

MISCELLANEOUS ENGLISH WEIGHTS AND MEASURES—Continued.

MEASURES OF TIME.

60 Seconds.....	= 1 Minute.
60 Minutes.....	= 1 Hour.
24 Hours.....	= 1 Day.
7 Days.....	= 1 Week.
28 Days.....	= 1 Lunar Month.
28, 29, 30, or 31 Days.....	= 1 Calendar Month.
12 Calendar Months.....	= 1 Year.
365 Days.....	= 1 Common Year.
366 Days.....	= 1 Leap Year.

ANGULAR MEASURE.

60 Seconds.....	= 1 Minute.
60 Minutes.....	= 1 Degree.
30 Degrees.....	= 1 Sign.
90 Degrees.....	= 1 Quadrant.
4 Quadrants, or 360°.....	= 1 Circumference, or Great Circle.

CUBIC OR SOLID MEASURE.

1728 Cubic Inches.....	= 1 Cubic Foot.
27 Cubic Feet.....	= 1 Cubic Yard.
40 Do. of Rough, or.....	} = 1 Ton or Load.
50 Do. of Hewn Timber.....	
42 Cubic Feet of Timber.....	= 1 Shipping Ton.
108 Cubic Feet.....	= 1 Stack of Wood.
128 Cubic Feet.....	= 1 Cord of Wood.
40 Cubic Feet.....	= 1 Ton Shipping.

LIQUID MEASURE.

	Gals.	Qts.	Pts.
Four Gills, one Pint.....	1
Quart.....	..	1	2
Gallon.....	1	4	8
Firkin or Quarter Barrel.....	9	36	72
Kilderkin or Half Barrel.....	18	72	144
Barrel.....	36	144	288
Hogshead of Ale (1½ barrel).....	54	216	432
Puncheon.....	72	288	576
Butt of Ale (3 barrels).....	108	432	864

Practically, the only measures in use are gallons and quarts, the others are merely nominal; *e. g.*, the hogshead of 54 gallons, *old measure*, contains but 52 gallons, 1 quart, 1 pint, and 3.55 gills imperial measure, and of wine six nominal quart bottles go to the gallon. Of imported wines the following are the usual measurements:

Pipe of Port or Masdeu.....	= 115 Gallons.
" Teneriffe.....	= 109 "

Pipe of Marsala.....	= 93 Gallons
Madeira and Cape.....	= 92 "
Butt of Lisbon and Bucellas.....	= 117 "
Sherry and Tent.....	= 108 "
Aum of Hock and Rhenish.....	= 30 "
Hogshead of Claret.....	= 46 "

DRY OR CORN MEASURE.

4 Quarts.....	= 1 Gallon.
2 Gallons.....	= 1 Peck.
4 Pecks.....	= 1 Bushel.
3 Bushels (four of corn).....	= 1 Sack.
12 Sacks.....	= 1 Chaldron.
8 Bushels, or two sacks.....	= 1 Quarter.
5 Quarters.....	= 1 Load.

MEASURES OF WEIGHT.—AVOIRDUPOIS.

27½ Grains.....	= 1 Drachm = 27½	} Grains.
16 Drachms.....	= 1 Ounce = 437½	
16 Ounces.....	= 1 Pound = 7000	} Grains.
8 Pounds.....	= 1 Stone of Butcher's Meat.	
14 Pounds.....	= 1 Ordinary Stone.	
28 Pounds.....	= 1 Quarter (qr.).	
4 Quarters.....	= 1 Hundredweight (cwt.).	
20 Cwt.....	= 1 Ton.	

This weight is used in almost all commercial transactions, and common dealings.

TROY WEIGHT.

3⅞ Grains.....	= 1 Carat.
24 Grains.....	= 1 Pennyweight.
20 Pennyweights.....	= 1 Ounce = 480 grs.
12 Ounces.....	= 1 Pound = 5760 "

HAY AND STRAW.

Truss of Straw, 36 lb.
Truss of Old Hay, 56 lb.
Truss of New Hay, 60 lb.
Load, 36 Trusses = Straw, 11 cwt. 2 qrs. 8 lb.; Old Hay, 18 cwt.; New Hay, 19 cwt. 1 qr. 4 lb.

