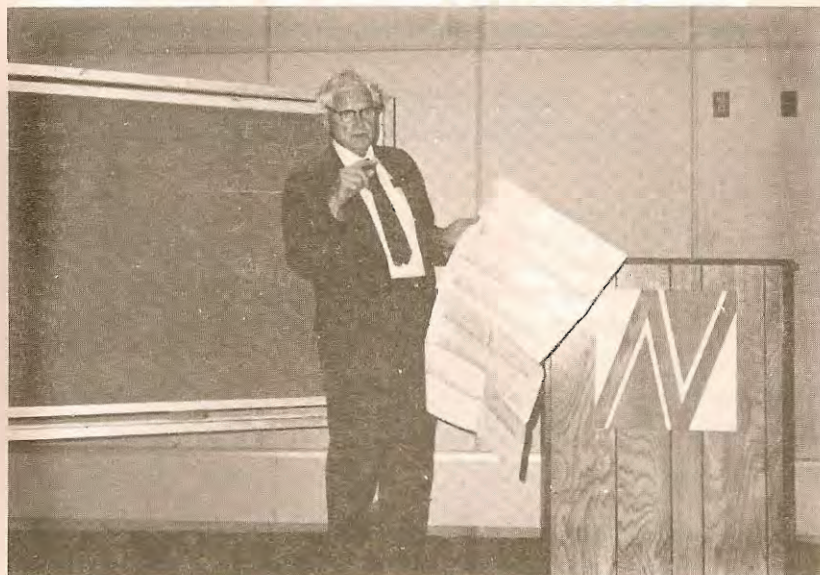


# THE DUODECIMAL BULLETIN 50;



Dudley George spoke on Squares and Approximations at the DSA Annual Meeting -- 13 October, 1984. See page 4.



Volume 2\*;  
Number 1;  
Winter 1985  
1195;



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



## 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

#### Class of 1985

Carmine DeSanto	Merrick, NY
Dr. Anton Glaser	Southampton, PA
Dr. Angelo Scordato (Chairman)	Valley Stream, NY
Patricia McCormick Zirkel (V.P.)	West Islip, NY

#### Class of 1986

Walter Berkmann	Norwalk, CT
Dr. John Impagliazzo (Secretary)	Island Park, NY
Robert R. McPherson	Gainesville, FL
Gene Zirkel (President)	West Islip, NY

#### Class of 1987

Dudley George	Palo Alto, CA
Jamison Handy, Jr.	Pacific Palisades, CA
James Malone (Treasurer)	Lynbrook, NY
Fred Newhall	Smithtown, NY



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. Years ago, as you can see from our seal, we used X and O. Both X and \* are pronounced "dek". The symbols # and O are pronounced "el".

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  $\frac{1}{2} = 0.5 = 0;6$ .

# The Duodecimal Bulletin

Whole Number Five Dozen

Volume 2\*; Number 1

Winter 1195;

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Patricia McCormick Zirkel, *Editor*  
Editorial Office:  
6 Brancatelli Court  
West Islip, New York 11795



DOZENAL SOCIETY OF AMERICA  
MINUTES OF THE ANNUAL MEETING

*Saturday, October 13, 1984  
Nassau Community College  
Garden City, NY 11530*

- I. The meeting was called to order at 10:15 A.M. by the organizational president, Prof. Gene Zirkel. The meeting took place in the Administrative Tower of Nassau Community College, Garden City, NY.
- II. The following people were present:

Members:

Alice Berridge  
Anthony Catania  
Robert Foley  
Victor Gany  
Dudley A. George  
John Impagliazzo  
James Malone  
Kathleen McKiernan  
Fred Newhall  
Angelo Scordato  
Gene Zirkel  
Patricia Zirkel

Guests:

Ellis vonEschen  
R. Keith Kirby  
Mary Newhall

III. Amending of Agenda

Moved that the agenda published in the Bulletin be amended as distributed at the meeting. Seconded and so carried.

IV. Secretary's Report: Dr. John Impagliazzo

Moved to accept the minutes as published in the Bulletin. Seconded and so carried.

