TABLES FOR THE USE OF ENGINEERS AND ARCHITECTS IN TAKING OUT QUANTITIES OF MASONRY, IRONWORK, &C.

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649412433

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Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

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IN TAKING OUT

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OF

MASONRY, IRONWORK, &c.

BY

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LONDON:
EDWARD STANFORD, 6, CHARING CROSS, S.W.
1873.

Richards, White & Co., Printers, 4, Brown's Buildings, St. Mary Axe, E.C.

PREFACE.

THESE Tables are intended to expedite the operation of taking out quantities in masonry, ironwork, &c., and are especially adapted for those cases which occur in the measuring up of works, where the dimensions are taken in considerable detail, and consequently the working out of the quantities by ordinary multiplication is a laborious process and very liable to error. The tables are based upon a short system of logarithms, easy of application and specially adapted to the English units of measure. Although the ordinary logarithms are used extensively in scientific calculations where great accuracy is required, yet they have never come into general use for simpler purposes, such as mensuration, owing to the many inconveniences attending their practical application. For instance, with the ordinary logarithmic tables, before the logarithms can be found, the fractional parts of the several dimensions must be reduced to decimals, and when the logarithms are obtained, the index figures and their signs, whether positive or negative, have yet to be determined. The addition of positive and negative indices moreover is a process requiring a considerable amount of care, and is frequently a source of error. The fact also of the ordinary logarithms, being tabulated to seven places of decimals, involves much unnecessary labour, three or four figures being generally quite sufficient for purposes of mensuration. In the accompanying tables the above mentioned inconveniences attending the use of ordinary logarithms are obviated. Table I. gives at once the logarithms of linear dimensions corresponding to feet, inches, and parts of inches, without the necessity of any previous reduction, and Table II., the areas, cubic contents, and weights of iron opposite their corresponding "Logs." The method of applying the Tables is shewn in the following series of Examples.

GENERAL RULES AND EXAMPLES.

Rule.—In Table I. find the logarithms corresponding to the given dimensions, and add them together, then look for their sum in the "Log." Column of Table II. Opposite this, under its proper heading, will be found the quantity required. (If the sum arising from the addition of the Logs. in Table I. consists of a whole number and a decimal, as will usually be the case, the *nearest whole number* in the Log. Column of Table II. must be used.)

Areas.

Example I. *(Square inches.)*

Required the sectional area of a bar, measuring ..... $10\frac{1}{16}$ inches. × $2\frac{5}{16}$ inches.

From Table I. ..... Log. $10\frac{1}{16}$ ins. = 2038.9

„ $2\frac{5}{16}$ = 1364.1

3403.0

In Table II. opposite Log. 3403 is found sq. in. 25.29 the quantity required.

Example II. *(Square feet.)*

Required the area in square feet of a surface, measuring 11 ft. 9 in. × 13 ft. 8 in.

From Table I. ..... Log. 11 ft. 9 in. = 3149.3

„ 13 8 = 3214.9

6364.0

From Table II. ..... Log. 6364 = sq. ft. 160.6

Example III. *(Square yards.)*

Required the area in square yards of the Section of an excavation, measuring..... 21 ft. 4 in. × 63 ft. 9 in.

From Table I. ..... Log. 21 ft. 4 in. = 3406.2

„ 63 9 = 3883.7

7291.9

From Table II. *(nearest whole number)* Log. 7292 = sq. yds. 151.1

Cubic Quantities.

Example IV. *(Cubic inches.)*

Required the number of cubic inches in a solid, measuring $2\frac{1}{2}$ in. $\times$ $3\frac{1}{16}$ in. $\times$ $4\frac{1}{16}$ in.

From Table I.	Log.	$2\frac{1}{2}$ in.	=	1397.9
	,,	$3\frac{1}{16}$	=	1595.2
	,,	$4\frac{1}{16}$	=	1608.8
				4601.9

	Log.	cub. in.
From Table II.	4602	= 39.99

Example V. *(Cubic feet.)*

Required the number of cubic feet in a bridge coping, measuring ..... 62 ft. 9 in. $\times$ 1 ft. $4\frac{1}{2}$ in. $\times$ 0 ft. $7\frac{1}{2}$ in.

