THE
DUODECIMAL
BULLETIN
77;

POETRY AND DUODECIMALS

One, two
Five-sixths to do;
Three, four
Two-thirds more;
Five, six
Half the mix;
Seven, eight
One third will wait;
Nine, dek
A sixth to check;
El, do
Home I go.

-Nyr Indictor

Volume   39;
Number   2;
              1996
              11✳4;

THE DOZENAL SOCIETY OF AMERICA

(Formerly: The Duodecimal Society of America)

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

Membership dues are $12.00 (US) for one calendar year. Student Membership is $3.00 per year, and a Life Membership is $144.00 (US).

The Duodecimal Bulletin is an official publication of the DOZENAL SOCIETY OF AMERICA, INC., c/o Math Department, Nassau Community College, Garden City, LI, NY 11530.

BOARD OF DIRECTORS OF
THE DOZENAL SOCIETY OF AMERICA

THE
DUODECIMAL BULLETIN

Whole Number Seven Dozen Seven

Volume 39;   Number 2;

11✳4;

IN THIS ISSUE

FOUNDED
1944

ANNOUNCEMENT OF OUR ANNUAL MEETING

Call for Participation

The UPE Computer Science Honor Society &
the Computer Science Club of Hofstra University
are proud to sponsor the

Four-Dozen and Fourth (52nd) Annual Colloquium of the

DOZENAL SOCIETY OF AMERICA

Saturday, 17; October 11✳4 [19 October 1996]

Student Center - Rooms 142 and 145
Hofstra University, Hempstead, New York

Short Papers — Panel Discussions — Seminars

Student presentations are welcome!!

Schedule: 9:00 [9 am] Reception
✳:00 [10 am] Papers, panels, seminars
10:00 [Noon] Luncheon
11:00 [1 pm] Featured Speaker
12:00 [2 pm] Papers/panels/seminars
14:00 [4 pm] Business meeting

Registration Fee: Before 4 Oct: 1/3 dozen do dollars
(Includes lunch)   On/after 4 Oct: 1/2 dozen dollars

Submission Deadline: Fri 18; Sep 11✳4; [20 Sep 1996]

Information
(submissions, registration, & miscellaneous):
Professor Gene Zirkel
Dept. of Mathematics and Computer Processing
Nassau Community College
Garden City, New York 11530
Phone: +1-516-572-7611 or +1-516-669-0273
E-mail: marinor@amanda.dorsai.org

Abstracts of presentations will be published in this *Bulletin*, and papers will be
considered for publication.

☐

IN MEMORIAM: PROFESSOR JAMES MALONE

Gene Zirkel

The DSA has lost another devoted leader. Jim Malone, my friend for over two dozen years,
passed away last March after a long illness.

Jim and Mary Malone

One day as I walked down the
halls of Nassau Community Col-
lege I passed a classroom in which
my colleague Jim Malone had
just finished giving a lecture. I
dropped in and was surprised to
discovered his lecture was about
dozenals. Jim had developed a
very clever story about selling
eggs either individually, by the
dozen, or by the gross, a story
which he made use of in order to
teach the fundamentals of base
twelve numeration.

That was the beginning of our
long association in the DSA. Jim
joined the Society as member
number 245; and was the fea-
tured speaker at our 118# (1979) Annual Meeting presenting his imaginative talk,
"Eggsactly a Dozen". His devoted wife Mary joined us one dozen members later becoming
member number 255;. Subsequently Jim's talk was printed in our *Bulletin*, volume 26;
number 1, and then recorded on video in 1195; (1985).

By 118# (1979) President Tom Linton was very concerned about the future of the Society.
Tom was both President and Treasurer and our *Bulletin* had been out of print for over a
dozen years. In 1190; (1980) he invited Jim and myself to fly to the annual meeting in
Denver and Jim was elected to the Board of Directors and to the position of Treasurer. He
faithfully served as Treasurer for many years, carefully husbanding our meager resources,
enabling us to continue our work. Every year he presented a detailed Treasurer's report at
the Annual Meeting. At times, when faced with a cash flow, he generously gave our Society
interest free loans by temporarily using his own money to pay our bills. At one point he
donated a substantial sum by refusing to accept repayment for such a loan.

A dedicated member of the DSA, after his many years as Treasurer, he was elected Board
Chair. Over the years he served on several committees including Financial, By Laws,
Nominating and Awards. Later, when called upon, he accepted the role of Treasurer once

again. A forward looking individual, it was Jim who many years ago first suggested that we computerize our membership list.

In 1195; (1985) he was made a Fellow of the Society and two years later he was the recipient of our Annual Award. The plaque given to him read:

> The Annual award of the Dozenal Society of America
> is hereby presented to **Professor James Malone**
>
> Who willingly took on the role of treasurer when
> we needed him, and who has carefully & diligently
> managed the monies of the Society ever Since.
>
> Jim joined us in 1979 (member no. 245;) & has
> faithfully and consistently served as an Officer
> and a Board Member for over a half dozen years.
>
> His helpful advice, his warm personal encouragement,
> his service on numerous committees — all given with
> his ever-present smile — are deeply appreciated
> by the members of the Society.
>
> Truly, without dedicated people such as Jim,
> there would be no DSA.
>
> Given With Gratitude By The Board of Directors

1197;   1987.

☐

DID YOU FORGET?

Treasurer Alice Berridge informs us that our printing bills have escalated recently. She writes that if we wish to continue to spread the message of dozens, our members need to renew promptly. Alice suggests that "Our end-of-year renewal letter may have been filed away. If so, please extract that letter and send in your dues for 11✳4 (1996). Remember, your extra, tax deductible contribution helps to defray the brunt of the extra printing costs and is sincerely appreciated."