1984 ANNUAL MEETING, Continued

V. President's Report: Prof. Gene Zirkel

- (1) A short presentation of the current history of the Society was given. Prof. Zirkel highlighted the recent increase in membership and interest.
- (2) In the past year public libraries were given free subscriptions to the Duodecimal Bulletin. Also information was given to faculty members in the area.
- (3) The Society has become the benefactor of a part of the estate of Kingsland Camp. The material includes slide rules, books and other materials.
- (4) A base 60 calculator was donated to the Society by Jamison Handy. This sexagesimal calculator was circulated for information and perusal.
- (5) A new issue of the Dozenal Journal of the DSGB will be sent to our society from our sister society in England.

VI. Treasurer's Report: Prof. James Malone

Liquid assets from 10/14/83 to 10/13/84 were \$4,243.93 with expenses of \$3,160.98. Expected revenue from investments is about \$1,500.00 per year. The total assets of the organization amount to \$15,208.00. A copy of the Treasurer's Report was submitted. (See appendix 1.)

VII. Editor's Report: Patricia Zirkel

- (1) Three issues per year are to be published at a cost of about \$400.00 per issue. The Bulletin will appear in three color schemes on a rotation basis.
- (2) The editor made a "call for papers" so that work in the area of dozens can be published. Also any pertinent information concerning the Society and its members will be appreciated.

*Continued . . .*



VIII. Awards Committee: Dr. Angelo Scordato

- (1) The DSA Annual Award is given this year to Eugene (Skip) Scifres by unanimous vote of the Committee. A plaque was awarded to him for his outstanding years of service. The plaque was accepted in his behalf by Jim Malone. (See related article, this issue.)
- (2) Moved that Tony Scordato and Pat Zirkel again be appointed as co-chairs of the awards committee. Seconded and so carried.

IX. By-Law Committee Report: Dr. Angelo Scordato

- (1) The By-Laws of the Society have been revised. (The Constitution was previously revised.)  
The major changes include:
  - (a) Name: to Dozenal Society as opposed to Duodecimal Society of America
  - (b) Address: to Nassau Community College
  - (c) Membership: simplified to the categories of
    - (1) Member
    - (2) Honorary member (lacks vote)
    - (3) Fellow (Member, with vote, who has made a major contribution in the area of dozens.)
  - (d) Dues: to be set by a two-thirds vote of members present at the Annual Meeting.
  - (e) Annual meetings: to be held at convenient times as opposed to "early part of the year."

(The By-Laws will be published in a later issue.)

X. Annual Meeting Committee

The Society wishes to thank Alice Berridge for all the work she has done in organizing this meeting. The 1985

meeting will have an assistant chair who will, in turn, act as chair at the 1986 meeting. This procedure will continue each year. Prof. Anthony Catania has agreed to accept the position as assistant chair.

- XI. Moved that the annual meeting be held on 11 and 12 of October 1985, with a social function on Friday, a business meeting, luncheon, mathematical presentations, and a banquet on Saturday. The meeting will once again take place at Nassau Community College.

XII. New Business

- (1) Moved that a Financial Committee be established. Seconded and so carried. The president appointed Angelo Scordato as chair. Other appointments are Dudley George, Robert Foley, James Malone, Patricia Zirkel.
- (2) There are four complete sets of the Duodecimal Bulletin extant. Two of those sets should be bound for preservation. Moved that a total of 16 bound volumes of the Bulletin be made at a cost of about \$200.00. Seconded and so carried.
- (3) The need for a Parliamentarian was brought to the floor. Patricia Zirkel was appointed by the president as Parliamentarian of the Society. (This is an advisory position. It is the duty of the Parliamentarian to become thoroughly familiar with the Constitution and By-Laws of the Society.)
- (4) Noted:
  - (a) ten dozen and five letters of inquiry have been received by the Society this year.
  - (b) Donations to the DSA are tax deductible.
- (5) The Library of Congress will be sent all copies of the Bulletin that were issued in the last five years.

*Continued . . .*



## 1984 ANNUAL MEETING, Continued

XIII. Nominating Committee

The nominating committee presented the following four members as the Class of 1987 of the Board of Directors: Dudley George, Fred Newhall, Jamison Handy and James Malone.

