Gilson Slide Rules – Part II – The Large Rules

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Introduction

This is the second of a two-part report on Gilson Slide Rules. In the last issue of the Journal [1], the earliest of the Gilson slide rules were presented. They included the Pocket Slide Rule, which was the only slide rule known to be made by Gilson not having a circular format[1], and various versions of the 4-inch-diameter Gilson Midget circular slide rule. This report focuses on the larger diameter Gilson circular slide rules that followed the small rules.

The first of the large-diameter Gilson slide rules is the Gilson Atlas. It first appeared as a 30-revolution spiral on a 10-inch-square disk. Like most of the Midget models, the scales appear to be silk-screened on a painted aluminum surface. Versions of this slide rule are known to carry the 1922 patent, and not the 1931 copyright date of later versions. Thus, it appears that the Atlas was first made some time in between these two dates, perhaps before the move of the Company from Niles, Michigan to Stuart, Florida in 1927.

Sometime during or after 1931, Gilson began making an 8-inch-diameter version of the Atlas on a circular disk, the scale size being about 84% of that on the 'square' Atlas. In the mid 1930s, Gilson introduced an 8-inch-diameter version of the Midget circular slide rule called the Apex slide rule, a new 8-inch-diameter circular slide rule named the Binary Slide Rule, and a new version of the 8-inch Atlas having a 25-revolution spiral calculating scale. All of these slide rules have the same scale set (trig functions and decimal to fraction conversions) on the reverse face. It is curious that Gilson did not provide for making calculations with these scales, as they are simply tables of functions and numbers.

The mid 1930s appears to be the most creative period for the Gilson Slide Rule Company. In addition to introducing three new 8-inch-diameter circular slide rules, Gilson also made the Commercial Calculator and other circular slide rules on special order. There was also a keen eye for detail. Richard Gilson [3] wrote that "In 1934 or 35 my father made the Binary ... I worked all summer figuring out the position of the lines on the various scales, especially the log-log scales. Since it is in the log base 10 and then log base e (2.7128128) we carried the drawing to 5 figures - 1 part in 100,000". This was also the time when Gilson began highlighting scales in yellow to make it easier to distinguish one scale from another. The quality of finish and detail of Gilson slide rules are

impressive, especially if one considers that the manufacturing was essentially done in a remote backwoods home shop on a river bank in Florida, in the early days without electrical power or roads. Many Gilson slide rules from the 1930s can still be found in excellent condition. The company continued to thrive until the elder Gilson retired and sold it in about 1960. In the intervening period, Gilson slide rules were widely sold under many different names, including Frederick Post Co., Eugene Dietzgen Co., Charles Bruning Co., A. Lietz Co., Dietrich-Post Co., and Tavella Sales Co. In the US, Gilson slide rules were the most popular circular slide rules of their time. More details of the large-diameter Gilson slide rules follow.

The Atlas Calculator

The Gilson Atlas Calculator is a long-scale slide rule designed to allow the determination of results to 4 or 5 digits resolution. Three different types and four different versions are known. The first Atlas Calculator (Type I) has one circular scale 30-inches long (named a "C" scale by Gilson) and one 30-revolution spiral scale. Details can be seen in Figure 1. It was printed on a 10-inch-square aluminum sheet, the outside spiral having a diameter of about 9 inches. Two transparent plastic (celluloid) indicators facilitate the calculations. This is commonly referred to as the "square" Atlas. Gilson claimed a length of 75 feet for the Spiral scale; however, the scale has an actual length of about 46 feet. Close inspection of the range covered by last spiral reveals that its length is equivalent to one of the same range on a linear slide rule having a total length of about 71 feet. This, perhaps, is the root of the claim for a 75-foot scale length. An early example of the "square" Atlas has a patent date of January 17, 1922. It was probably made in the mid 1920s in Niles, Michigan. Another[2] Type I Atlas example (Fig. 2) is marked Stuart, Fla., and probably was made after 1927 when Gilson moved to Florida. It is interesting to note that the C and Spiral scales are used in concert. Because the Spiral scale gives 30 results to every problem, the C scale is used first to determine the result to 2 or 3 digits. One then makes the calculation on the spiral scale and knows on which revolution to look for the result.

Type II of the Atlas (Fig. 3) is printed on a circular disk, about 8-1/4 inches in diameter. It has the same 30-revolution scale layout as the "square" Type I Atlas, but reduced by about 16% in size. It, too, is marked "The Atlas Calculator". This version has a set of trigonometric

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[1] According to Richard Gilson [2], Gilson also made 11-inch-long straight Richardson slide rules for the International Correspondence Schools. However, no examples are known.

[2] Another version of the Type I Atlas has come to my attention as this article was about to go to press. It has somewhat more rounding on the corners than Version II, but is not as fully round as Version III.

and fraction-decimal equivalent scales (similar to those scales on the Midget slide rule) on the reverse (Fig.4) and is marked "Copyrighted 1931". There is an additional indicator on the reverse to help with reading the scales. The front and back scales are not linked. Another version of the Type II Atlas has the binary scale set (discussed later) printed on the reverse. The total length of the Spiral scale is about 39-ft., and the equivalent linear scale length is about 60-ft. It has 2 indicators on the Spiral scale side, and two additional indicators on the reverse to facilitate the calculations on the Binary scales. The Type II Atlas probably dates to the early 1930's.

The Type III Atlas (Fig.5) is also printed on an 8-1/4-inch diameter disk. It is marked "Atlas Slide Rule" on the front and "Copyrighted 1931" on the reverse. Its scale layout is different from the previous two types, in that the Spiral scale winds just 25 revolutions, and alternating decades on the scale are highlighted in yellow to help keep track of the scale position. The scale length is 35 feet, and its linear scale equivalent length is about 50 feet. It also has a "C" scale near the perimeter edge, and it has three additional scales: one (the C-Log scale) located inside the first spiral, for determining mantissa of the common logarithm of a number to 3 digits from the C scale; another (the C-Spiral scale) laid out on an extension of the outside spiral to help with determining the mantissa to 5 digits from the Spiral scale; and a third (the Coils scale) located inside the C-Log scale, that helps with the determination of the logarithm from the Spiral scale. There is also a set of constants laid out in a ring around the indicator pivot fastener. The reverse of the Type III Atlas slide rule (Fig. 6) has the same trig and decimal equivalent scales as the Type II Atlas, but with alternating yellow highlighting to help with visually separating the different scales. The Type III Atlas was probably made from the mid 1930s until the demise of the Gilson company in the early 1960s. The Type I and II Atlas models are quite scarce, and not frequently seen for sale, while the Type III model is commonly seen for sale.

