
Slide Rules of the Stanley Rule & Level Company

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It was 1883 when U.S.-based Keuffel & Esser first offered slide rules to American buyers. This date may be said to mark the beginning of the “modern” slide rule era in America. At first, K&E slide rules were manufactured by the German company Dennert & Pape, but within a few years K&E began to manufacture its own slide rules. When K&E first offered slide rules to American buyers, the Europeans already had well established makers of quality slide rules: D&P in Germany, Lenoir and successor companies in France, and various British makers were already offering quality engineering slide rules.

In America prior to 1883, slide rule makers were, for the most part but by no means exclusively, limited to manufacturers of measuring rules who also offered to their customers a few Routledge-type slide rules. These were generally two-foot, two-fold rules having what was often referred to as a “Gunter scale” or metal slide in one arm with a two-cycle log scale working against a similar scale on the body of the rule. The two-cycle scale, necessary because the rules had no cursor, gave these rules an effective length of 5.25 inches.

The hinged rule design originated with Henry Coggeshall and is described in the 1729 edition of his book *The Art of Practical Measuring Easily Performed by a Two Foot Rule that Slides to a Foot*. Since Coggeshall was particularly interested in timber measurements, he devised the girt line to facilitate such calculations. Coggeshall’s hinged rule with a slide in one arm was the basis for the invention in 1808 of the engineer’s slide rule by Joshua Routledge (1773-1829) of Bolton, England. Other English rule makers quickly adopted the Routledge design. The English rules were typically made of boxwood with brass hinges and slides, although rules were also produced in boxwood and German silver, and at times ivory was substituted for boxwood.

It didn’t take long for American rule makers to copy the Routledge design and to begin including them in their catalogs. These measuring rules *cum* slide rules were available in the forms of a carpenter’s, and an engineer’s slide rule. On the carpenter’s rule the scale below the slide, the Girt Line, was folded at 4 to facilitate the calculation of board feet in trees and logs. Instead of a folded scale, the engineer’s rules had a one-cycle log scale below the slide for use in calculating squares and square roots. Also, hand-stamped on the body of the rule below the slide were a series of tables of constants, conversion factors, and pumping engine gauge points to assist in technical calculations.

Among the early makers of Routledge-type slide rules in the United States were Belcher Brothers, New York (1821-1876) and C. A. Stearns & Co., Brattleboro, Ver-

mont (1838-1863). Another was H. Chapin (1834) which merged with D. H. Stephens & Co (1854) in 1901, and the successor company continued to operate until 1914 in Pine Meadows, Conn. Philip E. Stanley reports that H. Chapin offered both the engineer’s and carpenter’s rules as early as 1839. However, from the mid-1800s to early 1900, the dominant rule maker was Stanley Rule & Level Company. Thanks to Phil Stanley and his meticulous research, good information is available on the measuring and slide rules produced by Stanley Rule & Level Co. of New Britain, Conn. Information on other rule makers operating in competition with Stanley is not nearly so comprehensive, and these makers and their products represent fertile areas for future research and documentation.

The various Routledge-type slide rules offered by Stanley Rule & Level Co. and its predecessor company, A. Stanley & Co., over a 60-year period are summarized in Table 1. Over the years the company offered three carpenter’s slide rules and two engineer’s slide rules. Understandably, rules inscribed “A. Stanley & Co., New Britain, Conn.” and offered from 1854 to 1857 are particularly hard to come by. Prior to 1900 when the market for the company’s carpenter’s and engineer’s slide rules was the greatest, Stanley offered some 160 different standard measuring rules in its catalogs. Some of these measuring rules were of little interest to customers and were quickly discontinued, while others continued to be offered for over 100 years. In addition to offering a wide variety of measuring rules through its catalogs, an unknown number of non-standard or special-purpose rules were produced. These custom rules were for selected markets and individual buyers, and often were designed for advertising purposes. Thus, “sliding rules” with the so-called Gunter scale were but a small fraction of the company’s total output.

Some rules (notably Nos. 15 and 16 among the rules with a Gunter scale) were bound or edged with thin brass strips to strengthen the rule and to protect the edges from wear. Although more costly, bound rules were less liable to be damaged in tool boxes and on the job. As evidence of this, it is more difficult to find examples of unbound rules that do not show considerable wear and abuse. Readers seeking more information on Stanley rules and on the history of rule making in America are encouraged to obtain a copy of OS member Phil Stanley’s authoritative book *Boxwood and Ivory*. In this volume he provides good background information on rule making in America as well as a comprehensive listing and discussion of all standard rules produced and offered by Stanley Rule & Level Company.

The only true rectilinear slide rule manufactured by Stanley Rule & Level Company that was not first and foremost a folding measuring rule was the “Improved Slide Rule Arranged and Constructed by Jas. Hogg”. The Hogg slide rule never appeared in Stanley’s standard trade catalogs. This trim boxwood slide rule bound and tipped in German silver (12”LOA, 11/16” wide and 3/16” thick) was designed by James Hogg for use by technicians in textile trades. However, the only features that suggest this particular use are three small metal plugs located at 5.5, 10 and 11.4 on the C scale and labeled G, H, and K, respectively, to mark points related to textile calculations. In some rules these are brass plugs, but in the rule described here they are German silver. Like the other Routledge-type slide rules produced by Stanley, the Hogg rule had no cursor. Much of the text of the instruction booklet for this slide rule is written for “the Superintendent and Overseer in Textile Machinery”, and is devoted to a detailed discussion of its use in making calculations governing the adjustment and operation of weaving equipment.

