11. Collecting… gauge marks!

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Abstract: There exitsts a huge number of gauge points on slide rules. This article describes many of them.

Key words: gauge points.

Foreword

Some two or three years ago, while I was studying my recently purchased Albert Nestler N°40, I realised I knew very little on the numerous gauge marks one can find on slide rules. This prompted me to do the following:

1. examine all my slide rules and make a list of their gauge marks;
2. scrutinise all the instruction leaflets and manuals I could lay hands on;
3. sort out the gathered information;
4. write a compendium, explaining and documenting all gauge marks I would be able to find.

I naively thought this latest would be accomplished very soon… I have to admit I was wrong. After years of collecting information, a lot of the marks are still a mystery but somehow, it's more fun!

Definition

I had, paradoxically, already collected a lot of information before I asked myself the important question: "what are the criteria that should be used to decide whether a mark is to be considered as a gauge or not". I came up with following definition:

"A gauge mark is either a supplementary stroke added to the normal graduation, or a normal stroke highlighted by a symbol or any other mean".

This definition implies that even the stroke "1" can be considered as a gauge mark if there is something particular highlighting it.

Debut

The first users of slide rules must have "instinctively" marked the constants they frequently needed. I believe that this incited very soon the makers to include the scribing of the marks during the manufacturing process, maybe at the request of their customers.

The earliest gauge marks I have spotted are the WG, AG and MB marks on an instrument made by Everard, in the end of the 17th century [1].

Usefulness

If it is true that gauge marks facilitate calculations, they are not indispensable. When, for instance, π is not present on a scale, one can easily adopt the value $\frac{22}{7}$ or simply extrapolate its position between 3.1 and 3.15. Besides, when one has to perform many calculations involving the same constant, he can simply register its position with a pencil and erase it when he has finished.
Some slide rule manufacturers made a vast use of gauge points whereas others seemingly hated them. Burns Snodgrass, manufacturer or the Unique series, belongs to this latest group: "The inclusion of many gauge points in a slide rule is to be deprecated. The only one we think deserves its place is π and possibly $\frac{\pi}{4}$"[2].

Accuracy

The mark's positioning on the scales depends not only on the quality of the manufacturing but also on other factors such as for instance:

- the precision adopted to calculate the value;
- the alloy taken into account, in the case of specific weights;
- the standards taken into account;
- etc…

Consequently, points bearing the same symbol can have the same use but different values.

Reciprocal value

In a chain of calculations, dividing by a reciprocal value of a factor - instead of multiplying by its integer value - can save "one" movement of the slide. Many gauge points use that trick and are in fact reciprocal values of more common constants (specific weights for instance).

Special sets of marks

Depending on their purpose, some gauge points can be assembled into sets:

- commercial sets: conversions of units, conversions of currencies, special quantities such as 12 or 144 etc…;
- electrical sets: resistivities, power conversions, weight of wires etc…;
- angular sets: facilitating conversions of units and various trigonometric calculations;
- chemical sets;
- etc…

Coupled marks

Gauge marks are sometimes scribed at apparently illogical values. Those points need in fact to be used in combination with another similar point in order to form a table. I call them "coupled gauge marks"; they are often used for unit conversions. The gauges indicated at the back of the rules are very often coupled marks as well.

Registering the marks

Registering the gauge marks with strokes identical to the rest of the scale strokes is of course not very practical. Hereafter a non-exhaustive list of the methods used to highlight the gauges:

- longer stroke;
- floating stroke, i.e. not touching the scale line;
- indication of the value;
- symbol or abbreviation;
- supplementary mark such as "V" or "X";
- thick dot;
- small circle or triangle;
- arrow,
- brass centre pin;
- etc…

Compendium

The compendium I am writing (in French, my mother tongue) comprises:

- an introduction, with the same general information which constitutes the body of this article;
- an index of all abbreviations and symbols with cross-references to their respective gauge marks;
- a list of the gauge marks.

  Each article of the list is made up in the same way:

  - up to four digits of the value, without decimal point, the last digit being rounded off;
  - the decimal value and the formula from which it derives;
  - all the different abbreviations and symbols found for that gauge point;
  - a section with general comments (optional);
  - extracts from manuals mention-ning the gauge point (optional);

- a computation using the gauge point (optional);

Example:
1745

Valeur décimale: 0,017 453 2...*rd*

$= \frac{\pi}{180}$ *radian*

= 1°

Désignations: ρ

ρ°

V

Repère angulaire permettant de convertir des *degrés* en *radians*.

Voir aussi article 573.

Traces bibliographiques.

Les angles n'excédant pas 5,5°
«...se confondent pratiquement, lorsqu'ils sont exprimés en radians, avec leurs sinus et leurs tangentes: On peut écrire sin α = tg α = α avec une erreur qui est négligeable relativement au degré de précision propre à la règle à calcul.

Par conséquent, si l'on désire avoir le sinus ou la tangente d'un tel "petit angle" il suffit de convertir celui-ci en radians, la valeur ainsi obtenue étant non seulement celle de l'angle mais aussi celle de son sinus ou celle de sa tangente. On se rappellera à cet effet que pour passer des degrés aux radians... ...on applique à la valeur en degrés le facteur de conversion π/180 = 0,1745. (Ce facteur important est repéré sur la règle par le signe "ρ").» [3]

- name and model of a rule bearing that point.

