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## *Tavernier-Gravet Slide Rules: a Chronology of Cited Examples*

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### **Introduction**

This article is offered as a contribution toward the evolving understanding of Tavernier-Gravet (T-G) and related slide rules. It calls attention to eight key references and lists the T-G rules that are cited in these references.

### **Background**

Etienne Lenoir was a renowned French instrument maker who, among other things, was entrusted with the making of the first prototype standard meter in 1793 and the first official standard meter in 1799. When he died in 1832, the name of the firm became Gravet-Lenoir and later Tavernier-Gravet. [1, 2, 3]

### **Listing**

The following list indicates briefly the slide rules that

are mentioned in eight key references [1, 2, 4, 5, 6, 7, 8, 9]. The rules are listed in chronological order. Further details regarding these rules should be sought in the cited references.

### **Chronology**

**1821** “Lenoir makes the first of his copper rules, 35 cm long.” [1]

**1829** “The Lenoir-Gravet rule dates from 1829; it was the first rule with a sliding tongue” (réglette in French). [2]

This statement contradicts the assumption that the firm became Lenoir-Gravet (or Gravet-Lenoir) after Lenoir’s death in 1832. It also seems to forget that rules with sliding tongues existed long before Lenoir made

them; perhaps it should be read: “it was the first French rule with a sliding tongue”.

**1851** Amédée Mannheim, aged 20, improves the Lenoir rule by introducing a new scale layout and re-inventing the runner. “He did not want to benefit from his invention - at that time the patent illness was not rife yet -... and he gave his rule, without any compensation, to a Parisian precision instrument maker, Tavernier-Gravet.” [2]

**1869** “Règle ordinaire”, ordinary rule without runner made by Gravet et Lenoir. Exists in two sizes, 13 cm and 26 cm. The ordinary rule’s main features are the A—B and B—D front scales and the S, T, and L scales at the back of the slide. [7]

**1869** 51 cm slide rule with runner, made by Gravet. The main features are the A—B and C—D front scales and the S, L, and T scales at the back of the slide. This layout will later characterize the “Mannheim” rule but no connection with Mannheim is made by the author. [7]

**1869** “Mr. Mannheim has had a new very clever rule made”. It is a rule with segmented scales (“échelles repliées”); exists in 13 cm and 26 cm versions. Though no mention of Gravet et Lenoir is made in the paragraph, they were most certainly the manufacturer. [7]

**1869** “Règle à biseau, modifiée par Mannheim”, fully described in [9], made by Tavernier-Gravet, Rue de Babylone Nr 39 Paris, costs 10 francs. T-G also supplies the following models:

ordinary rule, 26 cm .....	6 fr
beveled ordinary rule .....	7 fr
rule with segmented scales, 13 cm .....	6 fr
rule with segmented scales, 26 cm .....	15 fr
36 cm rule .....	25 fr
50 cm rule .....	50 fr
demonstration rule, 2 meter long .....	200 fr

**1873** Colonel Mannheim cylindrical rule, made by Lenoir. Illustrated in [5]. Donated to the Musée National de Techniques (MNT) by Colonel Mannheim himself in 1873. In the same catalog are mentioned two more Mannheim cylindrical rules, one in cardboard and one in wood (this latter illustrated in [6]) but without indication of who made them.

**1878** Tavernier-Gravet boxwood rules, 25 cm, 35 cm, and 50 cm. Mentioned in [5]. Donated to the MNT by Mr. Tavernier-Gravet in 1878.

**1878** Péraux rule with two slides, boxwood, made by Tavernier-Gravet. Illustrated in [6], “golden medals 1878 and 1888” (curiously dated 1860 in the catalog).

**1882** Cherepashinskii, a Russian professor at the Moscow Polytechnic, designed a rule where the figures 1 of the A and B scales are placed in the middle of the rule. “He designed the rule in 1882 and had the firm Tavernier-Gravet in Paris construct one instrument.” [1]

**1883** Lenoir ivory rule, 35 cm. Illustrated in [5] & [6]. Entered in the museum collection in 1883, but is certainly an earlier model.

**1885** Péraux rule with two slides, 12.5 cm, made by Tavernier-Gravet. Mentioned in [5]. Donated to the museum by Mr. Péraux in 1885.

**1894** “The Béghin rule was launched in 1894 by the Tavernier-Gravet company.” [2]

**1899** Colonel Mannheim rule in celluloid, made by Tavernier-Gravet, 50 cm, with square scale (échelle des carrés). Mentioned in [5]. Donated to the museum by Mr. Tavernier-Gravet in 1899.

