THE DOZENAL SOCIETY OF AMERICA
c/o Math Department
Nassau Community College
Garden City LI NY 11530-6793

="Each one Teach One." — Ralph Beard, Founder of the DSA=

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THE DUODECIMAL BULLETIN

81;(97.)

OOPS!

WE GOOFED

See Page 7

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11*7; (1999.)

THE DOZENAL SOCIETY OF AMERICA

(Formerly: The Duodecimal Society of America)

is a voluntary, non profit, educational corporation, organized for the conduct of research and education of the public in the use of base twelve in numeration, mathematics, weights & measures, & other branches of pure & applied science.

Membership dues are $12 (US) for one calendar year. Student Membership is $3 (US) per year, and a life Membership is $144 (US).

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THE DUODECIMAL BULLETIN

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IN THIS ISSUE

OUR BRITISH ASSOCIATES

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ANNOUNCEMENT OF OUR ANNUAL MEETING

Our Annual Meeting is scheduled for Saturday, 6 November 11*7; (1999.) at half past dek in the morning (10:30 AM) at Nassau Community College, Garden City, LI, NY. The month of November is a departure from our usual meetings which have generally transpired on the second or third Saturday in October since 1193;(1983.) and is due in part to the busy agendas of our Board of Directors.

We will gather in the conference room, room 309 in the **OLD** Student Union Building which is next to Security. Room 309 is upstairs and across the hall from our Dozenal Archives. We have also reserved the math department conference room in building B, room 3303B as well as classroom 307 in Building B.

DSA President Jay Schiffman, a member of the Rowan University Mathematics Department faculty at the branch campus in Camden, NJ, will present a paper entitled *"The Terminal Digits of Recursive Sequences in Four Different Number Bases"*. Two of these sequences will be familiar to those who are versed in elementary computer science. The presentation will also feature the role of the graphing calculator in the study of these sequences.

We also look forward to discussing the progress of a **Society WEB Page** as the DSA enters the high technology phase of its operation. We invite your participation. You will be extremely disappointed if you miss our Annual Meeting.

FROM THE EDITOR

I wish to personally take this opportunity to express my sincere gratitude to the Dozenal Society of America for the generous donation of a computer to the editorial office in Philadelphia, PA. As your editor, it is my pleasure to help formulate and compile the Bulletins that our valued members and friends receive semi-annually. For me at this time this requires a sound computer that still works in Word Perfect 5.1, the industry standard in the early ninety's but a rare find indeed at present. Special kudos are in order to Gene and Pat Zirkel for taking the time from their busy schedules to travel from their home on Long Island to my residence in Philadelphia to assist with the installation. It is the selfless work of individuals like Gene and Pat that helps to shape our society and enables it to flourish. Once again, my warmest thanks. - Jay Schiffman, Editor

ORIGINS

When the Kingship Was Lowered from Heaven

Burton S. Rudman

The early chapters of the Book of Genesis list genealogies in which the individual personages have lives that are excessively long by present day standards. Scholars have long argued the meaning or lack of meaning of these "long lives". However, a precedent for this format is found in the Sumerian King List which antedates the Old Testament by perhaps a thousand years. (Sumer was a group of city-states in Mesopotamia in the third and early second millennia BCE.) The excessive reigns given in this list, particularly for the "kings before the flood" can be shown to be the result of simple errors in scribal transcription.

> When the kingship was lowered from heaven the kingship was in Eridu. In Eridu A-lulim became king and reigned 28,800 years; Alalgar reigned 36,000 years,
> 2 kings reigned its 64,800 years.
>
> I drop the topic of Eridu; its kingship to Bad-tibira was carried.
>
> In Bad-tibira En-men-lu-Anna reigned 43,200 years; En-men-gal-Anna reigned 28,800 years; divine Dumu-zi, a shepherd, reigned 36,000 years. 3 kings reigned its 108,000 years.

It should be noted, however, that the Sumerian cuneiform number system used a sexagesimal place-order notation. This means that the system was base-sixty rather than our own base-ten and that the order in which each digit/symbol (or symbol cluster) appeared determined the final value of the notation.

