

The Sliding Gunter—Who Was its Inventor?

Werner H. Rudowski

Definition

What is a “Sliding Gunter”? In the beginning, probably all slide rules were called Sliding Gunters, i.e., two Gunter scales put together to avoid the use of compasses.

James Atkinson in *The Correction to the Reader* of 8th Sept. 1693, mentioned “The Description and Use of the Gunter, Sliding Gunter, and Sector” [1]. Later in this book “The Use of Gunter’s Scale, both single and sliding” is described.

T. Tuttell and J. Moxon in their book *The Description and Explanation of Mathematical Instruments* (London 1701) had defined a Sliding Gunter “as made of Box, with a middle piece that slides between two pieces, with Lines to answer Proportions by inspections, chiefly used by Mariners.” [2]

Edmund Stone [3] in 1723 described in detail the construction of the Gunter scales. Before explaining the use he wrote:

“Note, These lines are also put upon Rulers to slide by each other, and are therefore called Sliding Gunters, so that you may use them without Compasses; but any Person that understands how to use them with Compasses, may also, by what I have said of *Everards’s* and *Coggeshall’s* Sliding-Rules, use them without.”

Stone obviously did not use the phrase Sliding Gunter for the first time. But something else is important:

He made a distinction between Everards’s, Coggeshall’s Sliding-Rules, and Sliding Gunters. “The latter are extremely useful for Navigation, Dialling, Astronomy, etc.”

But does this mean that all slide rules used for navigation were Sliding Gunters? One main criterion would be that two identical trigonometric scales work together, i.e., they are placed on stock and slide, and “slide by each other”. Many problems in navigation, etc., were solved by these scale arrangements. If this were the only criterion, the oldest Sliding Gunter would be Bissaker’s slide rule of 1654, which will be explained later.

Therefore it seems to be correct to define a **Sliding Gunter** as “a two-sided flat slide rule with one slide and with one of the scale arrangements as shown in Table 1 (see page 7) (Nos. 2 to 7) and with additional (secondary) scales on the stock, known from a Gunter scale, which have to be used with a pair of dividers”.

Comparison of Similar Slide Rules

Table 1 compares the main criteria of some known slide rules. The first slide rule is Bissaker’s rule in the Science Museum in London. It is described briefly in the Catalogue of the Science Museum [4], and in more detail in the *Handbook of the Napier Tercentenary Celebration*. [5] The slide has the form of a cross, and the stock consists of four pieces connected at the ends by brass strips. The slide and the four pieces of the stock together have a square cross section. It must be mentioned that the slide is one single piece with four sides. This arrangement allows placing more scales on the rule (see Figure 1 and Table 1).

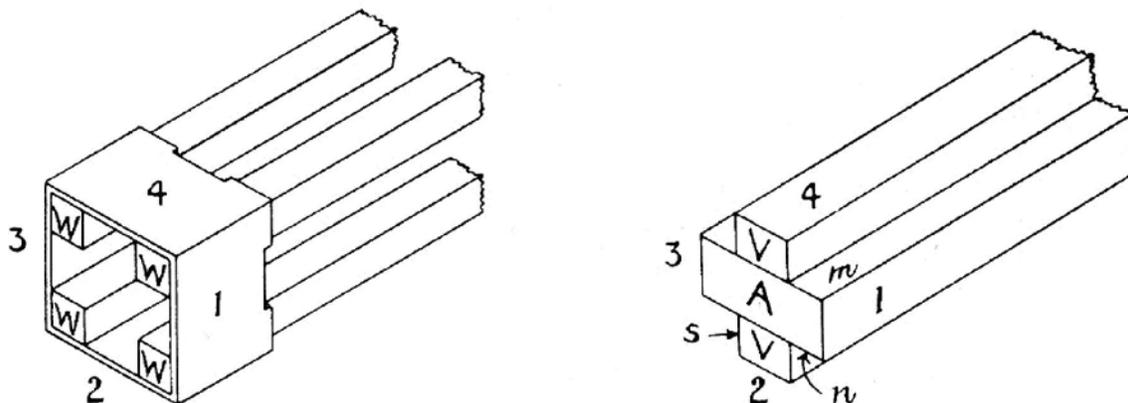


Figure 1. Sketch of the Bissaker rule.

