Lysaght's Trade Marks.

"QUEEN'S HEAD" Galvanized Tinned Special Flat Sheets. This brand will stand the severest tests, and commands the confidence of iron-workers everywhere.

"BLACK SHEETS" of the same brand are extensively used by manufacturers of Ventilating and other Pipes, Trunks, Stoves, Fender Bottoms, Ovens, &c., and for all other purposes where a reliable quality is desired.

"ORB" Tenax Flat Sheet iron, for working up, is of the finest possible quality, suitable for special high-class work, and is, in many instances, used as a substitute for copper.

"FLEUR-DE-LIS" Galvanized Tinned Flat Sheets enter largely into consumption in the lighter gauges, for that class of work in which a somewhat cheaper sheet is asked for. It will be found suited to all such requirements.

QUEEN'S HEAD

ORB

FLEUR DE LIS

INDEX.

A Product of the Nineteenth Century.

THE Nineteenth Century, which has so recently been brought to a close, forms a most important epoch in the history of the world, for not only has it attained distinction in the annals of Art, Literature and Science, but it has gained the right to be termed the **" Century of Progress,"** on account of its many great economic triumphs and splendid achievements, of which the introduction of Railways and Steam Navigation and the practical application of Electricity to everyday use (as exemplified by the invention of the Electric Telegraph, the Telephone and the Electric Light) are notable instances.

In no branch of industry has the advancement been more marked than in the Building trade, in which a complete revolution from the methods previously

in vogue has taken place, a result which may largely be attributed to the introduction of **Galvanized Iron.**

In the earlier part of the Century various unsuccessful attempts had been made to coat Metals, chiefly by a Galvanic process, and it is from these earlier methods that the term **"Galvanized,"** as applied to Iron, has come into modern use.

The first important success appears to have been achieved in 1837, when Mr. Henry Crawford secured a patent for a method of coating Iron sheets for the prevention of oxidation, by their immersion in molten Zinc. Later on Messrs. Morewood and Rogers, of Birmingham, working on similar lines, patented various improvements, and at the Great Exhibition of 1851 had so far perfected their methods as to exhibit a sheet of Plain Galvanized Iron. The same firm shortly afterwards introduced the " Morewood Tile," which for a time had a considerable sale.

The process of Corrugating is said to have been invented by Mr. John Spencer, in 1845, but it was the application of Steam to this process (for which a patent was taken out in 1854) that completed the evolution of the Galvanized Corrugated Sheet. This occurring almost simultaneously with the great expansion of Colonial trade which followed the Gold discoveries of California and Australia, the use of Galvanized Corrugated Iron (meeting as it did the Colonial requirements for a cheap and effective roofing, and ensuring also, what was of scarcely less importance at the time, a purer water supply) became immediately popular, and a constantly expanding business resulted.

In 1857, **Mr John Lysaght,** an Engineer of Bristol, forseeing the latent possibilities of the trade, and sparing no expense to secure the best appliances, directed his attention to further improvements—and produced the celebrated **"O R B"** brand of Corrugated Iron—

which he subsequently followed up by the introduction of the **" Queen's Head "** brand of Plain Iron for " working up " purposes, the former being characteristic of the highest grade of Corrugated and the latter of Plain Iron, the uniformity of quality and intrinsic merits of these were immediately recognised by the experts of the day as superior to all others.

Although the founder has passed away, his successors (John Lysaght Ltd.) continue the march of progress, and now at the beginning of a new century, with an established reputation of more than 40 years, Lysaght's **"ORB"** and **"Queen's Head"** brands still maintain their supremacy ; and such is the perfection of the methods adopted, and the magnitude of the Company's operations, in which an industrial army of some 4000 hands is employed, that it is enabled to place its manufactures on the various markets of the world, under conditions so

favorable that **" O R B "** Corrugated and **" Queen's Head "** Plain Iron can be purchased almost everywhere at little or no difference in price (sheet for sheet) from that of the many commoner brands and low grade unbranded imitations which from time to time appear on the market.

The fact that the annual production of Galvanized Iron in Great Britain now amounts to about 250,000 tons would, in its earlier history, have been deemed almost incredible; but the enormous proportions of the trade, and the lessened cost of production (the result of improved methods of manufacture), have all contributed to this magnificent result, and have proved it to be one of the most important evolutions of economic science for which the " record reign " of our late and revered Queen Victoria has been so pre-eminently distinguished.

1601.

Second Edition.

The First Edition of this little publication having been very favorably received, and suggestions made for incorporating other matters of kindred import, it has been thought advisable to revise the same and to somewhat reduce its dimensions, without however, it is hoped, necessarily impairing its utility.

The Tables contained herein have been compiled from existing sources of information; no originality is therefore claimed for them. Suggestions for further improvements or additions thereto, with a view of incorporation in any later edition, will be thankfully received, and may be addressed—

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THE PUBLISHER,

Metal Trades Referee,

P.O. Box 108,

Stock Exchange,

Melbourne.

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Weight-Bearing Iron.

Approximate Weight per Square Foot.
(Corrugations 4 inches wide by 2½ inches deep).

Gauge.	Weight.	
	lbs.	ozs.
16	5	8
18	4	4
20	4	12
22	3	14
24	2	6

LYSAGHT'S Weight-bearing Iron is of the well-known "Orb" brand of English manufacture, and has secured the highest approval of architects and others wherever it has been used. It is made in almost any desired Corrugation or Gauge, black or galvanised, curved or otherwise.

Galvanised Corrugated Iron.

Approximate No. of Sheets to a Case (Ordinary Corrugations) weighing about 10 cwt.

Length.	Gauge.					
	18	20	22	24	26	28
5 feet	47	56	65	83	115	124
6 "	39	46	55	70	96	103
7 "	33	40	47	60	82	88
8 "	29	35	41	52	72	77
9 "	26	30	36	47	64	68
10 "	23	28	33	42	57	61

LYSAGHT'S "Orb" Brand Corrugated Iron usually contains sheets in excess of the numbers given in the above tables, and is made in all lengths up to 12 feet, the heavier gauges to special order. Corrugations from 1 to 5 inches, those chiefly in use being 1-inch for ceilings, fences, &c., and 3-inch for ordinary purposes.

Galvanised Plain Iron.

Gauge.	Approximate number of 6 feet sheets to a case, Plain Iron averaging about 10 cwt. Width.			Gauge.	Approximate weight per sheet 6 feet long, in lbs. Width.		
	24	30	36		24	30	36
16 g.	37	29	24 shts.	16 g.	32	40	48 lbs.
18 g.	47	39	31 ,,	18 g.	25	29	36 ,,
20 g.	63	47	39 ,,	20 g.	20	25	29 ,,
22 g.	73	50	49 ,,	22 g.	17	19	23 ,,
24 g.	86	69	57 ,,	24 g.	12	16	19 ,,
26 g.	120	97	78 ,,	26 g.	9	12	14 ,,
28 g.	139	109	85 ,,	28 g.	8	11	13 ,,

LYSAGHT'S "Queen's Head" Special Flat somewhat exceeds the number of sheets given in the above tables. It is also obtainable in special sizes other than the above, to order.

QUEEN'S HEAD

LYSAGHT'S "Fleur de Lis" Plain Iron is largely used for the manufacture of the lighter classes of guttering, downpipe, ridging, &c., its smoothness of surface and freedom from buckle being conspicuous features.

FLEUR DE LYS

Black Sheet Iron.

Approximate Number of Sheets contained
in 20 Bundles of Black Sheet Iron.
averaging about 20 cwt.

Gauge	WIDTH		
	24	30	35
16g.	76	62	50
18	95	76	64
20	118	100	74
22	152	124	101
24	190	155	126
26	254	196	164
27	280	218	174
28	340	256	208

LYSAGHT'S "Orb" Brand Tenax Special
Flat Steel Sheets are obtainable in both Black
and Galvanised. They have secured the approval
of Ironworkers everywhere for those purposes in
which a very high grade of quality is necessary,
being almost as tough as copper.

