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Joel S Silverberg* (JSilverberg@rwu.edu), Dept of Mathematics, Roger Williams University, 1 Old Ferry Rd, Bristol, RI 02809. *A remarkable alternative to trigonometric tables in determining the angles of a right triangle, given the lengths of two of its sides, as described by Thomas Ratcliffe, Mariner, in 1684.* Preliminary report.

In the collections of the British Museum can be found a peculiar handbook of navigational mathematics written by a seaman named Thomas Ratcliffe in 1687, which presents calculations for plain and mid-latitude sailing, along with a detailed series of sample calculations and traverse tables of his own design.

As he describes the various cases that arise in plain sailing, he casually describes method for calculating the course of a sailing vessel – divide the product of 86 and the departure from the meridian by the sum of the distance sailed and half the difference in latitude (all measures being in miles or leagues). This, says he, gives the course in degrees.

For the angles of interest to the navigator this approximation is remarkably accurate, giving the correct angle to within a few minutes of arc and the Taylor Series expansion of Ratcliffe's function shows an error proportional to the fifth power of the angle sought (in radians).

Since European mathematicians such Gregory and Newton were just beginning to understand the mathematics that might underlie such an approximation, Maclaurin was still in his infancy, and Taylor was not yet born, from what inspiration might an unschooled navigator have come upon such formula? (Received July 29, 2005)