Moved that the Secretary cast a ballot of one to elect the proposed slate for the Board of Directors. Seconded and so carried.

Moved that the meeting be adjourned. Seconded and so carried. Meeting adjourned at 11:50 A.M.

*Respectfully submitted,*

*John Impagliazzo, Ph.D.  
Secretary*



Dozenal enthusiasts gather for luncheon. L - R Fred Newhall, Bob Foley, Pat Zirkel, Vic Gany, Kay McKiernan, John Impagliazzo, Mary Newhall, Gene Zirkel, Alice Berridge, Tony Catania, Dudley George.

## 1984 ANNUAL MEETING, Continued

## BOARD OF DIRECTORS MEETING, 13 October 1984

- I. The meeting was called to order at 12:02 P.M. by the Chairman of the Board, Dr. Angelo Scordato, in the Administrative Tower of Nassau Community College, Garden City, New York.
- II. Members and guests were present as noted in the Minutes of the 1984 Annual Meeting.
- III. The Chair thanked the audience for their interest in the Society and expressed the conviction that this interest will continue to grow.
- IV. The Nominating Committee submitted a slate of Officers for the 1985 year. They are:

Chairman of the Board:	Angelo Scordato
President:	Gene Zirkel
Vice President:	Patricia Zirkel
Secretary:	John Impagliazzo
Treasurer:	James Malone

There were no further nominations.  
Moved that nominations be closed. Seconded and so carried.



The Board of Directors meeting was chaired by Tony Scordato.

Continued . . .



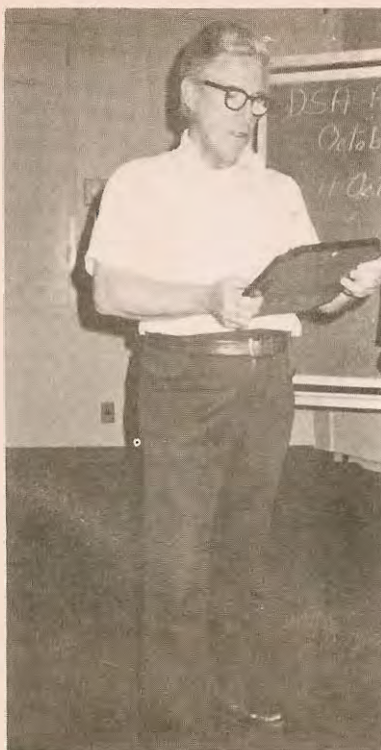
1984 ANNUAL MEETING, Continued

Board of Directors

- V. Moved that the Secretary cast a ballot of one for the election of the five nominated Officers. Seconded and so carried. The Chair congratulated the new Officers.
- VI. It was suggested that recordings of the activities of the Society should be considered for future reference. The suggestion will be studied.
- VII. Moved that the meeting be adjourned. Seconded and so carried. Meeting adjourned at 12:12 P.M.

*Respectfully submitted,*

*John Impagliazzo, Ph.D.  
Secretary*



*Jim Malone accepted the  
DSA Annual Award for  
Eugene Scifres.*

1984 ANNUAL MEETING, Continued

*At the conclusion of the Board of Directors Meeting, the DSA members and guests adjourned for luncheon.*

*At 2 P.M. the meeting was resumed for an afternoon of speakers' presentations. The featured speaker was R. Keith Kirby, Acting Chief of the Office of Physical Measurement Services, National Bureau of Standards, Gaithersburg, MD, who spoke on quality control and the functioning of his office. Also speaking were Fred Newhall, who discussed language and efficient number symbols; and Dudley George, who discussed squares and approximations.*

*It is hoped that as space becomes available in this BULLETIN we will be able to publish their remarks, or excerpts therefrom.*



*Alice Berridge and R.  
Keith Kirby prepare for  
the main presentation at  
the DSA Annual Meeting.*

*Continued . . .*





Fred Newhall discussed language and efficient number symbols at the afternoon session of the DSA Annual Meeting, 13 October 1984.

Continued . . .

