Napier's Bones Encyclopedia Article

Napier's Bones

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Napier's Bones

John Napier (1550-1617), a fifteenth century Scottish mathematician, noted that the astrologers and surveyors of his time toiled over their complex mathematical computations. He had long felt such tasks could be accomplished with less drudgery and greater accuracy. He became determined to improve the process.

Born in Edinburgh in 1550, Napier was educated in France and became increasingly interested in mathematics, which he began to study with a passion soon after his marriage in 1571. In 1594 Napier became particularly concerned with simplifying the multiplication and division processes, and the thought occurred to him that all numbers could be expressed in exponential form. Once written in such a form multiplication and division could be accomplished by adding or subtracting the exponents. He called this process of computing exponential expressions logarithms, or proportionate numbers. Exactly how Napier hit upon the use of logarithms is not clearly known, but their impact on the mathematical community of his time was highly significant.

In 1614 Napier he published a book, *Mirifici logarithmorum canonis descriptio*, in which he presented the logarithmic tables and explained their use. In the next several years, Napier took his concept one step further and invented several automatic calculating machines. One such device, a small box containing plates used to perform multiplication, was known as the *promptuary of multiplication*. Around 1617, he developed another device, which he called *rabdologiae*. Napier placed his logarithm tables on wooden cylinders, the surfaces of which contained numbers. By turning the correct cylinders (which represented the digits 0 to 9) and adding or subtracting the numbers which appeared, the correct result was displayed. As Napier's rabdologiae gained popularity, others referred to it as numbering rods, multiplying rulers and speaking rods. However, the device is best known to historians as Napier's bones--so called for the ivory or bone cylinders later used in place of the original wood. Thorugh Napier's invention, the process of doing routine calculations was simplified to an amazing extent, causing other mathematicians to implement Napier's bones on their own calculating devices. Napier's logarithmic discovery completely transformed the mathematical calculation process.