Projection Indicators

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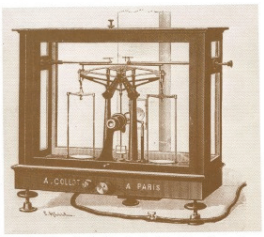

FIG 1.

The first person to use optical projection to indicate deflection from the zero position of the pointer (i.e. the inclination of the beam) was A.Collot Jnr (1827-1900) in Paris, as early as 1891. In this early stage the light beam was produced by a gaslight burner. The gas pipe leading to the balance can be seen in Fig 1, and the burner is shown in Fig 3, item E. This system was reported in the scientific journal 'Comptes Rendus' 112 (1891 pp 99-101), but at this stage, the balance had not yet got air-damping.

Collot's projection system is shown in Fig 3, as published by himself, in the journal 'Bulletin de la Société Chimique de Paris' (1891 pp 98-100). The gaslight E was behind the case of the balance, and the light, after passing through an aperture, was collected by an optical convex lens D. It passed through a little glass plate which was fitted into a rectangular frame near the end of the pointer. In the middle of this glass plate a fine line was marked. When the balance beam was swinging, the optical image of this line was projected to the microscope B, in which a micro-scale was fixed. In this way, the line of the pointer was swinging from left to right on the micro-scale. This image was magnified by lens F and could be seen easily on a translucent ground glass screen at the front of the microscope.* Collot produced a good number of balances with his optical projection system, and one of these instruments was shown at the International World Exposition in Paris in 1900.

In 1910, Erich Sartorius (1876-1947) of Goettingen, son of the founder of the firm, Florenz Sartorius (1846-1925), obtained German patent No.238891

** It should be noted that optical projection had already been used in electrical measurement apparatus.*

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Author	Jenemann, H.R.
Title	**Projection Indicators**
In	Equilibrium, 4 (1985), pp. 836-837
Size	2 pp., ill., 20.8 x 27.8 cm
Publisher	ISASC International Society of Antique Scale Collectors
Place	Chicago **Year** **1985**
ISBN ISSN	0893-2883
Abstract	
Remarks	