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NOVA SCOTIA SCHOOL SERIES.

THE

ARITHMETICAL TABLE BOOK,

FOR THE USE OF

SCHOOLS AND COUNTING HOUSES.

BY W. R. MULHOLLAND,

PRINCIPAL NORMAL SCHOOL, TRURO, N. S.

Prescribed for use in Public Schools of Nova Scotia, by the Council of Public Instruction.

THIRD EDITION.

HALIFAX, N. S.: A. & W. MACKINLAY. 1882.



The Arithmetical Table Book. As.

Notation and Numeration.

NOTATION is the writing or expressing of numbers by characters; and

NUMERATION is the reading of numbers expressed by characters Two systems of Notation are in general use—the Roman and the Arabic.

THE ROMAN NOTATION

Employs s	even ca	pital les	tters to	express	numbers	. Thu		
Letters-	I	·v	X	L	C	D	M	
					one	five	one	
Values- By comi	One, bining	five, these le	ten, etters th	fifty, l	hundred h	undred ans for	thousand, med the	
following			TAL	BLE.				
I			1	LX			60	ı.
II			2	LXX.			70	
III			3	LXXX				
1V				XC			90	ŀ
V			5	12			100	ł
VI			6	CC			200	
VII				CCC.			300	,
VIII			8	CD			400	
IX				D				
X				DC			. 600	
XI.				DCC.			700	
XII			12	DCCC			800	
XIII.			13	CM.		•••••	900	
XIV			.14	M			1000	
YY			20	MM	••••••	•••••	9000	
YYY		•••••	80	MMM	•••• •••		3000	
YI.			40	MMM	D		3500	
Τ.		• • • • • • •	50	MDCC	YIX		1980	
				1 22200	····			l

NOTE.-The system of Roman Notation is not well adapted to the purposes of numerical calculations, it is principally used for numbering chapters and sections of books, public documents, &c.

THE ARABIC NOTATION

Employs ten	char	acters	or tig	ures to	o exp	ress 1	umbers.	1	Thus,
Figures-1	2	3	4	5	6	7	8	9	Ó
Names)	****	these	fam	6.000	ein	10000	eight -		nought

and one, two, three four, five, sur, seven eight, nine, or cipher.

The first nine characters are called significant figures, because each has a value of its own. They are called Digits, a word derived from the Latin word digitus, which signifies finger.

The nought or cipher is also called Nothing or zero. The

cipher has ot itself no value, but is used to indicate the order of the significant figures which precede it.

To facilitate the reading of whole numbers they are divided into periods of three figures each, beginning at units, according to the following



NOTE.—This is called the French method of numeration, and is the one in general use. In the old form, which was called the English method, the periods contained six figures each.

Multiplication Table.

7	l'vice		3	tim	68	4	times	11	5 tim	es	6	time	s	7	tim	es
7	are	2	1	are	3	11	are 4	4]]	l ar	e 5	1	are	6	1	are	7
2	66	4	2		6	2	66 8	3 9	2 **	10	2	· · ·]	12	2	66	14
3	66	6	3	6.6	9	3	" 19	2 :	3 "	15	3	"]	18	3	66	21
4	66	8	4	44	12	4	" 10	3 4	1 "	20	4	"	24	4	64	28
5	1	0	5	6.	15	5	** 20		5 "	25	5	66. 8	30	5	6.6	35
6	" 1	2	6	6.6	18	6	" 2.	t (; "	.30	6	"	36	6	66	42
7	" 1	4	7	66	21	7	" 28	3 1	7 "	35	7	66 4	12	7	66	49
8	" 1	6	8	66	24	8	** 35	2 8	3 "	40	8	66 4	18	8	66	56
9	"].	8	9	6.6	.27	9	** 36	3 9	9 66	45	9	•6 8	54	9	66	63.
10	" 2	UI	10	66	30	10	" 40) 10) "	60	10	* 6	30	10	66	70
11	." 2	2	11	66	33	11	** 44	1 1	1 "	55	11	(6	11	65	77
12	" 2	4	12	66	36	12	" 48	3 19	2 "	60	12	"	12	12	"	84
8	time	8	1	91	time	28	1 10 1	ime	8	11	tim	es	11	2	time	28
1	are	8		.1	are	9	1	are	10	1	are	11		1 4	are	12
2	66	16		2	6.	18	2	66	20	2	66	22		2	66	24
3	66	24		3	66	27	3	66	30	3	44	33		3	"	36
4	66	32		4	66	36	4	66	40	4	66	44		4	66	48
5	66	40		5	66	45	5	66	50	5	66	55		5	"	60
Û	66	48		6	**	54	6	"	60	6	66	66		6	66	72
7		FO		-	44	00	1 17	66	70	7	6.6	77	1 1	7	66	84
	**	90		1	•••	60	1 1		10							
8	"	50 64		8	"	03 72	8	66	80	8	66	88		8	"	96
89	66 66	50 64 72		89	66 66	63 72 81	89	66 66	80 90	89	66 66	88 99		8 9	"	96 .08
8 9 10	66 66 66	56 64 72 80		8 9 10	66 66 66	63 72 81 90	8 9 10	66 66 66 .]	80 90	8 9 10	66 66	88 99 110	1	8 9 0	" "」	96 .08 .20
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Currencies.