LYSAGHT'S "Queen's Head" Black Sheet
Iron is recognised as the standard of perfection.
It will stand any and every possible test, charac-
teristics which have secured for it a reputation
almost world-wide.

QUEEN'S HEAD

Tanks—Square Black Iron..

100 gallon measures	...		2ft. 8in. square.
200	,,	,,	3ft. 8in. ,,
400	,,	,,	...	4ft. 0in. ,,

Tanks—Corrugated Iron
(CIRCULAR).
Reputed Capacity.

Diameter.	Height of Tank.				
	4 feet.	5 feet.	6 feet.	7 feet.	8 feet.
	gallons.	gallons.	gallons.	gallons.	gallons.
3 feet 3 inches	200	250	300	...	...
3 ,, 6 ,,	240	300	360	...	...
3 ,, 9 ,,	280	.350	[420	...	...
4 ,, 0 ,,	310	390	470	...	...
4 ,, 4 ,,	4..	...	540	...	...
4 ,, 6 ,,	...	...	590	...	...
5 ,, 0 ,,	...	...	720	840	960
6 ,, 0 ,,	...	...	1050	...	...

Tank Makers should specify LYSAGHTS "ORB" Brand
Corrugated Iron—it will stand any and every possible test
in curving or otherwise, being almost as tough as copper.

It is obtainable up to 12 feet in length.

TABLE SHEWING WEIGHT IN POUNDS

OF VARIOUS AREAS OF

IRON PLATES OF DIFFERENT THICKNESS.

Area in Feet.	THICKNESS IN FRACTIONS OF AN INCH.										
	⅛	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1
1	5	10	12·5	15	17·5	20	22·5	25·0	30	35	40
2	10	20	25·0	30	35·0	40	50	60	70	80
3	15	30	37·5	45	52·5	60	75	90	105	120
4	20	40	50·0	60	70·0	80	100	120	140	160
5	25	50	62·5	75	87·5	100	125	150	175	200
6	30	60	75·0	90	105·0	120	150	180	210	240
7	35	70	87·5	105	122·5	140	175	210	245	280
8	40	80	100·0	120	140·0	160	200	240	280	320
9	45	90	112·5	135	157·5	180	228	270	315	360
10	50	100	125·0	150	175·0	200	250	300	350	400
11	55	110	137·5	165	192·5	220	275	330	385	440
12	60	120	150·0	180	210·0	240	300	360	420	480
13	65	130	162·5	195	227·5	260	325	390	455	520
14	70	140	175·0	210	245·0	280	350	420	490	560
15	75	150	187·5	225	262·5	300	375	450	525	600
16	80	160	200·0	240	280·0	320	400	480	560	640
17	85	170	212·5	255	297·5	340	425	510	595	680
18	90	180	225·0	270	315·0	360	450	540	630	720
19	95	190	237·5	285	332·5	380	475	570	665	760
20	100	200	250·0	300	350·0	400	500	600	700	800
30	150	300	375·0	450	525·0	600	750	900	1050	1200
40	200	400	500·0	600	700·0	800	1000	1200	1400	1600
50	250	500	625·0	750	875·0	1000	1250	1500	1750	2000
60	300	600	750·0	900	1050	1200	1500	1800	2100	2400
70	350	700	875·0	1050	1225	1400	1750	2100	2450	2800
80	400	800	1000	1200	1400	1600	2000	2400	2800	3200
90	450	900	1087	1350	1575	1800	2250	2700	3150	3600
100	500	1000	1250	1500	1750	2000	2500	3000	3500	4000

Round and Square Bar Iron.

Approximate Weight per Lineal Foot.

Diameter or Side	Square Bars.	Round Bars.	Diameter or Side in Inches	Square Bars.	Round Bars.	Diameter or Side in Inches	Square Bars.	Round Bars.
¼	·209	·164	1¼	5·23	4·09	3	30·07	23·60
5⁄16	·326	·256	1⅜	6·35	4·96	3¼	35·28	27·70
⅜	·470	·369	1½	7·51	5·90	3½	40·91	32·13
7⁄16	·642	·502	1⅝	8·82	6·92	3¾	46·97	36·69
½	·835	·656	1¾	10·29	8·08	4	53·44	41·97
9⁄16	1·057	·831	1⅞	11·74	9·22	4¼	60·32	47·38
⅝	1·305	1·025	2	13·36	10·49	4½	67·63	53·12
11⁄16	1·579	1·241	2⅛	15·03	11·84	4¾	75·35	59·18
¾	1·870	1·476	2¼	16·91	13·27	5	83·51	65·58
13⁄16	2·203	1·732	2⅜	18·84	14·79	5¼	92·46	72·30
⅞	2·556	2·011	2½	20·87	16·39	5½	101·03	79·35
15⁄16	2·936	2·306	2⅝	23·11	18·07	5¾	110·13	86·73
1	3·34	2·62	2¾	25·26	19·84	6	120·24	94·43
1⅛	4·22	3·32	2⅞	27·61	21·68	—	—	—

Bar Iron—Flat.

Approximate Weight per Lineal Foot.

IN.	¼	5/16	⅜	7/16	½	⅝	¾	⅞	1
	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.
1	·83	1·04	1·25	1·45	1·66	2·08	2·50	2·91	3·33
1⅛	·94	1·17	1·40	1·64	1·87	2·34	2·81	3·28	3·75
1¼	1·04	1·30	1·56	1·82	2·08	2·60	3·12	3·64	4·16
1⅜	1·14	1·43	1·71	2	2·29	2·86	3·43	4·01	4·58
1½	1·25	1·56	1·87	2·18	2·50	3·12	3·75	4·37	5
1⅝	1·35	1·69	2·03	2·36	2·70	3·38	4·06	4·73	5·41
1¾	1·45	1·82	2·18	2·55	2·91	3·64	4·37	5·10	5·83
1⅞	1·56	1·95	2·34	2·73	3·12	3·90	4·68	5·46	6·25
2	1·66	2·03	2·50	2·91	3·33	4·16	5	5·83	6·66
2¼	1·77	2·21	2·65	3·00	3·54	4·42	5·31	6·19	7·08
2⅛	1·87	2·34	2·81	3·28	3·75	4·68	5·62	6·56	7·50
2⅜	1·97	2·47	2·96	3·46	3·95	4·94	5·93	6·92	7·91
2½	2·08	2·60	3·12	3·64	4·16	5·20	6·25	7·29	8·33
2⅝	2·18	2·73	3·28	3·82	4·37	5·46	6·56	7·65	8·75
2¾	2·29	2·86	3·43	4·01	4·58	5·72	6·87	8·02	9·16
2⅞	2·39	2·99	3·59	4·19	4·79	5·98	7·18	8·38	9·58
3	2·50	3·12	3·75	4·37	5	6·25	7·50	8·75	10
3¼	2·70	3·28	4·06	4·73	5·41	6·77	8·12	9·47	10·83
3⅜	2·91	3·64	4·37	5·10	5·83	7·29	8·75	10·20	11·66
3½	3·12	3·90	4·68	5·46	6·25	7·81	9·37	10·93	12·50
4	3·33	4·16	5	5·83	6·66	8·33	10	11·66	13·33
4¼	3·54	4·42	5·31	6·19	7·08	8·85	10·62	12·39	14·16
4½	3·75	4·68	5·62	6·56	7·50	9·37	11·25	13·12	15
4¾	3·95	4·94	5·93	6·92	7·91	9·80	11·87	13·85	15·83
5	4·17	5·20	6·25	7·29	8·33	10·41	12·50	14·58	16·66
5¼	4·37	5·46	6·56	7·65	8·75	10·93	13·12	15·31	17·50
5½	4·58	5·72	6·87	8·02	9·16	11·45	13·75	16·04	18·33
5¾	4·79	5·98	7·18	8·38	9·58	11·97	14·37	16·77	19·16
6	5	6·26	7·50	8·75	10	12·50	15	17·50	20

Girders. (I)
(Standard Sizes.)