The Apex Slide Rule

The Apex slide rule (Fig.7) is a double-sized, 8-1/4-inch diameter, version of the Gilson Midget slide rule. The front scales include C, CI, L, A, Binary, 2-turn Log Log, Fraction , Drill and Thread Size, and mm scales. The C, CI, L and A scales are the common scales that we all know. The Binary scale is an A scale (2 log cycles) divided in fractions rather than in decimals. It can be used (along with the A scale) for multiplying and division operations involving fractions and mixed numbers between the limits of 7/64ths and 10. The Log Log scale runs from about 1.14 to 1 million. The Fraction scale is used for adding and subtracting fractions ranging from 1/64th to 1 inch. The Drill and Thread scales are used in concert with the L and Fraction scales to find the size of a number or lettered drill for tapping screw threads. The mm scale is used in concert with the L scale to make conversions between inches and mm. The reverse has the same set of trigonometric and decimal fraction conversion scales found on the back of the Type IV, V and VI Midget slide rules. The scale set includes Degrees, Signs, and Tangents for three ranges; about 0.9 to 30 degrees, 30 to 60 degrees and 60 to 90 degrees. There is also a pair of scales giving the decimal equivalents for the range of 1/64th to 1. A single transparent indicator facilitates the reading of these scales. As with all Gilson circular slide rules, the front and back scales are not linked.

Known versions have light yellow painted disks, an apparent attempt to ease eyestrain. As for the Gilson Midget model, the front and back scales are not linked. The Apex slide rule was the predecessor to the more well known Binary model (to be discussed next). It was copyrighted in 1936 and produced for only a few years in the late 1930s. The Apex is a scarce Gilson slide rule model, and is not frequently seen for sale.

The Binary Slide Rule

The Binary slide rule is a refined version of the Gilson Apex. Like the Apex, the first model, Type I, of the Binary (Fig. 8) was light yellow in color. Richard Gilson, the son of Claire Gilson, stated in a letter [3] that he worked all through the summer of 1934 or '35 laying out the scales of the Binary Rule. That was quite a formidable task for someone 17 or 18 years of age! The Binary slide rule scales are laid out on an 8-/4-inch diameter aluminum disk with enameled scale surfaces. The following scales were included on the front face: C, CI, A, K, 4-turn Log Log, Binary, Drill and Thread Size, and mm conversion. The improvements made were to increase the range of the Log Log scale (from about 1.0015 to 1 million) and to add a three-decade K scale for cubes and cube roots.

The same set of trigonometric and decimal/fraction scales found on the Apex model were included on the reverse side along with one indicator. The front and back scales are not linked. A later model, Type II (Fig. 9) has white enamel faces with yellow highlighting to help delineate the scales. The Binary slide rule was copyrighted in 1940 and sold by many engineering supply houses until about 1960. It was listed in Dietzgen's catalog 22D, copyrighted 1956, along with the Atlas and Midget slide rules. The Binary circular slide rule was arguably the most popular of large-diameter circular slide rules ever made. As a result, many examples can be found for sale and in slide rule collections. Examples also can be found on the back of Atlas models, but these examples are very scarce.

The Commercial Calculator

The Commercial Calculator is a specialty version of the Gilson circular slide rule. The disk diameter is about five inches. It has scales for determining the amount of interest from interest rates and dates. It has C, CI, Rate, Day, Month, and Year scales. The example shown in Figure 10 is labeled Tavella Sales Co. Perhaps it was

a special model made by Gilson for Tavella to market. It has the 1-17-22 patent and 1934 Copyright. The estimated date of production is in the mid 1930s. This is a scarce model. Few are known in collections.

Other Gilson Slide Rules

According to Richard Gilson [2], the Gilson Slide Rule Company also made other special-purpose circular slide rules, such as one designed for growing mums, and another for handicapping horse races. He also states that they made a "11 inch straight (slide) rule for "ICS" (International Correspondence School) - The Richardson - which had different slides so it could be used by students of different courses". Perhaps that was the 'Pantrocrat' model that Richardson and Clark [4] advertise at the back of their instruction manual along with Type II Midget and Type I Atlas slide rules. Bobby Feazel [5] has also reported a special Sonar slide rule made by Gilson for the Woods Hole Oceanographic Institution for calculating the speed of sound in water.
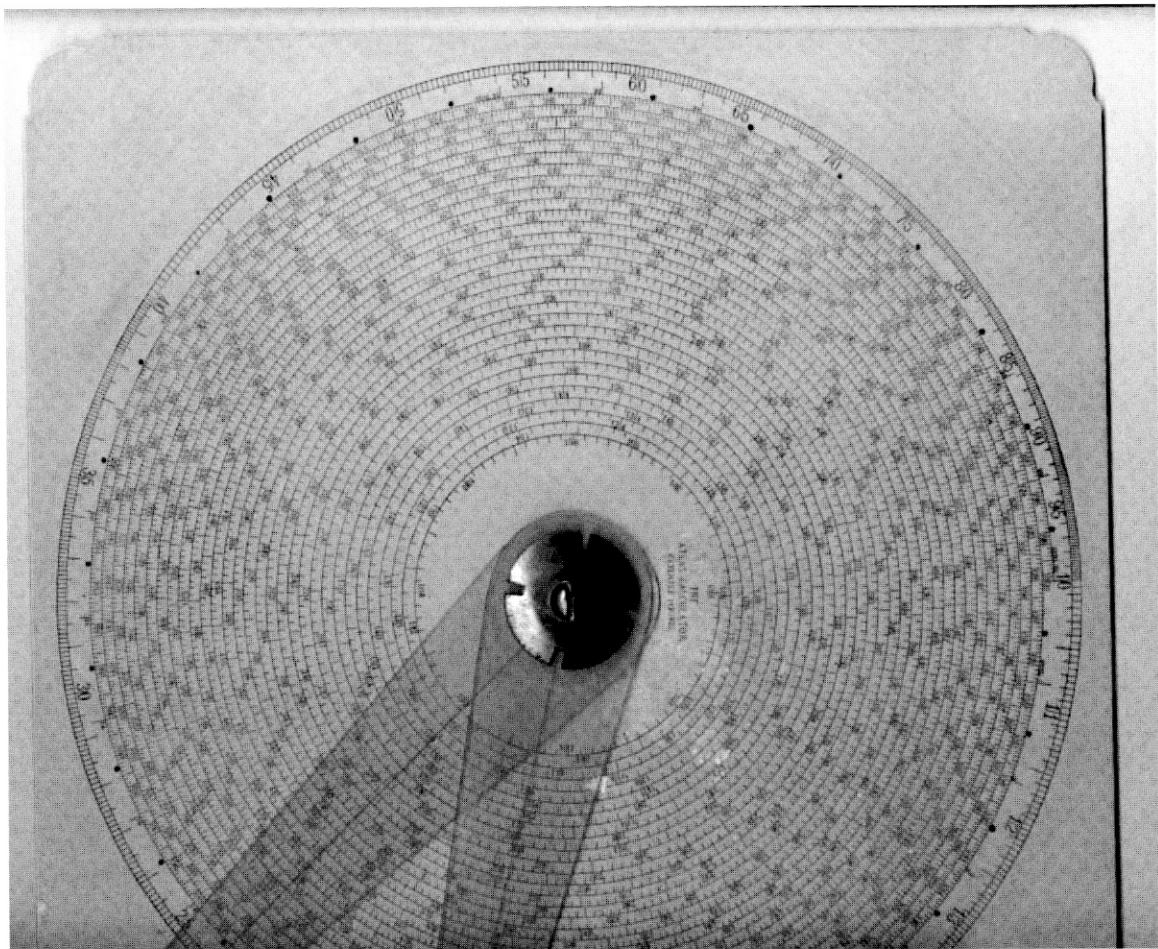
Gilson Atlas Slide Rule – Type I – Version I

