Steinhäuser's Suggestions for a Slide Rule in 1807

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The history of slide rules in Germany in the first half of the 19th century is well documented, for example by W. H. Rudowski [5]. Besides the rules named in this article I found a paper that documents the isolated new invention of a simple sliding rule which will be described here.
First of all some words about the inventor: Johann Gottfried Steinhäuser was born 1768 in Plauen and died 1825 in Halle, both cities now located in Germany. In 1805 he became Professor for Mathematics in Wittenberg and 1816 Professor for Science of Mining in Halle. He made investigations about terrestrial magnetism and tried to explain magnetic deviations with a magnet that rotates within the hollow earth [3].

His article [4, p. 33 – 45] is titled (in translation) *Description of a new very simple calculating machine by Prof. Steinhäuser, with which not only the four species of calculation, but also all proportions, roots and trigonometrical calculations can be performed very fast and secure with four places.* This description has been abridged repeatedly in contemporary encyclopedias in 1809 [1, Kap. XVII, p. 566 – 568] or in 1812 [2, heading *Rechenmaschine*] and in some others. It is striking to note that in none of those copies this instrument is compared with existing slide rules.

Steinhäuser argues as follows: for the usage of existing calculating aids the user must have knowledge in calculating. The easiest aid with which one can do roots and trigonometric calculations is the logarithmic table. Many people fear the table because of so much numbers inside, its use should be made easier and more comfortable. In his opinion a precision of 4 figures suffices in most cases.
Numbers can be expressed by the length of lines. So he thinks of two scales, about one meter in length, the first equally divided and marked with positive numbers 1 to 10000 and the other below with their mantissas. Both lines are better to be overlooked than a table. A pointer can be used as link between the two. With other words: he thinks of a small logarithmic table of one dimension placed on a rod or similar device. Operations could be done as usual by reading and writing.
In the next step Steinhäuser asks for and finally finds a way to omit the intermediate step of reading the logarithms. He invents the so called logarithmic scale. The readers are surely familiar with such a transformation from table to scale, but for the author two hundred years ago it seems to have been an unique new innovation, because he writes (in translation) “I hope to have served that purpose the following way”. With theses words his article is evidently not an explanation but describes an invention.

He suggests to build three identically equal rules, made of pear tree wood, 110 centimeter long and one *Zoll* (about 2.5 centimeter) in square. The first side bears a diagonal scale, probably 100 centimeter long as in the former suggestion, divided up to 1000 parts.
The second side bears the same scale, marked with numbers in a distance from the

origin 1 which equals their logarithms. When we follow Steinhäuser's instructions this logarithmic scale is divided 1 – 10 – 100 – 1000.
The third side bears an identical scale with values of logarithms for trigonometrical functions. By sliding the rules side by side it is possible to multiply, divide, to do proportions or with help of the scale on the first side to calculate roots or powers and all that by adding or subtracting lines and, as intended, without knowing the logarithms themselves. Examples of usage are added in the original article.

It is evident that Steinhäuser explains the principles of a slide rule. Based on his own words and since he mentions the already existing slide rules with no word we must assume he doesn't know them and describes his own original invention. At the end of his article the inventor promises to publish pictures of the scales in the future. Until now I haven't found them, maybe he got troubles in dividing the scales, maybe someone told him that the slide rule has been already invented...

Steinhäuser's ideas had had no influence on the further development of slide rules. They may be regarded as a singular event of little or even no importance, but they are a small part in the answer to the question how well known were slide rules in Germany before the second half of the 19th century.

References

[1] *Almanach der Fortschritte, neuesten Erfindungen und Entdeckungen...*, 13. Jg., Erfurt 1809
[2] *Krünitz's Ökonomisch-technologische Encyklopädie*, Berlin 1812
[3] *Pierer's Universal-Lexicon*, 4. Aufl., Bd. 16, New York 1863
[4] Riem, Johannes (Karl Richard), *Ökonomischer Schwanengesang*, Leipzig, 1807
[5] Rudowski, Werner H., “How Well Known Were Slide Rules in Germany, Austria and Switzerland Before the Second Half of the 19th Century?”, *Journal of the Oughtred Society,* 15:2, 2006