The
Duodecimal Bulletin

Whole Number 44

Volume 27, Number 2

Summer 1982

THE DOZENAL SOCIETY OF AMERICA

c/o Math Department
Nassau Community College
Garden City, LI, NY 11530

The
Duodecimal Bulletin

IN THIS ISSUE

DOZENAL SOCIETY OF AMERICA

Minutes of the Annual Meeting
_____

Saturday, May 15, 1982
Nassau Community College
Garden City, NY 11530

The meeting was opened at 11:00 A.M. by President
Gene Zirkel.
In attendance were:

Board Members:	Charles S. Bagley (proxy) Class of 1983	
	Miriam Bagley (proxy)	1982
	Dudley George	1984
	Dr. Anton Glaser (proxy)	1982
	Jamison Handy, Jr.	1984
	James Malone	1984
	Robert R. McPherson (proxy)	1983
	Dr. Angelo Scordato	1982
	Henry Webber	1983
	Gene Zirkel	1983
Members:	Carmine DeSanto	
	Patricia McCormick Zirkel	
Guest:	Vera Sharp Handy	

I.) Approval of Minutes:

The minutes of the 1981 Annual meeting were approved as
submitted.

II.) President's Report by Gene Zirkel

Gene stated that all the Board members except John Selfridge
mailed in proxies for the Annual meeting. Mr. Selfridge had
indicated to Gene that he would be unable to run for re-
election to the Board. Consequently, there was a vacancy on
the Board of Directors. John Earnest, Secretary of the
Dozenal Society, has submitted his resignation from that
position due to personal reasons. On behalf of the Dozenal
Society, Gene expressed our thanks to John Earnest for an
outstanding job as Secretary and as a member of the Board.

Gene has been sorting through some of the Society's
past notes and files to determine what materials should be
included in the DSA Archives which have been established at
our headquarters at Nassau Community College. The Library
at the College has agreed to maintain a permanent collection
of special Dozenal materials.

Gene reported that a railroad strike in England had
caused a delay in the mailing of the Dozenal Journal to this
country. The DSGB will mail out additional copies soon.

The Annual Award of the Dozenal Society of America was
awarded to Mr. Charles S. Bagley. It is being mailed to Mrs.
Bagley who will do the honor of presenting our award to her
husband.

Gene asked the members present to participate in the
organization by joining one of the following committees.
The committees and their appointed members are:

(1) Annual Award Committee: Patricia McCormick Zirkel
Jamison Handy, Jr.

(2) Nominating Committee: Henry Webber
John Earnest
Gene Zirkel

(3) By-Laws Committee: James Malone
Dudley George
Tony Scordato

(4) Annual Meeting Committee:

Gene Zirkel

Anyone interested in joining one of these committees, please
contact:

The Dozenal Society of America
c/o Math Department
Nassau Community College
Garden City, NY 11530

With regard to next year's Annual meeting, it was decided
to hold the meeting again in the East, either in May or
October of 1983. The two possible sites mentioned were
Pennsylvania or New York. The possibility of a 1984
meeting being held outside of the Eastern Region was dis-
cussed.

III.) Report of the Nominating Committee:

The Nominating Committee proposed the following slate for
the Board of Directors - Class of 1985:

Dr. Anton Glaser, PA
Dr. Angelo Scordato, NY

Patricia McCormick Zirkel, NY
Carmine DeSanto, NY

It also nominated the following officers:

Chairman of the Board - Dr. Angelo Scordato
President - Gene Zirkel
Vice-President - Patricia McCormick Zirkel
Secretary - Carmine DeSanto
Treasurer - James Malone

The committee's report was accepted by the members present, and the Board of Directors, Class of 1985, was elected for a three year term.

IV.) The Meeting of the Board of Directors:

In accordance with our Constitution, the Annual meeting was briefly adjourned while the new Board of Directors met for the first time. This meeting was chaired by Gene Zirkel and Tony Scordato. The Board quickly elected the Officers without opposition.

Gene proposed that the Society place an ad in the Fall issue of the Arithmetic Teacher and in the Spring issue of the Mathematics Teacher to promote interest and increase membership in the Dozenal Society. The proposal was accepted by the Board.

The Board also promoted Acting Editor Pat Zirkel to the position of Editor. Congratulations.

The Annual meeting was then reconvened under the Chairmanship of President Gene Zirkel.

V.) Treasurer's Report by James Malone

Treasurer James Malone reports that the Dozenal Society is in a good financial position. Presently, the Society owns an $11,000 C.D. and 67 shares of A.T.T. stock. The Society will be receiving dividends from the A.T.T. shares in the future rather than reinvesting the dividends as in the past, because of the Society's need for a cash flow to help pay ongoing expenses.