For example, in our current system the number written "1234" means 4 times 10-raised-to-the-zero-power (i.e. $4 \times 10^0 = 4 \times 1 = 4$) plus three times ten-raised-to-the-first power (i.e. $3 \times 10^1 = 3 \times 10 = 30$) plus two times ten-to-the-second (squared) power ($2 \times 10^2 = 2 \times 100 = 200$) plus one times ten-to-the-third (cubed) power (i.e. $1 \times 10^3 = 1 \times 1000 = 1000$). The total is read as one thousand, two hundred and thirty four.

In base-sixty notation, however, the first-place digit (furthest right) would be read as times 60-to-the-zero-power(i.e. $4 \times 60^0 = 4 \times 1 = 4$); the second digit is multiplied by 60-to-the-first-power(i.e. $3 \times 60^1 = 3 \times 60 = 180$); the third is multiplied by 60-squared (i.e. $2 \times 3600 = 7,200$); the fourth digit is multiplied by 60-cubed (i.e. $1 \times 216,000 = 216,000$). (The parenthesized numbers are in our own base-ten system). This numeral "1234" would, in the base-60 system, be read as two hundred twenty-three thousand, three hundred and eighty four.

Note further that the Sumerian System had neither a zero nor a decimal point. A "digit" meant to be in the second place, for example, might have been written larger than a "digit" meant for the first place. Consider then our own system without the benefit of zero or decimal point to designate a reference from which to count places. The group "1234" could be read erroneously as occupying the second, third, fourth and fifth place instead of the first, second, third and fourth. The total would then be read as twelve thousand, three hundred forty. The error is a factor of ten. A slip of two places would induce an error factor of 100.

Referring now to the portion of the King's List as referenced above, I suggest that in the scribal transcriptions and re-transcriptions, the place order was slipped two places and that each number is in error by a factor of 60-squared or 3,600. This may have been a simple error due to sloppy transcription or an error based on mis-reading and the tradition that antediluvian kings were god-like and their reigns intended to be longer. Nevertheless, the error is there. I suggest that this error had become scribally standardized and accepted by the time that the tablets now available were written.

In any event, if each of these reigns is divided by 3,600 the result is exact, with no remainder in ten out of fourteen instances. The actual years of reign of these kings (or groups of kings) as shown, are actually eight, ten, eighteen (2 kings), twelve, eight, ten, and thirty (3 kings) years. These spans are quite reasonable.

It should be noted further that of the kings after the flood, each span of years as translated for 17 out of the first 20 reigns is exactly divisible by 60; the place order has been slipped by one. Furthermore, in many of the reign values which are not exactly divisible by 60 or 3,600, the translations seem to be a round off and are suspect by the author.

An interesting speculation arises regarding the unnatural ages of individuals in the antediluvian genealogies of the Hebrew Bible. Did the extended life spans as written stem from the author's being steeped in a common tradition of "long life for the Ancients" — or were the authors simply victims of mathematical errors in the transcriptions of tablets similar to those available to modern archaeologists? □

Editor's Note: This article has been reproduced with permission of the author.

OOPS!

When you saw that this issue was Whole Number 81; you might have presumed that you had missed number 80; — well you did not.

The last two issues were both numbered 7#. The correct 7# has a picture the of officers of the DSA. The incorrectly numbered issue which is actually number 80; has a computer with the words "E-mail" and "Web Page" on the cover.

7#;(95) is Volume 3#;(47.) Number 2; 11*6;(1998.)
80;(96) is Volume 40;(48.) Number 1; 11*7;(1999.) and this is
81;(97) is Volume 40;(49.) Number 2; 11*7;(1999.)

And so, *Happy Anniversary to us!* With this issue we complete 4 dozen volumes of our Bulletin, a celebration we might have overlooked if not for this error..

In addition an error in Whole Number 7* pages 20-21; was spotted. The beginning of the last paragraph on page 20; and the penultimate paragraph on Page 21; are identical. Special kudos to Associate Editor and Vice President Gene Zirkel for calling this to my attention. □

DOREMIC SYSTEM OF MEASURES AND WEIGHTS

By H. C. Churchman

Reprinted from this bulletin, whole number 20; volume 10; number 1; pp 13-22; July 1170;(1956.)