Kindly send your dues and contributions to:

Prof Alice Berridge, Treasurer
The Dozenal Society of America
16 Burns Lane
Massapequa LI NY 11758

IN MEMORIAM: DUDLEY GEORGE

Gene Zirkel

Kay George called to give us the sad news that her husband — one of our Society's earliest and most devoted members — had passed away on November 1✳; 11✳3 (11/22/95).

Dudley George

One of the first three dozen people to apply for membership in what was then known as the Duodecimal Society of America, Dudley became member number 2#. In those early days of our Society applicants had to pass a series of four tests to demonstrate their proficiency in duodecimal arithmetic. Dudley became an aspirant in early 1162; (1946) and in a few months he was a full fledged member of the Society.

An active member from the very beginning, he served on many society committees including: By Laws, Nominating, Financial, and Mathematical Recreations. He was elected to the Board of Directors four times, serving a dozen years in that capacity, and he was twice elected to terms as Vice President. He was named a Fellow of the Society in 1196; (1986).

Like many members, over one and a half dozen years before he joined us Dudley had discovered duodecimals on his own and had invented his own symbols. These were printed in this *Bulletin* in September 1162; (1946). They were reprinted in 1195; (1985) when he was featured in an article in volume 2✳, number 2, entitled "Who We Are IV: Dudley George." The following issues of the *Bulletin* contained several positive reactions to his symbolism.

Dudley often attended the Annual Meetings of the DSA, traveling across the country from either his home in California or from his vacation home on Vashon Island near Seattle. My wife and I spent a wonderful day there with Kay and Dudley in 1197; (1987). I first met Kay when she accompanied him to a special meeting held in May of 1190; (1980). This meeting was held when Arthur and Ruby Whillock of the Dozenal Society of Great Britain were passing thru NY. Later, when Dudley traveled to England, he again met with the

Whillocks. At that time Tom Pendlebury had just published his book, *TGM, A Coherent Dozenal Metrology*. Dudley brought a dozen copies back with him and distributed them at the next Annual Meeting.

He was a featured speaker at several Meetings on such topics as "Squares and Approximations," "Dozenals in Measurement" and "Factoring in Decimal and Duodecimal Systems."

In an early *Bulletin* Dudley is listed as a donor to the society. More important than the money he gave, he inspired us with his devotion and service to our Society.

We offer our condolences to Kay and to their son. May his memory continue to inspire the members of the DSA.

A number of years ago, a video tape was made of several talks about duodecimals. One dek (ten) minute segment features Dudley George. I suggest that we show this at a future meeting, so that his inspiration will live on.

[Much of the information above was gleaned from our *Bulletin* with the help of the late Fred Newhall's wonderful index. Dudley and Kay are cited over 8 dozen times! Our gratitude to Fred. We certainly could use a volunteer to continue the great work that Fred started.]

☐

ERRATA

An Imπerfection

π_{twelve} is given in Whole Number 57; V30; N2; P11; 1197; (1987) to seven dozen places beginning 3;18<u>4</u>809 493#91 866457 3✻6212 ...

π is given incorrectly in

WN 6✻ V35 N1 P# 11✻0 (1992) as 3;1<u>6</u> instead of 3;18
WN 69 V34 N3 P1✻ 119# (1991) as 3;184<u>#</u> instead of 3;1848

We thank Jean Kelly for pointing out these errata, and we aπologize for any inconvenience they may have caused.

CREATING A DOZENAL HERITAGE

Nyr Indictor
Chappaqua, NY

If we are to expect our children to learn dozenal counting, we must create a twelve-based heritage for them to embrace. We must replace the *decade*nt with the do*decade*nt. Here are some decimated rhymes that I have attempted to dodecimate. By the time they have been around long enough to have become anonymous, they will have been sufficiently improved to be worthy of entering into the literature. In the meantime, I ask the readers' indulgence for any deficiencies, and urge any and all to edit and improve these modest drafts.

Twendo-six days hath September,
April, June and November,
All the rest have twendo-seven,
Without exception, thank heaven;
Except that February has twendo-four
(But on leap year it takes one more).

One and one make two;
This is always true.
Two and two make four;
Never slam the door.
Three and three make six;
A hen can't count her chicks.
Four and four make eight;
Don't stay out too late.
Five and five make dek;
Never bounce a check.
Six and six make do;
Reap as ye shall sow.

Rub-a-dub-dub
Do folks in a tub,
And who do you think they be?
The butcher, the baker,
The candlestick-maker,
The doctor, the lawyer,
The dentist, the sawyer,
The rabbi, the preacher,
The nun, nurse and teacher,
They've all gone off on a spree.

As I was going to St. Swithins,
I met a man with a dozen kittens.
Each kitten had a dozen cousins;
Over each cousin, each kitten was fussin',
And knit each cousin a dozen mittens.
But each kitten cousin was deeply smitten
With the mittens of another kitten.
And thus each kitten's cousin's mitten
Was bitten by the smitten kitten's cousin,
Till, instead of a dozen dozen dozen,
There was left one single mitten,
And that mitten fit *no* kitten!
A diller, a dollar,
A dek o'clock scholar,
Must you be so slow?
You used to come at dek o'clock,
And now you come at do.

"Baa, baa black sheep,
Have you any wool?"
"Yes, sir, yes sir,
Do bags full:
One for my master,
One for my dame,
One for my dear old aunt Mame.
One for my father,
One for my mother,
One for my sister,
One for my brother,
One for cousin Joe,
One for cousin Flo,
One for uncle Moe,
One for my best friend Jane,
And one for the little boy
Who lives down the lane."

(Editor's Note: The above application of duodecimals to poetry is both novel and appealing! We welcome all contributions to duodecimals and number bases in general, not only the scientific ones.)