VI.) Duodecimal Bulletin Report by Patricia McCormick Zirkel.

Pat Zirkel reports that the cost of the last two bulletins, volume 26 No. 1 and volume 27 No. 1, were $474.00 and

$487.00 respectively. Pat indicated that the bulk of these expenses is printing costs which range from $400 to $500 per issue. Pat hopes to print 3 issues of the Duodecimal Bulletin per year going forward.

VII.) New Business

(1) Gene has worked out an agreement with the Mathematics and Computer Education Journal and The Journal of the American Mathematical Association of Two Year Colleges for an exchange of free ads. These organizations will run a Dozenal Society Ad in their journals and we will reciprocate by running their ads in our Duodecimal Bulletin.

The meeting was suspended at 12:35 P.M. for lunch.

The meeting resumed at 2:18 P.M.

(2) Gene informed the members that our Duodecimal Bulletin is listed in a dozen and a half libraries across the country. He has agreed to contact these libraries to up-date their files, if need be, with our Bulletins.

(3) James Malone suggested that the membership list be typed on a computer file so that the list could be updated quickly in the future. This proposal was accepted and Gene will look into implementing this proposal.

(4) Gene stressed that an important goal of the Dozenal Society is to maintain a broad base within our Board of Directors. He believes that our affiliation with such societies as The National Council of Mathematics Teachers, The American Mathematical Association of Two Year Colleges and The Mathematics and Computer Education Journal will help to accomplish this goal.

(5) The Constitution Committee consisting of John Selfridge, John Earnest and Tony Scordato presented a revision of the Constitution of the Dozenal Society of America. Their revision was approved by the membership.

(6) Henry Webber donated 11 copies of the book entitled New Numbers, by F. Emerson Andrews to the Society.

(7) The meeting was adjourned at 3:43 P.M. so the members could visit the Dozenal Society's Archives and the Library Collection at Nassau Community College. Most of the members, with spouses and guests, reunited for a festive

dinner at the John Peel Room in Westbury, New York. The
evening began at 7 P.M., and was a happy and pleasant ending
to a very successful Annual Meeting.

Respectfully Submitted,

Carmine De Santo, Sceretary

Committee Changes

*Because Henry Webber is up for renomination to the Board
next year, he and Jamison (Jux) Handy have agreed to swap
Committee assignments. Henry will serve on the Awards
Committee and Jux will serve on the Nominating Committee.
Our thanks to both of these devoted Board members. -GZ*

*Tony Scordato (left), Chairman of the DSA Board,
and Gene Zirkel, DSA President, visit the
Nassau Community College Library's collection
of Dozenal material following the May 15th
Annual Meeting.*

NATIONWIDE COVERAGE

by Gene Zirkel

It was reporter Irene Virag who started the ball
rolling. Her editor had given her the assignment
of covering our Annual Meeting, and after two
phone conversations she decided to attend the
Saturday afternoon session. At first, she just
sat and listened, then she began to interview
those present. On the following day, Sunday, May
16th, her article appeared on page 19 of Newsday,
Long Island's largest newspaper. Headlined:
"Group Says Counting's Better by the Dozen", the
well-written piece talked about dozens of eggs,
inches, months, etc., and included this reference
to the decimal metric system: "It's a good idea
to measure and count the same way, but not by ten."

Her report was then sent out over the Los Angeles
Times, Washington Post News Service and was
printed by a number of newspapers. The following
are those of which we have heard: The San Fran-
cisco Chronicle, The Des Moines Register (page
one!), The Toronto Star, The Vancouver Sun, The
Atlantic City (NJ) Sunday Press, The Cleveland
Plain Dealer, The Middletown (CT) Press, and The

*Reporter Irene Virag
takes some last-
minute notes at the
DSA Annual Meeting
on May 15th.*

Charles W. Trigg
2404 Loring Street
San Diego, CA

In the duodecimal system, we wish to find the smallest integer beginning with the digit n such that if the n is transposed to the extreme right of the integer the new number is $1/n$ of the original number. Clearly the smallest of all the integers with this property is the trivial 11.

For values of n other than 1, we start the looked-for number as a dividend beginning with n10 and divide it by n, thus obtaining a quotient that begins with 10. The next digit in the quotient is also placed in the dividend to the right of n10, and the division is continued. This process of using the kth digit of the quotient (reading from the left) as the $(k+1)$st digit of the dividend is continued until n appears in the quotient without remainder.