I
Introduction

You do not have to be a skilled duodecimalist to grasp the advantages of the Doremic System of Measurements. If we might accustom ourselves to refer to the size of an 8 cubic foot household refrigerator in terms of four or more digits (for in- stance, cf8;000), we thus could achieve more accuracy in describing its capacity, especially its slightest proportion over or under cubic foot units.

Since we are arithmetically correct if we think of cf8.000 (8 cu. ') as eight dozen, dozen, dozen cubic inches, we retain by use of the doremic system of measurements the identity and definite relationship of eight cubic feet to eight dozen, dozen, dozen cubic inches. That concept is wholly lost in the equivalent decimal expression of 13,824 cubic inches.

Assuming the box capacity is exactly 8 cubic feet, some of its possible dimensions are as follows: (Let f denote foot, and cf denote cubic foot.)

height	x	width	x	length	=	capacity
f8	x	f1	x	f1	=	cf8
f4	x	f1	x	f2	=	cf8
f2	x	f2	x	f2	=	cf8

But if the cubic contents were even slightly decreased from the foregoing, we might incur some fraction of the cubic foot; and it is in this field that the use of dozens (rather than tens) of units shows its usefulness. For instance, if again we assume f to denote foot, cf to mean cubic foot, and f0.6 to equal 6/12th rather than six-tenths of a foot, the following dimensions might result, as shown below:

height	x	width	x	length	=	capacity
f3;4s	x	f1;6	x	f1;6	=	cf7;6 or 7½ cu.'

In the foregoing example cf7;6 might also be shown as 7600; cubic inches, keeping in mind that the 7000; equals seven dozen, dozen, dozen cubic inches, and the 600 represents six dozen, dozen cubic inches.

By use of dozenal arithmetic above we were able to visualize the proportion of 7600; to 8000;, and, in addition, we are able to comprehend the capacity of a box in either cubic feet or cubic inches, MERELY BY MOVING THE POINT.

Thus, cf8;0 indicates and is pronounced eight cubic feet. But by moving the dozenal point three digits to the right, we indicate 8000; (eight dozen dozen dozen) cubic inches.

And if we assume one *pinch* to equal one-twelfth of an inch, then we may indicate eight cubic feet as equal to 8000000 (eight dozen dozen dozen dozen dozen dozen) cubic pinches. Arithmetically, we are as correct as when we say one plus one equals two. We have merely substituted dozens for decimals.

II
Preliminary Problem

Now if we should separate Do-Re-Mi into its components and let Do (10;) denote not ten but a dozen things; let Re (100;) denote not one hundred but one dozen dozen things; and let Mi (1000;) denote one dozen dozen dozen things and not one thousand units, we might with some slight effort understand the following problem.

What is the cubic foot capacity of an electric refrigerator box the dimensions of which are 21." times 16." times 38."?

Let us assume *f* to indicate foot, *sf* to mean square foot, *cf* to denote cubic ', and 0;2 to denote 2/12.ths, 0;4 to indicate 4/12.ths, and 0;48 to denote four dozen and eight of 144. parts of the given unit. *(Continued)*

***Remember* — your gift to the DSA is tax deductible**

```
Work:      38." = f3;2 (3'2") multiplied by
           16." = f1;4 (1'4")
                   108
                   32
         equals sf4;28 (4 sq', 2 dozen and 8 sq")
    multiplied by f1;9 (1'9")
                  3200
                  428
        equals cf7;480 or 7480; (pronounced 7 Mi, 4 Re,
                                 8 Do) cu.", or decimally
                                 7 56/144ths, or7 7/18ths cu.'
```

By moving the dozenal point three places to our right, we are able to change

cf7;480 into 7 dozen dozen dozen cu.", plus 4 dozen dozen cu.", plus 8 dozen cu.". And by removing the dozenal point back three places, we again have 7 cu.' plus $^{56}/_{144}$ths of a cubic'.