Exemple de calcul.

«On veut avoir sin 3° (ou, ce qui revient au même à notre degré de précision, tg 3°).

On a: 3 degrés $= \frac{3{,}14... \times 3}{180}$ radians ou, plus rapidement, = ρ x 3 radians; effectuant cette opération sur la règle on trouve 0,0524. Donc on peut écrire 3 degrés = 0,0524 radian; et donc aussi sin 3° = tg 3° = 0,0524» [3]

Exemple de règle portant ce repère.

Marque: UTO

Modèle: 601

Position: échelles de base de la règle et de la réglette

Désignation: ρ

[1] Gerard L'E Turner,
Scientific Instruments 1500-1900 An Intoduction,
Philip Wilson Publischers, 1998.
ISBN 0 85667 491 5.

[2] Burns Snodgrass, Teach yourself the slide rule,
The English Universities Press LTD, London EC4, 1955, Impression 1967.

[3] J. Carly, Manuel pour l'emploi de la règle à calcul,
A.W.Faber-Castell, Stein bei Nürnberg,
264, 1/700fr.

Simplified list

Of course the list hereafter is not exhaustive, it simply gives all the marks I have been able to find on my slide rules (a little more than 400 "different" models, all from the 20th century). A small minority of the marks was found in manuals, books and instruction leaflets.
I have also examined almost all the pictures from the excellent CD published by Herman van Herwijnen and found more than 300 marks unknown on my rules. They are not

listed hereafter, as I have not had the time to go through them yet.
One more remark: the precision *up to four digits* is most of the time not necessary; it simply allows me to differentiate the gauges more easily.

Mark	**Meaning**
1	coupled mark for many different conversions
1	100.01 = mass of the CrO_3 molecule
1	100.09 mass of the $CaCO_3$ molecule
101	1.01 = 1 + 1%
101	1.01 reminds graduations are 0.01 apart
101	$\log_e$ 1.01005 = 0.01
1013	1.0125 = 1 + 1.25%
1015	1.015 = 1 + 1.5%
1016	1016.04 *kg* = 1 *long ton*
1018	1.0175 = 1 + 1.75%
1019	coupled mark for *yard/metre* conversions
1019	101.94 = mass of the Al_2O_3 molecule
102	1.02 = 1 + 2%
1023	1.0225 = 1 + 2.25%
1025	1.025 = 1 + 2.5%
1028	1.0275 = 1 + 2.75 %
103	1.03 = 1 + 3%
1033	1.0325 = 1 + 3.25 %
1035	1.035 = 1 + 3.5%
1038	1.0375 = 1 + 3.75%
104	1.04 = 1 + 4%
104.2	104.2 = mass of the Cr_2 molecule
1043	1.0425 = 1 + 4.25%
1045	1.045 = 1 + 4.5%
1048	1.0475 = 1 + 4.75%
105	1.05 = 1 + 5%
105	105 %
1053	1.0525 = 1 + 5.25%
1055	1.055 = 1 + 5.5%
1055	105.5%
1058	1.0575 = 1 + 5.75%
106	1.06 = 1 + 6%
1063	1.0625 = 1 + 6.25%
1065	1.065 = 1 + 6.5%
1066	coupled mark for *Imperial gallon* conversions
1068	1.0675 = 1 + 6.75%
107	1.07 = 1 + 7%
1073	1.0725 = 1 + 7.25%
1075	1.075 = 1 + 7.5%
1078	1.0775 = 1 + 7.75%
1079	107.88 = mass of the Ag atom
108	1.08 = 1 + 8%
1083	1.0825 = 1 + 8.25%
1085	1.085 = 1 + 8.5%
1088	1.0875 = 1 + 8.75%
109	1.09 = 1 + 9%
1092	**???**
1093	1.0925 = 1 + 9.25%
1094	1.0936 = $\frac{1}{0{,}9144}$ (0.9144 *metre* = 1 *yard*)
1094	0.109375 = $\frac{7}{64}$
1095	1.095 = 1 + 9.5%
1098	1.0975 = 1 + 9.75%
1099	109.86 = mass of the Mn_2 molecule
11	1.1 = 1 + 10%
11	110% 110 *minutes* = 1 *hour* 50 *minutes*
1105	$\log_e$ 1.10517...= 0.1
1107	1.1073 = $\log_8 10$
111	111%
1112	**???**
1117	111.7 = mass of the Fe_2 molecule

1117 $2.738^{1,117} = 3{,}08$

1124 $0.11236 = \frac{1}{8{,}9}$

(8.9 *kg/dm³* = specific weight of copper)

1128 $1.1284 = \sqrt{\frac{4}{\pi}}$

1133 1132.67 *m³* = 1 *ocean ton*

1137 1.1365 *litres* = 1 *British quart*

1145 $0.000\ 114\ 47 = \frac{1}{78 \times 112}$

(78 *cm* x 112 *cm* = paper size)

1146 **???**

115 115%

115 coupled mark to find the golden number

116 116.01 = mass of the CrO_4 molecule

1176 117.56 *Austrian Crown* = 100 *Deutsch Mark*

1182 sin 1.18189° = 0.020 626 5

(206 264.8 *seconds* = 1 *radian*)

1187 118.7 = mass of the Sn atom

1196 $1.196 = \frac{1}{(0.9144)^2}$

(0.9144 *metre* = 1 *yard*)