Specifically, when $n = 2$, the first four steps in contructing the smallest number are:

$$2\ )\underline{2106}\ ,\quad 2\ )\underline{21063}\ ,\quad 2\ )\underline{210631}\ ,\quad \text{and}\ 2\ )\underline{2106316}$$
$$106 \qquad\qquad 1063 \qquad\qquad 10631 \qquad\qquad\qquad 106316$$

Continuing to repeat the operation, with the quotient determining the dividend, until a 2 appears in the quotient without remainder, we have

$$2\ )\underline{21063169484}\quad \text{--}\quad \text{the desired number}$$
$$10631694842$$

The smallest integers beginning with other values of n are given below in order of magnitude. *Continued...*

Smallest Integers	n
31 04145 59#39	3
81 01623 34#14	8
410 30923 6*882 06164 71954	4
5102 5355* 94330 73*45 84099 19#71	5
61020 40814 2854* 99773 2650* 18346 91630	6
7 10189 9#864 406#3 3**15 42391 37459 49305 255#1	7
*10 12630 37690 **832 88098 20250 60731 61994 65541	
74404	*
910 14196 48634 459#9 384#2 6#533 04054 7216*	
1155# 3#129 78*39	9
#1011 23593 0336* 53909 *873# 32581 9#997 5055#	
54*31 45*42 69415 70784 04491	#

SYMBOLS, SYMBOLS, @#$%¢&*(?! SYMBOLS

Professor Gene Zirkel
Nassau Community College
Garden City, NY (USA)

In May 1980, several members of the Dozenal Society of America met at Nassau Community College with Arthur Whillock of Great Britain. One of the most lively discussions Arthur raised concerned symbols. The two things we all seemed to agree upon were: first that the choice of symbols is very important, and second that EVERY idea proposed so far was imperfect.

The discussion seemed to narrow in on the following proposals for ten and eleven:

a) maintain the historical American symbols X and ℰ

b) use the British symbols 乙 and Ɛ (rotated 2 and 3);

c) use the IBM hexadecimal digits A and B;

d) use the telephone company's symbols asterisk, *, and octothorpe, #;

e) use symbols that can be shown on a seven-element calculator display such as ⌐ and ⌐ ;

f) consider symbols that are already available both on a typewriter and to printers.

I found the discussion enlightening. I had come with preconceived notions about the best symbols to use. I left with my head spinning between the advantages and disadvantages of each of the various proposals which we discussed.

For my own use, I now believe that the telephone company's * and # are the best symbols to use at the present time. Some of the reasons that sway me are:

The telephone company is ubiquitous. Their new instruments are appearing everywhere and average people are becoming used to seeing these two symbols as some type of digit.

I have found them easy to use with pen and pencil and also with a typewriter. (I was disappointed when Mr. Whillock informed me that # is not a standard key on British keyboards. However, since it is standard in the U.S., it would seem simpler to either buy an American typewriter or to order an existing key from America than to go to the trouble and expense of having special keys made with X, Ɛ, or a rotated 2 and 3.) Further, if the Bell symbols become adopted world wide, we may see the # key becoming more popular. Incidentally, both * and # exist on computer keyboards as standard IBM characters.

I do not think that the IBM hexadecimal digits are convenient because of the confusion that would arise between numbers such as $2A_{twelve}$ and $2A_{sixteen}$ which equals 36_{twelve}. The hexadecimals are well established among computer people. What we do not need is any more confusion.

If we get a dozenal calculator, we could then get embroiled in the seven-element controversy. I think that this is far down the road, and not a very important question at this time.

Thus, I advocate the use of * for ten and # for eleven. Note that the asterisk is like a Roman ten with a bar through it and the sharp is like the decimal number eleven with two bars through it. I know that this solution is not perfect. It just seems to me to have the least drawbacks of all of the proposals that I have heard.

The question of symbols is important. In the U.S. we have advocated unity (without demanding compliance) for more than 3 dozen years. Now that the various dozenal movements are in closer touch, it would be beneficial if we could agree on a single set of symbols. With this in mind, I view the world wide push by the Bell Telephone Company as a singular gift that might help to unite dodekaphiles.

HOW TO MAKE A DODECAHEDRON

A simple construction of the regular twelve-sided polygon appeared in the May 1982 issue of the Mathematics Teacher, volume 75, number 5, pages 380-382. This periodical should be available in most high school and college libraries, as well as many public libraries.

A Program for Base Conversion

by Sam Sesskin
Nassau Community College
Garden City, NY

This program was written for a program-mable Texas Instruments TI-57 calculator.

Program Description:

This program converts decimal numbers to base b, and may be used to either (1) convert a series of decimal numbers to same base simply by plugging in the new number after the flasher indicates calculations have ended or (2) convert a single number to different bases by inserting (STR 1) & (RCL 2) at learning step 20.

How To Use It

Step 1.   -Key in base b.