Figure 1. Face of Atlas - Type I - Version I

Material:	Square aluminum disk with white painted surface
Size:	10 inches square with notched rounded corners
Front Scales:	C, Spiral (46-ft length)
Back Scales:	None
Cursors:	Two transparent celluloid cursors on front
Named:	The Atlas Calculator
Location:	None
Patents:	Patented 1-17-22
Copyright:	None
Dates to:	mid 1920s

Gilson Atlas Slide Rule – Type I – Version II
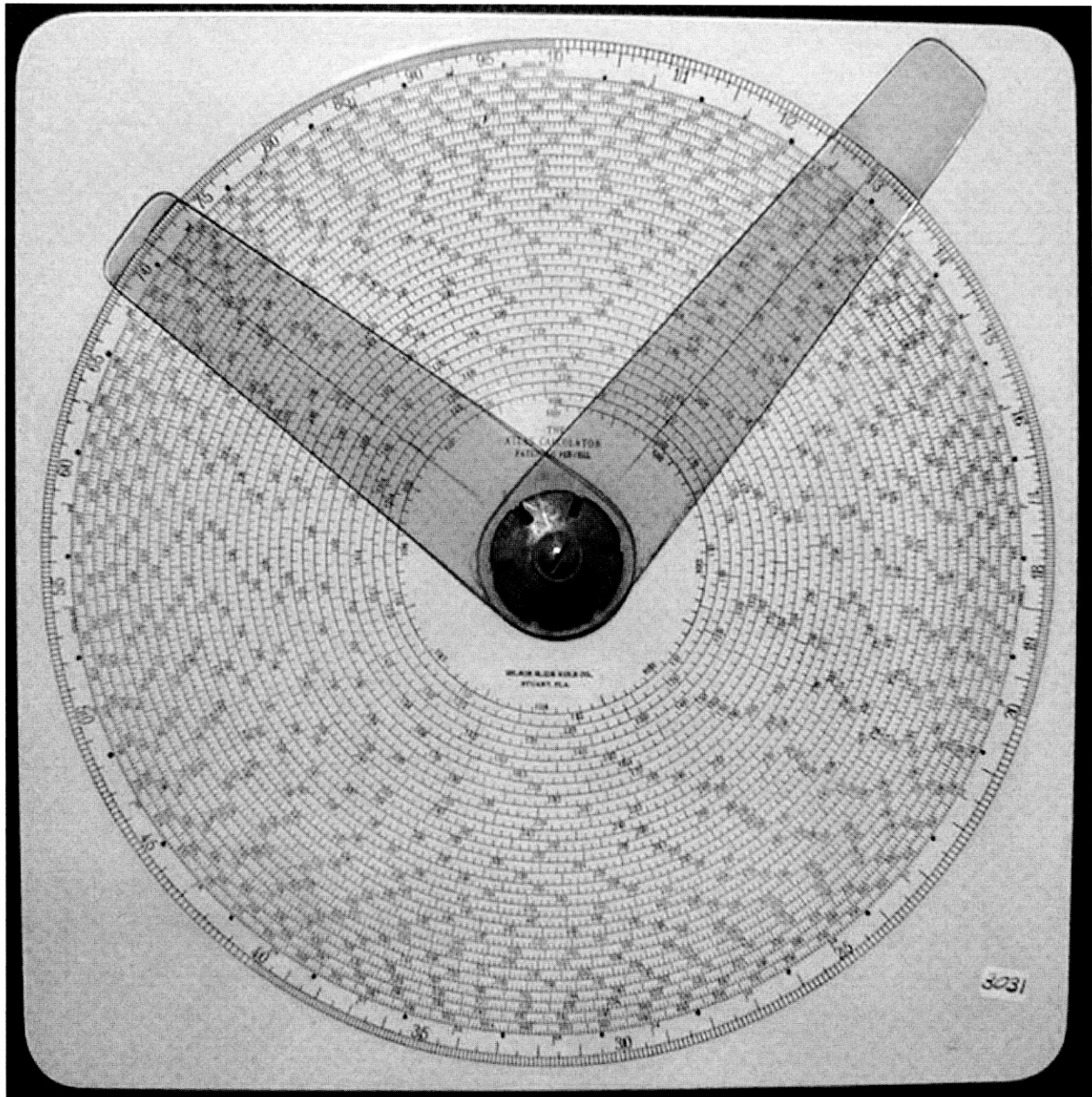
Figure 2. Face of Atlas – Type I – Version II.