1196 $1.196 = \sqrt{\frac{40}{\pi * 8.9}}$

(8.9 *kg/dm³* = specific weight of copper)

12 one dozen

120%

120 *minutes* = 2 *hours*

1201 12.01 = mass of the C atom

1215 **???**

1217 121.65 mass of the CuCNS molecule

122 coupled mark for *km* conversions

123 **???**

1235 123.46 *French Franc* = 100 *Deutsch Mark*

125 125%

0.125 = 1/8

1269 126.92 = mass of the J atom

1271 127.14 = mass of the Cu_2 molecule

1273 $1.273 = 4/\pi$

1275 **???**

1279 $1.279 = \sqrt{\frac{40}{\pi * 7.78}}$

(7.78 *kg/dm³* = specific weight of steel)

128 coupled mark for *US gallon* conversions

13 130%

130 *minutes* = 2 *hours* 10 *minutes*

1333 1.333 = 4/3

1339 133.9 mass of the AgCN molecule

134 $1.34 = \frac{1}{0.746}$

(0.746 *kilowatt* = 1 *British horsepower*)

135 135%

1355 $\sqrt{\frac{4}{\pi * 0.693}}$ **???**

136 $1.36 = \frac{1}{0.735\ 75}$

(0.73575 *kilowatt* = 1 *metric horsepower*)

1361 136.14 = mass of the $CaSO_4$ molecule

1374 137.36 = mass of the Ba atom

1382 $1.382 = \sqrt{\frac{6}{\pi}}$

1386 138.55 = mass of the $KClO_4$ molecule

14 140%

140 *minutes* = 2 *hours* 20 *minutes*

1401 14.01 = mass of the N atom

1406 0.140 625 = 9/64

1413 **???**

1414 $1.414 = \sqrt{2}$

142 141.96 = mass of the P_2O_5 molecule

142.05 = mass of the Na_2SO_4 molecule

1429 $0.000\ 142\ 857... = \frac{1}{70 \times 100}$

(70 *cm* x 100 *cm* = paper size)

143 coupled mark for *feet* conversions

1433 143.34 = mass of the AgCl molecule

144 1 gross = 12 dozens

145 145%

1476 147.64 = mass of the $SrCO_3$ molecule

1481 $0.1481 = \sqrt{\frac{0.017\ 22 \cdot 4}{\pi}}$ (resistance in a copper wire, whose resistivity at 15°*C* is 0.01722 *Ωmm²/m*)

1493 $0.1493 = \sqrt{\frac{0.0175 \cdot 4}{\pi}}$ resistance in a copper wire whose resistivity at 20°*C* is 0.0175 *Ωmm²/m*

1495 $0.1495 = \sqrt{\frac{0.01755 \cdot 4}{\pi}}$ resistance in a copper wire whose resistivity at 20°*C* is 0.01755 *Ωmm²/m*

1498 149.82 = mass of the As_2 molecule

15 150%

150 *minutes* = 2 *hours* 30 *minutes*

1507 150.7 = mass of the Sn O_2 molecule

1508 $1.508 = \sqrt{\frac{4}{\pi * 0.56}}$

(0.56 *kg/dm³* = specific weight of fir wood)

152 152.02 = mass of the Cr_2O_3 molecule

1525 **???**

153 coupled mark for *statute mile* conversions

1538 $0.000\ 153\ 846... = \frac{1}{65 \times 100}$

(65 *cm* x 100 *cm* = paper size)

155 155%

155 $0.155 = \frac{1}{2{,}54^2}$

(2.54 *cm* = 1 *inch*)

1563 0.015625 = 1/64

0.15625= 5/32

1571 $1.571 = \pi/2$

0.01571 *radian* = 1 *decimal degree* = $\pi/200$ *radian*

159 0.159 *m³* = 1 *petrol barrel*

1597 159.7 = mass of the Fe_2O_3 molecule

16 16 = mass of the O atom

16 160%

1609 1.609 *kilometre* = 1 *statute mile*

1639 16.387 *cm³* = 1 *cubic inch*

Pud **???**

1648 164.8 = mass of the Mn_3 molecule

165 165%

165 coupled mark for *kilogram* conversions

1667 100% + 2/3

m/s **???**

17 170%

1703 17.03 = mass of the NH_3 molecule

1719 0.171875 = 11/64

1732 $1.732 = \sqrt{3}$

1736 $0.0001736 = \frac{1}{64 \text{ x } 90}$

(64 *cm* x 90 *cm* =paper size)

1738 0.01738 *Ωmm²/m* = resistivity of copper at 15°*C*

1743 174.25 = mass of the K_2SO_4 molecule

1745 0.0174532 *rd* = $\frac{\pi}{180}$ *radian* = 1°

175 175%

175 0.0175 $\Omega mm^2/m$ = resistivity of copper at 20°*C*

176 coupled mark for *nautical mile* conversions

1762 **???**

1782 $0.000178189 = \frac{1}{61 \text{ x } 92}$

(61 *cm* x 92 *cm* = paper size)

1785 0.01785 $\Omega mm^2/m$ = resistivity of copper at 20°*C*

18 180%

180 *minutes* = 3 *hours*

1804 18.04 = mass of the NH_4 molecule

1829 1.829 *metres* = 1 *fathom*

1833 $0.000183284 = \frac{1}{62 \text{ x } 88}$

(62 *cm* x 88 *cm* = paper size)

1837 183.69 = mass of the $SrSO_4$ molecule

185 185%

1852 1.852 *km* = 1 *international nautical mile*

1853 1.853 *km* = 1 *British nautical mile*

???