III

An Estimate of the Situation

Everyone with even the slightest knowledge of music is familiar with the Do-Re-Mi scale. Music knows no language barriers. If we consent that "Do" shall represent for us a dozen units of measurement, "Re" a dozen dozen objects, and "Mi" a dozen dozen dozen things, then we should have the implements of nomenclature with which to speak with facility about all values now described in our decimal system by " tens" and "hundreds" and"thousands," and we might all work our arithmetic with a song in our hearts. If attitude determines whether we look upon work as a pleasure or a chore, here is an opportunity to look upon our chores as a game.

But of what practical use to me is the common Do-Re-Mi nomenclature of the dozenal system? Well, for one thing, it might greatly alter our present system of coinage so that, as in England, we could divide the equivalent of our nickels and quarters in half without running into a fractional coin in the five, fifteen, and twenty-five cent area of merchandising. That subject is treated elsewhere.

Oddly enough, in American slang those three syllables thus taken together are

synonymous with the word money. Yet the principal field of Do-Re-Mi is not, I believe, in the area of money or music. It is becoming daily more popular to avoid compound denominate numbers and fractions, and the dozenal system offers the greater hope of success in that endeavor in English-speaking countries.

With the dozenal system gathering strength in the field of measures and weights, we might find the Nemesis and the ultimate successor of the metric system with its awkward liquid "fifths" attempting to supplant our "quarts" in the liquid refreshments field, and its fractions of meters never quite equalling our yards, feet, and inches, our gallons, and pounds. Indeed, our day may mark the end of a tactical retreat and the beginning of a mushrooming counterattack which might carry our pound, our foot, our gallon, and other long honored units of measurement among us, beyond our lands and deep into the metric areas of the world. We stand on the threshold of change.

Initially, this is no more than an approach to the beginning of consideration of the usefulness of a dozenal system of measures and weights, and nothing that I here say is to be treated as either sacred or final or to be cut in stone. The subject matter will require much work by many minds before it can flower around the earth.

Metric Terms: Let us first, to understand our problem, glance at the terms used in the metric system of measurements. Stems are used to denote a type of measurement. For instance, gram denotes weight; meter denotes length, surface, or cubic capacity; liter denotes liquid volume.

Prefixes which denote metric quantity, and the value which each represents, are, for general use, as follows:

Myria	10,000 units
Kilo	1,000 units
Hecto	100 units
Deka	10 units
	1 unit
Deci	1/10 part
Centi	1/100 part
Milli	1/1000 part

Thus, if we use the term kilometer, we know that one kilometer equals 1000 meters; if we use the word centimeter, we conceive it to be one of the 100 parts of a meter. If we use the word kilogram, we picture it as equal to 1000 grams; and if we employ the term centigram, each of us understands it, by common consent, to represent the value of one of the 100 parts of a gram. The same is true of liters. By international agreement, the value of one meter, one gram, or one liter is as fixed as is the value of one U.S. standard foot, pound (Av.), or gallon.

The metric system was not erected purposelessly; fathered by a group of mathematicians who could no longer tolerate the conglomerate systems of measurement and weight existing in their time in France, it was conceived out of necessity and born in Paris during the French revolution. It has been penetrating other nations quite peacefully; but English-speaking countries have resisted, on the whole, quite completely its efforts to substitute decimals for dozens.

Our Own Difficulties: And while our own system of measurements and weights, most of which we brought with us from England, might be said to be less confusing and frustrating than a system found in another nation, yet we must frankly confess it to be a mess when we venture a second step above or below the known value of the foot, the pound, and the gallon.

Even a quick glance at the Troy pound may indicate one of the difficulties in teaching arithmetic today. For instance, note the scales in these denominate numbers:

24. (double dozen) grain equal one scruple;
20. (double decimal) scruples equal one ounce;
12. (single dozen) ounces equal one pound (Troy).

And to bring home the confusion of our present system, let us remind ourselves that there are 12. ounces in one Troy pound, 16. ounces in the Avoirdupois (AV) pound, and there are 14.58 plus Troy ounces in the (AV) pound. Only Troy grains and (AV) grains are of equal mass, but there are 7000. grains in the (AV) pound, and 5760. grains in one pound Troy. This, we deliberately

inflict upon our children so that they may understand our miseries when they join us in adult activities. Without sacrificing our foot, pound, or gallon, we might eventually teach them more sensible alternate scales above and below those quantities. There is no other reason for this essay.