Size.	Weight per foot in lbs.	Size.	Weight per foot in lbs.
4 in. x 2 in.	5¼	10 in. x 6 in.	45
6 ,, x 3 ,,	16	12 ,, x 5 ,,	39
6 ,, x 5 ,,	25	12 ,, x 6 ,,	54
7 ,, x 3¼ ,,	18	14 ,, x 6 ,,	46
8 ,, x 4 ,,	25	15 ,, x 5 ,,	42
8 ,, x 6 ,,	35	15 ,, x 6 ,,	59
9 ,, x 3¾ ,,	20	16 ,, x 6 ,,	62
9 ,, x 7 ,,	58	18 ,, x 7 ,,	75
10 ,, x 5 ,,	29	20 ,, x 7½ ,,	89

Octagon Steel Bars.

Size.	Weight per foot in lbs.	Size.	Weight per foot in lbs.
1/16 inch	0·100	1¼ inch	3·640
⅛ ,,	0·180	1⅜ ,,	4·500
3/16 ,,	0·280	1½ ,,	5·450
¼ ,,	0·410	1⅝ ,,	6·480
5/16 ,,	0·550	1¾ ,,	7·610
⅜ ,,	0·720	1⅞ ,,	8·620
¾ ,,	1·120	2 ,,	11·520
⅞ ,,	1·620	2¼ ,,	14·580
⅞ ,,	3·200	2½ ,,	18·000
1 ,,	2·870	3 ,,	25·920

HOOP IRON.

Weight of a Ten-Foot Length in Pounds.

	10 W G	12 W G	14 W G	16 W G	17 W G	18 W G
1	4.68	3.65	2.60	2.08	1.81	1.55
1⅛	5.26	4.10	2.92	2.34	2.04	1.75
1¼	5.85	4.56	3.25	2.60	2.27	1.93
1⅜	6.43	5.01	3.57	2.86	2.49	2.13
1½	7.02	5.47	3.90	3.12	2.72	2.32
1¾	8.15	6.35	4.55	3.60	3.15	2.70
2	9.36	7.30	5.20	4.16	3.63	3.10
2¼	10.53	8.20	5.85	4.68	4.08	3.50
2½	11.71	9.12	6.50	5.20	4.54	3.87
2¾	12.87	10.03	7.15	5.72	4.99	4.26
3	14.05	10.95	7.80	6.25	5.45	4.65
3¼	15.10	11.80	8.40	6.70	5.80	5.00
3½	16.30	12.70	9.10	7.20	6.30	5.40
3¾	17.50	13.60	9.70	7.70	6.70	5.80
4	18.73	14.60	10.40	8.33	7.26	6.20
4¼	19.90	15.50	11.05	8.84	7.70	6.60
4½	21.07	16.40	11.70	9.36	8.17	7.00
4¾	22.23	17.33	12.35	9.88	8.62	7.36
5	23.42	18.25	13.00	10.41	9.08	7.75
5½	25.75	20.07	14.30	11.45	9.98	8.22
6	28.10	21.90	15.60	12.50	10.90	9.30

	16 W G	18 W G	19 W G	20 W G	21 W G	22 W G
½	1.10	.83	.71	.60	.54	.48
⅝	1.38	1.04	.89	.74	.68	.60
¾	1.66	1.25	1.07	.89	.82	.71
⅞	1.80	1.35	1.16	.97	.88	.77

Thickness of Sheet Lead.

2 lbs. per square foot = .034 inches
3 " " " = .051 "
4 " " " = .068 "
5 " " " = .085 "
6 " " " = .102 "
8 " " " = .136 "
10 " " " = .170 "
12 " " " = .204 "

Weight of Lead Pipe in pounds per yard.

Diameter.	Extra Light.	Light.	Medium.	Strong.	Extra Strong.
Inches.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
½	3	4	4½	5 & 6	7 & 8
⅝	4½	5	6	7	8 & 9
⅝	5	6	7	8	9 & 10
¾	5	6	7	8	9 & 10
1	5	6	10	12	14
1¼	6	8	12	14	16 & 18
1½	10	11	16	18	20
1¾	13	14	20	22	24
2	16	18			

Sheet Zinc.
Approximate Weight and Thickness according to "V. M." Zinc Gauge.

V.M. Zinc Gauge.	Decimals of an inch	Imperial Stan. Wire Gauge.	Weight per sq. foot in lbs.	36″ x 84″		36″ x 96″	
				Weight of Sheets in Lbs.	Sheets per 5 Cwt. about	Weight of Sheets in Lbs.	Sheets per 5 Cwt. about
3	.007	37	.25	5.17	107	5.91	94
4	.008	36	.30	6.32	88	7.22	77
5	.010	33	.35	7.47	74	8.54	65
6	.011	32	.42	8.77	63	10.03	55
7	.013	29	.48	10.17	54	11.62	48
8	.015	27	.56	11.65	48	13.31	42
9	.018	26	.65	13.54	41	15.47	36
10	.020	25	.72	15.01	37	17.16	32
11	.023	23	.83	17.47	32	19.97	28
12	.026		.95	19.85	28	22.70	25
13	.029	22	1.06	22.23	25	25.41	22
14	.032	21	1.17	24.61	23	28.13	20
15	.038	20	1.36	28.55	20	32.62	17
16	.043	19	1.55	32.48	17	37.13	15
17	.048	18	1.73	36.33	15	41.54	14
18	.053		1.92	40.28	14	46.08	12
19	.058	17	2.11	44.22	13	50.54	11
20	.063	16	2.29	48.07	12	54.92	10
21	.070	15	2.55	53.48	11	61.13	9
22	.077	14	2.80	58.90	10	67.31	8
23	.084		3.07	64.40	9	73.56	7½
24	.091	13	3.32	69.81	8	79.56	7
25	.098		3.58	75.22	7½	85.55	6½
26	.105	12	3.8?	80.04	7	92.55	6

Zinc.

Weight per Super Foot (Ordinary Wire Gauge).

Gauge.	Lbs.	Gauge.	Lbs.	Gauge.	Lbs.
10	5·2	16	2·3	22	1·2
11	4·6	17	2·1	23	1·1
12	4·1	18	1·8	24	1·0
13	3·5	19	1·7	25	0·9
14	2·8	20	1·5	26	0·8
15	2·6	21	1·4	27	0·7

Zinc Sheets.—(Approximate Weight of).

Zinc Gauge.	Ozs. per sq. foot.	Weight per Sheet, 7 x 3 feet.	Zinc Gauge.	Ozs. per sq. foot.	Weight per Sheet, 7 x 3 feet.
		lbs. ozs.			lbs. ozs.
4	5	6 9	11	15	19 11
5	6	7 14	12	17	22 5
6	7	9 3	13	19½	25 9½
7	8	10 8	14	22	28 14
8	9	11 13	15	24	31 8
9	11	14 7	16	26	34 2
10	13	17 1	17	30	39 6

Lead.

Weight per Super Foot.

Inch.	Lbs.	Inch.	Lbs.	Inch.	Lbs.
1/16	3·7	7/16	23·9	3/4	44·7
1/8	7·4	1/2	29·5	13/16	48·3
3/16	11·1	9/16	33·2	7/8	51·0
1/4	14·8	5/8	36·9	15/16	55·1
5/16	18·5	11/16	40·6	1	59·4
3/8	22·2				

Lead—Sheet.

Weight per Roll—30 feet x 7 feet 9 inches.

		c.	q.	l.			c.	q.	l.
3 lbs	...	6	0	14	5 lbs.	...	10	1	14
3½ ,,	...	7	0	20	6 ,,	...	12	1	0
4 ,,	...	8	1	0	7 ,,	...	14	2	0
4½ ,,	...	9	1	0					

Aluminium.

Gauge	Weight per square foot in lbs.	Weight of Sheet 24 in. x 96 in. in lbs.
12	1·406	11½
16	·906	7½
18	·687	5½
20	·42	4

A cube foot of Aluminium weighs 160lbs.

Solders.

