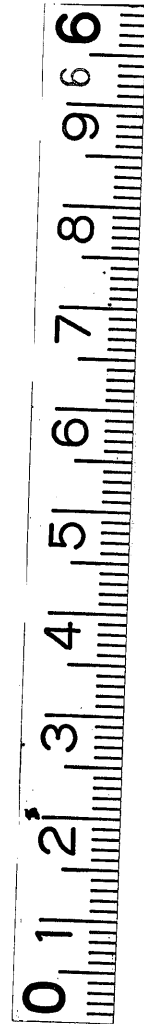


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THE
 Gentleman's and Trader's
G U I D E.
 Containing, The
 DESCRIPTION and USE
 OF
 A New - Invented
INSTRUMENT,
 For Preventing FRAUDS by
Counterfeit GOLD,

WHICH
 Gives the WEIGHT, and shews the ALLOY of that
 METAL, as well in COIN as in RINGS, JEWELS,
 and all Kinds of UTENSILS made thereof;
 WITH
 The Quantity of ADULTERATION, [if any.]

THE
INSTRUMENT
 Is neatly made in BRASS, and very easily portable in the POCKET.
 Price FIVE SHILLINGS.

*** Any Person, by sending to the AUTHORS, may have
 an INSTRUMENT made to Weigh and Prove any larger COIN
 or UTENSILS of GOLD or SILVER than THIS Instrument
 is design'd for.

BY
 W. BRADFORD, *Teacher of the Mathematicks,*
 R. DARBY, AND J. HULLS,
All of Campden, in the County of GLOUCESTER.

WORCESTER:
 Printed by H. BERROW, in *Goose-Lane.* 1754.

18



THE
Gentleman's *and* Trader's
G U I D E.



HO' we do not claim the first
Discovery of the Power whereby
this INSTRUMENT operates to
the Purposes mention'd in the
Title Page, yet we think we
may properly enough call it an
Invention, as the notable Im-
provements which have been made in late Ages
of former Discoveries in other Cases, particularly
Mr. GUNTER's Improvements in *Stereometry*,
are justly esteem'd such: For, after Lord NEPER,
Sir HENRY BRIGS, and others, had brought to
Perfection that Series of *artificial Numbers* call'd
LOGARITHMS, they remain'd useles to the com-
mon Artificer for many Years, 'till Mr. GUNTER
render'd them useful to the *Carpenter, Mason,*
A 2 *Builder,*

[4]

Builder, Gauger, and all Persons who bought or traded in such Things wherein the Knowledge of their Magnitude or Measure was necessary.

The Discovery of the Use of the **HYDROSTATICKS** is generally attributed to that famous Mathematician **ARCHIMEDES**; and, tho' improv'd by Mr. **BOYLE** and others, yet hath remain'd in a great Measure useless to the Trader in the Matter we are now treating of: But, by this Instrument, they are, in this Case, not only render'd useful, but also made plain and easy, even to the Illiterate; so that any Person, wholly unacquainted with *Hydrostatical* Principles, may, by it, readily know the *Goodness* or *Alloy* of **GOLD**, and the Quantity of its *Adulteration*; and, what particularly recommends it beyond all other *Hydrostatical* Machines heretofore made for this Purpose, is, That it is not only easily portable in the Pocket, but also saves the Trouble of working Arithmetical Proportions by Numbers in every Operation or Trial; for it shews the *Weight*, and also the *intrinsic Value*, by *Inspection* only.

There are many other Excellencies which we could enumerate of this Instrument, but those already mention'd we apprehend are sufficient.

If any Persons (unacquainted with *Hydrostatical* Principles) should doubt of the Certainty of the Performances of this Instrument, let them take a Piece of **GOLD**, of any Weight, and a Piece of any other Metal of the like Weight, and prove them both separately by this Instrument, according to the Rules laid down, and the

[5]

the Difference will so evidently appear, that it will need no further Demonstration.

Before we describe this Instrument, and shew the Method of using it, we shall first observe, That those who artfully counterfeit **GOLD** generally make Use of *Silver*, that being the fittest Metal wherewith to do it; for a Piece of Coin made with *Silver*, and near the Weight and Make of the Coin intended to be counterfeited, if made somewhat thicker in the Middle, and stamp'd with a good *Relievo*, and well gilt or plated, cannot be discover'd by weighing, or any common Experiment, without defacing it:* But let a Piece of Coin be never so artfully counterfeited, it will not stand the Test of *this* Instrument.