MONEY is the commodity adopted to serve as a universal equivalent or measure of value of all other commodities, and for which individuals readily exchange their surplus products or their services.

COIN is metal struck, stamped or pressed with a die, to give it a legal, fixed value, for the purpose of circulating as money. The coins of civilized nations consist of Gold, Silver, Copper, and Nickel.

A MINT is a place in which the coin of a country or government is manufactured.

NOTE.-In all civilized countries mints and comage are under the exclusive direction and c ntrol of government.

BULLION is uncoined gold or silver.

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BANK BILLS OR BANK NOTES are bills or notes issued by a banking Company, and are payable to the bearer in gold or silver, at the bank, on demand. They are substitutes for coin.

TREASURY NOTES are notes issued by the General Government, and are payable to the bearer in gold or silver, at the general treasury, at a specified time.

Currency is coin, bank bills, treasury notes, and other substitutes for money, employed in trade and commerce.

A DECIMAL CURRENCY is a currency whose denominations increase and decrease according to the decimal scale.

· CANADA MONEY.

10 Mills (m) make 1 Cent, marked Ct. or C.

44 1 Dollar " 100 Cents

NOTE .- Sterling Exchange at 9} per cent. premium is equal to par ;*e.g. £1 stg.=\$4.86 2-3.

UNITED STATES MONEY.

10 Mills (m) make 1 Cent. marked Ct. or C.

0 Cents	**	1 Dime,	**	D .
10 Dimes	"	1 Dollar,	"	\$.
0 Dollars	**	1 Eagle.	"	E .

NOTE 1.-Sterling Exchange at 9} per cent. premium is equal to par ;*

e.g., £1 stg.=\$4.86 2-3. NOTE 2.—The currency of Cuba, Demerara, and the Windward Isles is Dollars and Cents: \$4.80-=£1. stg.

*At a meeting of the leading merchants of Halifax, held July 20th, 1811. the value of the Spanish Dollar was fixed at 4s. 6d, stg., or 5s. currency, 18s. stg. were therefore equal to £1. corrency. This premium of 1-9th being added to the sterling, constituted what is now called the old par, value in the Dominion of Canada and the United States.

STERLING MONEY.

STERLING OR ENGLISH MONEY is the currency of Great' Britain.

The unit is the pound sterling, and all the other denominations are divisors of this unit.

TABLE.

4 Furthings make 1 Penny, marked d. '2 Pence "1 Shilling, "s. 20 Shillings "1 Pound or Sovereign, "£ or Sov. Norg 1.—The currency of Bermuda, Jamaica, Antigua, Australia and New Zealand, is Sterling.

Weights.

WEIGHT is the measure of the quantity of matter a body contains, determined by the force of gravity.

NOTE.—The process by which the quantity of matter or the force of gravity is obtained is called *weighing*; and consists in comparing the thing to be weighed with some conventional standard.

The origin of all weights in England was derived from a grain of wheat. Vide Statute of 51 Henry III; 31 Edward I., and Henry VII., which enacted, that 32 of them gathered from the middle of the car, and well dried, were to make 1 pennyweight; 20 pennyweights 1 ounce; and 12 ounces 1 pound.