186 coupled mark to find the golden number

1875 0.1875 = 3/16

1878 187.8 = mass of the AgBr molecule

19 19 = mass of the F atom

19 190%

1905 coupled mark for *US gallon* conversions

1906 **???**

191 $1.90985 = \frac{6}{\pi}$

1922 $0.192156 = \sqrt{\frac{4 * 0.029}{\pi}}$

(0.029 $\Omega mm^2/m$ = resistivity of aluminium at 20°*C*)

195 19.5° **???**

195 195%

1952 195.23 mass of the Pt atom

1968 $0.019684 = \frac{1}{50.8023...}$

1 *British hundredweight*

= 50.8023 *kg*

197 sinus 1.97° = 0.034377

(3437.7 *minutes* = 1 *radian*)

1974 197.37 = mass of the $BaCO_3$ molecule

2 20%

2005 currency conversions to *Austrian Shilling*

2006 200.61 = mass of the Hg atom

202 2.02 reminds graduations are 0.02 apart

2063 $206264.8'' = \frac{180 \times 60 \times 60''}{\pi}$

= 1 *radian*

2072 207.21 = mass of the Pb atom

209 209 = mass of the Bi molecule

21 210 *minutes* = 3 *hours* 30 *minutes*

212 212° *F* = 100° *C*

2158 215.76 = mass of the Ag_2 molecule

218 $2.17965 = \sqrt{\frac{40}{\pi * 2.68}}$

(2.68 kg/dm^3 = specific weight of aluminium)

2188 0.21875 = 7/32

22 0,219 975… = $\frac{1}{4{,}545\ 96}$ (1 *Imperial gallon* = 4.546 *litres*)

22 220 *Volt*

2203 $\log_e 22026.4... = 10$

2205 $2.20462 = \frac{1}{0{,}453\ 592...}$

1 *Imperial pound* = 0.453 592 *kg*

???

2215 coupled mark for *US fluid ounce* conversions

2217 0.221 690 = $\frac{1}{4.5108}$

1 *cicero* = 4.5108 *mm*

2226 222.6 = mass of the $Mg_2P_2O_7$ molecule

2232 223.26 = mass of the PbO molecule

2241 22.416 *litres/mole*

225 2.25 = 2 $\frac{1}{4}$

2288 228.79 = mass of the Mn_3O_4 molecule

23 23 = mass of the Na atom

2303 2.30258 = Log_e 10

2327 232.67 = mass of the HgS molecule

2334 233.42 = mass of the $BaSO_4$ molecule

2348 234.8 = mass of the AgI molecule

236 236.07 = mass of the HgCl molecule

2382 23.821 $ = 100 *Deutsch Mark*

2393 239.27 = mass of the PbS molecule

24 24 *hours*

240 *minutes* = 4 *hours*

241 coupled mark for *inch* and *ounce* conversions

243 24.32 = mass of the Mg atom

2435 243.52 = mass of the Sb_2 molecule

246 246 = mass of the As_2S_3 molecule

2478 247.82 = mass of the Ag_2S molecule

25 25%

$2^1/_2$

2534 253.37 = mass of the $BaCrO_4$ molecule

2538 253.84 = mass of the I_2 molecule

254 25.4 *mm* = 1 *inch*

2602 26.02 = mass of the CN molecule

2605 260.46 = mass of the BiOCl molecule

2642 0.2642 = $\frac{1}{3.785}$ (1 *US gallon* = 3.785 *litres*)

266 **???**

268 26.8 *Ampere hour/mole*

= 4.45 x 6.022

2697 26.97 = mass of the Al atom

27 2.7 *kg/dm³* = specific weight of aluminium

27 270 *minutes* = 4.5 *hours*

2718 2.71828 = e

275 2.75 = 2 $\frac{3}{4}$

278 currency conversions to *Netherlands guilder*

279 currency conversions to *Deutsch Mark*

2805 **???**

2806 28.06 = mass of the Si atom

2819 281.912 litres = 1 *US quarter*

2825 **???**

2832 28.3168 *litres* = 1 *cubic foot*

2831.68 *litres* = 1 *register ton*

2835 28.35 *grams* = 1 *ounce avoirdupois*

2835 coupled mark for *US gallon* conversions

2838 283.82 = mass of the $Mn_2P_2O_7$ molecule

2847 sinus verse 2.847° = 0.001

(2.847° = decimal degrees)

287 28.7 = $\frac{1}{2 \cdot 0.01742}$

(0.01742 *Wmm²/m* = resistivity of copper)

29 0.029 *Wmm²/m* = resistivity of aluminium

29 coupled mark for *feet* conversions

2908 290.8 *litre* = 1 *quarter*

2909 290.94 *litre* = 1 *British quarter*

3 3%

300 *minutes* = 5 *hours*

3001 30.01 = mass of the NO molecule

301 $0.30103 = \log_{10} 2$

3033 303.27 = mass of the $PbSO_4$ molecule

304 303.98 = mass of the $BiPO_4$ molecule

3048 0.3048 *metre* = 1 *foot*

3049 $3.049 = \frac{4}{\pi} \times 2.395$

($2.395 \cdot 10^{-5}$ Ω*inch² / yard* = resistivity of copper)

