



# Early History of the Inclination Balance

## Part 2

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FIG 14. Paper scale made by Louis Schopper of Leipzig, c1900. Sold by F.Leunig & Co. of London.

### EULER'S PRECISE THEORY

L.Euler (1707 - 1783), the great mathematician and physicist, a native of Basel, was the first to state the 'theory of the balance' in precise mathematical terms. For many years, he was a member of the Imperial Scientific Academy of St.Petersburg. In his dissertation 'De Bilancibus' (Ref.15) of 1738 (published in 1747), Euler explains the static fundamentals of the lever balance and develops the dynamics of the swinging beam with three axes. From this, he defines the essential quantities of the balance. At the same time, he deduces that the angle of deflection is a function of a small mass added to one of the pans; the tangent of this angle is related directly to the active force of weight. With his discourse, Euler not only defines the theory of the equal-armed balance with three axes, which was known at that time in practice, he also gives, by implication, the basic theory of the inclination balance.

### KUHN'S NEW AND MORE PERFECT BALANCE

H.Kuhn (1690 - 1769), professor of mathematics, was a founder-member of the Philosophical Society of Danzig, which had been established in 1742. In the same year that Euler's work was published, 1747, Kuhn published a comprehensive dissertation about "A new and more Perfect species of Balance" (Ref.16).It was a subject he had lectured on, to society members, some years earlier. Using trigonometric laws, Kuhn attained, more or less, the same results as Euler, in particular, the fundamental theory of the lever balance when the beam is inclined - it is possible that there was some communication between the Societies of St.Petersburg and Danzig, those towns being relatively close.

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**Abstract**

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