This boxwood slide rule is inscribed: “Made by Robert Bissaker, 1654 for T.W.”

Bissaker is listed in Gloria Clifton’s *Dictionary of British Instrument Makers* [6] but there is nothing known about T.W. Was T.W. a navigator or an astronomer, who

had the idea to put Gunter’s scales on a special slide rule of somehow exotic design? As the rule is a bit longer than two feet, he might have transferred the scales with the actual length from a Gunter scale. However, we do not find scales like M*L, CHO, RUM on this rule.

But we do have the adjacent SIN/SIN and TAN/TAN-scales, which allow easy and quick solution of navigational or astronomical problems.¹

The second slide rule is described by Mark Rees in the *JOS*, Fall 1998. [7] It is signed *T.S. 1703*. There is one maker with these initials in this period of time known from Clifton's book: She lists a *Thomas Sarjant*, who worked 1712-1713 but was an apprentice to *Thomas Cooke* in 1703, and who had sold slide rules.

This slide rule is 12 inches long and bears scales as usually can be found on typical Sliding Gunter. With one exception: On the lower stock of the front side, there is a line of artificial sines, while on most other known Sliding Gunter there is a line of Sine of Rhumbs, or in a few cases a line of Versus Sines.

But besides this small—however remarkable—difference this slide rule made in 1703 seems to be the oldest known Sliding Gunter.

The third rule is from a print from Jacob Leupold's book *Theatrum Arithmetico-Geometricum* published in 1727. [8] I presented this design during IM 2006 in Greifswald. The article also appeared in the *Proceedings* [9] and in the *JOS* 15/2. [10]

The next slide rule is most probably the oldest German slide rule that survived. It can be visited in the Staatliche Museen Kassel and was also presented during IM 2006. [9,10]

Table 1 (No. 5 and 6) shows the scales generally found on Sliding Gunter. They differ from the scales to be used with compasses. Otto van Poelje describes these scales in detail in the companion paper in this issue. [11]

Finally, I have listed the scales described by Seth Partridge in his book *The Description and Use of an Instrument, called the Double Scale of Proportion*. [12] The first edition of this book is dated 1661. As *Partridge* had not given a print of the scales in his book, his intention of the scale arrangement has to be taken from the description and the examples. Thus it might be that this is not the right interpretation. Table 1 gives two possible alternatives (see the companion paper, "The Sliding Gunter—Reconstruction of the Partridge Scales". [13])

In all four editions of *Partridge's* book there is "An Advertisement" where he recommended "that this Scale and all other Mathematical Instruments, are accurately made by Mr. *Walter Hayes* at Cross-Daggers in More-Fields, next Door to the Popes-Head-Tavern, London." (Editions 1671, 1685, and 1692). In the 1661 edition *Partridge* recommends *Anthony Thompson*, Hosier-Lane near West Smithfield in London. Both makers are listed by Gloria Clifton and there are trade-cards in the Catalogue *Scientific Trade Cards in the Science Museum Collection*. [14]

As we do not know of any slide rule with exactly the same scale arrangement as described by *Partridge* the question arises, whether somebody else had improved *Partridge's* layout. In this connection it is interesting to

look back to Jacob Leupold. He mentioned in his book [8] that he owned a description in German by an unknown author of a "curious slide rule". He got it made according to his drawing by the "Königlich – Preußischem Paedagogio und Mathematico Experimentalis Georg John in Halle". The arrangement of the main scales is exactly the same as on the slide rule of 1703, marked "T.S." and nearly the same as on later rules, commonly called Sliding Gunter. The only difference is that the later rules have Sine Rhumbs or in some cases Versus Sine instead of artificial (logarithmic) sines. The slide rule in Kassel (No. 4) obviously was influenced or even copied from the Leupold/John design.