305 **???**

3098 30.98 = mass of the P atom

3101 310.12 = mass of the As_2S_5 molecule

3105 310.46 = mass of the $Mg_2As_2O_7$ molecule

3125 $0.03125 = \frac{1}{32}$

$0.3125 = \frac{5}{16}$

3142 3.141 59 = π

3162 $3.162 = \sqrt{10}$

3183 $0.318\,309 = \frac{1}{p}$

32 32° *F* = 0° *C*

32 currency conversions to £

3206 32.06 = mass of the S atom

3219 32.185 *feet/sec²* = g = gravitational acceleration

3232 323.22 = mass of the $PbCrO_4$ molecule

325 $3.25 = 3\ \frac{1}{4}$

3281 $3.280\,84 = \frac{1}{0.3048}$

332 **???**

3333 $0.333\,333 = \frac{1}{3}$

334 $0.334\,197 = \sqrt{\frac{4}{\pi \times 11.4}}$

(11.4 *kg/dm³* = specific weight of lead)

335 currency conversions to *Swiss Franc*

3397 339.7 = mass of the Sb_2S_3 molecule

3408 34.076 = mass of the H_2S molecule

341 coupled mark for *Imperial gallon* conversions

3438 $3437.74' = \frac{180 \times 60'}{\pi} = 1$ *radian*

35 35%

35 35 *m/*Ω*mm²* = conductibility of aluminium

3524 0.035 24 *m³* = 1 *US dry bushel*

3527 0.035 27 *ounce avoirdupois* = 1 *gram*

353 **???**

3546 35.46 = mass of the Cl atom

3568 $3.568 = \sqrt{\frac{40}{\pi}}$

???

357 **???**

3592 $0.3592° \text{ K/mm Hg} = \frac{273}{760}$

36 360 *minutes* = 6 *hours*

3605 360.54 = mass of the PdI_2 molecule

3635 36.35 *litres* = 1 *British bushel* (!!! see 3637)

3635 coupled mark for *pound avoirdupois* conversions

3637 36.37 = 1 *British bushel*

3647 36.468 = mass of the HCl molecule

3679 $0.3679 = \frac{1}{2.718\,28...} = \frac{1}{e}$

375 $0.375 = \frac{3}{8}$

376 **???**

3784 $0.3784 = \sqrt{\frac{4}{\pi * 8.89}}$

(8.89 *kg/dm³* = specific weight of copper)

3785 3.785 *litres = 1 US gallon*

3789 $0.3789 = \sqrt{\frac{4}{\pi * 8.87}}$

(8.87 *kg/dm³* = specific weight of copper)

38 380 *Volt*

3812 **???**

3835 **???**

385 currency conversions to *Belgian Franc*

386 coupled mark for *pound avoirdupois* conversions

388 $0.388 = \sqrt{\frac{4}{\pi * 8.45}}$

(8.45 *kg/dm³* = specific weight of brass)

391 39.1 = mass of the K atom

3937 0.3937 *inch* = 1 *cm*

395 currency conversions to *Swedish Crown*

4 40%

4007 arc 4,00658° = 0,069 926 8…

= tg 4°

4008 40.08 = mass of the Ca atom

4025 **???**

4032 40.32 = mass of the MgO molecule

4038 403.82 = mass of the Sb_2S_5 molecule

4047 4046.85 *m²* = 1 *acre*

405 4.05 reminds graduations are 0.05 apart

405 $0.405 = \sqrt{\frac{4}{\pi * 7.76}}$

(7.76 *kg/dm³* = specific weight of iron)

409 0.409 *kg* = 1 *Russian Pound*

414 **???**

418 418 = mass of the Bi_2 molecule

4176 $0.4176 = \sqrt{\frac{4}{\pi * 7.3}}$

(7.3 *kg/dm³* = specific weight of cast-iron)

42 420 *minutes* = 7 *hours*

425 currency conversions to *French Franc*

4343 $0.4343 = \mathrm{Log}_{10}\ e$

436 coupled mark for conversions to *metre*

4375 0.4375 = 7/16

4401 44.01 = mass of the CO_2 molecule

4429 $4.429 = \sqrt{2\,g} = \sqrt{2 * 9.81}$

4441 444.05 = mass of the $(NH_4)_2Pt\ Cl_6$ molecule

4492 $0.4492 = \frac{273}{760} \times 1.2505$

(0.0012505 *kg/litre* = specific mass of nitrogen N)

45 45%

4536 0.4536 *kilogram* = 1 *pound*

45.36 *kilogram* = 1 US *hundredweight* = 1 *cental*

454 $\log_e 0{,}0000454 = -10$

454 coupled mark for *British gallon* conversions

4546 4.546 litres = 1 *British gallon*

46 45.99 = mass of the Na_2 molecule

4629 46.29 *Roubles* = 100 *Deutsch Mark*

465 coupled mark for *kilowatt* conversions

466 466 = mass of the Bi_2O_3 molecule

479 47.9 = mass of the Ti atom

48 48 *hours* = 2 *days*

480 *minutes* = 8 *hours*

4845 coupled mark for *litre* conversions

4862 486.16 = mass of the K_2PtCl_6 molecule

4864 48.64 = mass of the Mg_2 molecule

4896 4.896 £ = 100 *Deutsch Mark*

49 currency conversions to *Italian Lira*

5 50%

5013 arc 5,01273° = 0,087 488 6…

= tg 5°

508 50.80 *kilograms* = 1 *British hundredweight*

5142 514.18 = mass of the Bi_2S_3 molecule

52 52.01 = mass of the Cr atom

536 53.6 *Ampere hour/mole*

= 4.45 x 6.022 x 2

5394 53.94 = mass of the Al_2 molecule

54 $0.54 = \frac{1}{1.852}$

$0.54 = \frac{1}{1.853}$

(1 852 *metres* = 1 *international nautical mile*)