☐

AMERICA'S AVERSION TO METRIC CONVERSION

Gary W Brend
3336 Westmoreland Drive
Tampa FL 33618-2161

(Editor's note: Adapted from a paper for English 1102 TR. Gary earned 99/100 on this paper. Of course, 143/144 would have been a higher grade!)

"They who have already passed a certain period of life may not adopt [the metric system]; but the rising generation will embrace it and ever afterwards number it among the choicest possessions of an advanced civilization."

-Sen. Charles Sumner, 1866

Senator Sumner was a proponent for the decimal metric system. Even in his day there was a definite international economic advantage of America's using the metric system. 'Metrication' is a term used to describe the process of converting society to using the metric system of weights and measures. The decimal metric system is a system of physical units based on its unit of length, the meter[1].

Adoption of the metric system by the American public was a very controversial issue then, and it continues to be so today. It is doubtful that older Americans will ever adopt the metric system for everyday use because it is unpopular, costs too much, and involves extensive education.

The metric system is unpopular with Americans today for several reasons. One reason is pride in America and American products. "With our own way of measuring, we became the leading industrial nation in the world, the envy of everyone else" (Greene). Why should a great country as ours be forced to change to a 'foreign' system of measuring? Some persons will argue that the current balance of trade with the metric world [most countries except the US] is very low because of US industry not being in the competitive metric marketplace. Regarding metric labeling of products, Gary Carver, who is in charge of the US Commerce Department's metric program, stated, "The whole purpose of this is to help manufacturers of these products sell them in a global market" (qtd. in Ingley). The US government may not have thought of exporting toilets when it passed the Energy Policy Act of 1992 "in which urinals and toilets had to be marked in gallons per flush, thus flushing down any hopes for an export bonanza in commodes. They don't call them American Standard for nothing" (Gugliotta, "Regarding Metric System"). Some people have argued that it was the push for America switching to metrics in the mid-to-late 70's that caused the economic downturn that we now experience. Many industries that have products that would sell overseas should go metric. Small businesses and companies that do not have products that would sell overseas should stay with the current system.

The metric system with its base-ten may not be the best system to use. Gene Zirkel of the

DSA says, "It's a bad system, mathematically speaking. The metric system which is being proposed uses ten as its base. Twelve would be a much better number to use. Carpenters devised rulers based on twelve inches since you can easily take a quarter and a third of twelve. Pharmacists base their weights and measures on twelve. You cannot do that with ten. Bakers independently came up with twelve as a dozen because it is a more useful number. Grocers whose name was derived from the word 'gross' used twelve as their base number for calculations." Ordinary citizens would more likely use twelve for everyday use than ten. In addition to dozens, some of the everyday weights and measures used by Americans that are multiples of twelve, and can therefore easily be divided into common fractions of halves, thirds and quarters are: number of hours in a day, minutes in an hour, seconds in a minute, months in a year, tones in a musical scale, degrees in a circle, troy ounces in a pound, and feet in a fathom. We might also note that the use of the number twelve was voluntarily adopted by people who saw the practicality of using twelve.

Groups such as the Dozenal Society of America[2], Americans for Customary Weight and Measure, The National Federation of Independent Business, and WAM [We Ain't Metric] have formed to oppose the awkward decimal metric system. These groups differ in purpose from the DSA which was formed to encourage the use of the more convenient dozenal metric system. According to a 1991 Gallup Poll, "64% of the American people opposed conversion to the metric system" (Greene). The US Government hopes to maintain the current "low-key approach to metrication which eventually will teach every citizen that metrication will improve living conditions because a decimal is so easy to use in everyday living. **Everyone will soon learn how foolish we are to cling to the "abacus" when we have the "computer" at our disposal**" (Alberg 39). Although the scientific community adopted the metric system almost from its very inception in the 1790s, its practical value in everyday American life is still not obvious to the American public.

Implementing the metric system across America will be very expensive. In 1975, the "estimated conversion costs range from $40 billion to $200 billion" (Beathard, "Excited?"). Individual states may have to "foot" the bill for converting to the metric system. Many states are balking about making the switch to the metric system because there hasn't been enough discussion as to who is going to pay the bill. Governor Nelson of Nebraska said "We're simply not going to do it...it's a dumb and unnecessary expenditure" (qtd. in Cordes). The cost of highway sign conversion alone for the state of Vermont is "estimated to cost more than $1 million" (Pfeiffer). Could you imagine MPH signs in Paris? *Quelle blague!* [French for "We'll never have it!"]

The general public is not receiving the needed education in using the metric system. Teachers are becoming frustrated when it comes to the metric system. Diane Dunseath, who teaches honors math and reading classes at Aire Libre Elementary School in Phoenix exclaimed, "I have to be honest, and I feel a little guilty. I don't spend a whole lot of time with the metric system...When they go home, it's not transferred into real life" (qtd. in Ingley). Kilos of cocaine, liters of Coca-Cola, 35 mm film, 1 Gigabyte of ram, 500 mg

aspirn tablets, Winston 100s [mm], 9mm Berettas, 15k [kilometer] races, and ten meter sailboats are some of the terms the average American has learned since the last big push for metrication in the 1970s. The previously mentioned 1991 Gallup poll stated that "*18% of Americans didn't even know what the metric system was*" (Greene). The drive for educating the public in the 1970s has left a bad taste in the mouths of the "Baby Boomers." Back then, G.T. Underwood, director of the Office of Metric Programs in the US Department of Commerce, said, "We made a mistake in 1975 by trying to jam metric down the throats of people" (qtd. in Beathard, "Drop Green Backs"). Many of us can still remember when gasoline pumps read in liters, interstates showed distances in kilometers, weather reports and bank signs reported temperature in Celsius, and everyone received an "easy-to-use" pocket metric conversion chart. Forcing metric education on the American public has gone the way of the Susan B. Anthony dollar coin. The effect on American industry has been that "After 20 years only 25% of US manufacturers have gone metric" (Beathard, "Drop Greenbacks"). The annual budget for the Office of Metric Programs, which has the task of educating the general public, has been cut to $300,000, compared to a peak of $3 million" (Young) when the Metric Conversion Act of 1975[3] was signed into law. That's hardly enough to educate a city, never mind a nation. The USMA [US Metric Association] in a report to Congress revealed "those who have conspicuously avoided strongly recommending the teaching of the metric system as the primary measurement system...are Education and national education organizations" ("Progress"24). America is in a time of downsizing and cautious conservatism. Education in metric for the masses has not happened.