It was subsequently thought better to divide the pennyweight into 24 equal parts, called grains.

The Imperial Pound, Avoirdupois, which is the standard unit by means of which all heavy goods or large masses is weighed, is defined to be the weight of one-tenth part of an imperial gallon, or of 27.7274 cubic inches of distilled water, ascertained at a time when the barometer stands at 30 ins., and the height of Fahrenheit's thermometer is 62°; and this standard may consequently be verified or recovered at any time, when it may be necessary to appeal to experiment.

If the weight of a cubic inch of distilled water be divided into 505 equal parts, and each of such parts be defined to be a halfgrain, it follows that 27.7274 cubic inches contain very nearly 7000 such grains; and it is hence declared by Act of Parliament that 7000 grains exactly, shall hereafter be considered a pound, avoirdupois; and that 10 grains shall be equivalent to 1 scruple; and 3 scruples to 1 dram. But these latter denominations are seldom necessary, unless great nicety is required.

2

This weight receives its name from avoirs, the ancient name of goods and chattels, and poids, signifying weight, in the ordinary language of the country in the time of the Normans.

Three scales of weight are in general use in this country and in England; namely, Troy, Avoirdupois, and Apothecaries.

TROY WEIGHT.

TROY WEIGHT is used in weighing gold, silver, and jewels ;

in philosophical experimer '3, and generally where great accuracy is required.

The unit is the pound, and of this all the other denominations in the table are divisors.

TA	BLE.

24	Grains	make	1	Pennyweight,	1	dwt.
20	Pennyweights	66	1	Ounce,	1	02.
12	Ounces	""	1	Pound,	1	16

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NOTE 1.-It was called a *pennyuceight* from its being the weight of the sliver penny then in circulation.

The term onnce comes from the Latin word uncia, which signifies a swelfin part

In the abbreviation, dwt., for pennyweight, d. is from the Latiu word denarius, a penny; wt. the first and last letters of the English word weight. Oz. is from the Spanish word onza, an onnce.

NOTE 2 .- Diamonds and other precious stones, are weighed by "Carata,"

each weighing 3,10,1, or nearly 3, grains, Troy. The term carat, applied

to gold has a relative meaning only : any quantity of pure gold, or of gold alloyed with any other metal, being supposed to be divided into 24 equal parts (carats), . If the gold be pure, it is said to be 24 carats fine; if 22 parts be pure gold, and 2 parts alloy, it is said to be 22 carats fine.

Norre 3.—Standard gold is 22 carats fine : jewellers' gold is 18 carats fine. Thus we generally perceive "18" on the cases of gold watches. This indicates that they are "18 carats fine," the lowest degree of purity which is marked ; but many articles are manufactured as low as 9 carats fine.

AVOIRDUPOIS WEIGHT.

Avoindurois Weight is used for all ordinary purposes of weighing.

The unit is the pound, and the table is made up of its divisors and multiples.

		TABLE.	Grains, Troy				
16 Drams	make	1 Ounce,	1 oz. = 437.50				
16 Ounces	**	1 Pound,	1 lb. = 7000				
25 Pounds	""	1 Quarter,	1 qr. = 175000				
4 Quarters	46	1 Hundredweight,	1 cwt = 700000				
20 Hundredweight	"	1 Ton,	1 ton = 14000000				

NOTE 1.—In the old system of weight 28 lbs. = 1 Quarter. The hundredweight was, consequently, 112 lbs., and the ton 2240 lbs.

2. The following denominations are also in use :--

196 lb	s. mak	e 1 barrel of flour or corn meal.
200	66	1 " beef, pork or fish.
112	"	1 quintal of dried salt fish.
14	"	1 stone.
100	"	1 cask of raisins.
100	"	1 quintal dry fish in U. States.

APOTHECARIES' WEIGHT.

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APOTHECARIES' WEIGHT is used by apothecaries and physicians in *compounding* medicines; but medicines are bought ar. 1 sold by avoirdupois weight.

The unit is the pound, of which all the other denominations in the table are divisors.

TABLE.

20	Grains (gr)	make	1	Scruple,	se	or	D.
3	Scruples	"	1	Dram,	dr.	or	7.
8	Drams	"	1	Ounce,	02.	or	-
12	Ounces	**	1	Pound,	16.	or	1b

Measures.