The metric system is wholly base ten. It contains no compromises with double decimals, double dozens, sixteenths, or eighths. Therein lies its strength, and ease of handling and memorizing. I shall not mention here its disadvantages; but in our own system it is especially frustrating when, to add or to subtract, we must convert feet to inches, pounds to ounces, pints to fluid ounces, hours to minutes, or minutes to seconds. Out of the habits of the past, we employ almost every scale in our present system of measurements and weights from two to sixty, especially favoring eight, ten, twelve, sixteen and twenty.

In the metric system we find the decimal base revealed in all of its utilitarian nakedness. Let us attempt to disclose the dozenal base in its natural beauty and usefulness. We can get away from our scruples, and grains, drama, and pennyweights, without going metric.

Doremic Terms: In the Doremic system of measurements and weights, the common stems are *fut, gal,* and *pound.* The U.S. standard (AV) pound is the stem used to denote mass. Its grains are of equal mass with Troy grains, and the grains of either are standardized in their relation to the (AV) pound. The U.S. standard foot (both singular and plural shortened to fut) is the stem to denote length, surface, and cubic capacity. The U.S. standard gallon (both plural and singular abbreviated to gal) is the stem to denote liquid volume. We, therefore, possess our basic stems, already standardized by U.S. statutory regulations.

Prefixes which denote quantity in the doremic system of units, and the value which each represents, are, for general use, as given in the next table.

Observe how the symbol 10000; (Do mi), if we think of each cipher as a dozen, describes itself by mere inspection as (count the ciphers) one dozen, dozen, dozen, dozen units.

Dozenal Symbol	Doremic Value	Dozenal units	Equivalent Decimal units
10000;	Domi	1 dozen, dozen, dozen, dozen	20736
1000;	Mi	1 dozen, dozen, dozen	1728
100;	Re	1 dozen, dozen144	
10;	Do	1 dozen	12
1		1 of anything	1
0;1	Edo	1 dozenth part	$^1/_{12}$ part
0;01	Ere	1 dozen, dozenth part	$^1/_{144}$ "
0;001	Emi	1 dozen, dozen, dozenth part	$^1/_{1728}$ "
0;0001	Edomi	1 dozen, dozen, dozen, dozenth part	$^1/_{20736}$ "

For limited use, the dozenal symbol 1,000,000; - having the value of one dozen raised to the sixth power - when used as a doremic prefix is called *Mammo,* i.e., mammofut, mammocrosm, mammoscopic, etc. Also used only in special work, the dozenal symbol 0;000001, having the value of one dozen, dozen, dozen, dozen, dozen, dozenth, when used as a doremic prefix is called *Mimi,* i.e., mimifut, mimicrosm, mimiscopic, etc.

The letter "a" is sometimes used in the English language as a prefix to denote the opposite direction or direct opposition, i.e., theist, atheist; gnostic, agnostic; "e" assumes that duty in the dozenal system.

Let us join several stems and doremic prefixes for a trial run.

Length: If we use the term "dofut", we know that one dofut equals one dozen U.S. standard feet, 144 inches, 4 yards, two fathoms, or one Mark Twain,

If we use the word "edofut", we know that one edofut equals one-twelfth part of one U.S. standard foot, or one inch if you wish. And one erefut equals one-twelfth part of one U.S. standard inch, or one pinch if you will say so. One emifut equals one-twelfth part of one pinch, and one edomifut equals one-twelfth part of one emifut or, decimally, 1/20736 part of one foot.

By standardizing the "dofut" to one Mark Twain, the fathom is equal to a half dofut, the yard to a quarter dofut, and we begin to simplify our denominate number system to doremic terms alone.

Table 1: Dimension (f) symbol for Measures of Length

Dozenal Symbol	Doremic Value	Decimal Equivalent in feet	
f10000	domifut	20736	
f1000	mifut	1728	
f100	refut	144	
f10	dofut	12	= 1 Mark Twain
f1	fut	1	= 12"
f0;01	edofut	$^1/_{12}$	= 1"
f0;01	erefut	$^1/_{144}$	= 1 pinch
f0;001	emifut	$^1/_{1728}$	
f0;0001	edomifut	$^1/_{20736}$	

Liquid: If we use the word "dogal", we know that the dogal equals one dozen U.S. standard gallons of bulk liquid.