For Lead	..	1 part Tin, 2 parts Lead.
For Brass	..	2 parts Brass, 1 part Zinc.
Hard Solder	..	2 parts Copper, 1 part Zinc.
Soft Solder	..	2 parts Tin, 1 part Lead.

Fluxes—For Soldering.

Tinned Iron	..	.. Resin or Spirits of Salts.
Copper and Brass	..	Sal. Ammonia or Spirits of Salts.
Zinc	..	.. Spirits of Salts.
Lead	..	.. Resin.

Fusing—Temperature of Metals.

	Degrees Fahr.
Solder ..	330
Tin ..	420
Lead ..	630
Zinc ..	800
Brass ..	1630
Silver ..	1830
Copper ..	2192
Gold ..	2280
Cast Iron ..	2912

Weights of Sheet Copper.

The equivalent in Weight of the various Gauges are as follows:—

No	Per Square Foot			No.	Per Square Foot		
1	14 lbs	0	oz	16	3 lbs	0	oz
2	13 "	0 "		17	2 "	12 "	
3	12 "	0 "		18	2 "	4 "	
4	11 "	0 "		19	2 "	0 "	
5	10 "	2 "		20	1 "	12 "	
6	9 "	8 "		21	1 "	8 "	
7	8 "	8 "		22	1 "	6 "	
8	7 "	10 "		23	1 "	3 "	
9	7 "	0 "		24	1 "	0 "	
10	6 "	4 "		25	0 "	14 "	
11	5 "	8 "		26	0 "	13 "	
12	5 "	0 "		27	0 "	11½ "	
13	4 "	8 "		28	0 "	10 "	
14	4 "	0 "		29	0 "	9 "	
15	3 "	8 "		30	0 "	8 "	

SUBSTANCE OF COPPER SHEETS.

$$48 \text{ in} \times 24 \text{ in} \times 8 \text{ lbs} = 24 \text{ W G}$$
$$\text{"} \quad \text{"} \quad 10 \text{ "} = 23 \text{ "} \quad \text{full}$$
$$\text{"} \quad \text{"} \quad 12 \text{ "} = 21 \text{ "}$$
$$\text{"} \quad \text{"} \quad 14 \text{ "} = 20 \text{ "}$$
$$\text{"} \quad \text{"} \quad 16 \text{ "} = 19 \text{ "}$$
$$\text{"} \quad \text{"} \quad 18 \text{ "} = 18 \text{ "}$$
$$\text{"} \quad \text{"} \quad 24 \text{ "} = 16 \text{ "}$$

Tin Plates.

Sheets and Weights.

Mark.	Inches.	Sheets.	Cwts.	Qrs.	Lbs.
IC	14 x 10	225	0	3	24
IX	14 x 10	225	1	0	24
IXX	14 x 10	225	1	1	17
IXXX	14 x 10	235	1	2	10
IXXXX	14 x 10	225	1	3	2
IC	14 x 20	112	0	3	24
IX	14 x 20	112	1	0	24
IXX	14 x 20	112	1	1	17
IXXX	14 x 20	112	1	2	10
IXXXX	14 x 20	112	1	3	2
IC	28 x 20	56	0	3	24
IX	28 x 20	56	1	0	24
IXX	28 x 20	56	1	1	17
IXXX	28 x 20	56	1	2	10
IXXXX	28 x 20	56	1	3	3
IC	12 x 12	225	0	3	24
IX	12 x 12	225	1	0	24
IXX	12 x 12	225	1	1	17
IXXX	12 x 12	225	1	2	10
IXXXX	12 x 12	225	1	3	3
DC	17 x 12½	100	0	3	10
DX	17 x 12½	100	1	0	8
DXX	17 x 12½	100	1	1	3
DXXX	17 x 12½	100	1	1	24
DXXXX	17 x 12½	100	1	2	17
DC	17 x 25	50	0	3	10
DX	17 x 25	50	1	0	8
DXX	17 x 25	50	1	1	3
DXXX	17 x 25	50	1	1	24
DXXXX	17 x 25	50	1	2	17
DC	34 x 25	25	0	3	10
DX	34 x 25	25	1	0	8
DXX	34 x 25	25	1	1	3
DXXX	34 x 25	25	1	1	24
DXXXX	34 x 25	25	1	2	17
SDC	15 x 11	200	1	1	27
SDX	15 x 11	200	1	2	20
SDXX	15 x 11	200	1	3	13
SDXXX	15 x 11	200	2	0	6
SDXXXX	15 x 11	200	2	0	27
SDC	15 x 22	100	1	1	27
SDX	15 x 22	100	1	2	20
SDXX	15 x 22	100	1	3	13
SDXXX	15 x 22	100	2	0	6
SDXXXX	15 x 22	100	2	0	27

Relative Weight of Metals.

The Weight of Bar Iron being. .... 1.
                Cast Iron .... .95
                Steel 1.02
                Copper 1.16
                Brass.. .... 1.0 ›
                Lead 1.48

The Weight of Cast Iron being............ 1.
                Bar Iron....... .... 1.07
                Steel 1.08
                Brass 1.16
                Copper 1.21
                Lead 1.66

The Weight of Brass being 1
                Bar Iron. .... .92
                Cast Iron .... .86
                Steel .... .93
                Copper 1.05
                Lead 1.35

The Weight of Copper being 1
                Bar Iron ....,...... .87
                Cast Iron .... .82
                Steel . ... .88
                Brass .... .93
                Lead 1.28

The Weight of Lead being. .... 1.
                Bar Iron..,................ .63
                Cast Iron................... .. .64
                Steel .... .69
                Brass ......,.. .. .. .74
                Copper .... .78

Various Metals.

The Comparative Weight of a Superficial Foot.

Thickness in inches	Wrought Iron.	Cast Iron.	Steel.	Copper.	Brass.	Lead.	Zinc.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1/16	2·626	2·344	2·552	2·891	2·734	3·708	3·104
1/8	5·052	4·667	5·104	5·781	5·469	7·417	4·687
3/16	7·578	7·031	7·656	8·672	8·203	11·125	7·031
1/4	10·104	9·375	10·208	11·563	10·938	14·833	9·375
5/16	12·630	11·719	12·700	14·453	13·672	18·542	11·719
3/8	15·156	14·062	15·312	17·344	16·406	22·250	14·062
7/16	17·682	16·406	17·865	20·234	19·141	25·958	16·406
1/2	20·208	18·750	20·417	23·125	21·875	29·667	18·750
9/16	22·734	21·094	22·969	26·016	24·609	33·375	21·094
5/8	25·260	23·437	25·521	28·906	27·344	37·083	23·437
11/16	27·786	25·781	28·073	31·797	30·078	40·792	25·781
3/4	30·312	28·125	30·625	34·688	32·813	44·500	28·125
13/16	32·830	30·469	33·177	37·578	35·547	48·208	30·469
7/8	35·635	32·812	35·729	40·469	38·281	51·917	32·812
15/16	37·861	35·156	38·281	43·359	41·016	55·625	35·156
1	40·417	37·500	40·833	46·250	43·750	59·333	37·500

Gauge.	Iron.	Copper.	Brass.	Gauge.	Iron.	Copper.	Brass.
30	·48	·550	·527	15	2·88	3·298	3·161
29	·52	·595	·579	14	3·32	3·801	3·644
28	·56	·641	·615	13	3·80	4·351	4·170
27	·64	·733	·703	12	4·36	4·992	4·785
26	·72	·824	·790	11	4·80	5·496	5·268
25	·80	·916	·878	10	5·36	6·137	5·883
24	·88	1·008	·966	9	5·92	6·778	6·497
23	1·00	1·145	1·097	8	6·60	7·557	7·248
22	1·12	1·282	1·229	7	7·20	8·244	7·902
21	1·28	1·466	1·405	6	8·12	9·297	8·912
20	1·40	1·603	1·536	5	8·80	10·076	9·658
19	1·28	1·924	1·844	4	9·52	10·900	10·448
18	1·96	2·244	2·151	3	10·36	11·862	11·370
17	2·32	2·656	2·546	2	11·96	13·007	12·468
16	2·00	2·077	2·853	1	12·00	13·740	13·170

Weight per Lineal Foot of Seamless Drawn Copper Tubes.