Measures (and weights) were invented 866 B. C.; fixed to a standard in England, A. D. 1257; regulated, 1492; equalized, 1826.

Agreeably to the Act of Uniformity which took effect 1st January 1826, the term measure may be divided into seven kinds, viz.:—Length, Surface, Volume, Capacity, Specific Gravity, Space, Time and Motion.

The several denominations of these measures have reference to certain Standards or Units of Measure, which are entirely arbitrary, and consequently vary among different nations. In England and her Colonies the unit of

> Length is a Yard Surface is a Square yard, foot or inch. Solidity is a Cubic yard. Capacity is a Gallon. Weight is a Pound.

The Standards of Angular Measure and of Time are the same in all European and most other nations.

LINEAR OR LONG MEASURE.

Long Measure is used in measuring lines or distances.

TABLE.

12	Inches	make	1	Foot	marke	al A.
3	Feet		1	Yard	**	ud.
53	Yards	"	1	Rod, Pole or Perch	**	rd. or p.
40	Rods or Perche	S "	1	Furlong	68	fur.
8	Furlongs	"	1	Mile	66	m.
3	Miles	66	1	League	**	· lea.
69	1 Miles (nearly)		1	Degree	**	deg. or o

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NOTE 1.-In Ireland 7 Yards=1 Perch. An Irish mile is therefore longer than an English mile.

NOTE 2.—An inch is the smallest linear measure to which a name is given; but sub-divisions are used for many purposes.—Among mechanics, the Inch is commonly divided into eighths and sixteenths. By the officers of the revenue, and by scientific persons, it is divided into tenths, hundredths, &c.—The inch, three-fourths inch, half-inch and quarter inch, divided into twelfths, are used by architects.

NOTE 3.-- The following measurements may be added as useful in certain cases :--

4 Inches make 1 Hand (used in measuring horses).

3 Inches " 1 Palm.

18 Inches " 1 Cubit.

3 Feet " a Common Pace.

5 Feet " a Roman Pace.

6 Feet " a Fathom.

120 Fathoms" a Cable's length.

60 Geographical Miles make a degree.

SURVEYORS' LINEAR MEASURE.

A GUNTER'S CHAIN, used by land surveyors, is 4 rods or 66 feet long, and consists of 100 links.

The unit is the chain, and the table is made up of divisors and multiples of this unit.

TABLE.

7.92	inches (in)	make	1	link,	marked	1.
25	links	66	1	rod,	"	rd.
4	rods, or 66 feet	"	1	chain.	"	ch.
80	chains	"	1	mile.	66	mi.

CLOTH MEASURE.

This measure, which is a species of Long Measure, is used for all kinds of cloth, muslin, ribbon, &c.

The yard in Cloth Measure, is the same as in Long Measure, but differs in its divisions and subdivisions.

21 Inches make 1 Nail.

4 Nails	"	1 Quarter, 1 gr.	,
4 Quarters	44	1 Yard, 1 yd.	
5 Quarters	"	1 English Ell.	
6 Quarters	"	1 French Ell.	
3 Quarters	"	1 Flemish Ell.	

Square Measure.

SQUARE MEASURE is used in computing areas or surfaces; as of land, painting, plastering, &c The unit is the area of a square whose side is the unit of length. Thus, the unit of square feet is 1 foot square; of square yards. 1 yard square.

The table of square measure is formed from that of long measure, by multiplying each lineal dimension by itself.

TABLE.

144	Square	Inches	make	1	Square	Foot	marked	sq. ft.
9	Square	Fcet	46	1	Square	Yard	"	\$7. yd.
30ł	Square	Yards	"	1	Square	Pole	66	sq. po.
40	Square	Poles	"	1	Square	Rood	"	ro.
4	Roods		"	1	Acre		**	ac.
640	Acres		"	1	Square	Mile	"	sq. mi.

NOTES 1.-Artificers estimate their w ck as follows :--

By the square foot: glazing and stone cutting.

By the square yard: painting, plastering, paving, ceiling, and paperhanging.

By the square of 100 square feet: flooring, roofing, slating, shingling and tiling.

Brick-laying is estimated by the thousand bricks, by the square yard, and by the square of 100 square feet.