WOOL.

		cwt.	qr.	lb.
7 Pounds.....	= 1 Clove.....	0	0	7
2 Cloves.....	= 1 Stone.....	0	0	14
2 Stones.....	= 1 Tod.....	0	1	0
6½ Tods.....	= 1 Wey.....	1	2	14
12 Sacks.....	= 1 Last.....	39	0	0

FRENCH METRICAL SYSTEM OF WEIGHTS AND MEASURES.

The Metrical System is based upon the length of the fourth part of a terrestrial meridian. The ten-millionth part of this arc was chosen as the unit of measures of length, and called *Mètre*. The cube of the tenth part of the *mètre* was adopted as the unit of capacity, and denominated *Litre*. The weight of a litre of distilled water at its greatest density

was called *Kilogramme*, of which the thousandth part, or *Gramme*, was adopted as the unit of weight. The multiples of these proceeding in decimal progression are distinguished by the employment of the prefixes *deca*, *hecto*, *kilo*, and *myria*, from the Greek, and the subdivisions by *deci*, *centi*, and *milli*, from the Latin:—

MEASURES OF LENGTH (UNIT MÈTRE).

EQUAL TO	Inches.	Feet.	Yards.	Fathoms.	Miles.
Millimètre.....	0.03937 ..	0.003281 ..	0.0010936 ..	0.0005468 ..	0.000006
Centimètre.....	0.39371 ..	0.032809 ..	0.0109363 ..	0.0054682 ..	0.000062
Décimètre.....	3.93708 ..	0.328090 ..	0.1093633 ..	0.0546816 ..	0.000621
MÈTRE.....	39.37079 ..	3.280989 ..	1.0936331 ..	0.5468165 ..	0.006214
Décamètre.....	393.70790 ..	32.809892 ..	10.9363306 ..	5.4681653 ..	0.0062138
Hectomètre.....	3937.07900 ..	328.09917 ..	109.3633056 ..	54.6816528 ..	0.0621382
Kilomètre.....	39370.79000 ..	3280.899167 ..	1093.6330556 ..	546.8165278 ..	0.6213824
Myriamètre.....	393707.90000 ..	32808.991667 ..	10936.3305556 ..	5468.1652778 ..	6.2138242

CUBIC, OR MEASURES OF CAPACITY (UNIT LITRE).

EQUAL TO	Cubic Inches.	Cubic Feet.	Pints.	Gallons.	Bushels.
Millilitre, or cubic centimètre.....	0.06103 ..	0.00035 ..	0.00176 ..	0.0002201 ..	0.0000275
Centilitre, 10 cubic do.....	0.61027 ..	0.000353 ..	0.01761 ..	0.0022010 ..	0.0002751
Déclilitre, 100 cubic do.....	6.10271 ..	0.003532 ..	0.17608 ..	0.0220007 ..	0.0027512
LITRE, or cubic Décimètre.....	61.02705 ..	0.023517 ..	1.76077 ..	0.2200967 ..	0.0027512
Décalitre, or Centistère.....	610.27052 ..	0.353166 ..	17.60773 ..	2.2009668 ..	0.2751208
Hectolitre, or Décistère.....	6102.70515 ..	3.531658 ..	176.07734 ..	22.0096677 ..	2.7512085
Kilolitre, or Stère, or cubic mètre.....	61027.05152 ..	35.316581 ..	1760.77341 ..	220.0966767 ..	27.5120840
Myrialitre, or Décastère.....	610270.51519 ..	353.165807 ..	17607.73414 ..	2200.9667675 ..	275.1208459

MEASURES OF WEIGHT (UNIT GRAMME).

EQUAL TO	Grains.	Troy Oz.	Avoirdupois lb.	Cwt. = 112 lb.	Tons = 20 cwt.
Milligramme.....	0.01543 ..	0.00032 ..	0.000022 ..	0.0000000 ..	0.0000000
Centigramme.....	0.15432 ..	0.000322 ..	0.0000220 ..	0.0000002 ..	0.0000000
Déigramme.....	1.54323 ..	0.003215 ..	0.0002205 ..	0.0000020 ..	0.0000001
GRAMME.....	15.43235 ..	0.0232151 ..	0.0022046 ..	0.0000197 ..	0.0000010
Déigramme.....	154.32349 ..	0.321597 ..	0.0220462 ..	0.0019684 ..	0.0000098
Hectogramme.....	1543.23488 ..	3.215973 ..	0.2204621 ..	0.0196841 ..	0.0000984
Kilogramme.....	15432.34880 ..	32.159727 ..	2.2046213 ..	0.0196841 ..	0.0009842
Myriagramme.....	154323.48800 ..	321.597267 ..	22.0462126 ..	0.1968412 ..	0.0098421

SQUARE, OR MEASURES OF SURFACE (UNIT ARE).

