithms while only using 30,000 calculated by Briggs, Vlacq modestly described his work as a second edition of Brigg's tables. Up until the late 19th century all the logarithmic tables that appeared were based on the work of Briggs and Vlacq. Besides his work with logarithms, Henry Briggs was instrumental in bringing into common use the long division algorithm usually taught in elementary school.

In a paper on the history of logarithms, Xavier Lefort of Les Instituts de Recherche sur l'Enseignement des Mathématiques, Nantes, lists the following quotation, indicating that Archimedes had the fundamental idea that would generate logarithms.

"When numbers are in continuous proportion starting from the unit, and that some of these numbers are multiplied between them; the product will be in the same progression, far away from largest from the multiplied numbers of as many numbers as the smallest one of the multiplied numbers is from the unit in the progression, and far away from the unit of the sum minus one of the numbers from which the multiplied numbers are far away from the unit."

Briggs also completed a table of logarithmic sines and tangents for the hundredth part of every degree to fourteen decimal points. They were published in 1633 under the title *Trigonometria Britannica*, which also included a table of natural sines to fifteen places and the tangents and secants to ten places. Briggs also wrote numerous articles that were never published. These include works on the geometry of Ramus and on Longomontanus's treatise on squaring the circle. Other works by Briggs include an edition of the first six books of Euclid's *Elements*, published in 1620. Demonstrating his versatility he published *A Treatise of the Northwest Passage to the South Sea, Through the Continent of Virginia and by Fretum Hudson* (1622). At the time, Briggs was a member of a company trading with Virginia. He was co-founder with Francis Bacon of the colony of Roanoke Island, from which all the colonists vanished, their fate never being known.

Briggs died on January 26, 1630 and was buried in Merton College chapel, Oxford. In his *Lives of the Gresham Professors,* Dr. Smith described Briggs as "a man of great probity, a contemner of riches, and contented with his own station, preferring a studious retirement to all the splendid circumstances of life."

Quotation of the Day: "Mr. Briggs appoints a certain day when to meet at Edinburgh; but failing thereof, Merchiston [Napier] was fearful he would not come. It happened one day as John Marr and the Lord Napier were speaking of Mr. Briggs, 'Oh! John,' saith Merchiston, 'Mr. Briggs will not come now.' at the very instant one knocks at the gate. John Marr hastened down and it proved to be Mr. Briggs to his great contentment. He brings Mr. Briggs into my Lord's chamber, where almost one quarter of an hour was spent, each beholding the other with admiration, before one word was spoken."
– William Lilly