(1 853 *metres* = 1 *British nautical mile*)

54 currency conversions to *Spanish* P*eseta*

54 540 *minutes* = 9 *hours*

5475 **???**

5493 54.93 = mass of the Mn atom

55 55%

5535 **???**

554 **???**

5585 55.85 = mass of the Fe atom

5608 56.08 = mass of the CaO molecule

5625 $0.05625 = \frac{360}{6400}$

57 currency conversions to *Danish* C*rown*

5711 tg 5.71059° = 0.1

572 57.2 *m/Wmm²* = conductibility of copper

573 $57.2958° = 1\ radian = \frac{180°}{\pi}$

573 sin 0.572967° = 0.01

5739 sin 5.73917° = 0.1

58 58 *m/Wmm²* = conductibility of copper

5846 58.46 = mass of the NaCl molecule

5869 58.69 = mass of the Ni atom

5894 58.94 = mass of the Co atom

5926 59.26 *Dutch Guilder* = 100 D*eutsch Mark*

5989 arc 5,98904° = 0,104 528 4…

= sin 6°

6 60%

60 *minutes*

60 *seconds*

6 60.01 = mass of the CO_3 molecule

601 60.06 = mass of the SiO_2 molecule

6022 arc 6,022025° = 0,105 104 2…

= tg 6°

611 **???**

62 $0.62 = \sqrt{\frac{0.302 \cdot 4}{\pi}}$

(0.302 *Wmm²/m resistivity of nickel silver)*

62 61.99 = mass of the Na_2O molecule

62.01 = mass of the NO_3 molecule

6214 $0.621\ 371 = \frac{1}{1.609\ 344}$

(1.609 344 *kilometre* = 1 *statute mile*

625 0.625 = 5/8

6283 $6.283 = 2\pi$

632 coupled mark for *metric horsepower* conversions

6345 tg 6.3451 *decimal degrees* = 0.1

6357 63.57 = mass of the Cu atom

6366 636 619.77 *decimal seconds* = 1 *radian* = $\frac{200 \times 100 \times 100}{\pi}$

6377 sin 6.37685 *decimal degrees* = 0.1

6406 64.06 = mass of the SO_2 molecule

6452 6.4516 cm^2 = 1 *square inch*

65 65%

6538 65.38 = mass of the Zn atom

66 coupled mark for *nautical mile* conversions

6667 0.6667 = 2/3

6854 $0.6854 = \sqrt{\frac{4}{\pi \times 2.71}}$

(2.71 kg/dm^3 = specific weight of **???**)

687 $0.6867 = \sqrt{\frac{4}{\pi \times 2.7}}$

(2.7 kg/dm^3 = specific weight of aluminium)

688 $0.688 = \sqrt{\frac{4}{\pi \times 2.69}}$

(2.69 kg/dm^3 = specific weight of aluminium)

6964 69.64 = mass of the B_2O_3 molecule

7 70%

70 *minutes* = 1 *hour* 10 *minutes*

7075 **???**

709 70.93 = mass of the MnO molecule

711 0.711 *metre* = 1 *Russian archine*

714 **???**

7185 71.85 = mass of the FeO molecule

735 0.735 *kilowatt* = 1 *metric horsepower* = 75 *kgm* x 9.8 m/s^2

736 0.73575 *kilowatt* = 1 *metric horsepower* = 75 *kgm* x 9.81 m/s^2

7456 74.56 = mass of the KCl molecule

746 0.746 *kilowatt* = 1 *British horsepower* = $33000 \frac{foot\ pound}{min}$ x 9.81 m/s^2 =

$33000 \frac{0.3048\ m \cdot 0.4536\ kg}{60\ sec} \times 9.81 m/s^2$

747 74.69 = mass of the NiO molecule

749 coupled mark for *litre* conversions

7491 74.91 = mass of the As atom

75 75%

755 coupled mark for *statute mile* conversions

759 **???**

7606 76.06 = mass of the SiO_3 molecule

7624 **???**

7646 0.7646 m^3 = 1 *cubic yard*

77 currency conversions to *$*

7808 78.08 = mass of the CaF_2 molecule

7819 78.19 = mass of the K_2 molecule

7854 $0.7854 = \frac{\pi}{4}$

788 **???**

7956 79.56 = mass of the CuO molecule

7958 $0.07958 = \frac{1}{4\pi}$

799 79.9 = mass of the TiO_2 molecule

79.92 = mass of the Br atom

8 80%

80 *minutes* = 1 *hour* 20 *minutes*

8006 80.06 = mass of the SO_3 molecule

804 80.4 *Ampere hour/mole*

= 4.45 x 6.022 x 3

8138 81.38 = mass of the ZnO molecule

8361 0.8361 m^2 = 1 *square yard*

844 **???** (for *kilowatt* conversions)