     -R/S

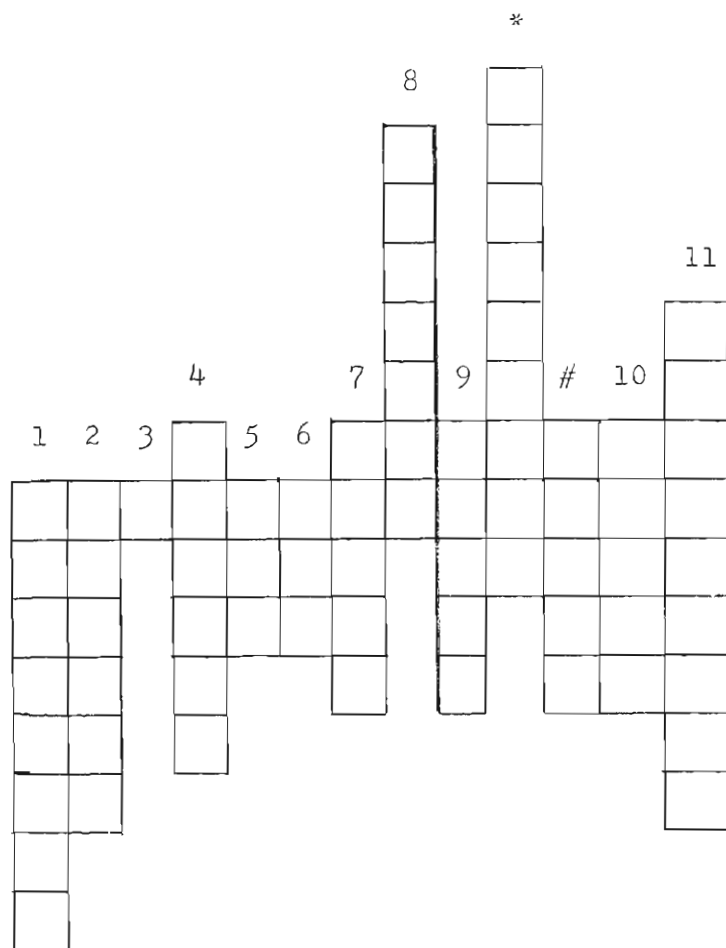Step 2.   -Key in number to be converted.

     -R/S

     -First number to appear in display is the last (or units) digit of the base b number. (Base b digits must be hand-written, with the realization that such digits may be comprised of two decimal numbers, in which event such double digit "digits" should be set off by parentheses.)

     -Repeat R/S, copy digit etc., until flasher appears indicating that calculations are completed. Press CLR. Calculator is now set either for new number to be converted to the same base, or, if the program is adjusted as described above, for a new base to convert the same number.

PROGRAM

Key	Location
STR 1	00
R/S	01
STR 2	02
2nd LBL 3	03
÷	04
RCL 1	05
=	06
STR 4	07
2nd INV INT	08
x	09
RCL 1	10
=	11
R/S	12
RCL 4	13
2nd INT	14
2nd x=t	15
GTO 5	16
GTO 3	17
2nd LBL 5	18
1/x	19
GTO 3	20

*

8

11

4   7   9   #   10

1   2   3   5   6

Answers in next issue.

ACROSS:

Name of symbol used on newer telephones.

(See #2, #4, #9, and #10 down.)

Down:

#1*

#2   # preceding a numeral, as #2.

#3   Ø

#4   # followed by a numeral, as 4#.
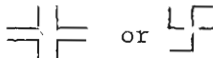
#5   Greek form of Dwiggin's ten.

#6   Base of an ill-conceived metric system.

#7   Unit of eggs.

#8   % by 100. (more recently simply %)

#9   # in music.

#*   ─┤├─ or ┗┏┛

100;

#10   # to a proofreader.

#11   Elision of ' & per se & ' .

*Symbol often used in footnotes !

Jean Kelly

Last summer while I was vacationing in Southern California, I spied a partially submerged dry dock in Los Angeles Harbor. On the side was painted a column of numbers which disappeared into the water:

> 19'0"
> 18'11"
> 18'10"
> 18'9"
> 18'8"
> .
> .
> .
> 17'5"

Obviously they were used to indicate the depth of the water in the dry dock.

It occurred to me that asking someone who was unfamiliar with any number base other then ten to count in inches would be a very simple and non-threatening way to approach the teaching of duodecimals. After they list 0", 1", 2", ..., 10", 11", 1'0", 1'1", 1'2" ..., it would be easy to switch to a dozenal based number system.

Most people can already do simple arithmetic in inches such as

> 3'8" + 4'11" = 8'7"   and   3 x 2'10" = 8'6"

It would not be difficult to alter the notation so that it reads

> 38 + 4# = 87   and   3 x 2* = 86

Try it!