Imp. St'd Gauge	Thickness of Copper.							
	6	8	10	12	14	16	18	20
Inch's	0.192	0.160	0.128	0.104	0.080	0.064	0.048	0.036
Inside Diam. Inch's	Weight of a Lineal Foot in Pounds.							
¼	1.03	0.79	0.58	0.44	0.32	0.24	0.17	0.12
⅜	1.32	1.04	0.78	0.60	0.44	0.34	0.25	0.18
½	1.61	1.28	0.97	0.76	0.56	0.44	0.32	0.23
⅝	1.90	1.52	1.17	0.92	0.68	0.53	0.39	0.29
¾	2.19	1.76	1.36	1.07	0.80	0.63	0.46	0.34
⅞	2.48	2.00	1.55	1.23	0.92	0.73	0.54	0.40
1	2.77	2.24	1.75	1.39	1.04	0.82	0.61	0.45
1⅛	3.06	2.49	1.94	1.55	1.17	0.92	0.68	0.51
1¼	3.35	2.73	2.13	1.70	1.29	1.02	0.75	0.56
1⅜	3.64	2.97	2.33	1.86	1.41	1.11	0.83	0.61
1½	3.93	3.21	2.52	2.02	1.53	1.21	0.90	0.67
1⅝	4.22	3.45	2.71	2.17	1.65	1.31	0.97	0.72
1¾	4.51	3.70	2.91	2.33	1.77	1.40	1.04	0.78
1⅞	4.80	3.94	3.10	2.49	1.89	1.50	1.12	0.83
2	5.09	4.18	3.29	2.65	2.01	1.60	1.19	0.89
2⅛	5.38	4.42	3.49	2.80	2.13	1.69	1.26	0.94
2¼	5.67	4.66	3.68	2.96	2.25	1.79	1.33	1.00
2⅜	5.96	4.91	3.88	3.12	2.38	1.89	1.41	1.05
2½	6.25	5.15	4.07	3.28	2.50	1.98	1.48	1.10
2¾	6.83	5.63	4.46	3.59	2.74	2.18	1.62	1.21

Weight per Lineal Foot of Seamless Drawn Copper Tubes.—*Continued.*

Imp. Std. Gauge	Thickness of Copper.							
	1	2	3	4	6	8	10	12
Inch's	.300	.276	.252	.232	.192	.160	.128	.104
Inside Diam. Inch's	Weight of a Lineal Foot in Pounds.							
3	11.98	10.94	9.91	9.07	7.41	6.12	4.84	3.90
3¼	12.88	11.77	10.68	9.77	7.99	6.60	5.23	4.22
3½	13.79	12.61	11.44	10.47	8.58	7.08	5.62	4.53
3¾	14.70	13.44	12.20	11.18	9.16	7.57	6.00	4.85
4	15.61	14.28	12.96	11.88	9.74	8.05	6.39	5.16
4¼	16.51	15.11	13.72	12.58	10.32	8.54	6.78	5.48
4½	17.42	15.95	14.49	13.28	10.90	9.02	7.17	5.79
4¾	18.33	16.78	15.25	13.98	11.48	9.50	7.55	6.11
5	19.23	17.62	16.01	14.68	12.06	9.99	7.94	6.42
5¼	20.14	18.45	16.77	15.39	12.64	10.47	8.33	6.74
5½	21.05	19.29	17.54	16.09	13.22	10.96	8.71	7.05
5¾	21.96	20.12	18.30	10.79	13.80	11.44	9.10	7.36
6	22.86	20.95	19.06	17.49	14.38	11.92	9.49	7.68

To ascertain the weight of a Seamless Tube of other metal, multiply the weight of a similar Copper Tube by 0.9626 for Brass (70 & 30 alloy)—by 0.86 for Wrought Iron—by 0.81 for Cast Iron—or by 1.28 for Lead.

The above weights are theoretically correct: but in practice a slight deviation from the theoretical weight must be expected.

Comparison of different Gauges in use.

Dimensions of Sizes in Decimal Parts of an Inch.

Number of Wire Gauge.	British Imperial Standard.	New Birmingham.	Stubs'.	American or Brown & Sharpe.	Washburn & Moen Mfg. Co.	U. S. Standard for Plate.	Number of Wire Gauge.
0	.324	.396	.34	.324	.306	.312	0
1	.300	.353	3	.289	.283	.281	1
2	.276	.314	.284	.257	.262	.265	2
3	.252	.280	.259	.229	.243	.25	3
4	.232	.250	.238	.204	.225	.234	4
5	.212	.222	.22	.181	.207	.218	5
6	.192	.198	.203	.162	.192	.203	6
7	.176	.176	.18	.104	.177	.187	7
8	.160	.157	.165	.128	.162	.171	8
9	.144	.139	.148	.114	.148	.156	9
10	.128	.125	.134	.101	.135	.140	10
11	.116	.111	.12	.090	.120	.125	11
12	.104	.099	.109	.080	.105	.109	12
13	.092	.088	.095	.071	.091	.093	13
14	.080	.078	.083	.064	.080	.078	14
15	.072	.069	.072	.057	.072	.070	15
16	.064	.062	.065	.050	.062	.062	16
17	.056	.055	.058	.045	.054	.056	17
18	.048	.049	.049	.040	.047	.05	18
19	.040	.044	.042	.035	.041	.043	19
20	.036	.039	.035	.031	.034	.037	20
21	.032	.034	.032	.028	.031	.034	21
22	.028	.031	.028	.025	.028	.031	22
23	.024	.027	.025	.022	.025	.028	23
24	.022	.024	.022	.020	.023	.025	24
25	.020	.022	.02	.017	.020	.021	25
26	.018	.019	.018	.015	.018	.018	26
27	.016	.017	.016	.014	.017	.017	27
28	.014	.015	.014	.012	.016	.015	28
29	.013	.013	.013	.011	.015	.014	29
30	.012	.012	.012	.010	.014	.012	30

Piping.

Compo Pipe.—For Gas Fittings.

Size.	Feet in Coil.	Ozs. per ft.	Size.	Feet in Coil.	Ozs. per ft.
¼	328	4	½	82	16
⅜	218	6	1	53	24
½	164	9	1	33	40
⅝	101	1			

Galvanised Piping (Iron).

Weight per 100 feet.

Size.	Per 100 Feet.			Size.	Per 100 Feet.		
	C.	Q.	L.		C.	Q.	L.
¼	0	3	0	1¼	2	3	2
⅜	1	0	5	2	4	0	6
1	1	1	22	3	6	0	8
1¼	2	1	10				

Lead Pipe.—For Water Connections, &c.

Size.	Feet in Coil.	Lbs. per yd.	Size.	Feet in Coil.	Lbs. per yd.
¼	170	3½	1¼	63	12
¼	127	4½	1¼	38	18
⅜	100	5	1½	57	12
⅜	100	6	1½	55	14
½	90	6½	1½	37	16 & 18
½	76	7½	1½	37	20 & 22
⅝	120	5	1½	38	17
⅝	100	6	2	37	17
⅝	84	7	2	37	20
¾	74	8	2	37	22
¾	64	9	2	31	30
1	76	8	2½	11	30
1	66	10	3	13	35
1	56	12	3½	13	40
1¼	66	10	4	13	50

Where two or more weights of the same size appear in the lead pipe, the heavier may be taken as the standard.

Pipes—Cast Iron (Water).

Spigot and Faucet.

NINE FEET LENGTHS.

Diameter.	Cwts.	Qrs.	Lbs.	Diameter.	Cwts.	Qrs.	Lbs.
2½	0	3	2	14	9	1	26
3	1	0	10	15	9	3	26
4	1	1	16	16	10	3	6
5	2	0	14	18	14	0	25
6	2	2	0	20	16	1	20
7	3	0	20	22	17	3	2
8	3	2	14	24	22	0	0
9	4	2	10	27	24	0	21
10	5	1	0	30	27	0	0
12	7	0	0	33	32	0	0

Drums or Pulleys.