Material:	Square aluminum disk with white painted surface
Size:	10-inches square with rounded corners
Front Scales:	C, Spiral (length = 46 ft.)
Back Scales:	None
Cursors:	Two transparent celluloid cursors on front
Named:	The Atlas Calculator
Location:	Gilson Slide Rule Co., Stuart, Fla
Patents:	Patented 1-17-22
Copyright:	None
Estimated date of production:	Late 1920s

Gilson Atlas Slide Rule – Type II
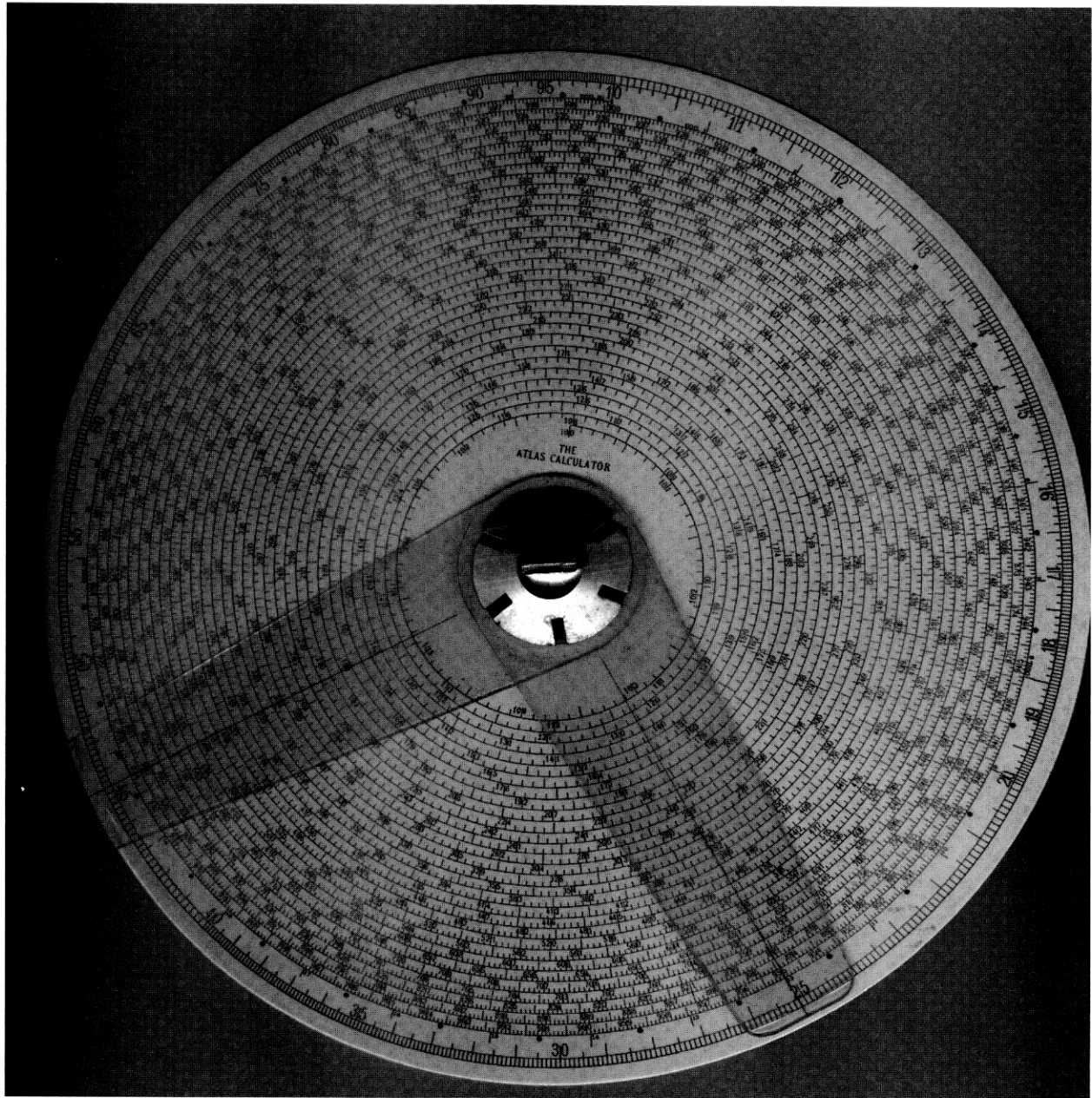
Figure 3. Face of Atlas – Type II

Material:	Round aluminum disk with light yellow or white enameled celluloid surface
Size:	8-1/4 inch diameter
Front Scales:	C, Spiral (scale length = 39 ft.)
Back Scales:	Degrees, Sines, Degrees, Sines, Tans, fractions, decimal equivalents
Cursors:	Two transparent celluloid cursors on front: one cursor on reverse
Named:	The Atlas Calculator
Location:	None
Patents:	None
Copyright:	Copyrighted 1931
Estimated date of production:	Early 1930s