It is well known *Fluids* resist in Proportion to the Magnitude of the Body immers'd in them; and if two different Bodies are separately weigh'd *statically* and *hydrostatically*, their relative Gravity is thereby known: Consequently, if an unknown Quantity of *Silver* be cas'd, or gilt over, with an unknown Quantity of *Gold*, and be weigh'd *statically* and *hydrostatically*, the Weight of each Metal may separately be found to the minutest Part of a Grain according to the Weight given.

* See the *Gentleman's Magazine* for June, 1752, Page 285.



We shall now proceed, in as concise a Manner as possible, to describe this INSTRUMENT, and then give some Rules for the Use of it.

FIRST, You have a small thin Plate of Brass, which you are to lay flat upon a *level* Table or Board, with the small Center Pins fix'd in it undermost, so as they may bear upon the Edge of such Table or Board, and play as the Ballance shall require, with a small Chain and Pincers wherein to fix any Piece of Money intended to be weigh'd and prov'd, hanging over the Edge of the Table; and, *note*, There are two Pair of these Center Pins, one Pair of which (*to wit*, those mark'd with the Letter *A*) to be made Use of for weighing and proving all Pieces of GOLD not exceeding the Value of 36s. and those mark'd *B*, for all Pieces from that Sum to 72s. or 3*l.* 12s.

On each Side of the Plate are two Lines, and a whole Division of each Line is equal to the Weight or Value of *One Shilling* in GOLD, and every Subdivision to that of *Threepence*, (after the Rate of 3*l.* 18s 1d. *Halfpenny* the Ounce, according to the Standard of the Coinage at the *Mint*, which makes the GUINEA to weigh 129 Grains); and, *note*, The Lines mark'd *A* and *B*, give the Weight only, and are properly *statical*; and those mark'd *W*, are design'd to shew the *Alloy* or *Adulteration*, and are *hydrostatical*, corresponding with the *statical* Lines.

Having

Having given a Description of the INSTRUMENT, we shall proceed to give some General RULES for the Use of it.

1. **P**IECES of GOLD not exceeding 36s. are weigh'd *statically*, by the Line *A*, and prov'd *hydrostatically*, by the Line *W*, on the upper Side of the Instrument.

2. Pieces from 36s. to 72s. or 3*l.* 12s. are weigh'd and prov'd in like Manner, by the Lines *B* and *W*, on the lower Side thereof.

And note, For weighing and proving the first Kind of these Pieces, the Center Pins mark'd *A*, and, for the large Sort, those mark'd *B*, are to be made Use of: For (let it be a general Rule) when the Line *A* is used, the Center Pins mark'd *A* is made Use of; and when the Line *B* is used, the Pins mark'd *B* are also to be used.

Note also, The End of the Sliding-Piece on the Plate, toward the Chain, is to be observ'd in the Use of this Instrument.

☞ If you should have Occasion to weigh and prove a very small Piece, as, a 2s. 3d. or 4s. 6d. put the said Piece in the Pincers, with some other Piece that you have weigh'd and prov'd before, and the Weight and Alloy of such small Piece will be easily known.

Having

[8]

Having gone thus far, we shall now proceed to give some EXAMPLES of weighing and proving of COIN.

EXAMPLE the First.
Of a GUINEA.

FIRST place the Sliding Piece to 21 on the Line A, on the uppermost Side of the Plate; then lay the Instrument on a level Table or Board, having the Chain, with the Piece hanging in the Pincers, over the Edge, and let the Plate move freely on the Center Pins mark'd with the Letter A; and if there be an Equipoise, then it is of proper Weight; if not, move the Slide, as Occasion requires, backward or forward, 'till it acts in Equilibrio, and the Division, or Part of a Division, where it rests, is the true Weight.—For Instance,—Suppose it rests at 20 1-half, the Weight of it is 20s. 6d.—Then, to prove the Alloy of this Piece, place the Instrument in the former Position, having first brought the Slide back to 20 1-half in the hydrostatick Line, mark'd W, (for let it be a general Rule, that whatever Division the Slide is at in weighing on the statical Line, it must be brought back to the same on the hydrostatical Line adjoining, and also corresponding;) then take a Glass, or rather a Half-pint, of Water, and let the Piece in the Pincers, and the long Link whercon it is suspended, dip into the Water