Rules for Calculating the Speed.

The diameter of the driven being given, to find its number of revolutions :

RULE.—Multiply the diameter of the driver by its number of revolutions, and divide the product by the diameter of the driven ; the quotient will be the number of revolutions of the driven.

The diameter and revolutions of the driver being given, to find the diameter of the driven, that shall make any number of revolutions in the same time :

RULE.—Multiply the diameter of the driver by its number of revolutions, and divide the product by the number of revolutions of the driven, the quotient will be its diameter.

To ascertain the size of the driver

RULE.—Multiply the diameter of the driven by the number of revolutions you wish it to make, and divide the product by the revolutions of the driver ; the quotient will be the size of the driver.

GAS TUBES and FITTINGS.

INTERNAL DIAMETER	⅜	½	⅝	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3½	4
TUBES															
Tubes, 2 to 14 ft. long ℔ n.															
Long Screws, 12½-25 in. ea.															
Bends " 3 to 11 in.															
Springs, not socketed															
FITTINGS															
Socket or Pipe Union															85.0
Elbows, round															28.0
Tees															37.0
Crosses															
Plain Sockets															
Diminished Sockets															
Flanges															
Caps															
Plugs															
Backnuts															
Union Ends															
Nipples															
Barrel Nipples															
Union Bends															
Main Cocks															
Round " with Brass Plugs															
" with Brass Plugs															

List of Reducing Fittings is that of the largest diameter.

Weight and Strength of Coil Chain.

Nominal Diameter.	Weight per 100 ft.		English Proof Test.	Amer'n Proof Test.	Best B B B Crane Chain.
	English	Amer'n			
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
3–16''	41½	36	898	700	900
¼	83	72	1680	1200	1500
5–16	116½	110	2621	2500	3200
⅜	158	150	3795	3500	4425
7–16	217	200	5152	4800	6100
½	271½	250	6726	6200	7850
9–16	350	330	8512	7800	9870
⅝	433	420	10505	9600	12150
11–16	535	510	12700	11500	14550
¾	633	580	15120	13800	17475
⅞	817	790	20585	18800	23780
1	1083	1020	26886	24600	31200
1⅛	1267	1270	34003	29500	37300
1¼	1500	1580	41000	36500	46175
1⅜	1800	1880	50803	44000	55660
1½	2083	2220	60480	52500	66400

Actual breaking strain of American is about double the proof tests, while the safe working load is about one-half the test.

Weights and Strength of Wire Ropes.

Circum-ference.	Breaking strain in gross tons				Weight in lbs. per fathom			Diameter.	Circum-ference.
	Galv'd C.S. Hawser.	Galv'd B.B. Rigging.	Plough quality Cast Steel.	Patent Cast Steel.	Flexible Hawsers.	B.B. Wire Rigging.	Patent Steel Hoisting Ropes.		
6"	88	55	170	115	30	32	34½	1⅞	6"
5½	74	42	142	95	26	26	29	1¾	5½
5	59	34	120	80	21	22	24	1⅝	5
4½	47	32	101	71	17	20	21½	1½	4½
4¼	36	26	85	57	12½	16	17½	1⅜	4¼
4	33	22	75	51	11	14	15½	1¼	4
3½	26	16	58	39	8	11	12½	1⅛	3½
3	18	11	42	28	6	8	8¼	1	3
2¾		8.55	36	24	5	7	7	13-16	2¾
2½	12	7.4	29	20	4	6	6	11-16	2½
2¼	9½	6.35	23	15½	3½	5	5	⅝	2¼
2	7	4.3	18½	12½	2¾	4	4	9-16	2
1¾	5¼	3.25	14½	9½	2	3	3	½	1¾
1½		2.25	10¾	7	1½	2	2	7-16	1½
1¼	3	1.75	6	4½	1¾	1½	1½	⅜	1¼
1	1½	.1	4½	3	¾			5-16	1

Wire.

Comparative Weight of 100 Lineal Feet. Standard Gauge.

Gauge.	Iron.	Steel.	Brass.	Copper.
	lbs.	lbs.	lbs.	lbs.
0	27·77	28·06	30·58	31·78
1	23·81	24·05	26·21	27·24
2	20·15	20·36	22·19	23·06
3	16·80	16·97	18·50	19·22
4	14·24	14·39	15·68	16·29
5	11·89	12·01	13·09	13·61
6	9·75	9·85	10·74	11·16
7	8·19	8·28	9·02	9·38
8	6·77	6·84	7·46	7·45
9	5·49	5·42	6·04	6·28
10	4·53	4·35	4·77	4·96
11	3·60	3·60	3·92	4·07
12	2·86	2·89	3·15	3·27
13	2·24	2·26	2·47	2·56
14	1·69	1·71	1·86	1·94
15	1·37	1·39	1·51	1·57
16	1·08	1·40	1·19	1·24
17	·83	·84	·22	·95
18	·61	·62	·67	·70
19	·42	·43	·47	·49
20	·34	·35	·38	·39

WEIGHT OF A CUBIC INCH OF

Lead	equals	...	...	·4103 lb.
Copper, sheet	,,	...	...	·3225 ,,
Brass, ,,	,,	...	...	·3037 ,,
Iron, ,,	,,	...	...	·279 ,,
Iron, cast	,,	...	...	·263 ,,
Tin, ,,	,,	...	...	·2636 ,,
Zinc, ,,	,,	...	...	·26 ,,
Water	,,	...	...	·03617 ,,

Barb Wire.

No. 12 contains 440 yards per cwt.
No. 14 contains 710 yards per cwt.

Iron Fencing Wire.

Gauge	WEIGHT OF		LENGTH OF	
	100 yds.	1 mile.	1 cwt.	1 ton.
	lbs.	lbs.	yards.	yards.
4	40·6	714	276	5520
5	33·8	595	332	6640
6	28·2	495	397	7940
7	23·4	412	470	9580
8	19·6	344	573	11460
9	16·5	290	680	13600
10	13·7	241	819	16380
11	8	142	1392	27860
12	4·8	85	2322	45440

Steel Wire.

Table showing quantity required per mile of fencing.

Gauge	Length per Cwt.	WEIGHT REQUIRED PER MILE													
		One Wire.			Two Wires.			Three Wires.			Four Wires.			Five Wires.		
NO.	YDS.	c.	q.	l.	c.	q.	l.	c.	q.	l.	c.	q.	l.	c.	q.	l.
4	255	6	3	17	13	3	6	20	2	23	27	2	12	34	2	1
5	303	6	3	6	11	2	12	17	1	18	23	0	24	29	0	2
6	361	4	3	14	9	3	0	14	2	14	19	2	0	24	1	19
7	428	4	0	13	8	0	26	12	1	11	16	1	24	20	2	9
8	509	3	1	23	6	3	18	10	1	13	13	3	8	17	1	3
9	609	2	3	15	5	3	2	8	2	17	11	2	4	14	1	19
10	747	2	1	12	4	2	24	7	0	8	9	1	20	11	3	4
12	1,244	1	1	18	2	3	8	4	0	26	5	2	16	7	0	6
14	2,240	0	3	4	1	2	8	2	1	12	3	0	16	3	3	20
15	2,800	0	2	14	1	1	0	1	3	14	2	2	0	3	0	14
16	3,500	0	2	0	1	0	0	1	2	0	2	0	0	2	2	0
18	6,222	0	1	4	0	2	8	0	3	12	1	0	16	1	1	20
20	11,200	0	0	18	0	1	8	0	1	26	0	2	16	0	3	6

Wire Netting.

Approximate weight per Mile, 24 inches wide.

(Other widths may be estimated pro rata.)

