

**SIKES'S TABLE OF THE  
CONCENTRATED STRENGTH OF  
SPIRITS: WITH DIRECTIONS FOR  
THE USE OF HIS HYDROMETER**

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Sikes's Table of the Concentrated Strength of Spirits: With Directions for the use of his Hydrometer by Various

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**VARIOUS**

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SIKES'S TABLE  
OF THE  
CONCENTRATED STRENGTH  
OF  
SPIRITS;

WITH  
DIRECTIONS FOR THE USE

OF HIS  
**Hydrometer,**

ESTABLISHED THROUGHOUT THE UNITED KINGDOM, FOR ESTIMATING THE DUTIES  
ON SPIRITUOUS LIQUORS,

BY ACT OF PARLIAMENT,

58 GEO. III. CAP. 28.

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LONDON:  
J. D. POTTER, 31, POULTRY,  
SUCCESSOR TO THE LATE R. B. BATE,  
HYDROMETER & SACCHROMETER MANUFACTURER.

1860.

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B. Lab 9318.60.3

Phys 44.0.22

Botan. Lab.

1898 June 23

Gift of

G. S. Goodale



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Botanical Museum

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# DESCRIPTION

OF THE

## HYDROMETER, TABLE,

&c., &c.

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THE HYDROMETER consists of a spherical Ball or Float, and an upper and a lower Stem; the upper Stem has 10 principal Divisions, numbered 1, 2, 3, &c., which are subdivided into five parts; and the lower Stem is made conical, to admit of the Weights being readily slipped on at the top, and also of their resting firmly at the bottom of it. The Instrument is adjusted to spirits of a very high degree of strength, and sets out therein at Zero, or Division 0, without a Weight. As the density or weight of the spirits *increases* in proportion to their *decrease* in strength, the Hydrometer will not sink so low in weaker spirits, but will float at some point of the Stem below Zero, unless they be of much inferior strength, when the Stem will remain entirely out of the spirits, and the addition of one of the Weights will become necessary to sink it. There are nine of these Weights, each representing so many principal Divisions of the Stem as its number indicates; thus, Weight 10 is equivalent to 10 Divisions, and, being used when Division 10 appears just above the surface of the Sample, will sink the Stem to the same point below 0; the Weight 20 is in like manner equivalent to 20 principal Divisions, and so on to 90, which finishes in water at Division 10. The whole range of the Instrument thus consists of 100 principal Divisions, which are subdivided into 5 parts of two-tenths of a Division each, called .2, .4, &c., according to their value; these together subdivide the range from pure Alcohol to Water into 500 equal parts.

The line on the edge of the Stem near Division 1 is the point to which the Weight 60 sinks the Hydrometer in spirits exactly of the *Strength of Proof*, at 51° Temperature: the square weight or cap being applied at the top of the Stem will, with the above-named Weight, sink the Hydrometer to the same point in distilled water of the same Temperature; and being exactly one-twelfth part of the total weight of the Hydrometer and Weight 60, confirms the definition of Proof Spirit given in the Act of Parliament

for establishing this Hydrometer, which states *Sikes's Proof Spirit to weigh at 51° Temperature, exactly twelve-thirteenth parts of an equal bulk of distilled water*; and this cap may be at any time so employed to determine the fitness of the Instrument for use.

THE THERMOMETER will show the Temperature of the Hydrometer, as well as of the sample, and a correct knowledge of the Temperature of each is necessary to the true estimation of the Strength of the latter; the bulb is stripped of its usual encumbrance of metal to facilitate the immediate action of the mercury, and the Scale is of transparent Ivory to admit of its being read without taking it out of the liquor: the divisions are single degrees of Fahrenheit, which are intended to be subdivided by the eye when required.

THE TABLE shows the Concentrated Strength appertaining to each Division and Subdivision of the Stem for every degree of Temperature from 30° to 80°, to a single tenth of strength per cent., so that 500 given points of strength in each degree of Temperature may be had by bare inspection. It is divided into five Sections, each comprising the strength for eleven degrees of Temperature (the last columns being repeated in the succeeding Section), and each has ten pages, which give the entire range of the Hydrometer, and its nine Weights through those Temperatures: by attending to this arrangement, and opening the Table accordingly, it will hardly ever become necessary to consult more than one Section through the same parcel of samples, and it will frequently occur that the required strengths may all be found in the same opening. This arrangement also affords the ready means of proportioning the strength to any intermediate part of a degree of Temperature when required, and exhibits, with curious accuracy, the curves or relative proportions in which the several strengths are affected by a change of Temperature.

THE SLIDING RULE has three edges of its slide divided so as to represent the Divisions and Subdivisions of the Stem, and marked INDICATION, at the end of which is a Star or Index; these lines read, as numbered, from right to left, each being a continuation of the preceding: on the edges of the sides opposite to them are set the corresponding Strengths in whole per cents. sufficiently open to admit of their being read to tenth parts by the eye. The letter P. represents the Proof point, and the Strengths are to be



estimated in the order of their numbers, right and left from this point, for Over and Under Proof, as designated on the edges of these sides. The left end of the first side of the Rule, numbered 30 to 80, and marked Thermometer Scale, refers only to the Temperature ascertained by that Instrument, and described above. The finely-divided lines on the fourth edges of the slide and side are logarithmic numbers, usually called multiplying lines, but so arranged as to admit of a single radius performing the office commonly assigned to two, which affords double the usual length to each several division.