(Note well: The following were not meant as jokes. They are serious statements "compiled and edited from two publications produced by the South African Bureau of Standards. They adhere to approved international metric rulings accepted by all nations" using metrics.*)

The comma now replaced the decimal point thus $1\frac{1}{2}$ kg (which is never to be used!) = 1,5 kg. Spaces now replace the old commas and so the old 1,234.5 = the new 1 234,5.

However, in the case of handwritten checks points replace the spaces and a hyphen replaces the new comma. We write the old $2,400.30 as the new $2.400-30, and not as $2 400,30.

When expressing time however the point remains as in 4.50P.M. and paragraphs are still numbered with points as in 1.3.1.

(*In keeping with the principle that one of the advantages of the metric system is its consistency, we add to the above the following:*) The decimetre will not be used as a unit of length (*in a DECIMAL based system!*).

Megahertz is to be abbreviated as capital MHz, but kilohertz is kHz as is already "well known."

Kilograms and grams are used for mass, NEVER for weight. Mass is MEASURED on a MASSMETER just as length is measured with a tape measure. It is never weighed on a SCALE. Don't say he weighs too much, say his mass is too large.

Continued on next page

METRIC SYSTEM OR SYSTEMS?

Ten base metric proponents don't often mention that there is not just one world wide system of units, but rather there exist many such systems, differing from country to country. Even our own U.S. Metric Conversion Act reads:

> "The metric system of measurement means the International System of Units...interpreted or modified for the United States by the Secretary of Commerce." (Emphasis added.)

METRICS MADE SIMPLE

continued

The objects used on a balance to measure mass, previously known as weights, are to be called masspieces.

If weight, which is technically force, is desired it must be expressed in newtons. However, weight is of no importance in everyday use and is usually only used in technical circles (*as every dieter knows*).

(*Now all of this is to help convince you to move voluntarily towards the more convenient decimal metric system.

P.S. You have just inherited 1,203 shares of IBM stock, whatever that may mean*)

> from the American Metric Journal
>
> July/Aug 1980 vol VIII-unit 4
> (*and Gene*)
>
> Reprinted from Mathematics and Computer Education,
> Box 158
> Old Bethpage, N.Y. 11804
> Vol. 15, No. 2, Spring 1981
> p. 149.

A PROGRAM FOR BASE CONVERSION

To convert a single number to

different bases, substitute

the following at location 20:

Key	Location
STR 1	20
RCL 2	21
GTO 3	22

FOUR FOURS

Gene Zirkel

In a letter from F. Emerson Andrews to Ralph Beard dated December 27, 1945, Andrews comments on the famous Four Fours problem which he had apparently received from George Terry.

The problem is this: How many integers can you represent using exactly four 4's and the elementary math symbols $+$, $-$, $\times$, $/$, $\sqrt{\ }$, and the unit point? For example $0 = 44-44$ or $4/4-4/4$, and $6 = 4 \times 4/4 + \sqrt{4}$.

Andrews solved the puzzle for the integers from 1; to 16; and for the even integers from 18; to 26;

> (a) Can you do as well?
> (b) Can you do better? Can you express one or more of the odd integers from 17; to 25; using four fours and the elementary symbols listed above?

In the letter, Andrews comments that he cannot figure out one of Terry's symbols. He states "I've got to pass -- his $.\dot{4}$ eludes me." The mathematical symbol $.\dot{4}$ denotes the infinite repeating fraction .44444... which is equivalent to $4/\#$.

Using this symbol Terry may have[1] found an expression for some of the odd integers which had eluded Andrews, for example 17; $= 4/.\dot{4}+4+4$.

> (c) Can you express any other integers with this symbol?

Send us your solutions to problems (a), (b), and/or (c) above for future publication.

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[1] We do not have Terry's solution.

DOZENAL JOTTINGS

.........*from members and friends*..........