From Table I.	Log.	62 ft. 9 in.	=	3876.8
	,,	1 $4\frac{1}{2}$	=	2217.6
	,,	$7\frac{1}{2}$	=	1875.1
				7969.4

	Log.	cub. ft.
From Table II.	7969	= 53.88

Example VI. *(Cubic yards.)*

Required the number of cubic yards in a piece of brickwork, measuring ..... 25 ft. 6 in. $\times$ 10 ft. 9 in. $\times$ 2 ft. $7\frac{1}{2}$ in.

From Table I.	Log.	25 ft. 6 in.	=	3485.7
	,,	10 9	=	3110.8
	,,	2 $7\frac{1}{2}$	=	2498.3
				9094.6

	Log.	cub. yds.
From Table II.	9095	= 26.67

Weight of Wrought Iron.

Example VII. *(Weight in pounds.)*

Required the weight in pounds of a plate of

	ft.	in.		ft.	in.		in.
wrought iron, measuring.....	10	9	×	0	$6\frac{1}{2}$	×	$0\frac{8}{16}$

		ft.	in.		
From Table I.	Log.	10	9	=	3110.6
	,,	0	$6\frac{1}{2}$	=	1813.9
	,,		$0\frac{8}{16}$	=	494.8
					5418.3

	Log.	lbs.
From Table II.	5418	= 72.73

Example VIII. *(Weight in tons.)*

Required the weight in tons of the web of a plate

	ft.	in.		ft.	in.		in.
girder, measuring	95	9	×	9	$6\frac{1}{2}$	×	$0\frac{3}{8}$

		ft.	in.		
From Table I.	Log.	95	9	=	4060.3
	,,	9	$6\frac{1}{2}$	=	3058.8
	,,		$0\frac{3}{8}$	=	574.0
					7693.1

	Log.	tons.
From Table II.	7693	= 6.116

Note.—The weights of wrought iron given in Table II. have been calculated upon the usual assumption, that a bar one inch square weighs ten pounds per lineal yard, corresponding to a specific gravity of 7.68. The weight of cast iron may be obtained by estimating as for wrought iron, and deducting $\frac{1}{15}$th from the result.

Circular Areas.

Rule.—Take out the Logs. of the dimensions as if for a square, and deduct a constant number, viz., 104.8, from the sum of the Logs., then find the quantity in Table II. as before—

Example IX.

Required the sectional area of a bar $10\frac{1}{16}$ inches diameter.

From Table I.	Log.	$10\frac{1}{16}$ ins.	= 2038.9
	„	$10\frac{1}{16}$	= 2038.9
			4077.8
Deduct the constant			104.9
			3972.9
	Log.	Square inches.	
From Table II.	3973	= 93.97	

CYLINDRICAL CONTENTS AND WEIGHTS.

Rule.—Take out the Logs. of the dimensions as if for a square section, and deduct the same constant as above, viz., 104.9, from the sum of the Logs., then find the quantity in Table II. as before.

Example X.

Required the contents in cubic feet of a circular vessel, measuring ..... 10 ft. $3\frac{1}{2}$ in. deep × 4 ft. 8 in. diameter.

From Table I.	Log.	10 ft. $3\frac{1}{2}$ in.	= 3091.7
	„	4 8	= 2748.2
	„	4 8	= 2748.2
			8588.1
Deduct the constant			104.9
			8483.2
	Log.	Cubic ft.	
From Table II.	8483	= 176.0	

Example XI.

Required the weight of a wrought iron shaft, 19 ft. 9 in. long × 1 ft. $10\frac{1}{2}$ in. diameter.

From Table I.	Log.	19 ft. 9 in.	= 3374.7
	„	1 $10\frac{1}{2}$	= 2352.2
	„	1 $10\frac{1}{2}$	= 2352.2
			8079.1
Deduct the constant			104.9
			7974.2
	Log.	Tons.	
From Table II.	7974	= 11.68	