**1904** The next 15 rules were donated to the MNT this year by Madame Tavernier-Gravet. They are all mentioned in [5].

Two Béghin rules, one in boxwood and one in celluloid, made by Tavernier-Gravet, 25 cm and 35 cm, with turned scale (échelle retournée).

Béghin rule in celluloid, made by Tavernier-Gravet, 25 cm, with time-table scale (échelle horaire).

Bosromier rule for the tacheometre, trigonometric scales graduated in decimal degrees, made by Tavernier-Gravet. Goulhier rule for the clinometer, made by Tavernier-Gravet.

Goulhier rule for topography, with centesimal graduation, made by Tavernier-Gravet.

Lallemand rule in boxwood, made by Tavernier-Gravet, 50 cm, with segmented scale.

Colonel Mannheim rules in boxwood, made by Tavernier-Gravet, 13 cm and 26 cm, with folded scales (échelles repliées).

Colonel Mannheim rules in boxwood, made by Tavernier-Gravet, 21 cm, 26 cm, and 50 cm, with square scale (“échelle des carrés”).

Moinot rule for tacheometric calculations, with centesimal graduation, made by Tavernier-Gravet.

Montrichard rule, volume calculations of timber (“cubage des arbres”) made by Tavernier-Gravet.

Péraux rules with 2 slides, in boxwood, 12.5 cm, 25 cm, and 50 cm, made by Tavernier-Gravet.

Saint-Chamond blast furnaces rule, made by Tavernier-Gravet. “To determine the speeds, weights, sizes of projectiles, and thicknesses of perforated plates.”

Sanguet rule for the tacheometre, in boxwood, trigonometric scales graduated in decimal degrees, made by Tavernier-Gravet.

Tavernier-Gravet rule in celluloid, 35 cm.

Tschérépaschinsky rules in boxwood, made by Tavernier-Gravet, 13 cm and 26 cm.

**1938** Meinrath slide rule by Tavernier: “the S scale starts at 5°44’”. There are no further details [8].

**1950** Aviation “Recently created...” [2]

**1950** Barrière rule. Main feature is the use of segmented scales and a peculiar scales layout. [2]

**1950** Béghin rule. A. Béghin was a professor at the “Ecole des Arts et Métiers” in Lille. [2]

**1950** Béghin-De Catalano rule. “Especially developed for navigation calculations, ...gives the sinus of angles between 0°35’ and 90°, as well as the tangent of angles be-

tween  $0^{\circ}35'$  and  $84^{\circ}5'$ , whereas ordinary rules give tangent only up to  $45^{\circ}$ ." [2]

**1950** Béghin-Faure rule. Commercial rule. "includes many gauge marks, ...this rule has no trigonometric scales, ...but the back of the slide comprises three log-log scales facilitating calculations of composed interests, annuities, etc." A scale allows calculations with shillings and pence. [2]

**1950** Darmstadt rule. [2]

**1950** Electro rule. Same as Mannheim, plus two Log-Log scales on the body, one inverted scale on the slide, dynamo and volt scales in the well,  $\cos \phi$  scale on the lower side. [2]

**1950** Mannheim rule. A French manual referenced in [2] gives interesting information about some variants of the Mannheim rule (not necessarily the TG ones).

- The S and T scales are sometimes expressed in decimal degrees (one right angle equals 100 decimal degrees or "grades" in French).
- Some Mannheim rules have no S, T, and L scales on the back of the slide.
- The well sometimes continues the cm scale of the upper edge.
- "There exist also Mannheim rules with a cube scale at the lower part of the body or an inverted scale in the middle of the back of the slide."
- 1950 Physicien rule from M. Ginat.

"This rule, having a modulus of 25 cm, gives the same precision as a rule having a 50 cm modulus, ...the big advantage of this rule is the use of segmented scales which were invented by M. Lallemand." [2]

**1950** Pien rule. "Recently created, used in the milk industry." [2]

**1950** Radio rule from M. Fromy. Allows the solving of the Thomson formula, the Nagaoka formula, conversions of wave lengths to frequencies, etc. [2]

**1950** Sanguet rule. "... is nothing else than a Mannheim rule, especially adapted to the needs of surveyors and topographers." Trigonometric scales for decimal degrees. [2]

**1950** Rietz rule. [2]

**1952** Commercial rule (règle commerciale). Illustrated in an advertisement for "Tavernier-Gravet 24, Rue Héricart-Paris-XVe" found in [4].

**1952** Darmstadt rule. Illustrated in an advertisement for "Tavernier-Gravet 24, Rue Héricart-Paris-XVe" found in [4].

**1952** Electro rule (règle d'électricien). Illustrated in an advertisement for "Tavernier-Gravet 24, Rue Héricart-Paris-XVe" found in [4].

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