

# **Research notes on slide rule production and sales volumes**

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The following notes were compiled while writing Robert A. James, "The Deaths of the Slide Rule," *Journal of the Oughtred Society*, Vol. 23, No. 2 (Fall 2014), 6-17. Citations refer to sources referenced in that article. The notes are only conjectures at present and the compiler welcomes further input. Correspondence is welcomed at rob.james@pillsburylaw.com.

Quantity	Evidence	Best guesstimate
<i>Slide rules ever made on the planet Earth</i>	<ol style="list-style-type: none"> <li>1. Stoll 2006: 40 million rules made during "era." No authority cited.</li> <li>2. But if at the peak, say a year in the 1963-64 time frame, Hemmi/Post was at 1 million (or even high six figures), ARISTO, Sterling and Faber-Castell were in the mid to high six figures, and K+E and Pickett were in the six figures, with Dietzgen, Nestler, IWA, Ricoh, Concise, the British, French and Dutch makers adding up to another high six figures, then even just US, Europe and Japan would have made <i>at least</i> 3 million in that single year. Then one would need to add the Soviet bloc and Chinese rules. If slide rules were in mass production for decades, then even allowing for ramping up and down from that peak figure, 40 million sounds <i>far</i> too low.</li> </ol>	At <i>least</i> double Stoll's estimate, maybe 100 million? Especially if Soviet and Chinese rules are added—triple, 120 million? Perrygrafs excluded in any event.
<i>Annual calculator sales worldwide in the 1970s</i>	<ol style="list-style-type: none"> <li>1. Nigel Tout, of vintagecalculators.com, collects <i>New Scientist</i> articles on the emergence of transistorized four-function calculators and presents the following data. Japan exported 112,000 units to the US in 1969, 200,000 more in the first nine months of 1970. The total Japanese production in 1971 was 2.75 million units, with Sharp 40%, Canon 15% and Casio 12%. Then the American produced calculators with MOS semiconductors, integrated circuits, and Large Scale Integration microprocessors. In 1973, 15 million calculators were sold. <i>New Scientist</i> Nov. 13, 1975: 50 million were sold in 1975 alone.</li> <li>2. Petrovski 1992 states 50 million per year in the 1970s, without</li> </ol>	<p>At least 50 million annually, based on sales of that magnitude in 1975 reported by <i>New Scientist</i> Nov. 13, 1975.</p> <p>2.75 million calculators made in Japan alone in 1971 is a huge overhang on slide rule sales before the HP-35 came out. Hemmi reported that even the 1964 transistorized desktop calculators cut into their slide rule sales (Kadokura JOS 1/2).</p>

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<i>Annual U.S. slide rule market</i>	<p>citing authority.</p> <ol style="list-style-type: none"> <li>1. Feely 1999 presents actual K+E data given to Technical Advisory Committee in 1969: US market in 1967 was 260,000 with K+E 38% or 97,500, Pickett 23% or 60,000, Post (Hemmi-made) 20% or 52,000, Dietzgen 7% or 18,000, and “foreign” 12% or 31,000.</li> </ol> <p>These data were provided by Klaus Lutter, K+E product manager for slide rules and drafting tools. There seems no reason for K+E to have told this committee anything but their best view of facts. The K+E data are reliable and Lodge 2012 confirms the Dietzgen range. But notice that Sterling is not even mentioned here, and the New York Times 1982 says Sterling sold a million rules in 1964-65. K+E may have excluded “inexpensive plastic rules” from its market definition.</p> <ol style="list-style-type: none"> <li>2. <b><i>Shepherd-Konshak-James Conjecture (SKJ)</i></b>: one might estimate a year’s slide rule sales <math>T</math> for the U.S. Golden Age (1945-1970) by estimating the freshman science/engineering student population and multiplying by a coefficient. For the freshman population, use statistics on science/engineering bachelor degrees four years later, relying on the <i>SED</i> quantity reported by <i>U.S. Department of Education, National Center for Education Statistics</i>.</li> </ol> <p>The SKJ formula is thus</p> $T_t^{US} = c SED_{t+4}^{US}.$ <p>In other words, the US slide rule sales <math>T</math> in year <math>t</math> are a multiple of the graduating class <i>SED</i> four years later, in year <math>t+4</math>, for <math>t</math> between 1945 and 1970.</p> <p>What should the coefficient <math>c</math> be? Arguments for <math>c&gt;1</math>: students who bought multiple rules, attrition from freshman classes to</p>	<p>150% to 300% of the college freshman science/engineering student population, anywhere from 300,000 to 1 million rules per year during the heyday.</p>