[9]

ter till the Mark on the Link is equal with the Surface; and, if the Instrument acts in Equilibrio, as in the last Operation, or dips lower in the Water, it is Standard Gold: But if you are compell'd to bring the Slide more backward than 20 1-half in the hydrostatick Line, before it will equiponderate or dip, you may conclude the Guinea is adulterated.—And then, to find out the Quantity of Adulteration, if alloy'd with Silver, count 2s. for every Penny it wants in the hydrostatical Weight, which may be easily estimated, though the Divisions on the Instrument go lower than Three-pence; and then, if the Number of Pence the Piece is deficient in Weight hydrostatically, when doubled, exceed the Number of Shillings it weighs statically, it may be justly concluded that it is adulterated with some baser Metal.

EXAMPLE the Second.

Of a Three Pound Twelve Shilling PIECE.

PUT this Piece likewise into the Pincers, and place the Instrument on the Center Pins mark'd B, and let the Plate, as before, move freely, having first brought the Slide to 72 in the Line B, on the lower Side of the Plate, and if it then moves in Equilibrio, the Piece is of proper Weight; but if not, move the Slide till there is an Equipoise, which will be the true Weight.—And to prove the same Piece hydrostatically, bring the Slide back to the same

B

Number

Number or Division on the *hydrostatick* Line *W*, as it rested at in the *statick* Line, and put the Instrument into its proper Method for Trial in the Water, and you will find thereby the *Adulteration* of this Piece, as in the foregoing Example of a *GUINEA*: — Which two Examples may serve for Directions for weighing and trying of other Pieces of different Value.

Tho' 'tis needless, in common Practice, to have any Recourse to Numbers or Arithmetical Calculations, yet those that are curious may turn to the Table in Page 12, whereby the Quantity of *Adulteration* is known to the *hundredth* Part of a *Grain*, according to the Weight given.

A more speedy Method to find whether any Piece of GOLD be adulterated or not, without moving the Slide more than once, which may be sufficiently near the Truth in common Practice.

WHEN you have weigh'd a Piece *statically*, and found the *Weight*, bring the *Slide* to the same Number on the *hydrostatick* Line, and apply the *Fluid* as before, so that the Surface of the *Water* may be exactly at the Mark on the *long* Link whereon the *Pincers* are suspended; and if the Instrument doth not then *equiponderate*, gently lower your Hand that holds the *Fluid*, till the Instrument begins to move; and, by observing if any Part of the *Pincers* be above the Surface of the *Water*, you may very easily discover whether it be adulterated, and guess at the Quantity of *Adulteration*.

As for Instance;—If a counterfeit *Half-Guinea*, or other small Piece, be try'd, some Part of the *Pincers* will appear above *Water*, before the Instrument will act in

is *Equilibrio*.—If a counterfeit *Guinea* be try'd, great Part of the *Pincers* will appear above *Water*, before the Instrument will move.—Again,—If a counterfeit *Thirty six Shilling Piece* be try'd, the Instrument will not *equiponderate* till not only the *Pincers*, but also some small Part of the *Coin*, are above the *Surface*.—Also, If a counterfeit *Three Pound Twelve Shilling Piece* is try'd, there will more of the *Metal* appear above the *Surface* of the *Water* than there will in a counterfeit *Thirty six Shilling Piece*.

In trying *GOLD* by this last Method, observe, when the Piece and Instrument *counterpoise*, the Quantity of *Adulteration* is always in Proportion to as much of the *Pincers*, or the *Metal* held by them, as appears above the *Surface* of the *Water*.

It is easily conceived that the *Pincers* cannot appear so far above the *Surface* of the *Water* in trying a *small* counterfeit Piece, as one that is *large*, and made of the same base *Metal*; by Reason the *larger* the counterfeit Piece is, the *more* it is deficient in the *hydrostatick* Weight, according to the foregoing Demonstrations.

N. B. If a Piece, of any Weight, be *Standard GOLD*, the Instrument will move before any Part of the *Pincers* is above the *Surface* of the *Water*.

C A U T I O N S.