EQUAL TO	Sq. Feet.	Sq. Yards.	Sq. Perches.	Sq. Rods.	Sq. Acres.
Centiare, or square mètre.....	10.764299 ..	1.196033 ..	0.0395383 ..	0.0009885 ..	0.0002471
ARE, or 100 square mètres.....	1076.429934 ..	119.603326 ..	3.9538290 ..	0.0988457 ..	0.0247114
Hectare, or 10,000 square mètres.....	107642.993419 ..	11960.332602 ..	395.3828959 ..	9.8845724 ..	2.4711431

TABLE FOR THE CONVERSION OF METRIC WEIGHTS AND MEASURES INTO ENGLISH.

Mètres into yards.		Kilomètres to miles and yards.		Litres into galls. and quarts.		Hectolitres into quarts and bushels.		Kilogrammes into cwt., qrs., lbs., oz.		Hectares into acres, r., p.	
1	1.094	1	0 1094	1	0 0.880	1	0 2.751	1	0 0 2 3¼	1	2 1 35
2	2.187	2	1 427	2	0 1.761	2	0 5.502	2	0 0 4 6½	2	4 3 31
3	3.281	3	1 1521	3	0 2.641	3	1 0.254	3	0 0 6 9¾	3	7 1 26
4	4.374	4	2 855	4	0 3.521	4	1 3.005	4	0 0 8 13	4	9 3 22
5	5.468	5	3 188	5	0 4.402	5	1 5.756	5	0 0 11 0¾	5	12 1 17
6	6.562	6	3 1282	6	1 1.282	6	2 0.507	6	0 0 13 3½	6	14 3 12
7	7.655	7	4 615	7	1 2.163	7	2 3.258	7	0 0 15 7	7	17 1 8
8	8.749	8	4 1709	8	1 3.043	8	2 6.010	8	0 0 17 10¾	8	19 3 3
9	9.843	9	5 1043	9	1 3.923	9	3 0.761	9	0 0 19 13¾	9	22 0 38
10	10.936	10	6 376	10	2 0.804	10	3 3.512	10	0 0 22 0¾	10	24 2 34
20	21.873	20	12 753	20	4 1.608	20	6 7.024	20	0 1 16 1½	20	49 1 28
30	32.809	30	18 1129	30	6 2.412	30	10 2.536	30	0 2 10 2½	30	74 0 21
40	43.745	40	24 1505	40	8 3.215	40	13 6.048	40	0 3 4 3	40	98 3 15
50	54.682	50	31 122	50	11 0.019	50	17 1.560	50	0 3 26 3¾	50	123 2 9
60	65.618	60	37 498	60	13 0.823	60	20 5.072	60	1 0 20 4¾	60	148 1 3
70	76.554	70	43 874	70	15 1.627	70	24 0.585	70	1 1 14 5¾	70	172 3 37
80	87.491	80	49 1251	80	17 2.431	80	27 4.097	80	1 2 8 6	80	197 2 38
90	98.427	90	55 1627	90	19 3.235	90	30 7.609	90	1 3 2 6¾	90	222 1 24
100	109.363	100	62 243	100	22 0.039	100	34 3.121	100	1 3 24 7	100	247 0 18
200	218.727	200	124 487	200	44 0.077	200	68 6.242	200	3 3 20 15	200	494 0 37
300	328.090	300	186 730	300	66 0.116	300	103 1.362	300	5 3 17 6	300	741 1 15
400	437.453	400	248 973	400	88 0.155	400	137 4.483	400	7 3 13 14	400	988 1 33
500	546.816	500	310 1217	500	110 0.193	500	171 7.604	500	9 3 10 5	500	1235 2 11

FOREIGN WEIGHTS AND MEASURES.

FRANCE.