#### A REMINDER...

#### DSA DUES

Dozenalists, DSA dues are payable as of January 1, 1985. For the calendar year 1985, dues are \$12.00 (U.S. funds only, please).

Life memberships are currently available at \$144.00. Student dues are still \$3.00.

Your contributions are always welcome, and aid the Society in "spreading the word" about duodecimals.

Please pay your dues, and/or send your tax-deductible contribution, today.

The evening banquet was the close of a most successful meeting. Cocktails, snacks, special cheeses, a sensational sunset, and the superb view from the 11th floor of the Administrative Tower at Nassau Community College launched the evening's activities. Out-of-town guests Mary and Fred Newhall and Dudley George were the first to notice that the "Twin Towers" and other highlights of the New York City skyline were in full view as we gathered to enjoy a dinner featuring chicken cordon bleu, noodles, broccoli, fruit cup, pastries, and superb wines. John Impagliazzo, our dozenal pianist, ended the very sociable evening with Broadway melodies and singable favorites on the 88's. The absence of Pat and Gene Zirkel (attending the wedding of a nephew) kept the wild dancing to a minimum.

Alice Berridge



John Impagliazzo tickles the ivories while Alice and Edmund Berridge join in the music.



## ANNUAL AWARD PRESENTATION

In 1945, in the very first issue of this Bulletin we published a list of do-two new aspirants to the newly formed DSA. At that time people had to pass four tests in dozenal arithmetic before becoming full fledged members. (We hope to publish those old tests in the near future.) Included in that early list were some now famous names, such as:

Kingsland Camp, who served us as both  
President and Chairman of the  
board

H.K. Humphrey, long time Treasurer, and  
the man who suggested the (;) to  
indicate fractions - it's now known  
as the Humphrey Point

Mary Lloyd, our Bulletin's First Puzzle  
Editor

Lewis Carl Seelbach, famous for his  
bibliography of Duodecimals and a  
former member of our Board of Directors

Paul E. Friedman, Former Vice President

W.B. Campbell, whose name appeared often in  
our early Bulletins

Private Bill Crosby

Corporal Dallas Lien, and

Lieutenant Eugene Scifres, AAC

*Continued on page 14;*



## ANNUAL AWARD WINNER

Eugene "Skip" Scifres was presented with the DSA Annual Award at the 1994 meeting. He is a past member of the Board of Directors and served as the Society Treasurer for many years.

## ANNUAL AWARD, Continued

TEXT OF THE AWARD



THE ANNUAL AWARD

Of

THE DOZENAL SOCIETY OF AMERICA

Is presented to

EUGENE 'SKIP' SCIFRES

*For his years of Dedicated Service*

*To the Society and to its Aims*

As

*A long time Member of the Board of Directors*

*Society Treasurer, a Benefactor,*

*A Contributor to THE DUODECIMAL BULLETIN,*

*A Member of Several Committees, and*

*A devoted Friend of Dozenals and of Dozenalists.*

PRESENTED WITH GRATITUDE

BY THE BOARD OF DIRECTORS

*Continued . . .*



ANNUAL AWARD, *Continued*

Skip Scifres, as he is known to his friends, became member number 11; and although that number is considered unlucky in some circles, Skip brought nothing but good fortune to our Society. In 1963 he was elected to our Board of Directors as part of the Class of 1966. Two years later he was elected Treasurer, and he served us in that position for 11; years.

In 1980, our Annual Meeting was held in Boulder, Colorado. Skip drove from Denver both days, graciously picked up members at the airport, and chauffeured them to Boulder. His hospitality made a lasting impression on the Easterners who were confusing the 'foothills' with the 'mountains'.

## HAVE YOU READ. . . .

...the July/August 1984 issue of The American Metric Journal, volume XII, Unit 4? It is a great issue, so run, don't walk, to your local library to read a copy.

It excerpts the 700 page report to Congress by the non-partisan Government Accounting Office (GAO) on the cost and the many disadvantages of converting to the ten based metric system. The subtitles in the report include:

COSTLY/ NO ADVANTAGES  
SCALE COSTS OVER \$ BILLION  
INCREASED COST -- NO BENEFITS  
A NIGHTMARE FOR THE METAL TRADES  
CONSUMER DANGER AND CONFUSION  
...NO BENEFITS OR REASON FOR CONVERSION  
PETROLEUM COST WILL RUN \$300 MILLION

Elsewhere in the issue we read: Conversion would hurt the U.S. economy, and There is no need to convert to the metric system.