Gilson Atlas Slide Rule – Type II
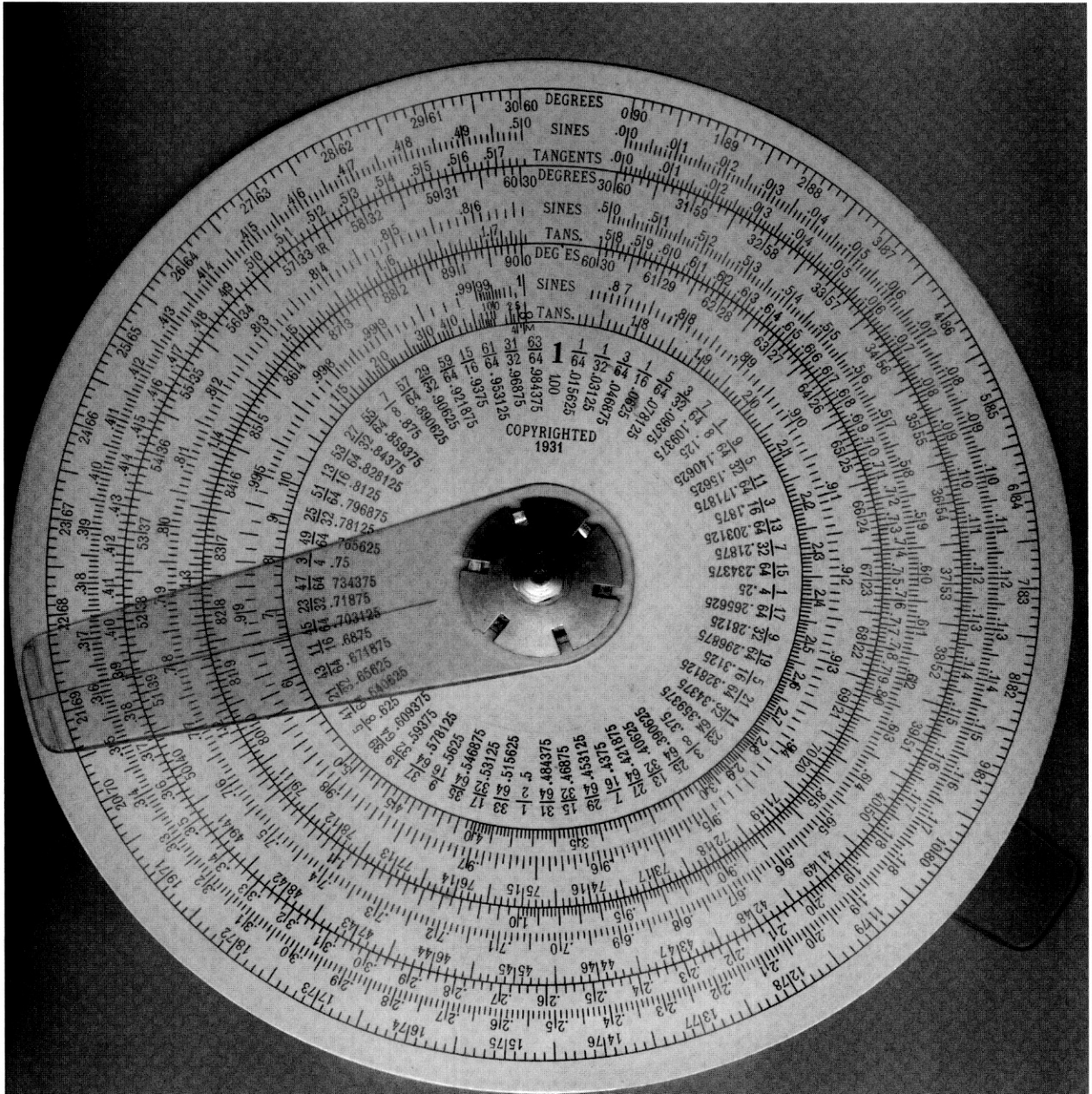
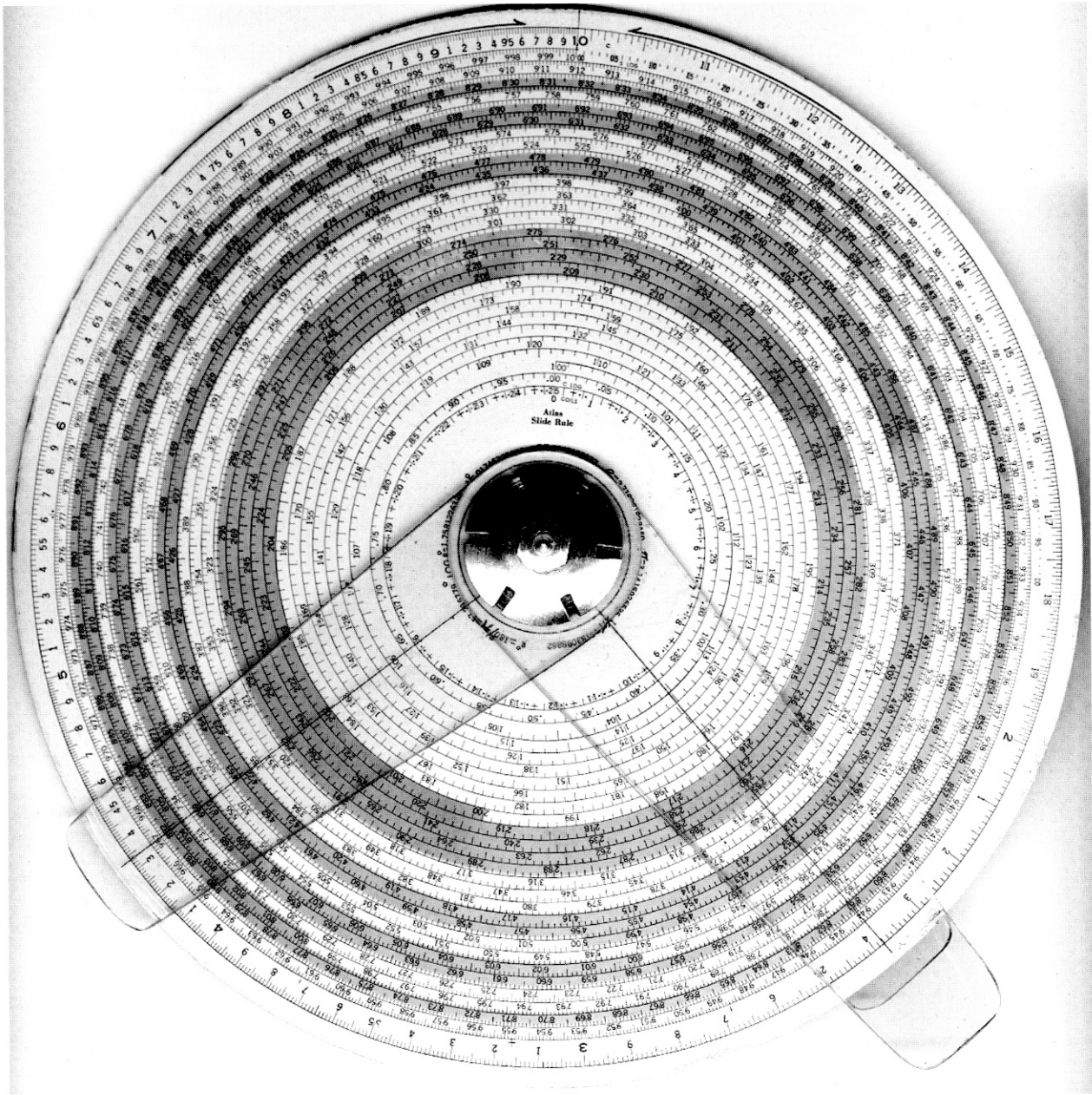Figure 4. Back of Atlas – Type II

Gilson Atlas Slide Rule – Type III

Figure 5. Face of Atlas - Type III

Material:	Round aluminum disk with white enameled surface
Size:	8-1/4 inch diameter
Front Scales:	C, Spiral (35 feet long) with yellow highlighting of alternating decades
Back Scales:	Degrees, Sines, Degrees, Sines, Tans, fractions, decimal equivalents
Cursors:	Two transparent celluloid cursors on front; one cursor on reverse
Named:	Atlas Slide Rule
Location:	None
Patents:	None
Copyright:	Copyrighted 1931
Estimated date of production:	Mid 1930s to 1960