Should the US government force Americans to use the metric system of measurement? Gene Zirkel observed "But not once — never — in the course of history has any society, anywhere, ever voluntarily adopted the unfortunate decimal metric system" (qtd. in *The Duodecimal Bulletin* 75;7). Americans will not be forced into using any number system. This particularly applies to older Americans who do not see the need to change. The metric system may be a good alternative to the current system when it comes to international trade and scientific knowledge. "It makes sense for the nation to speak the same technical language as its military allies" (Mills). The metric system was recently forced upon the British. "Even the French, who invented metrics during the revolution, had to enforce compliance" (Gugliotta, "Playing the Dozens"). Is the United States next? The best way would be a gradual change to a more useful system that everyone will enjoy using. Perhaps the base-twelve system should be explored. If the scientific community sees the benefit of using the metric system, let them. As for older Americans like myself, I'd rather sit in my easy chair, my *feet* on my *footstool*, a *pint* of cold beer in one hand, a *foot* long hot dog in the other, and watch a good old American game of *foot*ball.

NOTES

1. The meter [m] was originally defined as one ten millionths of the distance from the equator to the North Pole on a line running through Paris [France]. Between 1792 and 1799,

French scientists measured part of this distance. Treating the earth as a perfect sphere, they then estimated the total distance and then divided it into ten-millionths. Later, after it was discovered that the earth is not a perfect sphere, the standard meter was defined as the distance between two fine lines marked on a bar of platinum-iridium alloy, the international prototype meter. It was later redefined in terms of wavelength of red light from a krypton-86 source. The measurements of modern science required still greater precision, however, and in 1983 the meter was defined as the length of the path traveled by light in a vacuum during a time interval of 1/299,792,458 of a second. All metric units were originally derived from the meter, but by 1900 the metric system began to be based on the mks [meter-kilogram-second] by which the unit of mass, the gram, was redefined as the kilogram, and the unit of time, the second, was added. Later a unit of the electromagnetic system, the ampere, was added to form the mksa [meter-kilogram-second-ampere] system. Because of the need of science for small units, the cgs [centimeter-gram-second] system also came into use. The unit of volume, the liter, was originally defined as 1 cubic decimeter [cdm^3], but in 1901 it was redefined as the volume occupied by a kilogram of H_2O (water) at 4°C at 760 mm of Hg (mercury); in 1964 the original definition [cdm^3] was restored (Metric System).

2. The Dozenal Society of America (Formerly: the Duodecimal Society of America), founded April 5, 1944, is a voluntary, nonprofit, educational corporation, organized for the conduct of research and education of the public in the use of base twelve in numeration, mathematics, weights and measures, and other branches of pure and applied science.

3. "On December 23, 1975, President Gerald R. Ford signed the Metric Conversion Act of 1975. It defines the metric system as being the International System of Units as interpreted in the U.S. by the secretary of commerce. The act coordinates the metric effort, but docs not specify a conversion schedule" (Metric System).

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Zirkel, Gene. Telephone interview. 14 February 1996.

□

The DSA does NOT endorse any particular symbols for the digits ten and eleven. For uniformity in publications we use the asterisk (✳) for ten and the octothorpe (#) for eleven. Whatever symbols are used, the numbers commonly called "ten", "eleven" and "twelve" are pronounced "dek", "el" and "do" in the duodecimal system.

When it is not clear from the context whether a numeral is a decimal or a dozenal, we use a period as a unit point for base ten and the semi-colon, or Humphrey point, as a unit point for base twelve.

Thus 1/2 = 0.5 = 0;6.

ON THE PERFECT NUMBER PROBLEM

B.A.M. Moon
University of Canterbury

It is well-known that the only mathematical question posed by the ancient Greeks which remains unanswered is to determine a means other than trial for finding all *perfect numbers* (i.e. numbers whose proper factors add to the number itself e.g. $6 = 3 + 2 + 1$). It is also well-known that the last digit in all perfect numbers so far discovered, when expressed in base ten notation is 6 or 8, a result easily demonstrated.

This property is of course as much a property of the base of notation as it is of the perfect numbers themselves.

In the following chart the first six perfect numbers are expressed as numbers in each base from two to twelve.

These results may suggest to someone a fresh approach.

(Editor's Note: Jay L. Schiffman of Rowan College of New Jersey, Camden Campus extended Professor Moon's chart to include the first seven even perfect numbers and to express these numbers in bases binary to hexadecimal. The compilation of these results is printed in the chart below.)

The nth perfect number to various bases (P_n, where n = 1, 2, 3, 4, 5, 6, 7.)