--GENE ZIRKEL

## DOZENAL SOCIETY OF AMERICA

## REPORT FROM THE FINANCIAL COMMITTEE

November 30, 1984

The Finance Committee met on November 30, 1984, and approved the transfer of our savings account to a new bank to take advantage of better interest rates.

Consistent with the aim of our Society to foster interest in duodecimals, the Committee approved requests for bulk orders of Excursions for classroom use and the inclusion of a copy of our manual in each order.

Our support for the Duodecimal Society of Great Britain will continue with the purchasing of copies of their Journal which we will forward free of charge to our membership.

Dues for members living outside the United States will remain the same as for those within the States, providing mailing costs do not increase excessively.

A fee schedule was established for the purchase of advertising in our Bulletin. These fees reflect the printing costs to the Society, and do not include a profit margin. The schedule will be: \$37.50 per page; \$19.75 per 1/2 page; and \$10.50 per 1/4 page.

Approval was also granted to offer a small honorarium to our 1985 Annual Convention speaker to help defray the cost of transportation.

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.



## WHO WE ARE IV: DUDLEY GEORGE

Dudley George, a long-time member of our Society (his membership number is 2#) was nominated and elected to the Board of Directors in 1981 when Gene Scifres declined to run for re-election.

Born in Aitken, Minnesota, Dudley's family moved to California when he was 20 years of age. His varied career includes working in several banks, and as a steno-secretary, an accountant, an office manager, and a teacher. In addition, he worked for many years in electronics at both North American Aviation and at Lockheed Aircraft Company. It is perhaps because of his background in electronics that he has never given up on his dream to produce a dozenal electronic calculator. In the military, he spent four years as a Lieutenant in the Army Corps of Engineers doing supply work in England and France.

Dudley became interested in dozenals about a year after he attended the University of Minnesota in Minneapolis. He originally devised new symbols for all of the digits except 0 and 1, and his ideas for this were printed in this Bulletin, Volume 2; Number 2; Pages 16 and 17; September 1946. At that time Dudley wrote:

Some twenty years ago, I thought it would be fun to figure in twelves. However, I had, in order to earn a living, (as a bank clerk then) to continue to figure in the usual way in tens. The solution was the use of new symbols, both figure and sound, so as to avoid confusion. I find now that I have no difficulty doing your problems, but continue to think in my own symbols.

For the record, my figures (which have changed a little year by year, but not much) are as follows:

---

*Why not give some of our literature to a friend? Pamphlets, Excursions, and Bulletins are available.*

## WHO WE ARE, Continued

Numeral	New Symbol	Spelling	Pronunciation
1	1	on	on
2	L	tu	too
3	7	ri	ree
4	8	ka	kah
5	V	fe	fay
6	y	si	see
7	^	poi	poi
8	E	ge	gay
9	S	lai	lye
X	ø	vi	vee
ε	el	sho	show
10	10	den	dane

He married Catherine Atwood, a librarian, in 1956 and they have one son, Christopher. Dudley's interests include religion, especially the study of the Christian church in history, and he has read the twelve volumes of Arnold Toynbee's Study of History with great interest. He is deeply concerned with modern America's lack of feeling for spiritual values.

Over the years Dudley has attended many of our Society's annual meetings, traveling either from his home in Palo Alto, California, or from his vacation spot in Vashon, Washington. His support of our work and his input at our meetings have made him a valuable asset to the DSA.



## DECIMAL/DUODECIMAL PALINDROMES

Mark Calandra  
Chappaqua, NY

Symmetry is an unmistakable visual characteristic when present, and therefore palindromes (numerals which, when expressed in Arabic notation, have the same value when reversed) have always intrigued people.

Which numbers are palindromes in both base dek and base do?