Hot off the presses ... <u>Mathematical Reviews Annual Index -
1980</u>, edited by Board Member JOHN SELFRIDGE, whose work on
a new prime number conjecture was reported in the May issue
of <u>Mathematics Magazine</u>, page 180...We heard from Dr, IGOR
COLONNA VALEVSKY in Sa Paolo, Brazil, who inquired about
past officer FRIEDA BUTLER. Is anyone still in contact with
her? We discovered that Dr. Colonna Valevsky is both an
Honorary Member of our Society and a Fellow! Are there
any more Honorary Members or Fellows of the DSA out there?
Our records are in a disorganized state (due to the dis-
ruptions of the last few years), so please write and let us
know if you were so distinguished in the past, and when....
A. ADLER HIRSCH writes from Shreveport, Louisiana, that he
is "...disappointed to find I had no fellow members in
Louisiana, only one far away in Texas, and none close by in
Arkansas or Mississippi. This points up the need for a
membership campaign..."...GENE ZIRKEL was scheduled to
speak on the Dozenal Metric System at the 4th annual Student
Symposium, jointly sponsored by the Nassau County (NY)
Association of Mathematics Supervisors and the Nassau County
Mathematics Teachers Association, but a freak snowstorm in
April cancelled the event for this year. However, Gene's
letter to the National Council of Teachers of Mathematics
re the awkward base ten metric system was published in their
<u>Mathematics Teacher</u>, and has now been reprinted in <u>American
Metric Journal</u>, Vol IX, Unit 3, July-August 1981, page 61...
Once again PROF. JIM MALONE spoke at Nassau Community's
College-For-A-Day Program. As in the past, the title of his
lecture was "Count on Twelve Fingers". He distributed some
of our brochures to those who attended....(By the way, if

DUES STILL DUE!

*Thanks to the many members who sent us their dues (which
were due on January first), as a result of our request
in the last issue. How about it? Send us those dues
checks now and save us the time and cost of billing you.
Dues are a minimum of a half dozen dollars, and all
donations to the Society are tax deductible.*

any of you need literature, please don't hesitate to let us
know.)...ARTHUR WHILLOCK writes from England that the copies
of their <u>Journal</u> were lost in the rail strike last Christ-
mas. New ones are being reprinted under an insurance claim.
Arthur is very interested in symbols, and he promised us an
article on the topic for a future issue of the <u>Bulletin</u>....
DR. ANTON GLASER, a member of our Board of Directors, was
elected Chairman of the Mathematics Department at the
University of Pennsylvania, Ogontz campus. Congratulations,
Tony!.....New Member CHARLES LABERGE from Greenfield Park,
Quebec, Canada, writes: "Dear Sirs, this letter is in
reference to the article you sent me (Feb. 9th, 1982) en-
titled "An Excursion in Numbers", written by F.E. Andrews.
First off, let me say that this article is a very original
and refreshing piece of Mathematical literature. I enjoyed
it thoroughly, from cover to cover....I wish to discuss the
point where Mr. Andrews implies that we are 'stuck'
with the decimal system because, as humanoids, we are
'stuck' with 10 fingers and, therefore, it is impossible
for us to count by 12's on our fingers. The fact that
we adopted the decimal system because we have 10 fingers
might indeed be true and ever so logical. However, it
is not impossible for us to count duodecimally with the
use of our hands. Auguste Compte noticed that the
structure of the hand, composed of 4 fingers containing
3 phalanxes each, or 12 phalanxes, could be used when
applying the duodecimal system to calculations. Thus,
using the 4 fingers on the left hand for duodecimal
units, the 4 fingers on the right hand for duodecimal
10's (dozens decimally) and the 4 phalanxes of both
thumbs as duodecimal 100's (grosses decimally), it is
possible to count up to 510 (732 decimally).This, of
course, is an extreme advantage over the decimal sys-
tem (where one can only count up to 100 in a manner
which isn't confusing). On the other hand (ha-ha), if
we are to count duodecimally with the use of our hands,
our fingers shall have to develop an even greater
flexibility!" (For Mr. Laberge's reference to Compte,
see: Lucas, E., "Theorie des nombres", Lib. A. Blanch-
ard, Paris (1981), pp. 41-46.)....FRANZ ZRILLICH writes
from Hinckley, Ohio where he read about us in the
Cleveland <u>Plain Dealer</u> to express an interest in our
circular slide rule. He also inquires about the avail-
ability of dozenal yardsticks, rulers, weights and

measuring cups. Have any of our readers produced such items?...JOHN CHURCHMAN writes from Council Bluffs, Iowa, that his Dad, Henry, was pleased to read the same wire service article in the Des Moines <u>Register</u>. John said that the article was "...marvelous, and you are obtaining some nationwide publicity--Great!"...A similar article appeared in Canada, and Mrs. DORINE McIVOR wrote from Vancouver, B.C., with regard to Canada's switch to decimal metric measurement as follows: ...

"Where were you 'boys' when we needed you? Are you not a mite late after all the money that has been poured down the drain to convert everything to metric?

Can you believe that a woman in Calgary, the owner of a carpet store, had to go to court because she DARED advertise our former measurements along with the metric measurements? She said that people would come in asking for a carpet for a room 9 x 12. I have not heard how the case came out but I can tell you when I saw it on the news I was very angry. I should think in a case such as this, lawyers would offer their services free.