If we use the term "edogal", we know that one edogal equals one-twelfth part of one U.S. standard gallon, or two-thirds of one U.S. standard pint of liquid. Also we know that three edogal equal two pints, or one U.S. standard quart; and that six edogal equal four pints or two U.S. standard quarts.

We might note at this point that, in purchasing gasoline or petrol for your car or truck, ten British Imperial gallons of petrol are so nearly equal to one U.S. standard dogal that a thimble will swallow the difference, or one rapid acceleration.

Incidentally, the edogal ($^2/_3$ pint) is already being enjoyed commercially by a large supplier who by a recently developed process reduces one quart of whole milk to a quantity equal to two- thirds of a pint, freezes the concentrate at 15. to 20. degrees below zero, and so delivers it. This edogal, still frozen, is placed in a milk container with two edogal of distilled water, and, as its temperature rises, it becomes on shipboard one quart of pasteurized, cooled, delicious, American fresh milk. That system was pioneered, I am apprised, at the Iowa State College at Ames. (See *Farm Journal* December 1954, p. 37, "Frozen Milk").

If one gallon of concentrate could be separated or scored in one layer of three dozen frozen cubes (6 x 6), each cube, containing 4 eregal, might be placed in eight eregal of distilled water in a milk glass, producing one edogal ($^2/_3$ pint) of cool, fresh, whole milk on the table, when Johnny arrives home from school. Thawed out and used straight, it is said to whip just like cream. It is said to make good coffee cream when mixed with equal parts of water. So actually, one might retail three products in one flat, gallon, waxed container, easy to store in the freezing compartment, compact, non-spillable. See Tables 1 and 2.

Table 2: Bulk Liquids (g) Symbol for Measures of Volume

Dozenal Symbol	Doremic Value	Decimal Equivalent U.S. std gals, liquid
g10000;	domigal	20736
g1000;	migal	1728
g100;	regal	144
g10;	dogal	12
g1;	gallon	1
g0;1	edogal	1/12
g0;01	eregal	1/144
g0;001	emigal	1/1728
g0;0001	edomigal	1/20736

Mass: If we use the word "dopound", we know that one dopound equals one dozen U.S. standard pounds, (AV).

If we use the word "edopound", we know that one edopound equals one twelfth part of one U.S. standard pound, (AV). And everything being in dozenth parts, we may eventually forget whether twelve or sixteen ounces equal the pound, and pupils no longer will need to learn, except for historical purposes, the number of scruples in one ounce.

Groceries, if purchased by the pound, may be measured by one or more (three, seven, nine, or eleven) edopounds, every housewife eventually becoming familiar with the fact that twelve edopounds equal one pound; that twelve pounds of potatoes, for instance, equal one dopound.

Table 3: Precious Liquids (n) Symbol for Measures of Volume

Dozenal Symbol	Doremic Value in Edomigals	Decimal Equivalent	Present Terms
n10000;	dominal	20736.	= 1 U.S. standard gallon, liquid
n1000;	minal	1728.	= 1 Edogal or 5120. minims
n100;	renal	144.	= 1 Eregal or $426^2/_3$ "
n10;	donal	12.	= 1 Emigal or 35.55 "
n1;	nal	1	see Bulk Liquids, or 3-"
n0;1	edonal	$^1/_{12}$	see Bulk Liquids
n0;01	erenal	$^1/_{144}$	see Bulk Liquids
n0;001	eminal	$^1/_{1728}$	see Bulk Liquids
n0;0001	edominal	$^1/_{20736}$	see Bulk Liquids

Some grocery scales now are being developed to divide pounds into ten decimal parts. If we can stand that break with tradition, the end of our compound denominate number system is closer than we think. Gasoline is being retailed in the U.S. nominally in tenths of gallons, but is actually measured by the dollars and cents scale; and its price is always quoted "per gallon." If you advise the service station attendant to "fill the tank" of your automobile, he will endeavor to end up on a round cent; to that extent, it might be said that we retail gasoline to the customer and motorist by the hundredth part of the dollar. And no doubt we will continue to do that until our monetary system is improved.