Mason work is estimated by the rood of 36 square yards.

2.—In estimating the painting of mouldings, cornices, &c., the measuringline is carried into all mouldings and cornices.

3.—In estimating brick-laying by either the square yard or the square of 100 square feet, the work is understood to be 12 inches or 14 bricks thick. Mason work is allowed to be 22 inches thick.

4.—A thousand of shingles are estimated to cover 1 square, being laid 5 inches to the weather.

5.—Joiners, bricklayers, masons and plasterers, make an allowance for windows, doors, &c., of one half the openings or vacant spaces. Brick-layers and masons, in estimating their work by cubic measure, make no allowance for the corners of the walls of houses, cellars, &c., but estimate the work by the girl, that is, the entire length of the wall on the outside.

SURVEYORS' SQUARE MEASURE.

This measure is used by surveyors in computing the area or contents of land.

TABLE.

625	square links	(sq. 1.)	make	1	pole,	P	
16	poles	•••	46	1	square chain,	sq.	ch.
10	square chains		""	1	acre,	ac.	
640	acres		"	1	square mile,	sq.	mi.

DUODECIMALS.

DUODECIMALS are the parts of a unit resulting from continually dividing by 12; as $\frac{1}{12}$, $\frac{1}{144}$, $\frac{1}{1728}$, etc. In practice, duodecimals are applied to the measurement of extension, the foot being taken as the unit. square

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ntinu-, duone foot In the duodecimal divisions of a foot the different orders of units are related as follows :

1' (inch or prime) is $\frac{1}{\sqrt{2}}$ of a ft. or 1 in. linear measure. 1" (second) or $\frac{1}{\sqrt{2}}$ of $\frac{1}{\sqrt{2}}$ is $\frac{1}{\sqrt{44}}$ of a ft. or 1 in. square " 1" (third) or $\frac{1}{\sqrt{2}}$ of $\frac{1}{\sqrt{2}}$ of $\frac{1}{\sqrt{2}}$ is $\frac{1}{\sqrt{28}}$ of a ft.or 1 in. cubic "

TABLE.

12 Fourths ("	///), make 1	third,	1///
12 Thirds	**]	second,	۱″
12 Seconds	66	l prime,	1'
12 Primes	"	l foot,	ft.

Cubic Measure.

A CUBH is a solid, or body, having six equal square sides. SOLIDITY is the matter or space contained within the boundary surfaces of a solid.

CUMIC MEASURE, also called Solid Measure, is used in computing the contents of solids, or bodies; as timber, wood, stone, &c.

The unit is the solidity of a cube whose side is the unit of length. Thus the unit of cubic feet is a cube which measures 1 toot on each side; the unit of cubic yards is 1 cubic yard, &c.

TABLE.

728	Cubic Inches (cu. in.)	make	1 Cubic Foot cu. ft.
27	Cubic Feet	"	1 Cubic Yard, cu. yd.
40	Cubic Feet of round ti	mber or	1 Top on Lord 4
50	Cubic Feet of hewn do	., make	$\int 1 1011 \text{ or Load, } t.$
16	Cubic Feet	"	1 Cord Foot, cd. ft.
8	Cord Feet, or }	66	1 Cord of Wood, cd.
128	Cubic Feet	"	1 Barrol Bulk
42	Cubic Feet of timber	"	1 Shipping Ton.
74	CHOIC T.CCL OI HIMDEL		I Durpping Iou.

NOTES.-1. A cubic yard of earth is called a load.

2. Railroad and transportion companies estimate light freight by the space it occupies, and heavy freight by weight.

3. In scaling or measuring timber for shipping or freighting, 1-5 of the solid contents of round timber is deducted for waste in hewing or sawing. Thus, a log that will make 40 feet of hewn or sawed timber, actually contains 50 cubic feet by measurement; but its market value is only equal to 40 cubic feet of hewn or sawed timber. Hence, the cubic contents of 40 feet of round and 50 feet of hewn timber, as estimated for market, are identical.

MEASURE OF CAPACITY.

(CAPACITY signifies extent of room or space.

Measures of capacity are all cubic measures, solidity and capacity being referred to different units, as may be seen by comparing the tables.

Measures of capacity may be properly subdivided into two classes, Measures of Liquids and Measures of Dry Substances.