WHEN you have proved any Piece, and taken it out of the Instrument, beware you do not wet the *Slide* or *Ballance Beam* with your *Fingers*, nor the *Table* or *Board* whereon the Instrument is laid, for that will make an Error in the Trial of the next Piece.

If the *Sliding-Piece* should, by Accident, slip off the *Beam*, take Care, in putting it on again, that the *End mark'd* with a *small Notch* faces the *Chain End*.

A T A B L E,

Shewing (by the Deficiency of the hydrostatical Weight) the Quantity of ADULTERATION in a Piece of counterfeit GOLD that is alloy'd or mix'd with SILVER.

Pence.	l.	s.	d.	Pennywts.	Grains.
1	0	01	11 $\frac{3}{4}$	64	0 11,45
2	0	03	11 $\frac{3}{4}$	28	0 23,91
3	0	05	11 $\frac{1}{2}$	92	1 11,36
4	0	07	11 $\frac{1}{2}$	64	1 23,82
5	0	09	11 $\frac{1}{2}$	38	2 11,27
6	0	11	11 $\frac{1}{4}$	84	2 23,73
7	0	13	11 $\frac{1}{4}$	48	3 11,18
8	0	15	11 $\frac{1}{4}$	12	3 23,64
9	0	17	11	76	4 11,09
10	0	19	11	4	4 23,55
11	1	01	10 $\frac{3}{4}$	68	5 11,
12	1	03	10 $\frac{3}{4}$	68	5 23,46
13	1	05	10 $\frac{3}{4}$	32	6 10,91
14	1	07	10 $\frac{1}{2}$	96	6 23,37
15	1	09	10 $\frac{1}{2}$	6	7 10,82
16	1	11	10 $\frac{1}{2}$	24	7 23,28
17	1	13	10 $\frac{1}{4}$	88	8 10,73
18	1	15	10 $\frac{1}{4}$	52	8 23,19
19	1	17	10 $\frac{1}{4}$	16	9 10,64
20	1	19	10	8	9 23, 1
21	2	01	9 $\frac{3}{4}$	72	10 10,55
22	2	03	11	28	10 23, 1
23	2	05	10 $\frac{3}{4}$	92	11 10,46
24	2	07	9 $\frac{3}{4}$	36	11 22,92
25	2	09	9 $\frac{3}{4}$		12 10,37
26	2	11	9 $\frac{1}{2}$	64	12 22,83
27	2	13	9 $\frac{1}{2}$	28	13 10,28
28	2	15	9 $\frac{1}{4}$	92	13 22,74
29	2	17	9 $\frac{1}{4}$	56	14 10,19
30	2	19	9 $\frac{1}{4}$	2	14 22,65
31	3	01	9	84	15 10, 1
32	3	03	9	48	15 22,56
33	3	05	9	12	16 10, 1
34	3	07	8 $\frac{3}{4}$	76	16 22,47
35	3	09	8 $\frac{3}{4}$	4	17 9,92
36	3	11	8 $\frac{1}{4}$	4	17 22,38

The USE of the TABLE.
 IF I weigh a Piece of GOLD (suppose a Thirty-six Shilling Piece) and find it the true Weight, statically; but, when I try the hydrostatick Weight I find the Instrument will not equiperate till the Slide is brought back 15 Pence, (which is one Division and 1 4th Part of another), then I look back in the first Column of the Table for 15 d. the Number of Pence it wanted hydrostatically, and in the second Column I find 1 l. 9 s. 10 d. Halfpenny, 6 Parts of 100th Part of a Farthing; and so much Gold is wanting in that Piece. And to know how much Silver is in the room of it, look in the third Column, and there you will find 7 Pennyweights, 10 Grains, and 82 Parts of 100th Part of a Grain. — [And so of any other Piece.]

A T A B L E,

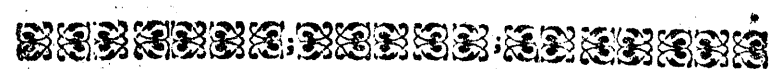
Shewing the Weight and Value of such Pieces of GOLD as are current in this Kingdom; and, if counterfeit, likewise shewing, by the Number of Pence they are deficient of the hydrostatick Weight, of what Metal the Counterfeit is made, whether of Silver, Copper, Brass, or Tin.