Field corn and small grains, more and more fed or sold by their weight in pounds, need no longer be measured by a bushel basket. It approaches a legal fiction to quote the price per bushel, and fewer farms each year keep a bushel basket around. Eventually, we might quote and sell grains by the pound, the dopound (12 lbs.), the four-dopound (48 lbs.), the repound (144 lbs.) or even by the domipound (20736 lbs.) when transferred in large, single deals. They divide readily into halves and quarters and thirds down to the pound and below.

If corn sells at $1.40 per bushel, it equals 2½¢ per pound, 30¢ per dopound, or $3.60 per repound. The repound is the better unit of price quotation, perhaps, since it may fluctuate upward or downward by one cent without the use of fractions of a cent.

The doremic system embraces only simple denominate numbers. Compound denominate numbers are entirely avoided, just as they are unknown to the metric system.

Some of the units and the larger and smaller containers might be shown with a prefix letter to indicate their stem, quite the same as we prefix the $ sign to indicate that we are referring to money denominations in the United States of America, The symbol for the (AV) pound (#) is familiar to grocers and meat markets throughout the land.

Table 4: Avoirdupois (#) symbol for Measures of Weight

Dozenal Symbol	Doremic Value in pounds	*Decimal* Equivalent	Troy or Apothecary Grains
#10000	domipound	20736	
#1000	mipound	1728	
#100	repound	144	
#10	dopound	12	
#1	pound	1	7000
#0;1	edopound	1/12	583+
#0;01	erepound	1/144	48+
#0;001	emipound	1/1728	4+
#0;0001	edomipound	1/20736	1/3+

Transforming Denominate Numbers: A denominate number in the doremic system can be changed to the next higher denomination simply by moving the dozenal point one space.

In measures of surface, since it requires 100; (one re) of any denomination (dozen times dozen) to make one of the next higher, the dozenal point must be moved two places at once.

And in measures of cubic capacity, since it requires 1000 (one mi) of any denomination (dozen times dozen times dozen) to make one of the next higher, the dozenal point must be removed three places in a single change to the next denomination.

We can best illustrate these principles by setting forth tables of length, surface, and capacity, as they move from one denomination to the next.

Table 5: Doremic Measures of Length
(Dozenal symbol 10; is pronounced do)

Doremic Value	Doremic Denomination	Decimal Equivalent in U.S. std. ft.
10; edomifut	1 emifut	$^{1}/_{1728}$
10; emifut	1 erefut	$^{1}/_{144}$
10; erefut	1 edofut	$^{1}/_{12}$
10; edofut	1 fut	1
10; fut	1 dofut	12
10; dofut	1 refut	144
10; refut	1 mifut	1728
10; mifut	1 domifut	20736

Table 6: Doremic Measures of Surface
(Dozenal symbol 100; is pronounced re)

Doremic Value	Doremic Denomination	*Decimal* Equivalent
100 sq edomifut	1 sq emifut	$^{1}/_{144}$ sq pinch
100 sq emifut	1 sq erefut	1 sq pinch
100 sq erefut	1 sq edofut	144 sq pinches, 1 sq"
100 sq edofut	1 sq fut	144 sq inches, 1 sq'
100 sq fut	1 sq dofut	144 sq feet
100 sq dofut	1 sq refut	144 sq dofut
100 sq refut	1 sq mifut	144 sq refut
100 sq mifut	1 sq domifut	144 sq mifut

Table 7: Doremic Measures of Capacity
(Dozenal symbol 1000; is pronounced mi)

Doremic Value	Doremic Denomination	Decimal Equivalent
1000 cu edomifut	1 cu emifut	$^{1}/_{1728}$ cu pinch
1000 cu emifut	1 cu erefut	1 cu pinch
1000 cu erefut	1 cu edofut	1728 cu pinches, 1 cu"
1000 cu edofut	1 cu fut	1728 cu", 1 cu'
1000 cu fut	1 cu dofut	1728 cu', 64 cu yds
1000 cu dofut	1 cu refut	1728 cu dofut, 110592 cu yds
1000 cu refut	1 cu mifut	1728 cu refut, 191102976 cu yd
1000 cu mifut	1 cu domifut	1728 cu mifut

In computing the capacity of commercial vehicles, the cubic contents of rooms, surface of windows, walls, floors, rugs, now shown in compound denominate numbers of feet and inches, the Doremic dozenal system of measurements might prove itself more useful to architects, carpenters, builders, and manufacturers simply because fractions seem to just vanish. We may add or multiply feet and inches without converting to inches. We may subtract or divide without meeting any apparent fractions.