Gilson Atlas Slide Rule – Type III
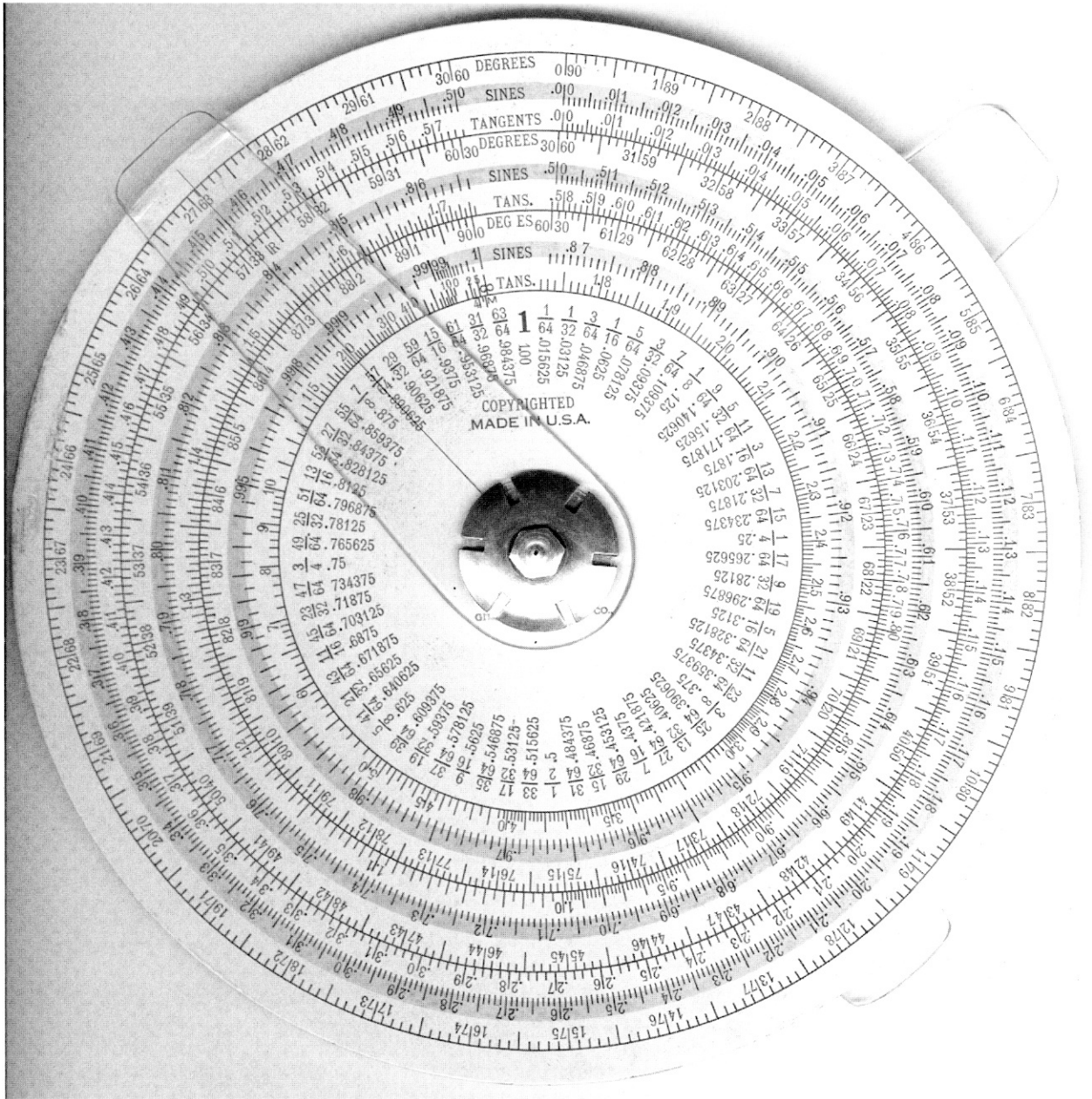

Figure 6. Back of Atlas - Type III

The Apex Slide Rule
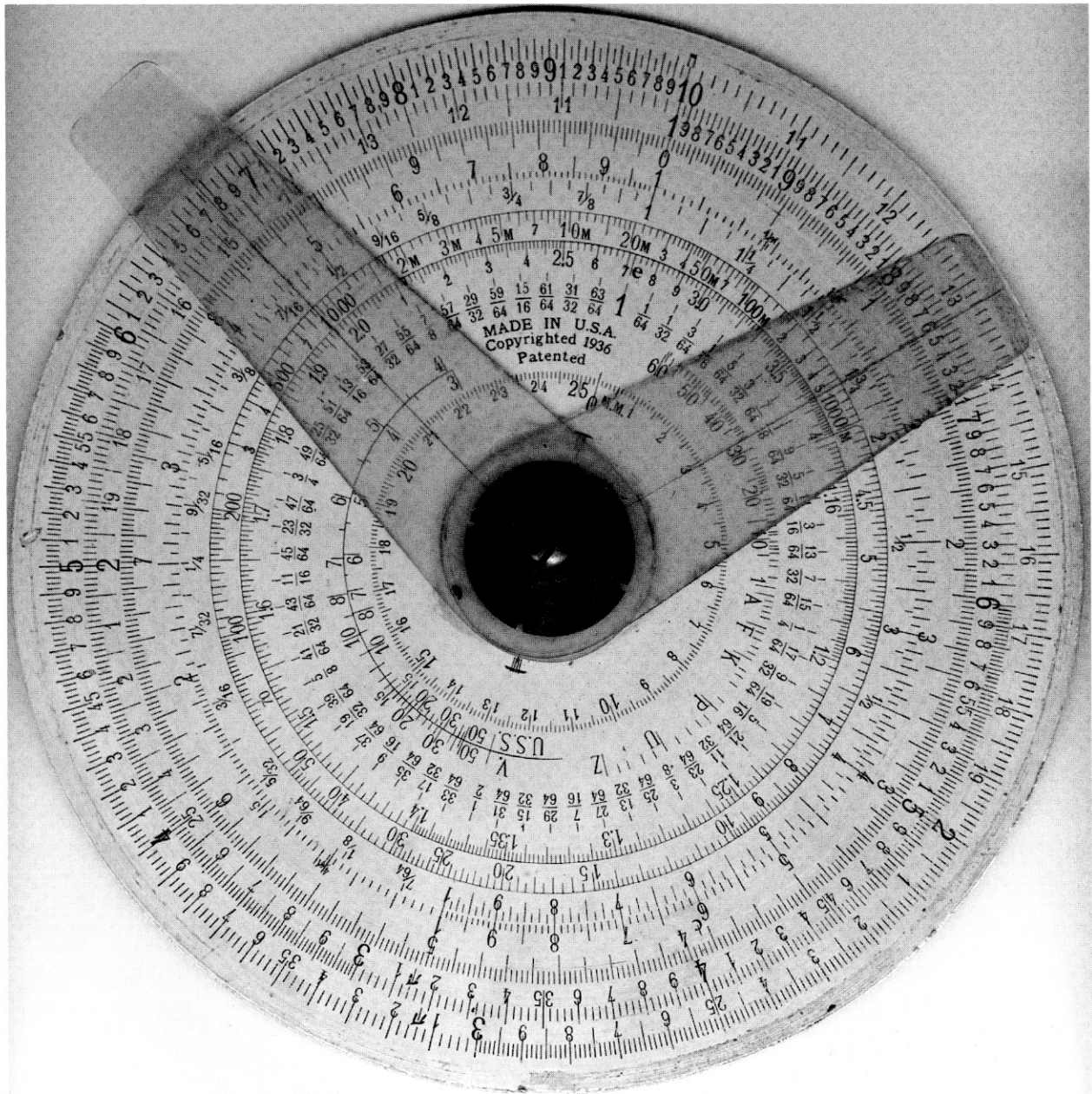

Figure 7. Face of Apex Slide Rule (back same as Atlas – Type II)

