Napier's Rods Encyclopedia Article

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Napier's Rods

Napier's rods (or bones) were a set of graduated rods used as a mechanical aids to calculation beginning in the early seventeenth century. Scottish mathematician **John Napier** (1550-1617) invented the rods named after him in order to speed up arithmetic calculations. Napier published his *Rabdologia* in 1617, in which he discussed various methods for abbreviating calculations. One method of multiplication and division (and of determining squares roots and powers) that Napier described in his *Rabdologia* was the ingenious system of numbered rods eventually called Napier's rods or bones (see figure). It was a major improvement on the ancient system of counters then in use, and today Napier's rods are considered the forerunner of the **slide rule**.

Multiplication can be reduced to simple addition with Napier's rods by using an "index" rod (i.e., a rod with "index" written across the top or sometimes, as shown in the figure, with no number at the top) and other rods with specific numbers appearing at the top of each. The index rod is laid to the left of specifically numbered rods for multiplication. For example, to multiply 6 by 7, first locate the index rod (the left-most rod in Figure 1), and also the rod marked "7" at the top. Next, look right from "6" across the index rod, and then down from the 7 rod until the two meet. The result appears on the 7 rod: 42.

Multiplication of a number (i.e., 6) by larger numbers (i.e., 467) can also be quickly calculated. As shown in Figure 1, place the 4, 6, and 7 rods in sequence next to each other, and place the index rod to the right of all three. The row on the "index" rod that contains numeral "6" gives the result of 6 x 467 when the products with the units 7 rod (6 x 7 = 42), the tens 6 rod (6 x 60 = 360), and the hundreds 4 rod (6 x 700 = 2,400) are added together: 42 + 360 + 2,400 = 2,802. Multiplying even larger numbers is accomplished by inserting the necessary rods for thousands, ten thousands, hundred thousands, and so forth.