Size.	Weight.	Size.	Weight.
inches.	cwt. qr. lbs	inches.	cwt qr. lbs.
24 x ½ x 20	18 0 26	24 x 2 x 19	6 1 21
24 x ¾ x 19	16 3 25	.. x 2 x 18	8 1 12
,, x ¾ x 20	12 2 12	.. x 2 x 17	12 0 14
24 x 1 x 19	12 2 8	.. x 2 x 16	14 0 25
,. x 1 x 20	9 3 17	24 x 2½ x 18	6 3 8
24 x 1¼ x 19	9 3 8	.. x 2½ x 17	9 3 17
.. x 1¼ x 18	12 0 10	.. x 2½ x 16	11 2 15
.. x 1¼ x 17	16 2 19	24 x 3 x 18	5 1 8
24 x 1½ x 19	8 2 14	.. x 3 x 17	7 2 16
.. x 1½ x 18	11 1 1	.. x 3 x 16	9 2 18
.. x 1½ x 17	14 1 10	.. x 3 x 15	13 0 14
24 x 1¾ x 19	7 0 17	.. x 3 x 14	15 0 12
.. x 1¾ x 18	8 2 7	24 x 4 x 16	7 2 22
.. x 1¾ x 17	13 1 6	.. x 4 x 15	9 2 6
		.. x 4 x 14	11 0 26

Birmingham Wire Gauge

Comparative Sizes.

No	1	4	7	11	16	22	gauges =
	3/16	1/4	3/16	1/8	1/16	1/32	of an inch

WIRE NETTING.—(ENGLISH "ROLL" LIST).

Per Roll of 50 Yards.

Mesh	Gauge	12-in.	18-in.	24-in.	30-in.	36-in.	42-in.	48-in.	60-in.	72-in.
½-in.	22	13/3	19/11	26/6	33/2	39/9	46/5	53/0	66/4	..
,,	20	16/0	24/0	32/0	40/0	48/0	56/0	64/0	80/0	..
⅝-in.	20	9/0	12/0	16/0	20/0	24/0	28/0	32/0	40/0	48/0
,,	19	10/3	15/5	20/6	25/8	30/9	35/11	41/0	51/4	61/6
1-in.	20	6/3	9/7	12/9	16/0	19/2	22/4	25/6	..	..
,,	19	7/3	10/11	14/6	18/2	21/9	25/5	29/0	..	..
,,	18	8/0	13/2	17/6	21/11	26/3	30/8	35/0	..	..
1¼-in.	19	4/9	7/2	9/6	11/11	14/3	16/8	19/0	23/10	28/6
,,	18	5/9	8/8	11/6	14/5	17/3	20/2	23/0	28/9	34/6
,,	17	7/3	10/11	14/6	18/2	21/9	25/5	29/0	36/3	43/6
,,	16	9/6	14/3	19/0	23/9	28/6	33/3	38/0	47/6	57/0
1½-in.	19	4/9	7/2	9/6	11/11	14/3	16/8	19/0	23/0	28/6
,,	18	5/9	8/8	11/6	14/5	17/3	20/2	23/0	28/9	34/6
,,	17	7/3	10/11	14/6	18/2	21/9	25/5	29/0	36/3	43/6
,,	16	9/6	14/3	19/0	23/9	28/6	33/3	38/0	47/6	57/0
1¾-in.	19	4/5	6/7	8/9	11/0	13/2	15/4	17/6	21/11	26/3
,,	18	5/5	8/1	10/9	13/6	16/2	18/10	21/6	26/11	32/3
,,	17	7/0	10/6	14/0	17/6	21/0	24/6	28/0	35/0	42/0
,,	16	8/9	13/2	17/6	21/11	26/3	30/8	35/0	43/9	52/6
2-in.	19	3/6	5/3	7/0	8/9	10/6	12/3	14/0	17/6	21/0
,,	18	4/5	6/7	8/9	11/0	13/2	15/4	17/6	21/11	26/3
,,	17	5/11	8/10	11/9	14/9	17/8	20/7	23/6	29/5	35/3
,,	16	7/6	11/3	15/0	18/9	22/6	26/3	30/0	37/6	45/0
,,	15	9/3	13/11	18/6	23/2	27/9	32/5	37/0	46/3	55/6
2½-in.	19		4/11	6/6	8/2	9/9	11/5	13/0	16/3	19/6
,,	18		6/3	8/3	10/4	12/5	14/6	16/6	20/8	24/9
,,	17		7/11	10/6	13/2	15/9	18/5	21/0	26/3	31/6
,,	16		10/2	13/6	16/11	20/3	23/8	27/0	33/9	40/6
3-in.	18			6/0	8/6	10/2	11/10	13/6	16/11	20/3
,,	17			8/0	11/0	13/2	15/4	17/6	21/11	26/3
,,	16			11/0	13/0	16/5	19/3	22/0	26/0	33/0
,,	15			13/0	16/3	19/6	22/9	26/0	30/9	39/0
,,	14			15/9	19/9	23/9	27/7	31/6	39/5	47/3
4-in.	16			8/0	10/6	12/0	14/0	16/0	20/0	24/0
,,	15			10/6	13/2	15/9	18/6	21/0	26/3	31/6
,,	14			12/6	15/8	18/9	21/11	25/0	31/3	37/6

Relative Value based on Mile Measurements.

Per Mile.	Per 100 Yards.
£40 0 0	£2 5 5
39 10 0	2 4 11
39 0 0	2 4 4
38 10 0	2 3 9
38 0 0	2 3 2
37 10 0	2 2 7
37 0 0	2 2 1
36 10 0	2 1 6
36 0 0	2 0 11
35 10 0	2 0 4
35 0 0	1 19 9
34 10 0	1 19 2
34 0 0	1 18 8
33 10 0	1 18 1
33 0 0	1 17 6
32 10 0	1 16 11
32 0 0	1 16 4
31 10 0	1 15 10
31 0 0	1 15 3
30 10 0	1 14 8
30 0 0	1 14 1
29 10 0	1 13 6
29 0 0	1 12 11
28 10 0	1 12 5
28 0 0	1 11 10
27 10 0	1 11 3
27 0 0	1 10 8
26 10 0	1 10 1
26 0 0	1 9 7
25 10 0	1 9 0
25 0 0	1 8 5
24 10 0	1 7 10
24 0 0	1 7 3
23 10 0	1 6 8
23 0 0	1 6 2

Relative Value based on Mile Measurements.

Per Mile.			Per 100 Yards.		
£22	10	0	£1	5	7
22	0	0	1	5	0
21	10	0	1	4	5
21	0	0	1	3	10
20	10	0	1	3	4
20	0	0	1	2	9
19	10	0	1	2	2
19	0	0	1	1	7
18	10	0	1	1	0
18	0	0	1	0	5
17	10	0	0	19	11
17	0	0	0	19	4
16	10	0	0	18	9
16	0	0	0	18	2
15	10	0	0	17	7
15	0	0	0	17	1
14	10	0	0	16	6
14	0	0	0	15	11
13	10	0	0	15	4
13	0	0	0	14	9
12	10	0	0	14	2
12	0	0	0	13	8
11	10	0	0	13	1
11	0	0	0	12	6
10	10	0	0	11	11
10	0	0	0	11	4
9	10	0	0	10	10
9	0	0	0	10	3
8	10	0	0	9	8
8	0	0	0	9	1
7	10	0	0	8	6
7	0	0	0	7	11
6	10	0	0	7	5
6	0	0	0	6	10
5	10	0	0	6	3
5	0	0	0	5	8

Hints for Reckoning.

TO FIND THE SUPERFICIAL MEASUREMENT OF TIMBER.

Multiply the breadth by the thickness in inches, divide by 12, then multiply product by the length.

TO FIND THE VALUE OF A GIVEN WEIGHT AT A GIVEN PRICE PER TON.

EXAMPLE— Tons. cwt. qrs. lbs.
        2   10   1   18 @ £5/10/- per ton.

Reckon the tons as pounds; cwts. as shillings; each qr. as 3d. and for every 9 lbs. 1d., equals

per ton = £2 10 5 multiplied by the price
                5½ pounds sterling.

        £12 12 1
          1   5 2½

        £13 17 3½ Answer.

TO FIND THE PREMIUM OR DISCOUNT OF ANY SUM.