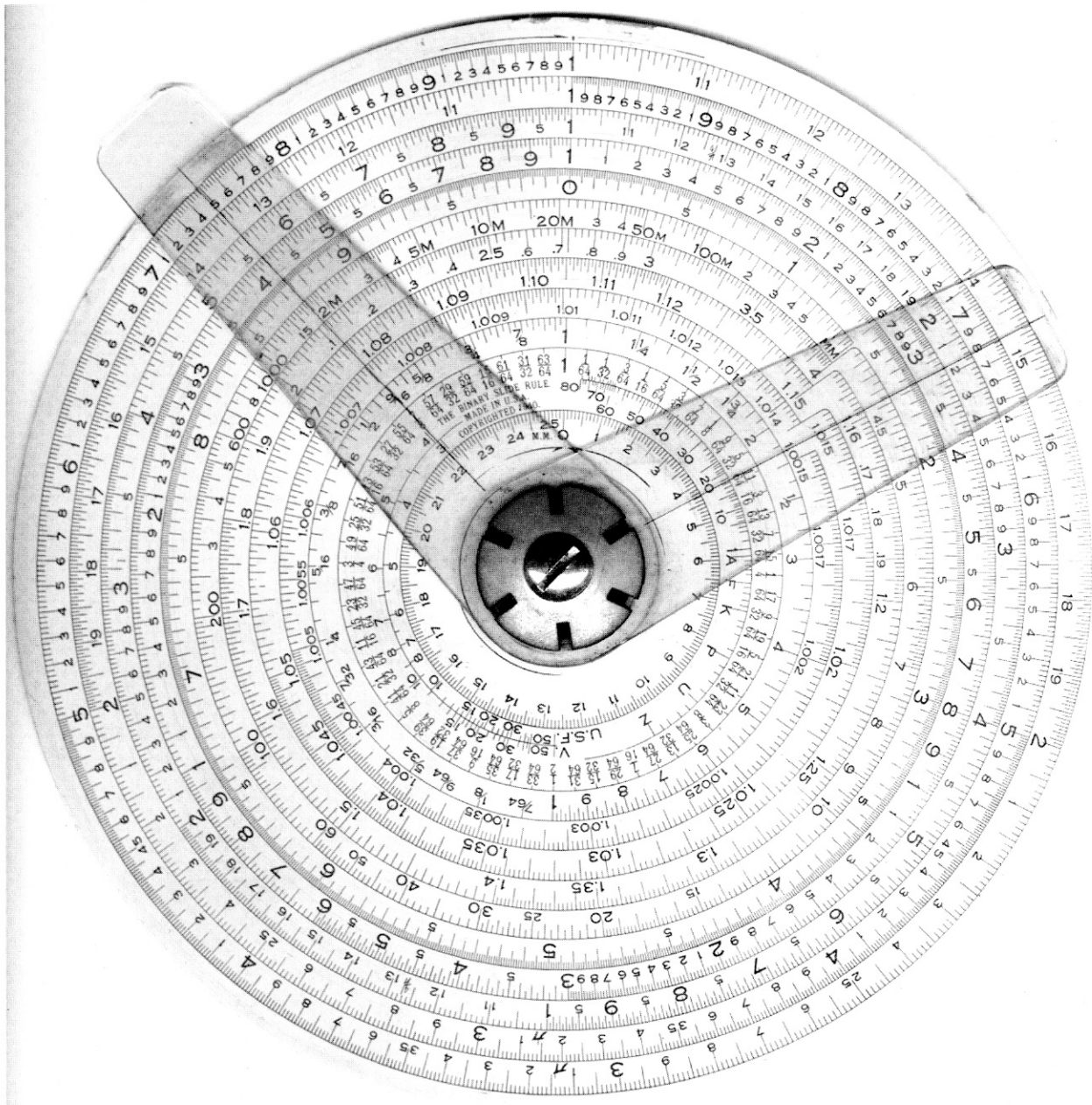|	
Material:	Round aluminum disk with light yellow painted surface
Size:	8 1/4-inch diameter
Front Scales:	C, CI, L, A, Binary, 2 turn Log Log, Fractions, Drill and Thread
Back Scales:	Degrees, Sines, Degrees, Sines, Tans, fractions, decimal equivalents
Cursors:	Two transparent celluloid cursors on front; one cursor on reverse
Named:	No name on slide rule
Location:	Made in USA
Patents:	Patented
Copyright:	Copyrighted 1936
Estimated date of production:	Late 1930's

The Binary Slide Rule

Figure 8. Face of Binary - Type I (back same as Atlas – Type II)