Binary (Base Two):

$P_1 = 110$
$P_2 = 11\ 100$
$P_3 = 111\ 110\ 000$
$P_4 = 1\ 111\ 111\ 000\ 000$
$P_5 = 1\ 111\ 111\ 111\ 111\ 000\ 000\ 000\ 000$
$P_6 = 111\ 111\ 111\ 111\ 111\ 110\ 000\ 000\ 000\ 000\ 000$
$P_7 = 1\ 111\ 111\ 111\ 111\ 111\ 111\ 000\ 000\ 000\ 000\ 000\ 000$

Ternary (Base Three):

$P_1 = 20$
$P_2 = 1\ 001$
$P_3 = 200\ 101$
$P_4 = 102\ 011\ 001$
$P_5 = 2\ 100\ 010\ 112\ 102\ 001$
$P_6 = 211\ 011\ 122\ 100\ 120\ 010\ 001$
$P_7 = 111\ 010\ 202\ 100\ 010\ 220\ 210\ 001$

Base Four:

$P_1 = 12$
$P_2 = 130$
$P_3 = 13\ 300$
$P_4 = 1\ 333\ 000$
$P_5 = 1\ 333\ 333\ 000\ 000$
$P_6 = 13\ 333\ 333\ 300\ 000\ 000$
$P_7 = 1\ 333\ 333\ 333\ 000\ 000\ 000$

Base Five:

$P_1 = 11$
$P_2 = 103$
$P_3 = 3\ 441$
$P_4 = 230\ 003$
$P_5 = 32\ 042\ 102\ 321$
$P_6 = 120\ 043\ 001\ 302\ 211$
$P_7 = 4\ 222\ 433\ 301\ 110\ 303$

Base Six:

$P_1 = 10$
$P_2 = 44$
$P_3 = 2144$
$P_4 = 101\ 344$
$P_5 = 3\ 155\ 033\ 344$
$P_6 = 3\ 540\ 210\ 412\ 144$
$P_7 = 143\ 045\ 524\ 045\ 344$

Base Seven:

$P_1 = 6$
$P_2 = 40$
$P_3 = 1\ 306$
$P_4 = 32\ 461$
$P_5 = 555\ 113\ 251$
$P_6 = 422\ 602\ 453\ 006$
$P_7 = 12\ 633\ 600\ 413\ 041$

Octal (Base Eight):

$P_1 = 6$
$P_2 = 34$
$P_3 = 760$
$P_4 = 17\ 700$
$P_5 = 177\ 770\ 000$
$P_6 = 77\ 777\ 600\ 000$
$P_7 = 1\ 777\ 777\ 000\ 000$

Base Nine:

$P_1 = 6$
$P_2 = 31$
$P_3 = 611$
$P_4 = 12\ 131$
$P_5 = 70\ 115\ 361$
$P_6 = 24\ 148\ 316\ 111$
$P_7 = 433\ 670\ 126\ 701$

Decimal (Base Dek [Ten]):

$P_1 = 6$
$P_2 = 28$
$P_3 = 496$
$P_4 = 8128$
$P_5 = 33\ 550\ 336$
$P_6 = 8\ 589\ 869\ 056$
$P_7 = 137\ 438\ 691\ 328$

Base El [Eleven]:

$P_1 = 6$
$P_2 = 26$
$P_3 = 411$
$P_4 = 6\ 11*$
$P_5 = 17\ *35\ 956$
$P_6 = 3\ 708\ 836\ 83*$
$P_7 = 53\ 318\ 616\ 014$

Duodecimal (Base Do [Twelve]):

$P_1 = 6$
$P_2 = 24$
$P_3 = 354$
$P_4 = 4\ 854$
$P_5 = \#\ 29\#\ 854$
$P_6 = 1\ 7\#8\ 891\ 054$
$P_7 = 22\ 777\ \#33\ 854$

Base Do One [Thirteen]:

$P_1 = 6$
$P_2 = 22$
$P_3 = 2C2$
$P_4 = 3\ 913$
$P_5 = 6\ C48\ C91$
$P_6 = A6B\ 802\ 672$
$P_7 = C\ C64\ 048\ 033$

Base Do Two [Fourteen]:

$P_1 = 6$
$P_2 = 20$
$P_3 = 276$
$P_4 = 2\ D68$
$P_5 = 4\ 654\ B28$
$P_6 = 5B6\ B74\ A76$
$P_7 = 6\ 91B\ 3BC\ 8C8$

Base Do Three [Fifteen]:

$P_1 = 6$
$P_2 = 1D$
$P_3 = 231$
$P_4 = 2\ 61D$
$P_5 = 2\ E2A\ C91$
$P_6 = 354\ 1B6\ 5C1$
$P_7 = 3\ 895\ E35\ 31D$

Hexadecimal (Base Do Four [Sixteen]):

$P_1 = 6$
$P_2 = 1C$
$P_3 = 1F0$
$P_4 = 1FC0$
$P_5 = 1\ FFF\ 000$
$P_6 = 1FF\ FF0\ 000$
$P_7 = 1\ FFF\ FC0\ 000$

Note: For bases exceeding do (twelve), the symbols A, B, C, D, E, and F respectively are employed to denote the digits dek (ten) through do three (fifteen).

☐

A LETTER TO BOARD MEMBER GENE ZIRKEL

December 23, 1995

Dear Professor Zirkel,

I am in contact with the British Weights and Measures Association, Hertfirdshire, England, whose members oppose this silly mad dash by the government to ram the metric system down our throats, whether we like it or not; whether it is needed or not.

I was told you were once president of an organization in the USA that likewise opposed our nation going metric, and would like to know what is being done in the political arena to stop this silly waste of our hard earned tax money?

If you have articles or any information challenging the need to convert to metric, I would appreciate some copies. I will also submit a copy to my contacts in England.

It certainly is twisted logic and reasoning to force the United States to convert to metric when after over two hundred years we have achieved the greatest industrial manufacturing force in the world; we produced the greatest amount of wealth for the greatest number of people; invented the greatest number of useful items that have benefitted the whole world; have sent the greatest number of tax funds throughout the world to aid the poor, all utilizing our present system of measuring things. Yet, we let penny-ante nations, who foolishly changed to the metric system, tell us we must change over to their system, or else they will not do business with us. I say, go ahead. Let them try it. Our products have been the most widely bought and used throughout the world. The customers are not concerned with how they are measured.