In order to answer this question, an IBM Personal Computer was used to search through the positive integers less than  $49*55$ ; . The search resulted in only 19; palindromes within that range:

<u>Palindrome Number</u>	<u>Decimal Notation</u>	<u>Duodecimal Notation</u>
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
*	11	#
#	181	131

## PALINDROMES, Continued

<u>Palindrome Number</u>	<u>Decimal Notation</u>	<u>Duodecimal Notation</u>
10	555	3*3
11	616	434
12	676	484
13	737	515
14	797	565
15	1111	787
16	8008	4774
17	35953	18981
18	43934	21512
19	88888	43534

*Definition of a palindrome expert:*

*A mathematician who knows his subject forwards and backwards.*

*Ron McCuiston  
Pensacola Junior College  
(Reprinted from the MATYC JOURNAL)*



## REVERSE NOTATION REVISITED

Gene Zirkel  
Nassau Community College  
Garden City, NY

J. Halcro Johnston, member number 55, wrote The Reverse Notation in 1937. In that book he suggested the use of negative digits. Computers now regularly use negative digits in what is referred to as the "Two's Complement Notation." In this notation the leftmost digit is always considered to be a negative digit. Thus the binary number 1011 is interpreted as

$$-1(2^3) + 0(2^2) + 1(2^1) + 1(2^0) \text{ or}$$

$$-8 + 0 + 2 + 1 = -5.$$

To find the negative of a number written in two's complement form, one simply interchanges each binary digit, swapping the ones and zeros and then adds +1. Thus the negative of  $-5 = 1011$  is  $0100 + 1 = 0101$ , which in two's complement notation is

$$-0(2^3) + 1(2^2) + 0(2^1) + 1(2^0) \text{ or}$$

$$0 + 4 + 0 + 1 = +5.$$

In this notation all positive numbers begin with a zero, and all negative numbers begin with a (negative) one. Confusion results when one forgets this important fact and proceeds to change +8 into binary as 1000 instead of 01000. Remember that 1000 is to be interpreted as  $-8 + 0 + 0 + 0 = -8$ .

If we borrow Johnston's notation and put a bar over the leftmost negative digit, then no confusion would occur.

$\bar{1}011$  would be in two's complement form and would equal -5, while 1011 (without the bar) would be an ordinary binary number equal to #.

Note both 01000 and 1000 would equal +8, and no confusion would ensue between these expressions and  $\bar{1}000$ , the two's complement form for  $\bar{8}$  (or -8). Every number preceded

## REVERSE NOTATION, Continued

(explicitly or implicitly) by a plus sign would already be in two's complement form! The question: Does 101 mean +5 or -3 would no longer plague us.

Notice also that we no longer treat the leading digit differently than the rest of the digits. No longer must we sometimes subtract one digit and then add the rest of them. With Johnston's bar we add all the digits all of the time.

Applying these ideas to duodecimals we can express negative integers in an el's complement notation. The leftmost digit will be a 0 or a  $\bar{1}$ , and it is to be subtracted from the other digits. In el's complement form  $-79$  would be expressed as  $\bar{1}43$  (since  $-100 + 40 + 3 = -79$ ). A positive number could be expressed as either 013 or simply 13 without confusion.

To find the el's complement of a positive k digit number, we simply subtract it from  $10^k$  and append the negative digit  $\bar{1}$  to the left.

For example the el's complement of +79 is found as follows. Since 79 is a two-digit number,  $k = 2$ . Subtracting 79 from  $10^k = 100$  we obtain  $100 - 79 = 43$ . Now appending  $\bar{1}$  we have  $-(+79) = \bar{1}43$ .

(If you considered 079 to be a three-digit number you would get

$$1000 - 079 = \bar{1}\#43,$$

which is equivalent. In fact, just as any number of 0's can be inserted between the plus sign and the leading digit of a positive number, so too, any number of #'s can be inserted or deleted after a leading  $\bar{1}$  without changing the value of a negative number.  $\bar{1}\#\#\#0 = \bar{1}\#0 = \bar{1}0$ .)

Continued . . .