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#### USE OF THE HYDROMETER, &c.

First observe the Temperature of the Thermometer on taking it out of the box, where, being kept with the Hydrometer, it may be presumed to show its temperature also; and if, upon immersion into the sample, the mercury be found to stand precisely the same as before immersion, this will be the correct TEMPERATURE, and the sample as well as the Instruments, will be precisely in the state most favourable to a true result.

Then immerse the Hydrometer, press it downwards till the whole divided part of the stem be wet; observe the pressure or force required to sink it, and select such Weight as seems the nearest equivalent for that pressure; gently slip that Weight on the lower Stem of the Hydrometer, the small ball being still in or wet with the spirit; again immerse it, see that the whole be free from air bubbles, and pressing it down as before to Division 0, let it slowly rise, and allow about half a minute for its settling. Bring the eye to the *level* of the surface of the sample, note what part of the Stem be cut by that surface, *as seen from below*, and add such part or Division to the number of the Weight for the INDICATION.

But if, upon immersing the Thermometer, the mercury have any tendency to motion, the Hydrometer will obviously be of a different Temperature to the Spirits; lay it therefore out of the box, and gently stirring the liquor with the Thermometer, wait till the mercury becomes quite stationary, bring the eye to a position exactly opposite the edge or surface of the mercury, and note the point at which it rests for the true TEMPERATURE; then, taking out the Thermometer, immerse the Hydrometer with its proper

Weight on, allow about the same time for it to acquire the Temperature of the liquor, press it down to Division 0, and note the INDICATION as before directed.

When the mercury in the Thermometer does not stand at any whole Division or degree, its precise point should, in strictness, be estimated by the portion of a degree at which it stands above it; thus, supposing it to be between  $53^{\circ}$  and  $54^{\circ}$ , if one-tenth of a degree above  $53^{\circ}$ , it should be called  $53.1^{\circ}$ , if two-tenths above,  $53.2^{\circ}$ , and so on to nine-tenths, when it should be called  $53.9^{\circ}$  for the true TEMPERATURE.

In like manner, if the level of the surface, seen from below, do not cut the Stem of the Hydrometer at any Division or Subdivision, but at a point between any two of them, the distance of such point from the Division or Subdivision above it should be estimated and added thereto for the true INDICATION.

But it will be found sufficiently correct, for practice, to take the nearest whole degree of the Thermometer, when the mercury stands between any two of them, for the TEMPERATURE; and also the Division or Subdivision of the Stem nearest to the *level* of the surface of the liquor for the INDICATION, observing always that this can only be correctly seen from below.

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## FOR THE STRENGTH.

### BY THE TABLE.

Turn to that section of the Table headed with the given TEMPERATURE, and seek the given INDICATION amongst the numbers in the marginal columns; upon the same line, under the degree of Temperature, will be found the Strength; thus, at  $50^{\circ}$  Temperature, 45 Indication gives 22.8, 45.2 gives 22.5, 45.4 gives 22.2, and 45.6 gives 22 per cent. Over Proof; those Strengths, in each Section, which precede the zigzag line, being OVER PROOF, and those which succeed it UNDER PROOF.

### BY THE SLIDING RULE.

Set the Star upon the slide to the given TEMPERATURE on the Thermometer Scale, opposite to the given INDICATION will be

found the Strength, and the Rule so set becomes a Table for that Temperature, the Strength being throughout given opposite to its correspondent Indication : thus, if the Star be set to 50° Temperature, 45 Indication gives 22.8 per cent. Over Proof, 45.2 gives 22.5, and 45.6 gives 22 per cent. Over Proof.

The Strength is expressed in numbers, denoting the excess or deficiency per cent. of Proof Spirit in any sample, by the actual produce which would be found on its reduction to Proof; and each of these numbers (having its decimal point removed two places to the left) becomes a factor, whereby the gauged content of a cask or vessel of such spirit being multiplied, and the product being *added* to that gauged content if Over Proof, or *deducted* from it if Under Proof, the result will be the actual quantity of Proof Spirit contained in such cask or vessel.

#### EXAMPLES.

1. In Spirits of 50° Temperature, if the Hydrometer require the Weight 40 to sink the Stem, and float it with Division 5 precisely cut by the level of the surface, the INDICATION will be  $40 + 5$ , or 45, which, in the Table under 50° Temperature, gives 22.8 per cent. Over Proof. Or, if Division 5 be not in the level but above it, and the next subdivision be nearer to that level, the Indication may be taken at that subdivision, viz.,  $5.2 + 40 = 45.2$ , which gives the Strength = 22.5 per cent. Over Proof.

For the OVER PROOF and total QUANTITY of PROOF SPIRIT. If the gauged content be 132 gallons, that number multiplied by .225 (the Strength, with its decimal point removed two places to the left) will give 29.7 for the OVER PROOF to be *added* to the gauged content, viz.,  $132 + 29.7 = 161.7$  gallons for the total QUANTITY of PROOF SPIRIT contained in, or which would be produced by the 132 gallons on reduction to Proof.

Or, by the Sliding Rule. Set the Star on the slide to the given TEMPERATURE, viz., 50° on the Thermometer Scale, opposite the INDICATION 45.2, will be had the Strength = 22.5 per cent. Over Proof.

For the OVER PROOF, &c. Turn to the line of numbers on the back of the Rule, set Unity on slide to .225 upon the side, opposite