<p align="right">Continued...</p>

The following are available from the Society

1. Our brochure (free)

2. "An Excursion In Numbers" by F. Emerson Andrews. Reprinted from the *Atlantic Monthly*, Oct. 1934. (Single copies free. Bulk orders 20;¢ each)

3. *Manual of the Dozen System* by George S. Terry ($1;00)

4. *Duodecimal Reciprocals 4/6 Places* by James M. Dixon ($1;00)

5. *New Numbers* by F. Emerson Andrews ($10;00)

6. *Douze: Notre Dix Futur* by Jean Essig in French ($10;00)

7. Dozenal Slide rule, designed by Tom Linton ($3;00)

8. Back issues of the *Duodecimal Bulletin* (as available) 1944 to present ($1;00 each)

A metric one-cm bolt from a Toyota will not fit a metric one-cm nut from a Volkswagen. Where we once had uniformity in the imperial system in reinforcing steel bars, now in Canada, the U.K. and Australia, which have all switched to SI, we have different sizes and ranges in the No. 15, No. 16 and No. 20 bars..."....On 15; May 1192 Mr. JAY M. JEFFERY of Cleveland, Ohio became DSA member number 260;- member number one was, of course, F. EMERSON ANDREWS, one of our founding fathers, who established the Society more than 3 dozen years ago. We now have more than seven dozen active members with an additional dozen names on our mailing list.

<p align="right">................continued........</p>

The Case of the Missing DSBG Journals:

First, a railway strike in England resulted in the loss of the <u>Journals</u> which had been mailed to us and to many others. Then, after insurance paid for a second printing, eight dozen were sent to us. They finally arrived just as we went to press, and members of the DSA should have received a copy by now. We apologize for the delay.

DOZENAL JOTTINGS......................

...DUDLEY GEORGE, Vashon, WA, sent us the following two quotes from Toynbee's A Study of History, Vol VII, pp. 305 and 306: The French reformers..."showed their practical good sense in irrationally following for this purpose the inconvenient decimal system which had been unanimously adopted by all branches of the Human Race, neither on its merits nor as the result of some laboriously achieved diplomatic compromise between conflicting better plans, but simply because the normal human being was born with ten fingers and ten toes.

It was one of Nature's unkind practical jokes that she had furnished some of the tribes of her vertebrate brute creation with six digits apiece for each of their four limbs without endowing the possessors of this admirable natural abacus with the intellectual capacity for mathematical calculation, while she had dealt out to the genus Homo a niggardly allowance of appendages that added up, not to dozens and double dozens, but only to decades and scores. Given the human anatomy, a decimal notation of Man's mathematical affairs was as inevitable as it was unfortunate. It was unfortunate because, on a decimal count, the basic scale of reckoning is divisible only by the low-powered number Two and the not very useful number Five, while the lowest number divisible alike by all the three key factors Two, Three, and Four is Twelve......

The Sumerian discovery of the virtues of the number Twelve was a stroke of pure intellectual genius, for there were no obvious sets of twelve articulations on the surface of the human body to guide a pioneer mathematician to the ideal choice for a scale of reckoning. The Sumerians not only saw the advantages of the number Twelve; they took the revolutionary step of recasting their system of weights and measures on a duodecimal basis.............

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INTER-LIBRARY LOAN

Now that the Dozenal Collection has been permanently established at the Nassau Community College Library, it is possible for anyone to borrow books through inter-loan service with your local public or school library. Out-of-print books such as New Numbers by Andrews, The Dozen System by Terry, and others, are available.

EDWARD W. PHARO JR.

An obituary

Long time member Edward W. Pharo Jr. of Pennsylvania passed away recently. He was one of our earliest members, having membership number 23. Only four of our current members have numbers lower that that! The first mention of his Dozenal work is in our 1945 Bulletin, where reference is made to Pvt. Pharo.

A design engineer with Eckert Mauchly Co., he served on the DSA's Nominating Committee in 1948 and on the Committee on Mathematical Research in 1950. In 1952 he spoke at our Annual Meeting.

Mr. Pharo was active with the Esperanto League of North America, and served as Treasurer to ELNA. In 1954 he offered to have Andrew's "An Excursion In Numbers" translated into Esperanto. He worked with officers of the Esperanto League in developing Duodecimal nomenclature and was instrumental in getting the General Secretary of the Esperanto Association of North America to come to our Annual Meeting in 1958.

We still have copies of both our Society brochure and Andrew's article in the Esperanto language.

Pharo believed that those interested in a universal language would also be interested in the number base best suited for universal use in numbers and measures.