In his book Leupold gives a general description of the rule which he obtained from the unknown author, and now a surprise: This description is exactly a translation of *Partridge's* book. [12] Amazingly, Leupold had interpreted *Partridge's* idea differently. Or was he of the opinion that the scale arrangement should be slightly modified for easier handling?

If this assumption is correct, then we could assume that also instrument makers in England—at least T.S.—and maybe even *Partridge's* makers *Hayes* and *A. Thompson* had slightly modified his idea.

Finally, a nice remark from the Science Museum Catalogue [4, page 26]: In 1673 John Flamsteed (1646-1719), the first Astronomer Royal in Greenwich purchased for ten shillings "a 2ft double rulers of proportion which he liked very well". This looks like a Sliding Gunter.

Conclusion

In my opinion, Seth *Partridge* could be named as the inventor of the Sliding Gunter. Certainly he could have based it on the Gunter scale, on calculating rods, other earlier designs and maybe also on the Bissaker. But the dual-face design with the typical main scales was his invention. And it is not a contradiction that instrument makers did modify slightly the scale layout, until the Standard Sliding Gunter was established.

Acknowledgements

Otto van Poelje's many articles about Gunter scales [11,13,15] and the fruitful discussion with him about *Partridge's* book have been most helpful in writing this article. I also appreciate very much his comments and suggestions on the draft. And I thank Peter Hopp for additional information and sources.

References

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¹According to my knowledge, detailed research on Bissaker's slide rule has yet to be done.

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 [15] Poelje, O.E. van, "Gunter Rules in Navigation", *Journal of the Oughtred Society*, Vol. 13, No. 1, 2004.

No	Name	Source	Date	Length	Main Scales		Additional Scales		Back of Slide
					Side 1	Side 2	Side 3	Side 4	
1	Bissaker	actual piece	1654	over 24 in	N	S	MER E.P.	N	3 add. Scales
					N	T	E.P.	E.P.	
					S.R.	T	T	S	
No	Name	Source	Date	Length	Main Scales		Additional Scales with Dividers		
					Front	Back	Front	Back	Edges
2	T.S.	actual piece	1703	12 in	N	S	Inches	RUM, CHO, M:L	Date & Initials
					N	S			
					N	T			
					S	T	MER, E.P.	SEC, SIN, TAN	Foot-Scale
3	Leupold	book drawing	pre 1727	1 Schuch (\approx 1 foot)	N	S			
					N	S	open	open	open
					N	T			
					S	T			
4	Kassel	actual piece	1st Quart. 18th Cent.	286 mm	N	S	Stein	PEQ, MER	Ha-Zoll
					N	S			
					N	T			
					S	T	Rum, MEG	Tangen Sinus	Gun.- Scales
							Cordar, ML		Bley, Eeysen
5	Typ. Sliding Gunter	actual pieces		12 in	N	S	Inch-Scale Foot-Scale	SIN, TAN, SEC; LEA, RUM	
					N	T			
					S.R.	T	MER, E.P.	RUM, CHO M*L	
					N	S	Inch-Scale Foot-Scale	SIN, TAN, SEC; CHO, RUM, LEA, RUM, CHO	
					N	T			
					S.R.	T	MER, E.P.	V.SIN	
6	Typ. Sliding Gunter	actual pieces		24 in	N	S			
					N	T			
					S.R.	T			
					N	S	open	open	open
					N	T			
					S or N	T or S			
					S S	T T			
7	Partridge	book, text	1661	1, 2 or 3 ft or other	N	S			
					N	T			
					S or N	T or S			
					S S	T T			

Table 1. Characteristics of some known Sliding Gunter.