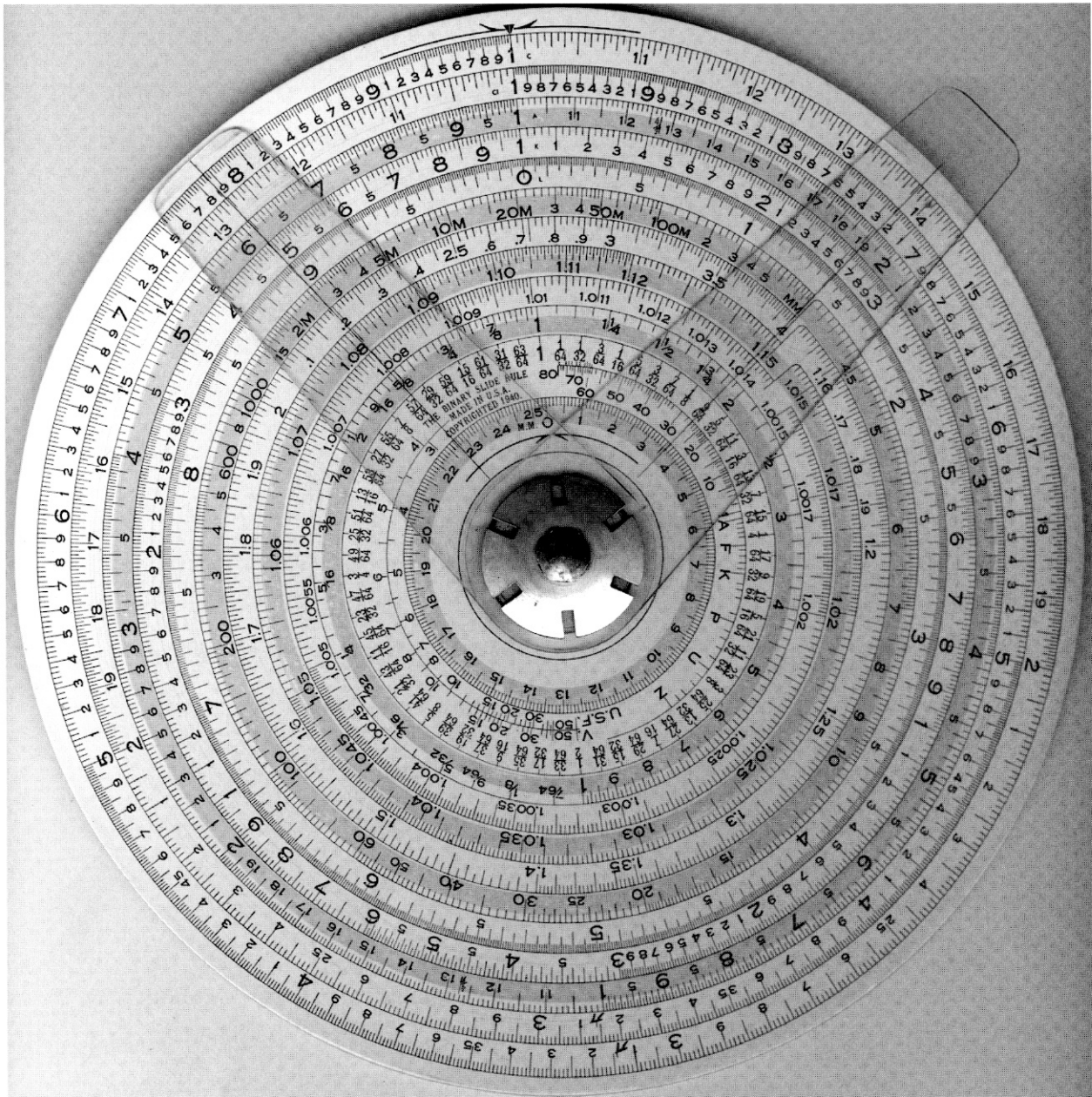|	
Material:	Round aluminum disk with light yellow painted surface
Size:	8 1/4-inch diameter
Front Scales:	C, CI, A, K, L, 4 revolution Log Log, Binary, Fraction, drill size, and mm conversion
Back Scales:	Degrees, Sines, Degrees, Sines, Tans, fractions, decimal equivalents
Cursors:	Two transparent celluloid cursors on front; one cursor on reverse
Named:	The Binary Slide Rule
Location:	Made in USA
Patents:	None
Copyright:	Copyrighted 1940 (face) and 1931 (reverse)
Estimated date of production:	Early 1940's.

Gilson Binary Slide Rule – Type II

Figure 9. Face of Binary – Type II (back same as Atlas – Type III)

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Material:	Round aluminum disk with white enameled surface and yellow highlighting
Size:	8 1/4-inch diameter
Front Scales:	C, CI, A, K, 4 revolution Log Log, Binary, Fraction, drill size, and mm conversion
Back Scales:	Degrees, Sines, Degrees, Sines, Tans, fractions / decimal equivalents
Cursors:	Two transparent celluloid cursors on front; one cursor on reverse
Named:	The Binary Slide Rule
Location:	Made in USA
Patents:	None
Copyright:	Copyrighted 1940 (face) and 1931 (reverse)
Estimated date of production:	1940's to about 1960.

The Commercial Calculator
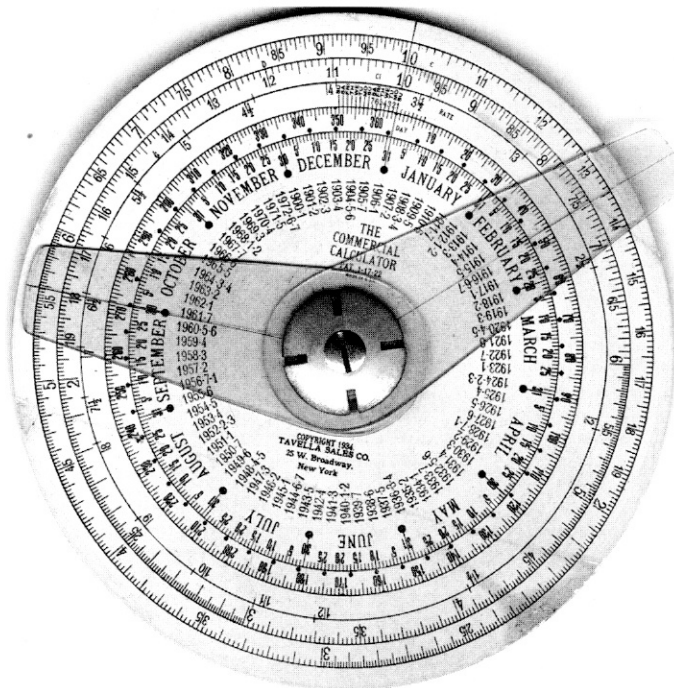
Figure 10. Face of Commercial Calculator

Material:	Round aluminum disk with white celluloid surfaces
Size:	4-15/16-inch diameter
Front Scales:	C, CI, Rate, Day, Month, Year
Back Scales:	None
Cursors:	Two transparent celluloid cursors
Named:	The Commercial Calculator
Location:	Tavella Sales Co., 25 W. Broadway, New York
Patents:	Pat. 1-17-22
Copyright:	Copyrighted 1934
Estimated date of production:	Mid 1930s.

Other Gilson Slide Rules
References

1. Aldinger, Henry & Chamberlain, Ed. "Gilson Slide Rules - Part I - The Small Rules", *Journal of the Oughtred Society,* v.9, n.1, Spring 2000, pp.48-61.

2. Gilson, Richard. Letter to Bobby Feazel dated Aug. 22, 1992, *Journal of the Oughtred Society,* v.2, n.2, Oct. 1993, pp.8-11.

3. Gilson, Richard. Letter to Raymond Burton dated November 2, 1987.

4. Richardson, Geo. W. and J.J. Clark, *The Slide Rule Simplified,* The Technical Supply Company, Scranton, PA, copyright 1918, 100 p.

5. Feazel, Bobby, personal communication.