Soon we may see the dozenal adding machine in extensive use in the transportation of freight and cargo.

The big effort today is to standardize sizes, to avoid fractions, to construct buildings so that when in place a certain number of parts will equal the length of so many feet or so many inches. In brick, incidentally, units of four inches (4 edofut) or their multiples (8 edofut, 12. edofut, 16. edofut) are emerging as popular dimensions. Automobile license plates tend to standardize at six by twelve edofut.

A grocer or grosser originally was one who bought and sold by the gross or some twelfth part of a gross or dozen. Since one re is equal to one gross in

doremial nomenclature, all retailers might now be classed as those who tally and sell by the re or some twelfth part of the re or the dozen; those who tell or tally by the re, and hence, retailers, tellers, or talliers. Originally it meant "apiece cut off" or"to cut again." The word retail is especially fitting, since it is in retailing that dozens prove so essential.

The metric system has been resisted in English-speaking countries around the earth; and also in other nations which have adhered from time immemorial to habits of merchandising, particularly wholesaling, in terms of dozens, gross, and dozens of gross. Their reasoning is simple. The metric system is just plain impractical.

One phase of resistance to that system lies in the inability of the metric system to break down into thirds and quarters as readily as in halves, without breaking into a bottle or a bunch or a bundle of lower units.

Take liquids, for instance. Divide a gallon of liquid into ten parts, placed in ten receptacles. You may want to buy a quarter of a gallon. You can buy two one-tenth gallon bottles or three, but not a quarter gallon without opening one of them. If you want a third of a gallon, you must buy either three bottles or four but you can not buy three and one-third bottles (1/3 gallon) without opening one of them and removing a portion. It is no more palatable that you use the term liter instead of gallon. Metrically, we become slaves to numbers instead of letting numbers work for our pleasure.

Theoretically, fractions may exist; and a sufficient number of fractions might add up to one whole number, but no one, in fact, wants to split bundles or bottles or bunches or packages to conform to odd fractions.

If, on the other hand, you will divide a gallon of liquid into a dozen parts, placed in twelve receptacles, you may buy or sell at retail one-sixth of a gallon (2 bottles), one-quarter of a gallon (3 bottles), a third of a gallon (4 bottles), a half gallon (6 bottles), two-thirds of a gallon (8 bottles), three- quarters of a gallon (9 bottles), or any number of one-twelfths of a gallon, without breaking the seal or bond of any edogal container. In this manner, the reputation of the

manufacturer or the packer is carried direct to the purchaser; and this will encourage more direct advertising by the manufacturer or packer or producer.

Everyone enjoys music of one type or another. In practicing

♪ Mi
Re
Do

the voice rises in a musical scale. In running the scale,

Mi
Re
Do,

we come down the steps. In the doremial nomenclature of the dozenal system, denomination changes are suggested by that same musical scale. Thus,

Mifut (1728 units), and again, Mifut,
Refut (144 units), Refut,
Dofut (12 units), Dofut.

More and more, we will count by dozens, particularly in transportation and in the building trades and professions. Pinch by pinch, inch by inch, and foot by foot, glaciers move to the sea. As unstoppable as a glacier, dozens are descending upon us, do what anyone will to stop the avalanche.

The doremic system of measurements would come like a cyclone If merchants and hucksters should persuade the Congress to set up a Doremic Branch in the Office of Weights and Measures, National Bureau of Standards. But a cyclone is often destructive, and perhaps we should gladly accept the pace of the glacier or some other moderate rate of travel to which the subject matter may naturally gravitate according to its usefulness. □

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