8475 $0.008\ 475 = \frac{1}{118}$

(percentage calculations: 18%)

85 85%

85 coupled mark for *kg* conversions

8699 86.99 = mass of the MnS molecule

87 **???**

875 0.875 = 7/8

8763 87.63 = mass of the Sr atom

Help…

The triple question mark (**???**) in the list above indicates, either that I am not sure of the meaning of the gauge or that I could not find any meaning at all. I would greatly appreciate if any of the members could help me fill in the gaps and give me more information on following points (preferably with extracts from instruction manuals or leaflets, no matter the language):

8772 $0.008\,772 = \frac{1}{114}$

(percentage calculations: 14%)

8889 88.89 Swedish Crown = 100 Deutsch Mark

89 8.89 *kg/dm³* = specific weight of copper

895 $0.895 = \sqrt{\frac{4}{\pi * 1.59}}$

(1.59 kg/dm³ = specific weight of **???**)

9 9%

90%

90 minutes = 1.5 hours

???

9048 $\log_e 0.904\,837... = -0.1$

9072 907.184 *kg* = 1 *short ton*

9144 0.9144 *metre* = 1 *yard*

9206 92.06 = mass of the SiO_4 molecule

929 929.0304 *cm²* = 1 *square foot*

9318 coupled mark for *yard* conversions

9419 94.19 = mass of the K_2O molecule

9434 $0.009434 = \frac{1}{106}$

(percentage calculation: 6%)

9464 0.946 353 *litre* = 1 *US quart*

9498 94.98 = mass of the PO_4 molecule

95 9.5 %

95% coupled mark for *kilogram* conversions

953 **???**

96 **???**

9606 96.06 = mass of the SO_4 molecule

9744 97.44 = mass of the ZnS molecule

9808 98.076 = mass of the H_2SO_4 molecule

981 9.81 *m/s²* = g

gravitational acceleration

99 $\log_e 0.990\,049... = -0.01$

1092 found on A.W.FABER "CASTELL" 1/22 DISPONENT für den Kaufmann, indicated **Desj**.

1112 found on HONO 300 S.R.E. ELEKTRON 25 N°670, indicated **VE**'.

1146 found on P.I.C. RULE SLIDE R.A. V.F.0129 10". Gunner's mark. What is the theory behind it?

1215 found on A.W.FABER-CASTELL 111/48 System Dr. Winkel, indicated by an hexagon;

123 found on A.W.FABER "CASTELL" 1/22 DISPONENT für den Kaufmann, indicated **Wd**;

1275 found on A.W.FABER-CASTELL 111/48 System Dr. Winkel, indicated by a circle;

1355 found on TAVERNIER-GRAVET 13 bis REGLE BEGHIN, indicated **c ch**. Calculates the weight of a cylinder made of what?

1413 found on HONO 300 S.R.E.-ELEKTRON 25 N°670, indicated **VP**;

1525 found on B NORMA GRAFIA 190, indicated **DIN A4**. For comparisons between paper formats. Where does this value come from?

1639 found on many models. What is the meaning of the indication **Pud** found on A.W.FABER "CASTELL" DISPONENT 1/22/322.

1667 found on ARISTO AVIAT G Nr.616, indicated **m/s**. Why metre/second?

1762 found on ARISTO AVIAT G Nr.616, indicated **lb**. What is the relation with the *pound*?

1853 found on A.W.FABER "CAS-TELL" 378, indicated **A**. Being an electro modell, I doubt this gauge has anything to do with the nautical mile.

1906 found on B NORMA GRAFIA 190, indicated **DIN A1**. For comparisons between paper formats. Where does this value come from?

195 19.5° found on P.I.C. RULE SLIDE R.A. V.F.0129 10", indicated **F** on the S scale.

2205 found on NESTLER N°40, indicated by an incomprehensible abbreviation looking like **e u**.

266 found on B NORMA GRAFIA 190, indicated **p**.

2805 found on NESTLER Nr.0374 System MOISSON, indicated **L**.

2825 found on HONO 300 S.R.E.-ELEKTRON 25 N°670, indicated **VPP**;

305 found on B NORMA GRAFIA 190, indicated **DIN A5**. For comparisons between paper formats. What is the decimal value?

332 found on A.G. THORNTON P I.C. N°131, indicated **W**.

353 found on HONO 300 S.R.E.-ELEKTRON 25 N°670, indicated **VE"**;

3568 found, amongst others, on A.W.FABER-CASTELL 111/48 System Dr. Winkel, indicated by a square. Why a square?

357 found on TAVERNIER-GRAVET 13 bis REGLE BEGHIN, indicated **p f**.

376 37.6' found on P.I.C. RULE SLIDE R.A. V.F.0129 10", indicated **Y** on the S scale.

3812 found on B NORMA GRAFIA 190, indicated **DIN A2**. For comparisons between paper formats. Where does this value come from?

3835 found on A.W.FABER-CASTELL 111/48 System Dr. Winkel, indicated by an hexagon.

4025 found on A.W.FABER-CASTELL 111/48 System Dr. Winkel, indicated by a circle.

414 found on A.W.FABER "CASTELL" 1/22 DISPONENT für den Kaufmann.

5475 found on B NORMA GRAFIA 190, indicated **DIN C6**. For comparisons between paper formats. What is the decimal value?