Liquid Measure.

OF THE DOMINION OF CANADA, P. E. ISLAND, NEWFGUND-LAND, UNITED STATES AND THE BRITISH WEST INDIA ISLANDS.

LIQUID MEASURE, also called Wine Measure, is used in measuring liquids; as molasses, water, liquors, &c.

The unit is the gallon, and the table is made up of its divisors and multiples.

TABLE.

4 Gills (g) 2 Pints 4 Quarts 31 f Gallons	make "	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Pint, 1 Quart Gallon Barrel	marked "	pt. qt. gal.	Cu. In. 28.875 57.75 231.	111	10414 .20828 .83311	6.
2 Barrels	"	1	Hogsh	cad.					

NOTES.—1. To convert the above into imperial multiply by .83311. To convert imperial into the above multiply by 1.20013.

2. The standard unit of liquid measure adopted by the above named places, is the old Wine Gallon of England, containing 231 cubic inches, or very nearly 8.338 lbs. avoirdnpois of pure distilled water.

3. The denominations, barrel and hogshead, are used in estimating the capacity of cisterns, reservoirs, vats, &c.

4. The tierce, hogshead, pipe, butt, and tun, which we often find in invoices, are merely the names of casks, and do not express any fixed or definite measure. They are usually guaged, and have their capacities in gallons marked on them.

5. In the United states beer and milk is often measured by the old ale and beer measure, the gallon containing 282 cubic inches.

DRY MEASURE

OF THE DOMINION OF CANADA, P. E. ISLAND, NEWFOUND-LAND, UNITED STATES, AND THE BRITISH WEST INDIA ISLANDS.

DRY MEASURE is used in measuring articles not liquid; as grain, fruit, salt, roots, ashes, &c.

The unit is the bushel, of which all the other denominations in the table are divisors. LI

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4	Gills (g.)	make	1	Pint,	marked	pt.	33.6	-	.12118
2	Pints	66	1	Quart,	**	qu.	67.2	-	.24236
4	Quarts	"	1	Gallon,	"	gall.	268.8	=	.96945
2	Gallons	**	1	Peck,	"	pk.	537.6	=	1.93891
4	Pecks	"	1	Bushel,	"	bush.	2150.4	==	7.75567
36	Bushels	"	1	Chaldro	n "	chal.			

NOTES.—1. To convert the above into Imperial multiply by .96945. To convert Imperial into the above multiply by 1.03151.

2. The standard unit of dry measure adopted by the above named places is the Winchester bashel, so called because the standard measure was formerly kept at Winchester, England. This is an upright cylinder, which is 18½ inches in diameter and 8 inches deep, and contains 2150.42 cubic inches or 77.627 lbs. avoirdupois of distilled water, at 62° Fahr. and 30 inches barometer.

3. Grain and some other commodities are often sold by stricken measure, and in such cases the "measure is to be siricken with a round stick or roller, straight and of the same diameter from end to end."

4. When coal, fruit, roots, and a few other articles are sold by measure, the bushel and other measures are to be heaped. The bushel heaped measure is the Winchester bushel heaped in the form of a cone, which come must be $19\frac{1}{2}$ inches in diameter (:= the outside diameter of the standard bushel measure,) and 6 inches high.

5. A bushel heaped measure contains 2747.7167 cubic inches or 597.2967 cubic inches more than a bushel stricken measure.

A bushel heaped measure contains 59.6917 cubic inches more than 5 pecks stricken measure. As this is about 1 bu, 1 pk, 1_3^3 pts., it is sufficiently accurate in practice to call 5 pecks stricken measure 1 heap bushel.

6. As grain, potatoes, turnips, &c., are generally sold by standard bushe of a certain weight, the following table will be found useful:

		N. Scotia.	Canada.	P. E. I.	U. S.
A bushel of	Oats,	38 lbs.	34 lbs.	36 lbs.	32 lbs.
"	Wheat,	60 "	60 "	58 "	60 "
"	Barley,	48 "	43 "	48 "	48 "
"	Rve,	56 "	58 "	56 "	56 "
-4	Indian Corn.	58 "	56 "	57 "	56 "
66	Beans,	58 "	50 "	60 "	56 "
"	Peas,	58 "	60 "	60 "	66 "
"	Buckwheat,	48 "	40 "		
"	Detates and	/P	CO 11 -	-11 -41	

Potatoes and Turnips, 60 lbs., all other edible roots 40 lbs. per bushel.

