

(Mitutoyo)

## **A Brief History of the Micrometer Part II: The Bronze Age**

Originating in mid 19<sup>th</sup>-century France, today's typical micrometer features a standard U-shaped frame with single-handed operation. The birth of the modern micrometer is attributed to French inventor J. Palmer, who received his patent in 1848 for the Palmer System.

### **The Birth of the Modern Micrometer**

Palmer based this compact, handheld micrometer on the same principles as Gascoigne's 1638 invention (*A Brief History of the Micrometer Part I: The Early Period*). However, with a far more advanced design, Palmer's model would become the foundation on which all modern micrometers would be built – making a considerable impact on the tool's history.

In close alignment with Palmer's U-shaped frame design, modern micrometers also incorporate the Palmer System's thimble, sleeve, spindle and anvil concepts. Palmer set the thimble's reading edge at a slightly tapered angle to meet gradations on the sleeve, while the thimble's circumference was divided equally in 20 parts to deliver an accuracy level of up to 0.05mm.

### **Born in France, Raised in America**

Having discovered the Palmer System in 1867 at the International Exposition in Paris, Joseph R. Brown and Lucian Sharpe of B&S Co. were the first to introduce the design to America. Though it employed 1mm pitch threads and was highly accurate, Brown and Sharpe recognized potential improvements to the Palmer System, as it did not incorporate a spindle clamp, and its graduated lines were unequally spaced. Disregarding these minor imperfections, Brown and Sharpe chose to enhance Palmer's original design by incorporating a finer 40 threads per inch spindle.

Following its introduction to America, improvements in micrometer design began in earnest with countless innovations that have made the tool so indispensable today. Though born in France, the modern micrometer was raised in America.

### **Micrometers for Plate Thickness Measurements**

Micrometers quickly became essential to the American industrial market. Until now, manufacturers and their customers had relied on their own unique gages for measurement of brass plate thickness, leading to disagreements and inconsistency.

Samuel Wilmot, chief inspector of Bridgeport Brass Plate Company, created six prototypes based on a tabletop micrometer design produced in New York. Wilmot presented these trial gages to B&S Co., suggesting they market the design for general use.

While the prototype was similar in both principle and appearance to a modern micrometer, it complicated the reading of dimensions. Requiring the user to interpret measurements based on the meeting point of the lines, the device was subjective and ultimately unsuccessful.

Having analyzed their renderings of the Palmer System, Brown and Sharpe now decided to add both a mechanism to hold spindle threads as well as a spindle clamp. In 1868 they introduced their compact, pocket-sized micrometer, which would be available on the market the following year.

### **Micrometers for All Applications**

Nearly a decade after Brown and Sharpe's micrometer's debut, the device had become a standard fixture for machine shops. In 1877 after years of development, B&S Co. introduced a new 11 inch outside micrometer, which was accurate to 0.001in or 0.0254mm.

In November of the same year, the inaugural publication of *American Machinists* featured an advertisement from Victor Machine Co. for a new micrometer made in America. As no advertisements had been placed by B&S Co., it seemed the two companies had designed their micrometers independently yet almost simultaneously.

During this period, the sewing machine had become increasingly vital to industrial development, and the micrometer was essential to the manufacturing of its components. As such, both B&S Co. and Victor Machine Co. ensured their micrometers were widely available. With the rise of industrial America well underway, micrometers now played a vital role in product quality for machine shops everywhere.

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