The Hogg slide rule described here is stamped “Pat. Applied For” and was produced in a plant located in Lawrence, Mass. Other James Hogg slide rules were produced in Lowell, Mass., indicating that he changed locations during the period that Stanley offered his slide rule.

From the top of the Hogg rule downward there are eight scales, the first six of which are lettered A through F but bearing no relation to lettered scales found on later conventional slide rules. The scales which are precisely calibrated are arrayed as follows:

A scale: a single-cycle scale like the conventional C or D scale. B scale: a two-cycle scale like the conventional A or B scale on later rules inscribed immediately adjacent to the A scale above to allow squares or square roots to be read directly. C scale: a two-cycle scale like the conventional A or B type scale adjacent to and above the slide. D scale: a two-cycle scale on the upper edge of the slide. The C and D two-cycle scales described here and operating against each other was the normal arrangement for early slide rules, which had no cursors. E scale: a two-cycle scale on the lower edge of the slide. F scale: a two-cycle inverted or reversed scale on the body of the rule, which facilitated computations as the CI scale did on later rules. NUM scale: a single-cycle scale. The “NUM” designation is found, for example, on Gunter rules to identify the logarithmic scale. LOG scale: a linear L-type scale. Since the NUM and L scales abut, the logarithms of numbers on the NUM scale may be read directly on the L scale. Thus, even without a cursor and LL scales, these scales may be used in calculations involving fractional exponents.

There are 12” arithmetic scales on each edge of the Hogg rule and on the reverse side are numerical tables similar to those found on Stanley’s two-foot, two-fold engineer’s rules. There was some variation in the arrange-

ment and information contained in the tables appearing on Hogg rules. Philip Stanley describes a Hogg rule produced in Lowell, Mass. without gauge points for pumping engines, while the one described here displays those gauge points. Interestingly, there is at least one random error in the gauge points hand-stamped on the rule. Such errors were not unusual given the sustained attention required to hand-stamp individually the 168 numbers comprised of 501 separate digits that appear on the typical engineer’s rule.

The Hogg slide rule appeared, according to Philip Stanley, “sometime prior to 1886”, about the time that K&E began to sell slide rules. The fact that this quality slide rule did not attract the attention of more buyers who were seeking a better rule for technical calculations may be attributed at least in part to the fact that the rule had no cursor at the time when the cursor was becoming more widely available. In addition, Stanley did not promote the Hogg rule as a “true and improved” engineer’s slide rule. Had it done so and had the rule appeared in its catalogs with other Stanley rules, instead of being produced and marketed exclusively as a specialized rule for the textile trades, the rule would undoubtedly have attracted many more buyers with the result that it would have been more commonplace today.

The purpose of this brief paper is to draw the attention of readers to slide rules that were available through American manufacturers of conventional measuring rules. During the last half of the 19th century, the makers of measuring rules were producing them primarily for builders, tradesmen, and merchants. They never awakened to the fact that there was a growing demand for quality slide rules by those in technical fields. Oriented as they were toward the production of shop and on-the-job tools, makers of measuring rules didn’t appreciate the potential of this new technically oriented market, nor did they have the expertise to design slide rules to meet this specialized demand. This may serve, even today, as an object lesson of the danger of company management locking into one product line without remaining alert for ways of adapting and diversifying to accommodate new emerging markets.

By 1900 few customers, other than perhaps the occasional tradesman, wanted the two-foot, two-fold rules with sliding “Gunter scales”. As a result, these early two-foot, two-fold Routledge-type slide rules for engineers and carpenters were eventually phased out as precision instrument companies introduced more versatile and accurate instruments. Nevertheless, these Routledge-type boxwood rules are among America’s first widely available slide rules and thus represent an important period historically in the development of this country’s slide rules. As such they deserve greater attention and research.

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Table 1. Routledge-Type Slide Rules Produced by Stanley Rule & Level Company

| Rule Number | Type | When Offered | Description |
|-------------|-------------|--------------|---|
| No. 6 | Engineer's | 1859 – 1905 | 2 foot 2 fold, unbound, arch joint |
| No. 12 | Carpenter's | 1855 – 1915 | 2 foot 2 fold, unbound, arch joint |
| No. 14 | Carpenter's | 1855 – 1859 | 2 foot 2 fold, bound, arch joint No example known to exist and information is scant |
| No. 15 | Carpenter's | 1855 – 1915 | 2 foot 2 fold, fully bound, arch joint |
| No. 16 | Engineer's | 1815 – 1902 | 2 foot 2 fold, fully bound, arch joint |
| No. 27 | Carpenter's | 1855 – 1915 | 2 foot 2 fold, unbound, square joint |
| No. 83 | Carpenter's | 1855 – 1872 | 2 foot 4 fold, unbound, arch joint This 6" slide rule is rare and was produced with a measuring rule after 1872. |