I. Measure of Length.

- 1 Myriamètre..... = 10000 Mètres.
 1 Kilomètre..... = 1000 Mètres.
 1 Decamètre..... = 10 Mètres.
 1 Mètre..... = The 10,000,000 part of the quarter of the meridian of the earth.
 1 Decimètre..... = 1-10th of a mètre.
 1 Centimètre..... = 1-100th of a mètre.
 1 Millimètre..... = 1-1000th of a mètre.

II. Measure of Surface.

- 1 Hectare..... = 100 Ares.
 1 Are..... = 100 Square mètres.
 1 Centiare..... = 1 Square mètre.

III. Measure of Solidity.

- 1 Stere..... = 1 Cubic mètre.
 1 Decistere..... = 1-10th of a stere.

IV. Measure of Capacity.

- 1 Kilolitre..... = 1 Cubic mètre.
 1 Hectolitre..... = 10 Decalitres.
 1 Decalitre..... = 10 Litres.
 1 Litre..... = 1 Cubic decimètre.
 1 Decilitre..... = 1-10th of a litre.

V. Measure of Weight.

- 1 Millia..... = 1000 Kilogrammes, and is the weight of a ton of sea-water.
 1 Quintal..... = 100 Kilogrammes.
 1 Kilogramme..... = Weight of a cubic decimètre of water, at the temperature of 4° above melting ice, or about 40° Fahrenheit.
 1 Hectogramme..... = 100 Grammes.
 1 Decagramme..... = 10 Grammes.
 1 Gramme..... = 1-1000th of a kilogramme.
 1 Decigramme..... = 1-10th of a gramme.

These measures may be compared with the English measures by means of the following table:

- 1 Mètre..... = 39.38 English inches, nearly.
 1 Are..... = 3.9 English perches, nearly.
 1 Stere..... = 35.32 English cubic feet.
 1 Litre..... = 1.76 English pints.
 1 Gramme..... = 15.44 English grains.

BELGIUM.

The metrical system is used here; but the kilogramme is termed a livre; the litre, a litron; and the mètre, an aune.

NETHERLANDS.

Here, also, the metrical system has been adopted; but Flemish names are employed instead of those used in France.

LOMBARDO-VENETIAN KINGDOM.

The metrical system, with Italian names substituted for most of the original terms, is used officially; but the old measures are also used. See *Venice*.

AUSTRIA.

The ell = 30.6 inches. The joch = 1 acre 1.75 rood. The metzen = 1-7 bushel. The eimer = 12.4 gallons. The pfund = 1-2 pound. Gold and silver are weighed by the mark of Vienna, which = 4333 grains.

BASLE.

100 pounds = 108.6 pounds avoirdupois. The ohm = 10.7 gallons. The sack = 3.6 bushels. The large and small ells = 46.4 and 21.4 inches respectively.

BAVARIA.

The long and short ells = 24 and 23.3 inches respectively. The schaff of 8 metzen = 5.6 bushels. The muid of 48 máss = 15 gallons. 100 pounds heavy and light weight = 108.3 and 104.2 pounds avoirdupois respectively. The mark of Augsburg = 3643 grains.

BREMEN.

The foot or half-ell = 11.4 inches. The ohm = 31.5 gallons. The last = 10.2 quarters. 100 pounds = 109.9 pounds avoirdupois.

CAPE OF GOOD HOPE.

The centner, or 100 pounds Dutch weight = 108.9 pounds avoirdupois. The leager of 15 ankers = 126.5 gallons. The muid of schepels = 3 bushels. The ell of 27 Rhyndland inches = 27.8 inches.

CHINA.

The chang of 10 chih = 4 yards, nearly. The shing = 1 pint. 10 ho = 1 shing; 10 shing = 1 tow; 10 tow = 1 lwuh, or 120 catties. The catty = 1.33 pound avoirdupois. 16 taels = 1 catty; 100 catties = 1 pecul. Liquids are sold by weight; but the English gallon is used in trading with foreigners.

DENMARK.

The foot = 12.3 inches. 100 ells = 68.6 yards. The viertel = 1.7 gallon. 100 tonnen = 47.8 quarters. The pound = 1.1 pound avoirdupois. The pound for gold and silver weighs 7266 grains.

EAST INDIES.