THE "TWELFTH'S RULE"

Adapted from:
McKay's Smart Seamanship, An Illustrated Handbook
Bill Beavis, Editor
David McKay Co., Inc., New York, 1978

The "Twelfth's Rule" is a rough attempt to quantify
the changing rate at which the tide rises and falls.
It divides the range (of hours between high and low
tide) into twelfths and says that the tide rises (or
falls) one-twelfth in the first and sixth hours, two
twelfths in the second and fifth hours, and three
twelfths in the third and fourth hours. This gradually
increasing, then decreasing rate is usually set out
as follows:

Interval	Rise or Fall
1st hour	one/twelfth
2nd hour	two/twelfths
3rd hour	three/twelfths
4th hour	three/twelfths
5th hour	two/twelfths
6th hour	one/twelfth

To use the "Twelfth's Rule" subtract the nearest LW (low
water) from the nearest HW (high water) to find the range.
Divide by 12 and assign the appropriate rise (or fall) for
each hour.

Example: HW is at 0800 hours -- height given as 18 feet.
          LW at 1400 hours -- height given as 6 feet.
          How high will the tide be at 1200 hours?

HW 18 feet minus LW 6 feet = range 12 feet

In 1st hour tide falls	1/12th of range (12 ft.)		=1 foot
In 2nd hour	"	2/12ths	"	=2 feet
In 3rd hour	"	3/12ths	"	=3 feet
In 4th hour	"	3/12ths	"	=3 feet

Total =9 feet

Height of tide at 1200 hours is 18 feet minus 9 feet =
9 feet.

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The above is an example of a rule using the number 12,
submitted by John Earnest (NY). Readers are invited to
submit similar rules or related material.

NATIONWIDE COVERAGE

continued from page nine

Globe (a nationwide newspaper sold in supermar-
kets). In less than a dozen days we received
mail and phone calls from Reno, Nevada; Hinckley,
Ohio; Wildwood Crest, New Jersey; and Los Angeles,
California.

In addition, I have been interviewed three times
with reference to the wire-service article. Both
John Picton of the Toronto Star and Nancy Bolick
of The Globe called for additional information and
wrote their own articles (which have since appear-
ed in their respective publications). I was also
heard live on station KHGZ (97 FM) in Los Angeles
at 8 a.m. on Wednesday, May 26th.

The publicity netted us many requests for addi-
tional information and several new members. We
owe a debt of gratitude to Ms. Virag for her well-
balanced report of our activities.

COMING in the Fall 1982 issue....

A DOZEN PROPERTIES OF THE NUMBER TWELVE

Prof. Jay Schiffman
Kean College of New Jersey

CALENDAR REFORM

Jean Kelly

COUNTING IN DOZENS

1	2	3	4	5	6	7	8	9	*	#	10
one	two	three	four	five	six	seven	eight	nine	dek	el	do

Our common number system is decimal—based on 10. The dozen system uses twelve as the base, which is written *10*, and is called *do*, for dozen. The quantity *one gross* is written *100*, and is called *gro. 1000* is called *mo*, representing the meg-gross, or great-gross.

In our customary counting, the places in our numbers represent successive powers of ten; that is, in 365, the 5 applies to units, the 6 applies to tens, and the 3 applies to tens-of-tens, or hundreds. Place value is even more important in dozenal counting. For example, *265* represents *5* units, *6* dozen, and *2* dozen-dozen, or gross. This number would be called *2 gro 6 do 5,* and by a coincidence, represents the same quantity normally expressed as 365.

We use a semicolon as a unit point, thus two and one-half is written 2;6.

Place value is the whole key to dozenal arithmetic. Observe the following additions, remembering that we add up to a dozen before carrying one.

94	136	Five ft. nine in.	5;9'
31	694	Three ft. two in.	3;2'
96	3#2	Two ft. eight in.	2;8'
19#	1000	Eleven ft. seven in.	#;7'

You will not have to learn the dozenal multiplication tables since you already know the 12-times table. Mentally convert the quantities into dozens, and set them down. For example, 7 times 9 is 63, *which is* 5 dozen and 3; so set down *53.* Using this *"which is"* step, you will be able to multiply and divide dozenal numbers without referring to the dozenal multiplication table.

Conversion of small quantities is obvious. By simple inspection, if you are 35 years old, dozenally you are only *2#*, which is two dozen and eleven. For larger numbers, keep dividing by 12, and the successive remainders are the desired dozenal numbers.

```
12 ) 365
12 ) 30 + 5
12 ) 2 + 6
       0 + 2   Answer: 265
```

Dozenal numbers may be converted to decimal numbers by setting down the units figure, adding to it 12 times the second figure, plus 12² (or 144) times the third figure, plus 12³ (or 1728) times the fourth figure, and so on as far as needed. Or, to use a method corresponding to the illustration, keep dividing by *, and the successive remainders are the desired decimal number.

Fractions may be similarly converted by using successive multiplications, instead of divisions, by 12 or *.

For more detailed information see *Manual of the Dozen System* ($1;00).

DETACH HERE