If our politicians ever tried common sense even just once, they should be informing the entire world to change to our system, a system that has done the greatest good globally. In fact, it would even be less costly to our nation's taxpayers to pay those other nations for the cost of conversion to our system, then for us to spend tens of billions of dollars of our precious tax dollars to adopt their system, with no benefit to the American taxpayer.

It likewise appears ironic that our politicians are telling us that we must tighten our belts because their is a scarcity of tax funds to cover everything that is essential. While the federal government cuts back and even eliminates numerous good services that are really beneficial to the populace, supposedly for the desire of tax monies, those same politicians are forcing us to go metric at the cost of billions of our tax dollars. So much for honesty and integrity in government.(Editor's Note: So what else is new?) I surmise there is much more work to be done by the voters, as was done in the November 1994 election.

LETTER to SECRETARY/TREASURER
ALICE BERRIDGE

223 Fawn Court
Anchorage, Alaska 99515
January 22, 1996.

Dear Professor Berridge,

I must have misplaced your letter since I just came across it today. Usually I send my annual dues to Gene Zirkel directly, the person I write in connection with the Society, during the month of January, and I told him in my Christmas card I would be doing so again this year before the month was out. It appears, however, that dues are due before January 1 according to your letter, and they should be sent to you as Secretary/Treasurer, so I apologize and will do it this way in the future.

I usually send $50 and am enclosing that amount for 1996 (or is it 1995?). Anyway, I will become a life member as soon as finances allow, and hopefully that will be in the latter part of the current year, since I intend to always be associated with you.

You may know from my conversations with Gene and Pat (Zirkel), that I am very keen on the modular system by Peter D. Thomas. Unfortunately, the DSA does not appear to be as enthusiastic about it as I am because they do not seem to be publicizing it and the few books they have ("Modular Counting" and "The Modular System") are hardly moving.

I am very familiar through past reading of The Duodecimal Bulletin and The Dozenal Journal put out by the DSGB with pure dozenal metric systems to replace decimal metric. While I heartily agree dozenal metric is vastly superior to decimal metric as a metric system per se, I cannot really endorse any of them as measurement systems. I agree with Professor Maurice Danloux-Dumesnils, the French expert, who gave numerous reasons in his 1969 book "The Metric System" why no (pure) metric system could ever be practical.

The most obvious reason, of course, is too many impractical units, or units of limited practicality that are there simply because they must fit the format. Though there is more latitude in a dozenal metric system vis-a-vis a decimal one because of its greater factorability, it does have the disadvantage of having even larger gaps between the units than decimal metric. Another factor that is ignored in both decimal and dozenal metric is that the most natural form of measurement is having and doubling (binary).

The modular system is so appealing to me because all the units are fully practical yet it has the coherency of pure metric. It is what I call a modified metric system and thus allows us to retain all the vital practical units that have proved themselves over the centuries (some marginally changed). I believe it would appeal to the public both in the decimal metric and non-metric world if properly explained since in essence it has the best of both current

systems. It can also be used with decimal counting (a tremendous plus) until such time as dozenal counting becomes widespread.

Late this year I hope to get on the Internet with a weekly column entitled: "Modular Counting and Measurement: Why Not The Best?"

At the same time I will be gearing up to sell Peter's two books through e-mail orders. I will be adding a separate forward to the books myself because of Mr. Thomas' arbitrary symbols. I feel such symbols are obsolete since the advent of binary coded digits (BCDs) and I feel certain he would agree were he still with us. I also propose a dual set of symbols, and BCDs for international use, and decimal symbols for common use with two new symbols of my own to match for ten and eleven.

Gene is always urging me to write something for the *Bulletin* and I hope to explain my ideas sometime in that publication.(*Editor's Note:* Ian's contributions would definitely be welcomed.) This year I hope to write four articles for the *Weekly Telegraph* out of London urging Britain to make the simple transition from Imperial to modular instead of the politically-correct decimal metric. I also expect to submit an article to the *Atlanta Journal Constitution* around the time of the Olympic Games discussing a change from decimetric measures in sports to modular which I hope will attract attention around the world.

Please tell Gene I will be writing him next month instead of this month since I am sending you the dues. It will give me more time to clear up my Christmas mail.

I really enjoy the *Bulletin* you send me and gleam much information I hope to use in my Internet columns of 600-800 words which I expect to put out weekly. Gene was telling me last year the DSA was proposing to get on the Internet but I did not hear anymore. I feel this is such an advantageous way of advertising we cannot afford to pass it up. I will close by wishing you and the Society all the best for 1996.

From,
Ian B. Patten

P.S.: Do you have an Alaskan member of the DSA other than myself? If so, I would be grateful if you could furnish his/her name and address since I would like to contact such. I would like to find someone up here interested in advising and scanning the work I put out and maybe even helping me publish the books (by photocopying) if close enough.

This year I will be contacting organizations in Britain and the U.S. dedicated to preserving Imperial and Customary, urging them to consider the transition to the modular system, so I may obtain some good contacts from that.

□

Do you have an idea to share with our members? Why not submit an article to the *Bulletin*?

DOZENAL JOTTINGS

We welcome new members (the first four were paid for by member Miles McKee).