Bengal.—The Factory maund = 74.66 pounds avoirdupois. 10 bazar maunds = 11 Factory maunds. 16 chittacks = 1 seer; 40 seers = 1 maund. The guz of 2 cubits = 1 yard.

Bombay.—The maund = 28 pounds avoirdupois. 40 seers = 1 maund; 20 maunds = 1 candy. The candy = 24.5 bushels.

Madras.—The maund = 25 pounds avoirdupois. 40 pollams = 1 vi; 8 vis = 1 maund, mauns = 1 candy. The coid = 18.6 inches. The gar of 80 parash = 16.875 quarters, and weighs 8400 pounds avoirdupois.

EGYPT.

The Turkish pike = 27 inches. The ardeb of 24 Cairo rubbie = 6 quarters. The cantar = 100 pounds avoirdupois. 216 drams or 144 meticals = 1 rottole; 100 rottoli or 36 okes = 1 cantar.

FRANKFORT ON THE MAINE.

The ell = 21.2 inches. The foot = 11.2 inches. The matter = 3 bushels, nearly. The viertel = 1.6 gallon, nearly. The pound, light and heavy weight, = 1.03 and 1.1 pound avoirdupois. The Zoll-center = 110.2 pounds avoirdupois. The Cologne mark, used for gold and silver, weighs 3609 grains.

GENEVA.

The ell = 45 inches. The acre = 1 acre 1.1 rood. The coupe, or sack = 2.1 bushels. The setier = 10 gallons. The heavy pound = 1.2 pound avoirdupois; the light pound 1-6th less. The mark weighs 3785 grains.

GENOA.

The braccio of 2.5 palmi = 22.9 inches. The mina = 3.3 bushels. The barile = 16.3 gallons. The pound = 0.7 pound avoirdupois. 1.5 pound = 1 rottole. The pound sottile, for gold and silver, weighs 4891.5 grains.

GREECE.

The Venetian measures of length are used, the braccio being called a piche. 100 kila = 11.4 quarters. The cantaro of 40 okes = 112 pounds avoirdupois.

HAMBURG.

The foot = 11.3 inches, nearly. 100 ells = 62.6 yards. The scheffel = 1 acre 6 perches. The last = 1.09 last. The viertel = 1.6 gallon. The pound = 1.06 pound avoirdupois. For the Cologne mark, see *Frankfort*. 2 marks = 1 pound troy.

LUBECK.

The ell = 22.9 inches. The last = 11 quarters. The viertel = 1.6 gallon. The pound = 1.07 pound avoirdupois, nearly.

MALTA.

The palme = 10.25 inches; 3.5 palmi = 1 yard; 8 palmi = 1 canna. The salma = 7.8 bushels. The caffiso = 4.5 gallons. The barile = 9.33 gallons. 64 rottoli = 1 hundredweight. The cantaro = 175 pounds avoirdupois.

MAURITIUS.

Besides the English weights and measures, those of France before the late alteration are used. The aune = 1.3 yard. The velle = 1.7 gallon. The poid de marc = 1.08 pound avoirdupois.

NAPLES.

The canna = 83.2 inches. The moggia = 3 roods 12 perches. The tomolo = 1.4 bushel. The barile = 9.1 gallons. The cantaro grosso and piccolo = 196.5 and 106 pounds avoirdupois, respectively. The pound used in weighing gold and silver contains 4950 grains.

PORTUGAL.

The covado = 25.8 inches. The almude = 3.6 gallons. The pound = 1.01 pound avoirdupois.

PRUSSIA.

The ell = 26.5 inches. The morgen = 2 roods 21 perches. The scheffel = 1.5 bushel. The eimer = 15.1 gallons. The pound = 1.03 pound avoirdupois. The mark of Cologne is used for gold and silver.

ROME.

The canna of 8 palmi = 2.2 yards. The canna of 10 palma = 88 inches, nearly. The rubbio = 8.1 bushels. The boccale = 0.4 gallon. The pound = 0.7 pound avoirdupois.

RUSSIA.

The arshine = 28 inches. The foot = 13.75 inches. The dessetna = 2 acres 2.8 roods. The tschetwert = 5.7 bushels. The wedro = 2.7 gallons. The pound = 0.9 pound avoirdupois. The pood = 36 pounds avoirdupois.