LIQUID AND DRY MEASURE OF ENGLAND, OR IMPERIAL MEASURE.

TABLE.

							Cubic Inches.
Gills	make	1	Pint,	marked	1	pt.	34.6592
Pints	"	1	Quart,	**	1	igt.	69.3185

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					Cu	bic Inches.
4 Quarts make	1	Gallon,	marked	1	gal.	277.274
2 Gallons "	1	Peck,	"	1	pk.	554.548
4 Pecks "	1	Bushel.	"	1	bus.	2218.192
8 Bushels "	1	Quarter.	"	1	quar.1	7745.536
36 Bushels "	1	Chaldron	, "	1	ch.	

HEAPED MEASURE.

Potatocs, Turnips, Fruit, Lime, Coals, and a few other articles, are sometimes bought and sold by heaped measure.

TABLE.

		Cubic Inches.
	1 Peck,	= 703.87148
4 Pecks	= 1 Bushel,	= 2815.4871
3 Bushels	= 1 Sack or Tu	$b_{1} = 8446.45776$
12 Tubs	= 1 Chaldron,	= 101357.49309.

NOTES.—1. The standard unit of both liquid and dry measure in Britain is the imperial gallon, and is defined to be a measure that will contain 277. 274 cubic inches, the linear inch being that above mentioned, or 10 pounds avoirdupois of pure distilled water, weighed at a temperature of 32° Fahr. and under a barometric pressure of 30 inches.

2. The gailon and its multiples and parts are used to measure both liquids, as water, spirits, &c.; and dry goods, as malt, corn, &c., and the system is therefore called the Imperial Liquid and Dry Measure.

3. The bushel heap measure, is the Imperial bushel heaped in the form of a conc, which cone is to be 194 inches in diameter and at least 6 inches high. The content of the heap is therefore 597.29518 cubic inches, which, added to 2218.192, the content of the bushel, gives 2815.4871 cubic inches for the content of the heaped bushel, and the contents of the other measures are in proportion.

COMPARATIVE TABLE OF MEASURES OF CAPACITY.

	Cub. in. in gall.	Cub. in. in qt.	Cub. in. in pt.	Cub. in. in gill.
Wine Measure,	231	573	287	732
Dry Measure (1 pk.)	268	671	33 8	87
Imperial,	277 61	6925	3438	85

APOTHECARIES' FLUID MEASURE.

60	Minims (m.)	make	1	Fluidrachm,	f.	3
8	Fluidrachms	"	1	Fluidounce,	f.	X
16	Fluidounces	"	1	Pint,		ŏ
9	Pints	"	1	Gallon,	Con	ıg.

NOTE.—In some places a pint equals 20 ounces. A minim may be reckoned 2 drops, a drachm about a tea-spoonful, and 1 ounce about 2 tablespoonfuls. Nor 2. mical o'cluc 3. the fu

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Britain in 277. pounds Fahr.

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Measure of Time.

TIME is the measure of duration. The unit is the day, and the table is made up of its divisors and multiples.

TABLE.

60 Seconds (sec)	make	1	Minute. 1 min.
60 Minutes	66	1	Hour. 1 hr.
24 Hours ·	* 6	1	Day, 1 day.
7 Days	**	1	Week, 1 wk.
28 Davs	66	1	Lunar Month.
28, 29, 30, or 31 Davs	66	1	Calendar Month.
12 Calendar Months	"	1	Year.
365 Days	66	1	Common year.
366 Days	66	1	Leap Year.
100 Years	"	1	Century.

NOTES.-1. In most business transactions 30 days are called a month.

2. The civil day begins and ends at 12 o'clock, midnight. The astronomical day, used by astronomers in dating events, begins and ends at 12 o'clock, noon. The civil year is composed of civil days.

3. The number of days in each month is easily remembered by means of the following lines:

Thirty days hath September, April, June, and November; All the rest have thirty-one: Except leap-year, and then's the time, February's days are twenty and nine.