5535 found on A.G. THORNTON P I.C. N°131, indicated **R**.

554 found on B NORMA GRAFIA 190, indicated **Konk**.

611 found on B NORMA GRAFIA 190, indicated **DIN A6**. For comparisons between paper formats. Where does this value come from?

6854 found on TAVERNIER-GRAVET 13 bis REGLE BEGHIN, indicated **c m**. Calculate the weight of a cylinder made of what?

7075 found on HONO 300 S.R.E.-ELEKTRON 25 N°670, indicated **VE'"**.

714 found on A.W.FABER "CAS-TELL" 378, indicated **N**.

759 found on JEPPESEN MODEL CR-5, indicated **FUEL LBS**.

7624 found on B NORMA GRAFIA 190, indicated **DIN A3**. For comparisons between paper formats. Where does this value come from?

788 found on A.W.FABER "CASTELL" 398, indicated **K**.

844 found on TAVERNIER-GRAVET 43 R 7-21, indicated KW. Clearly for kilowatt / horsepower

conversions but what is the rational behind it?

87 found on P.I.C. RULE SLIDE R.A. V.F.0129 10".

895 found on TAVERNIER-GRAVET 13 bis REGLE BEGHIN, indicated **c br**. Calculate the weight of a cylinder made of what?

9 found on HONO 300 S.R.E.-ELEKTRON 25 N°670, indicated **VM**.

953 found on B NORMA GRAFIA 190, indicated **DIN A0**. For comparisons between paper formats. Where does this value come from?

96 found on JEPPESEN MODEL CR-5, indicated OIL LBS.

… and more help

As stated before, I have found many other marks on the slide rules from Herman's CD. If any of the members have information, instruction leaflets or manuals for following items, please let me know. If the editors are willing to accept a second article on such a boring subject ☺, I may complete the list and write an addendum for one of the next MIRs.

Maker, model, (match number).

- Alro Militaire Rekenschijf (**0049**)
- Alro Philips Telecommunication (**0056**)
- Alro Radio NR 04 - 2220 (**0089**)
- American Blueprint Military Slide Rule (**0096**)
- Aristo Schul-Commerz Nr.0905 (**0292**)
- Aston & Mander Mk. VI (**0477**)
- B·R·L Artillery MK. 3 (**0522**)
- B·R·L R52 Janus Series (**0525**)
- B·R·L VF0129 (**0527**)
- Dalton Aviation ComputerMark 1 (**0565**)
- Marcantoni N°25R (**0592**)
- Cook London (**0638**)
- Diwa Re-Inforced Concrete N° 221 (**0757**)
- E·M·T (**0829**)
- Faber-Castell Demegraph 111/66 (**1138**)
- Felsenthal Mark VIII-C (**1200**)
- G. Felsenthal & Sons Computer Type D-4A (**1202**)
- Goble Aircraft Specialities Airlines Computer Model D (**1271**)
- Graphoplex 697(**1329**)
- Keuffel & Esser GP12 (**1513**)
- Koch, Huxold & Hannemann
- Wasserversorgung u. Entwässerung (**1551)**
- Loga Doppel-Rechenschieber (**1587**)
- Loga 30 RZh (**1594**)
- Loga 30 sT (**1595**)
- Loga Topo 6400 $A^0/_{00}$ (**1601**)
- Logomat Devis-o-Mat Nr 4206 (**1665**)
- Albert Nestler No.26 (**1853**)
- Nestler International Nr.0127 (**1915**)

- Nestler System Dr. Schäfer Nr. 0432 (**1915**)
- Norma Gambrinus 100 (**2087**)
- Pickett U.S. Military Slide Rule (**2146**)
- Reed Service Electronic Engineers (**2232**)
- Reiss (**2243**)
- Roberts (**2281**)
- Roberts (**2282**)
- SanTech Mark VIII-C Computer Model FDW-31 (**2327**)
- Sterling Pocket Metric Converter (**2389**)
- Stutchbury Makers (**2394**)
- Sun Hemmi NO.257 (**2468**)
- Calcolator (**2503**)
- P.IC 141 (**2546**)
- Warner B-1 Computer cw-2 (**2646**)
- Mk1B for 6B/404 (**2665**)
- A.W.FABER. 377 (**2725**)
- Tecnostyl (**2776**)
- Telex Anglo-Met-Converter Model MET-56 (**2792**)
- Faber-Castell Scheisstechnik 67/56b (**2793**)
- Richardson Slide Rule Model of 1917 (**2819**)
- B·R·L E.13c (**2870**)
- A.W.FABER. 374 (**2894**)
- B·H·L PG54-2 (**2908**)
- Blundell 808 Accountants (**2909**)
- B·H·L Artillery 10" Mils MK.2 (**2914**)
- Blundell Harling Super Duplex A504 (**2962**)
- A.W.Faber-Castell 57/74 System Schirdewann (**3030**)
- The Supreme (**3074**)
- Airtour Computer CRP 9 (**3090**)
- Alro Radio 04 - 2220 (**3411**)
- Mercator Calculateur d'estime type 100 (**3513**)
- Norma Gambrinus 190 (**3515**)
- Keuffel & Esser Military Slide Rule (**3671**)

Acknowledgements

I would like to thank Simon van der Salm for having me invited to write this article in the MIR. I hope it will be of some interest for fellow collectors.

2 October 2001