BRIAN M LERCH 352;
102 GORDON AVENUE
MATTYDALE NY 13211

CURTIS M MCKEE 353; S
4819 WHITE BIRCH COURT
SYLVANIA OH 43560

MATTHEW K MCKEE 354; S
2925 PURDUE ROAD
DALLAS TX 75225

STEPHEN K MCKEE 355; S
2925 PURDUE ROAD
DALLAS TX 75225

MARK E SHOULSON 356;
30 S ADELAIDE AVE, 5K
HIGHLAND PARK NJ 08904

NYR INDICTOR 357;
BOX 465
CHAPPAQUA NY 10514

GARY BREND 358;
3336 WESTMORELAND DRIVE
TAMPA FL 33618-2161

The Society is saddened by the loss of Professor Clarence Heinke (member number 143;) who passed away in early summer 11✳2 (1994). We appreciate the correspondence received from his colleague T. Gearhart of the Department of Mathematics, Computer Science and Physics at The Capital University in Columbus, OH on November 24; 11✳3 (11/28/95.)

Jay L. Schiffman, President of *The Dozenal Society of America,* presented a paper at The Metropolitan New York Section of The Mathematical Association of America on May 5, 1996 held at C.W. Post College of the Long Island University entitled "Perfect Numbers in Bases Binary to Hexadecimal with Patterns."

□

A CHALLENGE FOR DESIGNERS AND ARTISTS

Those who count in the customary base ten, use ten numerals: 0,1,2,3,4,5,6,7,8,9.

Computer scientists who use base sixteen, employ sixteen numerals: 0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F.

Dozenalists — believing that it is easier to count and measure in base twelve — need a dozen numerals.

Some use 0,1,2,3,4,5,6,7,8,9,A,B. Others denote the two extra symbols by **t**, **T** or **d** for *ten* or *dek,* and, correspondingly, **e**, **E** or **k** for *eleven* or *el.*

Following the phone company, the *DOZENAL SOCIETY OF AMERICA* uses the asterisk ✳ for dek and the octothorpe # for el. (As one long time member said: A Roman Numeral **X** crossed out because it's dek, *not* ten, and an eleven ‖ crossed out twice, because it's el, *not* eleven.)

The *DOZENAL SOCIETY OF GREAT BRITAIN* follows the suggestion of Sir Isaac Pitman, the inventor of shorthand symbols; it uses ᕒ (a rotated two) for dek, and ℇ (a rotated three) for el.

Years ago the famous type designer William Addison Dwiggins created a script ✗ and ℰ for the Dozenal Society of America.

1. Your assignment (if you chose to accept it) is to design two new numerals for dek (or ten) and el (or eleven).

2. Some dodekaphiles hold that we should not merely add two new symbols to the current Hindu-Arabic numerals that we are all familiar with. Rather, they propose that we create an entirely new set of twelve numerals to replace 0,1,2,3,4,5,6,7,8,9,✳,#. Perhaps you would care to accept this additional challenge?

Acceptable submissions will be published along with appropriate credit in this *Bulletin.*

For further information and/or literature about duodecimals contact

Dozenal Society of America
Nassau Community College
Garden City LI NY 11530
516 669 0273

□

THINK 12 . . . twelve . . . 10; . . . do . . . .

PROBLEM CORNER

Jay L. Schiffman
Rowan College of New Jersey,
Camden Campus

Problem 1: In the year $*98$; (1556), Tartaglia conjectured that the sequence 1+ 2 + 4, 1 + 2 + 4 + 8, 1 + 2 + 4 + 8 + 14;, ... was alternately prime and composite. Employing duodecimal notation, prove that he was erroneous by going far enough out in the sequence. In addition, do you see any correlation between this sequence and a finite geometric progression that leads to Mersenne Numbers and consequently even perfect numbers? (A *perfect number* is one that is equal to the sum of all its proper factors. For example, 6 is perfect; for 6 = 1 + 2 + 3. A *Mersenne Number* M_p is a prime number of the form $2^p - 1$, where p is prime.)

Problem 2: Consider in the awkward base dek the pattern 9, 98, 987, 9876, 98765, 987654, 9876543, 98765432, 987654321, 9876543219, 98765432198, 987654321987, ... Determine the number of primes in this sequence. (This mind boggler was adapted from the text Mathematics for Elementary School Teachers, Fifth Edition by Billstein, Libeskind, and Loft on Page 197; (Page 259). Publisher: Addison-Wesley. By the way, the authors do mention other number bases including our favorite base but alas not our society.)

Problem 3: Repeat the pattern treated in Problem 2 where this time all numerals are taken in the duodecimal base. Discover any differences while contrasting this problem to the previous Problem 2. Can you formulate a pattern with duodecimals leading to the same conclusion as the one deduced in Problem 2? Also consider what transpires if one considers the sequence of duodecimal integers in the pattern #, #*, #*9, #*98, #*987, #*9876, #*98765, #*987654, #*9876543, #*98765432, #*987654321, #*987654321#, #*987654321#*, #*987654321#*9, ... Are there primes in this sequence?

Solutions to the above problems are invited and will be printed in future issues of the *Bulletin*. Readers are invited to submit interesting queries involving aspects of number bases to the editorial office in Philadelphia, PA. It would be nice to have the problem corner as a regular feature of our *Bulletin*.   ☐

A Letter to Our Board Member Gene Zirkel *(Concluded)*

If you have the name/address of organizations in the United States that are working to oppose this silly metric change over, I would be grateful to receiving same.

Sincerely,
William J. Holdorf
Woodridge, IL 60517

(Editor's Note: A very enlightening article by Mr. Holdorf entitled **SAVE THE INCH** will appear in our next issue.)

                                                                              ☐

Six Revolutionary Ideas for the Next Millenium

The turn of the calendar into the next century and millenium will be an occasion to reflect on our past, present and hopes for the future. There is the danger, however, that this will have little lasting importance, amounting to not much more than a media opportunity for thousands of forgettable articles, some coffee table picture books and publicity given to people predicting the end of time.