Names of the Pieces.	Weight in Grains.	Value in Shillings. s. d.	Silver.	Copper.	Brass.	Tin.
$\frac{1}{2}$ a Guinea	64 $\frac{1}{2}$	10 6	5,38	7,48	9, 8	9,76
a Guinea	129	21 0	11,78	14,98	18,16	19,54
$\frac{1}{4}$ Moidore	41 $\frac{1}{4}$	6 9	3,44	4, 8	6,66	6,94
$\frac{1}{2}$ Moidore	82 $\frac{1}{2}$	13 6	6,90	9,62	13,34	13,88
a Moidore	165	27 0	13, 8	19,26	26,70	27,78
$\frac{3}{8}$ 36s Piece	27	4 6	2,30	3, 2	3,88	4,44
$\frac{1}{4}$ 36s Piece	55	9 0	4, 6	6,42	7,78	8, 9
18s Piece	110 $\frac{1}{2}$	18 0	9, 2	12,84	15,56	17, 8
36s Piece	221	36 0	18, 4	25,68	31,12	35,62
3l 12s P.	442	72 0	36, 8	51,38	62,24	71,24

The USE of the TABLE.

SUPPOSE you would prove a Piece call'd a MOIDORE, look in the first Column of this Table for the Word Moidore, and, opposite to it, in the second Column, you find its true Weight to be 165 Grains, and, in the third Column, its Value to be 27 s. And if, by weighing a counterfeit Piece of this Kind in the Instrument, you find it is deficient in the hydrostatick Weight 19 Pence, look further in the several opposite Columns till you find the nearest Number to 19, and, under the Word Copper, in the fifth Column, you will find 19,26, being the nearest Number to that sought for, whereby you may conclude the Piece is counterfeited with Copper; which may serve for a Rule in proving other Pieces.

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To be had of the AUTHORS.

Their New and Compleat Improved

SLIDING-RULE,

WHEREBY

The Content of all SOLIDS and SUPERFICIALS are more easily and readily cast up than by the common SLIDING-RULE; for this Instrument will perform the same at one Operation as will require two or three on the Sliding-Rules heretofore made.

AS FOR INSTANCE,

LET a Piece of Timber or Block of Stone be never so unequally sided, and let the Dimensions be given in any Denomination, or in different Denominations, this Instrument will give the Content at one Sett or Operation, without being at the Trouble of finding *mean Proportionals*, as you are compell'd to do in other Sliding Rules; and the making two or three Sets gives a great deal of Trouble, and is liable to many Mistakes, by Reason we are generally compell'd

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pell'd to carry a mixt Number in the Head, in order to proceed in the next Operation; but here we are freed from that Trouble and Difficulty: And, what farther recommends it to the World, is, the *Commodiousness* thereof, and *Manner of Use*; for, in other Instruments, you are obliged to state the Question right to find the Answer; but in this, if you state the Question improperly, it will come right notwithstanding, which renders it advantageous and easy to those that are unskill'd in *Arithmetick* or *common Slides*.

An Instance in BRICKWORK.—Let the Length and Height of a Wall be given, and the Number of Bricks thick, this Instrument will give the Content of any Wall in Rods, and reduce it to the Standard Thickness, at one Operation; also, if the Length and Height of any Wall be given, with the Length and Thickness of one Brick, the Instrument will shew, at one Operation, the Number of Bricks it will take to build such Wall.

It is also of great Use in framing of Timber for Building, shewing the Lengths of all Hys, Valleys, Gutter Pieces, or King Pieces, &c. at any Pitch assign'd, not only in Square Buildings, but also in Bevel Roofs, which Lengths cannot be found by any Arithmetical Proportions, or by any other Sliding Rule, yet are shewn on this by *Inspection*: And, therefore, not only of great Use to the Master Builder, but also to the common Carpenter, who is unskill'd in the Rules of ARCHITECT.

Here are also many Advantages in *Measuring* SUPERFICIALS as well as SOLIDS by this Instrument: As for Instance: — If the Content of a whole Stock of Boards be required, by setting the Instrument for the Length and Breadth of one Board only, you have the Content of any Number of those Boards whatsoever; the Slide being set for one Board, the Instrument is in Effect a Table of the Contents of any Number of Boards, without moving any Part of the Instrument: If there are
Parts

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Parts of a Foot in *one* Board, all the Parts as well as the Feet are Sum'd together in the Content of the whole Stock at the *same* Operation.