Similarly, to find the el's complement of a negative k digit number we proceed as follows:

- a) If the number is not in the el's complement form, we simply change the sign, as in  $-(-16) = +16$ .
- b) If the number is already in el's complement form with a negative one as its leftmost digit, we subtract it from  $10^k$  and discard the leftmost digit which will be +1. For example,  $-(\bar{1}43)$  is found by subtracting:  
 $1000 - \bar{1}43 = 1079$   
 and then discarding the 1, yielding 079 or 79.

#### A Second Method

As with the two's complement notation, we can also find the negative of a number by swapping each digit, d, with the corresponding digit, #-d, and then adding 1. The digits which are interchanged are:

- |   |     |   |
|---|-----|---|
| 0 | <-> | # |
| 1 | <-> | * |
| 2 | <-> | 9 |
| 3 | <-> | 8 |
| 4 | <-> | 7 |
| 5 | <-> | 6 |

However, a leading 0 is swapped with  $\bar{1}$ , and vice versa.

(Note that the units digit of  $\# - \bar{1}$  is 0.)

Thus the negative of  $\bar{1}43$  is  $078 + 1 = +79$ , and

$$-16 = -016 = \bar{1}*5 + 1 = \bar{1}*6, \text{ or}$$

$$-(0 + 10 + 6) = -100 + *0 + 6.$$

The advantages of the two's complement notation in computers are:

1. There is no need to store nor to check for a sign bit.
2. Subtraction is replaced by adding the two's complement.

In dozenals this latter advantage still holds. For example, the subtraction,  $46 - 37$ , becomes the addition:

$$046 + \bar{1}85 = 00\#.$$

It would seem that Johnston was a man ahead of his time!

Reference: The Reverse Notation, Introducing Negative Digits with 12 as the Base, Blackie and Son, London and Glasgow, 1937.

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 available.)
3. *Manual of the Dozen System* by George S. Terry (\$1.00)
4. *New Numbers* by F. Emerson Andrews (\$10.00)
5. *Doznes Notre Dis Futur* by Jean Essig, in French (\$10.00)
6. Dozenal Slide rule, designed by Tom Linton (\$3.00)
7. Back issues of the *Duodecimal Bulletin* (as available) 1944 to present (\$4.00 each)



by Fred Newhall

METRIC MADNESS by J.W. Batchelder.

Devin-Adair Publishers, 6 No. Water  
St., Greenwich, CT 06830.

To all conservatives who are stolidly opposed to the Metric System, this book will be a rewarding source of propaganda. For anyone else who would like to weigh the facts for and against, there just are none for. Its subtitle, "Over 150 Reasons for NOT Converting to the Metric System" is correct except for the word "Reasons". There are statements, each repeated a dozen different ways; but anyone with even a slightly logical mind will have to look hard for any reasoning in the book. Instead there are half-truths, insinuations, slurs, sensationalisms and name-calling. For instance: "...metric system...growing suspicions of a conspiracy...swindles, humbug, assorted flimflam, merchandising gimmicks and general exploitation...there must be something fishy about anything as wonderful as metric is claimed to be..." (Page 1)

The author had his own engineering company and probably has much practical experience, but he makes occasional errors that betray his lack of scientific knowledge. He says, "...self-proclaimed measurement experts...switched grams, meaning weight in the old system, to mean mass in the SI system." (Page 20). "High speed bullets of little weight have so much mass they penetrate when stopped suddenly." (Page 21) Mass and weight are the same on earth. By "mass" he means inertia. He strongly objects to the use of decimals and exponents as being difficult to understand, but nowhere does he mention the simplicity of moving a decimal point to indicate steps of measurement, as from centimeters to meters. If we want to step from yards to miles, or vice versa, we can not just move a decimal point; we have to multiply or divide by an unwieldy fraction in our present system.

He does have a sense of humor. After listing all the SI prefixes-- micro, nano, pico, femto, and atto, he says: "The only missing metric prefixes are Groucho, Chico, Gummo, Zeppo, and Harpo". (Page 41)

This book was published by the Devin-Adair Company, Old Greenwich, Conn., 06870 in 1981. The list price is \$12.95 and the book has 265 pages. I have a complaint against all books being padded. After reading the cover flaps, there are 2 title pages, a quotation page and a blank. Then the publisher inserts 4 pages of his own preface before the author's 4 page preface. This is followed by 5 pages of introduction which repeats again what was said on the previous pages. The 36 pages following the end of the book are also partly repetitive, but do contain the essential index, references, and a list of organizations. (Ours is omitted.)