Of course, the numbering of the years is arbitrary and has no significance beyond what we place on it. To make an event of the turning of the calendar is a purely existential endeavor, which is, perhaps, the best of reasons for doing it. Understanding that we have the best of reasons for making an occasion of the dawn of the new millenium, what should the nature of the event be? Ideally, it should reflect the best of human aspirations. Timothy Travis suggests in the book, **4000, THE FIFTH MILLENIUM, Six Revolooshunairy Iedeeas,** that we take a thoughtful look at some of the tools we use in our daily lives that hamper education, business, industry and even world peace. To celebrate the year 2000 and take us stronger into the next millenium, he proposes:

▶ *Adopting phonetic spelling.* Because English spelling is not phonetic, a tremendous impediment exists to the learning of reading and writing. Mark Twain, Benjamin Franklin, George Bernard Shaw, and Thomas Jefferson are among those who have advocated phonetic spelling. English is now the international language. Adopting phonetic spelling would raise the world's literacy rate. "Said" should be spelled "sed". This work is in conjunction with the American Literacy Council which has software for the conversion of traditional text into phonetic spelling.

▶ *Adopting base twelve numbering.* Our number system is based on ten because of the biological accident of our having ten fingers. Members of The Dozenal Society of America have developed a numbering and weight and measure system based on twelve which is superior not only to the English system but also to the French decimal system. This base twelve system would greatly facilitate the learning of math and science and the use of technology.

▶ *Changing the calendar.* Our disorderly calendar wastes our time. There is no correlation between the days of the week and the days of the month. Months can have 28, 29, 30 or 31 days and the seasons start within the months. On the "Raenbo" calendar, each of the twelve, thirty-day months looks the same. The three-month seasons are separated by 5 1/4 solstice and equinox holidays.

▶ *A lifelong diploma that could be upgraded at any time.* This would be a user friendly way to get a certified education unlike our present systems which are institution oriented.

▶ *Awarding ribbons to exercise and promote citizenship.* This would be a yearly program in which any one over the age of six could participate.

▶ *Recognizing how scientific and spiritual truth are essential but in different realms and how confusing them endangers peaceful society.* Travis presents a framework that breaks ground in dealing with controversial issues of the day.

For more information contact, Aster Espirit Press, PO Box 1615, El Toro, CA 92630 tel. (714) 588-9737. You can order the book by calling 800-35-BOOKS; $14.95 + s&h

                                                                              ☐

WHY CHANGE?

This same question was probably rife in Europe in the late middle ages when the new Hindu-Arabic numerals were inching forward, displacing the comfortable and familiar Roman numerals then universally used.

Yet, although it took five centuries and in spite of much opposition — ("Who needs a symbol for nothing?") — the better notation did come into popular use. Released from the drag of Roman Numerals thinking leapt forward dramatically, and mathematicians discovered a new dimension in mathematical symbolism. Working with Hindu-Arabic numeration, they found that the new system better accommodated mathematical statements and facilitated the working out of ideas. Re-examining their fundamental concepts of numbers, they made advances in arithmetic, algebra, logarithms, analytic geometry and calculus, and thus contributed to the explosion of human thought which later became known as the Renaissance.

In a related development, people awoke to the fact that different number bases could be used.

A parallel to today seems tenable. The notation of the dozen base better accommodates mathematical statement and facilitates ideation. It, too, is a step forward in numerical symbolism. The factorable base is preferred for the very same advantages which led the carpenter to divide the foot into twelve inches, the baker and the grocer (one who deals in *grosses*) to sell in dozens, the chemist and the jeweler to subdivide the Troy pound into twelve ounces. And yet, this is accomplished by such simple means that students in the primary grades can tell why they are better. Literally, the decimal base is unsatisFACTORy because it has NOT ENOUGH FACTORS.

Then should we change? Yes, but no change should be forced, and we urge no mandated change. All the world counts in tens. But people of understanding should learn to use duodecimals to facilitate their thinking, their computations and their measurings. Base twelve should be our second mathematical language. It should be taught in all the schools. In any operation, that base should be used which is the most advantageous, and best suited to the work involved. We expect that duodecimals will progressively earn their way into general popularity because they simplify the all-important problem of the correlation of weights and measures, the expansion of fractions ($1/3 = 0;4$) and give an advantage in calculations involving time and our twelve-month calendar. Perhaps by the year 2000, (or maybe by 1200; which is one and a third dozen years later!) duodecimals may be the more popular base. But then no change need be made, because people will already be using the more convenient base.

If "playing with numbers" has sometimes fascinated you, if the idea of experimenting with a new number base seems intriguing, if you think you might like to be one of the adventurers along new trails in a science which some have erroneously thought staid and established and without new trails, then whether you are a professor of mathematics of international reputation, or merely an interested pedestrian who can add and subtract, multiply and divide, your membership in the Society may prove mutually profitable, and is most cordially invited.

☐

We extend an invitation to membership in our society.
Dues are only $12 (US) per calendar year; the only requirement is a constructive interest.

Application for Admission to the Dozenal Society of America

Name _____
     LAST   FIRST   MIDDLE

Mailing Address (For DSA items)_____

_____
                (See below for alternate address)

Telephone: Home _____ Business _____

Date & Place of Birth_____

College Degrees_____

Business or Profession_____

           Annual Dues .... $12.00 (US)

           Student (Enter data below) ....$3.00 (US)

           Life .... $144.00 (US)

School_____

Address _____

Year & Math Class _____

Instructor_____ Dept. _____

Other Society Memberships _____

_____

Alternate Address (Indicate whether home, office, school, other)

_____

_____

_____

Signed _____ Date _____

My interest in duodecimals arose from _____

_____

Use space below to indicate special duodecimal interests, comments, and other suggestions, or attach a separate sheet:

Mail to: Dozenal Society of America
         %Math Department
         Nassau Community College
         Garden City, LI, NY 11530

DETACH HERE-- OR-- PHOTOCOPY --