4. The number of days in each month may also be recollected by counting the months a the *four* fingers and *three* intervening spaces. Thus, January on the first finger, February in space between first and second fingers; March on second finger; April in second space; May on third finger; June in third space; July on fourth finger; August on first finger (since there are no more spaces); September in first space, &c. Now, when counted thus, all months having 31 days come on the fingers, and all having 30 only fall into the spaces.

Measure of Angles.

CIRCULAR MEASURE, or Circular Motion. is used principally in surveying, navigation, astronomy, and geography, for reckoning latitude and longitude, determining locations of places and vessels, and computing difference of time.

The circumference of every circle is considered to be divided into 360 equal parts, each of which is often called a degree, as it subtends an *angle* of 1° at the centre of the circle.

The unit is the degree, which is $\frac{1}{260}$ part of the space about a point in any place. The table is made up of divisors and multiples of this unit.

· FABLE.

1 Second is written 1 sec., or 1"

60 seconds	make	1 Minute,	1 min. or 1'
60 Minutes	66	1 Degree,	1 deg. or 1º
90 Degrees	**	1 Right Angle,	1 rt. ang. or 90"

NOTE.--Minutes of the earth's circumference are called geographic or bautical miles.

French Weights and Measures.

The tables of Standard Weights and Measures adopted by the French Government, are all formed upon a decimal scale, and constitute what is called the *French Metrical System*.

FRENCH MONEY.

The Franc is the unit of ...oney of the new system of French currency.

10 Centimes make 1 Decime. 10 Decimes "1 Franc. 20 Francs "1 Louis.

FRENCH LINEAL MEASURE.

The Standard unit of French lineal measure is the Metre. Its length according to the mean of several comparisons, is equal to 39.3809171 imperial inches.

10 Metres	make	1	Decametre,	==	32.817431	feet
10 Decametres	"	1	Hectometre,	=	328.17431	66
10 Hectometres	"	1	Kilometre,	-	3281.7431	66
10 Kilometres	"	1	Myriametre,	==	32817.431	66

The standard by which the new French measure of length is determined, is the quadrant of a meridian of the earth, or the terrestrial arc from the equator to the pole, in the Meridian of Paris. The ten-millionth part of this is called a metre, which is equal to 39.381 imperial inches nearly.

The metre is subdivided into 10 decimetres; the decimetre into 10 centimetres; the centimetre into 10 millimetres.

FRENCH SQUARE MEASURE.

The unit of French Superficial Measure is the Arc, whose sides are each a decametre in length. Consequently it contains 100 square metres, or 119.6648496 imperial square yards. is in

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The arc is subdivided in the same manner as the metre.

FRENCH CUBIC MEASURE.

The unit of French Cubic Measure is the Stere, which is a cubic metre, and is equal to 61074.1564445 imperial cubic inches.

10 Decisteres make 1 Stere, 35.24384 cubic feet.

10 Steres " 1 Decastere, 353.4384

FRENCH LIQUID AND DRY MEASURE.

The unit of French Liquid and Dry Measure is the Litre, which is a cubic decimetre, and is equal to 61.074154445 imperial cubic inches, or .88106 imperial quarts.

10 Litres make 1 Decalitre, = 2.20266 gall. 10 Decalitres "1 Hectolitre, = 22.0266 " 10 Hectolitres "1 Kilolitre, = 220.262 "

The litre is subdivided in the same manner as the stere.

FRENCH JIRCULAR MEASURE.

The French divide the circle into 400 parts called grades, and the quadrant into 100 grades. The grades are divided into 100 equal parts, and each of these parts is divided into 100 other equal parts, according to the centesimal scale. Hence—

> The Second = .00009 English Degree. The Minute = .009 " " The Grade = .9 " "

FRENCH WEIGHT.

The unit of French Weights is the weight of a cubic centimetre of distilled water, at the maximum density, and is called a Gramme. It is equal to 15.433159 Troy grains.

10 Grammes mal	ke 1	Decagramme,		154331.59	grs
10 Decagrammes / "	1	Hectogramme,	-	1543.3159	-16
10 Hectogrammes "	1	Kilogramme,	=	15433.159	"
10 Kilogrammes "	1	Myriagramme,	-	154331.59	"

The gramme is divided into 10 decigrammes; the decigramme into 10 centigrammes; the centigramme into 10 miligrammes.

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