I did learn at least one new idea from the book. He mentioned that the ancient Egyptians had the only measurement system where length is directly related to time. Their cubit was the unit distance that noon travels in a unit of time. We could indeed have selected a more logical unit than the length of a king's foot, or more practical than a wave length of light.

Most books have a carefully planned outline. This book has ingenious chapter titles, but the author does not adhere to the subject within each chapter. For instance, "Our Impertinent Metric Immigrants" is about only one.

If you want to convince someone about the superiority of one system of measurement, an attempt should be made to weigh the advantages of each system in a sane, logical manner. "Madness" will not convince anyone.

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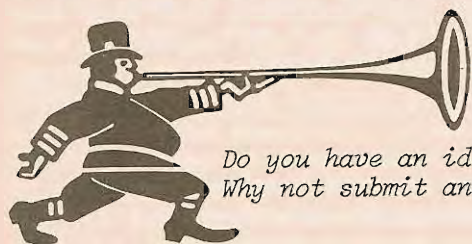
*Have you written a letter to some local newspaper or to a newsletter extolling the advantages of Base Twelve? Remember to mention that free literature is available from the Society.*



## DOZENAL JOTTINGS

*News from or about the dozenal activities of members  
and friends . . . . .*

Thanks to Dr. TONY GLASER, 1##; for pointing out to us the book *The Ascent of Mathematics*, which will be reviewed in a forthcoming *Bulletin* . . . In going through some old files of TOM LINTON and RALPH BEARD we discovered 3 1/2 dozen booklets and articles either (1) about dozenals, or (2) written by our members. These have all been added to our Dozenal Library Collection. The variety of subjects in this collection attests to the varied interests our members have, not only in different aspects of dozenals, but also in other branches of mathematical and non-mathematical topics. . . We recently heard from Dr. WILFRIED HERGET, a member from Clausthal-Zellerfeld in the Federal Republic of Germany. He enjoys reading the DSA *Bulletin* . . . Chairman of the Board, Dr. TONY SCORDATO recently suggested that your old *Bulletins* are valuable. If you throw yours away, or if they sit on a shelf gathering dust, perhaps your local library would like to have them. This is a good way to help us to fulfill our Society's goal of educating people about dozenals. Why not give it a try? . . . Welcome to our newest members: 288; KARI BORNHORST, Acton, Mass.; 289; RICHARD SCHRADER, Hiawatha, Kansas; 28\*; DAVID SINGMASTER, London, England; 28#; PERTTI LOUNESTO, Helsinki, Finland; 290; JEAN HORN, Seacliff, NY; 291; ANTHONY CATANIA, Seaford, NY; 292; ROBERT FOLEY, Garden City, NY. We warmly welcome them to the society and wonder, isn't there someone that you should invite to join us? . . . end



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

## WHY CHANGE?

This same question was probably rife in Europe between the years 1000 and 1500, when the new Hindu-Arabic numerals were slowly making their inching progress in displacing the comfortable and familiar Roman numerals then universally used.

Yet, although it took D years, and despite much opposition—"Who needs a symbol for nothing?"—the new notation did come into popular use. Released from the drag of Roman notation, man's 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, man awoke to the fact that different number bases could be used, and as early as 1585, Simon Stevin stated that the duodecimal base was to be preferred to the base ten.

The parallel 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 measurements. Base twelve should be man's 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 14; 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.



## 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  $12 \overline{) 365}$  is two dozen and eleven. For larger numbers,  $12 \overline{) 30} + 5$  keep dividing by 12, and the successive remainders are the desired dozenal numbers.  $12 \overline{) 2} + 6$   
 $0 + 2$  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  $12^2$  (or 144) times the third figure, plus  $12^3$  (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).

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 \_\_\_\_\_

Employer (Optional) \_\_\_\_\_

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

DETACH HERE