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	<p>science/engineering graduation (dropouts, changes to art majors), vocational school, community college and military non-academy populations, buyers other than freshman college students (younger and older). Arguments for <math>c &lt; 1</math>: science/engineering graduates who didn't ever buy a rule, students who had already bought rules in high school (which would then show up in earlier year data).</p> <p>The overweights seem stronger than the underweights. For now let us assume <math>c = 3</math>.</p> <p>Applying SKJ to the 1967 year reported by K+E, <math>SED_{1971}^{US} = 294,000</math>, so multiplying by 3, <math>T_{1967}^{US} = 900,000</math>. That estimate may be compared with K+E's 260,000 figure.</p> <p>3. AP story 1976 quotes Pickett representative saying industry sales declined 75% from 1973 to 1975.</p>	
<i>K+E annual sales</i>	<p>1. McCoy reports K+E ran through its million serial number counter three times: once 1922 or 1924 to 1943 (maybe 50,000-70,000/year), once 1944 to 1954 or 1956 (maybe 100,000/year), once 1954 or 1956 to 1964 (maybe 125,000/year), and then from 1964 to 1976 when they stopped around serial number 700,000 (maybe 100,000/year during the heyday and slipping after 1971).</p> <p>2. Feely 1999 quotes K+E's own sales data of 97,000 K+E rules in 1967, broken down by every model number. There is little reason to doubt these data, reported within K+E's own committee.</p> <p>3. New York Times 1982 quotes John J. Montesi, K+E customer service supervisor, as saying they sold 20,000 per month in the late 1950s.</p>	Ramp up from 50-75,000 a year before 1950s, peak of 125,000 or more in 1950s, ramp down to below 100,000 in 1960s and way down in 1970s until cessation in 1976.
<i>Dietzgen annual sales</i>	1. Lodge JOS 21/2 confirms about 15,000 a year maximum.	15,000 per year at the peak.
<i>Hemmi/Post annual</i>	1. Kodokura JOS 1/2 reports Hemmi timeline. 1963 1 million	It is not clear why the Hemmi timeline data would be

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<i>sales</i>	<p>units, decline 10% per year thereafter, with sharper decline in 1971. As part of the keiretsu now known as Sharp, calculator sales cut into their slide rule sales as early as 1964.</p> <p>2. K+E seems to have estimated their sales at a lower level, at least in the US. The Bob Otnes interview of Jack Burton and Gordon Anthony (JOS 7/2, 8/1 &amp; 8/2) says a Wall Street Journal article credited “Sun Hemmi” with 200,000 to 300,000 in annual sales—it is not clear when that article appeared (might have been as early as the 1940s) or whether those were US sales or worldwide sales.</p>	wrong. But experienced observers have reported surprise that Hemmi sold ten times the K+E rules. It still appears that Hemmi, with complete command of the Japanese and Asian markets, sold high six figures annually, reaching as much as a million at a peak.
<i>ARISTO annual sales</i>	<p>1. Hans Dennert (JOS 6/1) reported that over the life of the company D&amp;P sold 5.4 million school rules, 2.4 million 25 cm rules and 4.2 million 10 cm rules.</p> <p>2. Shepherd interview of Dennert (JOS 2/2) says during peak years 500,000 were sold to schools and 300,000 were sold to engineers.</p>	Mid to high six figures, 300,000 to 800,000 annually during heyday, dropping off dramatically in the 1970s.
<i>Faber-Castell annual sales</i>	<p>1. Comment on Yahoo! Board that Faber-Castell may have sold even more than ARISTO. No citation of authority.</p>	Six figures, but not enough information to make a guess. Neither Von Jezierski’s book nor his 1996 or 2001 JOS articles mentions Faber-Castell volumes.
<i>Sterling annual sales</i>	<p>1. New York Times 1982 quotes John J. Heath, Sterling customer service manager that their best year was 1964-65 when they sold a million units; they shut down in 1980 when they sold 24,000.</p>	Mid to high six figures, up to a million annually during heyday, dropping off dramatically in the 1970s.
<i>Pickett annual sales</i>	<p>1. No data, apart from K+E’s estimate of 60,000 US unit sales in 1967. O’Leary and other articles on Picketts do not mention sales volumes. They focused on the high school and other starter market with plastic and metal rules.</p> <p>2. In a letter to the editor of <i>Stanford Magazine</i> responding to an 2009 article on Tom Wyman’s collection, a correspondent mentions his conversation with a Pickett salesman in 1972 who said “our sales are better than ever.”</p>	<p>At least 60,000, maybe higher especially towards end.</p> <p>Bruce Reichelt interviewed John Pickett and reported Pickett’s recollection that the company sold up to “one million” units annually (author’s telephone interview with Reichelt, Sept. 2, 2013). It is remarkable that Sterling, Hemmi, and Pickett all recall such a round number as “a million” as the peak annual sales quantity.</p>

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<i>Nestler, IWA, British, Graphoplex, W&amp;G, Concise, Ricoh, other Western and Japanese sales</i>	1. No data	No reported data. A lot of engineers in these countries though.
<i>Soviet bloc and Chinese sales</i>	1. No data	No reported data. A lot of engineers in these countries though.