In like Manner may the GLAZIER Sum up the Content of any Number of *Panes of Glass* at *one* Sett;—or a BLACKSMITH the Contents of several *Casements*.

For PAVING:—Let the Length and Breadth of a Floor, and the Length and Breadth of *one* Brick, &c. be given, it shews, at *one* Operation, how many Bricks, &c. will pave such Floor.

This Instrument not only surpasses the common Slides in those Particulars, but also in many more of great Consequence; but I shall only Instance in these following:

There are but few useful Questions in Business relating to the *Measuring of Solids* (except *Cylinders*) that can be answer'd at *one* Sett of the Sliding Rules *now* in Use; for we seldom meet with a Piece of Timber or Stone to be measur'd which hath equal Sides, therefore cannot be answer'd at *one* Sett on the *common* Sliding Rules, unless there be a Line fitted by the Instrument Maker for one particular Purpose; then the said Rule is render'd useles in all other Cases, and will not cast up any Solid that is in any other Form; or, if the Dimensions are given, or the Content requir'd, in any other Denomination than what the Rule was made for, it will not answer the Question; but *this* Instrument remedies all those Inconveniencies in the Sliding Rules *now* in Use; for if the Dimensions be given or required in what Denominations soever, or different Denominations, it answers the Question with the same Speed and Exactness as if given or required in any particular Denomination.

There are a great many more *Solids* that the Sliding Rule will not cast up at *one* Operation, which *this* Instrument

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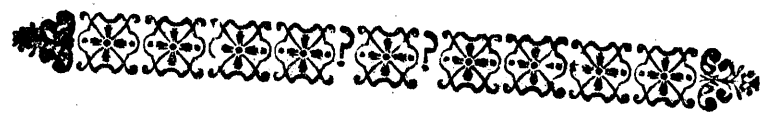
Instrument will, with Ease and Speed; as *Triangular Prisms, Pyramids, Elliptical Cones, Globes, &c.* also those whose *Bases* are *Elliptical, or Parallelograms, Rhombus, Rhomboides, Trapeziums, Poligons,* and many other.

In fine, This Instrument multiplies any three Numbers together successively, and divides that Product by any other Number, at *one* Set of the Slide, which comprehends all the most useful Questions relating to the *Measuring of Superficials and Solids.* It also performs the *Compound or Double Rule of Three,* containing Five Numbers given to find a Sixth; which no other Sliding-Rule will perform at *one* Operation.

N. B. The Use of this Instrument is so much easier learn'd and understood than the *Sliding-Rules* now in Use, that any Person unskill'd in *Arithmetick* or *Sliding-Rules,* may, (with the Directions given) be capable of giving the Content of any *Timber, Stone, Brickwork, Gauging, Paving, Tiling, Plastering, Painting, &c.* in a more easy Method than hath been heretofore used.

Q The Price of the RULE is *Five Shillings*; but, if any Person hath already a *Carpenter's common Sliding-Rule,* and is not willing to be at that *Expence,* he may have the BRASS FURNITURE added to it, to *slide on or take off* at Pleasure, which makes it as compleat for all Purposes as the *Rule* before mention'd, without taking up any more Room in the *Pocket,* or in the least defacing or damaging the *Rule.*

** The Price of the said FURNITURE is *Two Shillings.*
A BOOK of DIRECTIONS, *Sixpence.*



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Malt-maker's Instructor,

(Never before publish'd,)

S H E W I N G

HOW any Person, that can only multiply, may know the Duty to a Farthing (according to Act of Parliament) of any Quantity of MALT, either in Cistern, Couch, or Floor, without any Regard being had to the Number of Bushels; perform'd by Multiplication only, in a speedy Method, entirely new.

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How to place the Divisions on a common Dimension-Cane, or Stick, so that any Person, wholly unacquainted with Numbers, or Gauging Instruments, may, in the Tenth of a Minute, know the Duty, to the Parts of a Penny, of any Quantity of MALT contain'd in a Cistern or Frame, &c. without either Pen, Paper, or Rule, or in the least charging of the Memory; whereby any MALT-MAKER may know if he is overcharged, by the Officer, in the Duty.

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