EXAMPLE :— £24/10/6 @ 3½º/₀.

Multiply the sum named by double the rate per cent. and point off the product one to the right.

            £24 10 6
double 3½ =   7

       £17·1 13 6 Answer 17 1/10 th of a shilling,
                        say 17/2

ANOTHER SIMPLE CALCULATION is to divide the discount rate

by 5; and multiply the amount to be dealt with by the quotient; then by reading the pounds as shillings, and the shillings in equal proportion, the result will be the amount of discount or premium, as the case may require.

EXAMPLE :—£9 10 0 @ 40º/₀.

Divide 40 by 5 leaves 8, multiply
                £9 10 0
         by   8

       £76· 0 0 Answer 76 shillings.

Gold.
Table of the Qualities and Value.

		£ s. d.		Alloy Contained.	
24 Carats		4 5 0		Nil.	
23	,,	4 1 5½		1 Carat	
22	,,	3 17 11		2	,,
21	,,	3 14 4½		3	,,
20	,,	3 10 10		4	,,
19	,,	3 7 3½		5	,,
18	,,	3 3 9		6	,,
17	,,	3 0 2½		7	,,
16	,,	2 16 8		8	,,
15	,,	2 13 1½		9	,,
14	,,	2 9 7		10	,,
13	,,	2 6 0½		11	,,
12	,,	2 2 6		12	,,
11	,,	1 18 11½		13	,,
10	,,	1 15 5		14	,,
9	,,	1 11 10½		15	,,
8	,,	1 8 4		16	,,
7	,,	1 4 9½		17	,,
6	,,	1 1 3		18	,,

Gold and Silver Plate.

English Sterling Plate is denoted by the following marks, viz.:

1. Initial letters of the maker's Christian and surname.
2. Hall Mark stamp denoting where manufactured.
3. Duty Mark being the head of the reigning sovereign.
4. A letter and device indicating the year in which the plate is made.

The **Hall Mark** shows where the gold or silver plate upon which it is stamped was manufactured or assayed, viz.:

LONDON	A Leopard's Head.	CHESTER	A Dagger and Three Wheat Sheaves
EDINBURGH	Castle and Lion.	EXETER	A Castle with 3 wings
GLASGOW	Tree and Salmon with ring to mouth.	SHEFFIELD	A Crown
BIRMINGHAM	An Anchor.	YORK	Five Lions & a Cross
NEWCASTLE	Three Castles.	DUBLIN	A Figure of Hibernia

The Standard Mark for Gold is—

For ENGLAND	A lion passant	For GLASGOW A rampant lion
,, EDINBURGH	A thistle	,, all IRELAND A crowned harp

The Standard Mark for Silver throughout the United Kingdom is the figure of Britannia.

Foreign Monies

And their English Equivalents.

(Subject to variation in Standard Currencies.)

ENGLISH Money.			UNITED STATES and CANADA.	FRANCE.	GERMANY.
£	s.	d.	Dol. Cent.	Franc. Cent.	Mark. Pfen.
0	5	0	1 22	6 30	5 10
0	6	0	1 46	7 50	6 12
0	7	0	1 70	8 80	7 14
0	8	0	1 94	10 0	8 16
0	9	0	2 19	11 30	9 18
0	10	0	2 43	12 61	10 20
0	11	0	2 67	13 80	11 22
0	12	0	2 92	15 10	12 24
0	13	0	3 16	16 30	13 26
0	14	0	3 40	17 60	14 28
0	15	0	3 65	18 90	15 30
0	16	0	3 89	20 10	16 32
0	17	0	4 12	21 40	17 34
0	18	0	4 38	22 60	18 36
0	19	0	4 62	23 90	19 38
1	0	0	4 86	25 22	20 40

INDIA :—RUPEE is nominally of the value of 1/4 sterling.

SPAIN :—One PESETA   ,,   . nearly 9½d.

AUSTRIA :—One KRONER ..   .   10d.   ,,

	EXAMPLE :—
To ascertain the ENGLISH equivalent of AMERICAN Dollars and Cents, divide the same by 2, then by 12, and again by 20.	DOL. CENT. 500·25 to English equiv.
2	
12	25,012—1
20	2084—4 shillings & pence
Answer—£104, 4s. 4d.	104·4 pounds & shillings

Mensuration.

Simple Rules.

The **area** of a circle is about three-fourths the area of a square, having a side equal to its diameter.

The **circumference** of a circle is about three and one-seventh times its diameter.

The **cubical contents** of **cones** or **pyramids** are one-third that of cylinders or prisms, respectively, which have the same size base and are equal in height.

The **area** of the **curved surface** of a **cone** can be found by multiplying the slope of the cone by the circumference of the base and dividing by two.

Cisterns or Tanks.

Square or rectangular.—Multiply the length by the breadth, and the product by the depth; the result multiplied by 6¼ (6·2321) will give the base and contents in gallons.

Circular.—Multiply the diameter into itself and deduct one-fifth from the product, then multiply the remainder by the depth, and the result by 6¼ (6·2321) will give the contents in gallons.

Water.—A cube foot of water contains nearly 6¼ gallons (6·2321) and weighs a fraction over 62lbs. (62·5).

French Weights and Measures.

Metre	3.2808992 feet.
Decametre (=dix metres)	32.808992 feet.
Hectometre (=cent metres)	328.08992 feet.
Kilometre (=mille metres)	1093.633 yards.
Myriametre (=dix mille metres)	6.2138 miles.
Decimetre (=dixieme de metre)	3.937079 inches.
Centimetre (=centieme de metre)	.39371 inch.
Millimetre (=millieme de metre)	.03937 inch.
Are (=cents metres carres)	.098845 rood.
Hectare (=dix mille metres carres)	2.471143 acres.
Centiare (un metres carre)	1.196033 sq. yards.
Litre (=un decimetre cube)	1.760773 pint.
Decalitre (=dix litres)	2.2009668 gallons.
Hectolitre (=cent litres)	22.009668 gallons.
Kilolitre (=mille litres)	220.09668 gallons.
Decilitre (=dixieme de litre)	.17607 pint.
Centilitre (=centieme de litre)	.017607 pint.
Gramme	15.432349 grains troy.
Decagramme (=dix grammes)	5.6438 drachms av.
Hectogramme (=cent grammes)	3.527 oz. avoir.
Kilogrammes (mille grammes)	2.204621 lbs. av. ; or, 2.079227 lbs. troy.
Quintal metrique (=50 kilogrammes)	110.231 lbs. avoir.
Millier (tonneau de mer) (= 500 kilogrammes)	1102.31 lbs. avoir.
Tonne (=mille kilogrammes)	2204.621 lbs. avoir.
Decigramme (=dixiemme de gramme)	1.5432 grain.
Centigramme (=centieme de gramme)	0.15432 grain.
Milligramme (=millieme de gramme)	0.015432 grain.

64.

$$17.17.6$$
$$8.18.9$$
$$1.10.0$$

64) 10 8 9 (3/
$$20$$
$$20\ 8$$
$$\underline{192}$$
$$.16\quad 8$$
$$12$$
$$\underline{20\ 1}$$
$$192$$

(3

Memoranda.

Memoranda.

$$228 \overline{)\begin{array}{c} 60 \\ 17 \\ \hline 0 \end{array}} \big(3$$

$$\begin{array}{c} 77 \\ 68 \ 4 \end{array}$$

$$23$$

Lysaght's Trade Marks.

"**O**RB" **Galvanized Corrugated Iron** is favorably known and used throughout the world. Its uniformly reliable character is recognised by consumers everywhere. There are many imitations, but to those who compare its covering capacity with other nominally cheaper brands, its superiority in all respects is at once apparent.

"**W**EIGHT BEARING" **Iron** Lysaght's "**ORB**" brand used for building purposes, maintains the makers' reputation and may be specified by Architects and Engineers in the full confidence that it will justify their preference.

"**R**EDCLIFFE" **Corrugated Iron.**—A brand of well-established repute and a large demand—occupying a premier position in those markets in which price is a primary consideration.