St. GALLEN.

The ells for silks and woolens = 31.5 and 24.25 inches, respectively. The mitt or 4 viertels = 2.09 bushels. The eimer = 11.25 gallons. The pound, light and heavy weight = 1.03 and 1.3 pound avoirdupois, respectively.

SAXONY.

The foot = 11.1 inches. The acre = 1 acre 1.5 rood, nearly. The eimer, at Dresden, = 14.9 gallons; at Leipsic = 16.8 gallons. The wispel, at Dresden = 69.9 bushels; at Leipsic = 91.7 bushels. The pound = 1.03 pound avoirdupois.

SICILY.

The canna = 76.5 inches. The salma = 7.6 bushels. The barre = 8 gallons, nearly. The pound of 12 ounces = 0.7 pound avoirdupois. The cantaro = 175 pounds avoirdupois.

SMYRNA.

The pike = 27 inches. The kilow = 11.3 gallons. The rottolo = 1.2 pound avoirdupois.

SOUTH AMERICA.

The Spanish and Portuguese measures are most generally employed. The use of the English measures prevails in some parts.

SPAIN.

The vara, or ell = 33.3 inches. The fanegada = 1 acre 21 perches. The arroba = 3.5 gallons. The fanega = 1.5 bushel. The pound = 1.01 pound avoirdupois.

SWEDEN AND NORWAY.

The ell = 23.3 inches. The tunneland = 1 acre 1 rood, nearly. The tunnu = 0.6 quarter. The kann = 0.6 gallon. The pound = 0.9 pound avoirdupois.

TURKEY.

The pike = 26.25 inches. The killow = 0.9 bushel. The almud = 1.1 gallon. The oke = 2.8 pounds avoirdupois. The rottolo = 1.3 pound avoirdupois.

TUSCANY.

The braccio = 23 inches, nearly. The saccata = 1 acre 0.9 rood. The sacche = 2 bushels. The fiasche = 4 pints. The pound = 12 ounces avoirdupois.

VENICE.

Besides the metrical system, the following measures are used: The braccio, for woolens = 26.6 inches; for silks = 24.8 inches. The stajo = 2.2 bushels. The secchia = 2.4 gallons. The pound sottile = 0.7 pound avoirdupois, nearly; grosso = 1.05 pound avoirdupois.

REDUCTION OF FRENCH, PARIS, ENGLISH, AND RHENISH MEASURES OF LENGTH, USED BY SCIENTIFIC WRITERS, TO THE SCALE OF EACH.

TOISES, REDUCED TO ENGLISH AND RHENISH LENGTHS.

TOISES.	METRES.	ENGLISH FEET.	RHENISH FEET.
1	1.94904	6.39459	6.21002
2	3.89807	12.78918	12.42004
3	5.84711	19.18377	18.63006
4	7.79615	25.57837	24.84008
5	9.74518	31.97296	31.05010
6	11.69422	38.36755	37.26012
7	13.64326	44.76214	43.47014
8	15.59229	51.15673	49.68016
9	17.54133	57.55132	55.89017
10	19.49037	63.94592	62.10019
100	194.90366	639.45916	621.00194
1000	1949.03659	6394.59160	6210.01941

METRES, REDUCED TO PARIS, ENGLISH, AND RHENISH LENGTHS.

METRES.	TOISES.	PARIS. ft. in. lines.	ENGLISH. feet & inches.	RHENISH FT
1	0.51307	3 0 11.296	3 3.3708	3.18620
2	1.02615	6 1 10.592	6 6.7416	6.37240
3	1.53922	9 2 9.888	9 10.1124	9.55860
4	2.05230	12 3 9.184	13 1.4832	12.74480
5	2.56537	15 4 8.480	16 4.8539	15.93100
6	3.07844	18 5 7.776	19 8.2247	19.11720
7	3.59152	21 6 7.072	22 11.5955	22.30340
8	4.10459	24 7 6.368	26 2.9663	25.48960
9	4.61767	27 8 5.664	29 6.3371	28.67580
10	5.13074	30 9 4.960	32 9.7079	31.86200
100	51.30471	307 10 1.600	328 1.0790	318.62000
1000	513.04707	3078 5 4.000	3280 10.7900	3186.19996