

# THE DUODECIMAL BULLETIN 63;

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CONSTITUTION AND BY-LAWS

OF THE

DOZENAL SOCIETY OF AMERICA

See pages 8 and 12;

**DSA ANNUAL MEETING**

October 14, 1989

*Don't Miss It!!*

*See Schedule, p. 4;*



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



Volume 32;  
Number 3;  
Fall 1989  
1199;

# 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

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Jamison Handy, Jr. (Associate Editor)

# THE DUODECIMAL BULLETIN

Whole Number Six Dozen Three

Volume 32; Number 3;

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FOUNDED  
1944

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## DOZENAL SOCIETY OF AMERICA

## SCHEDULE OF THE ANNUAL MEETING -- 1199;

Saturday, October 14, 1989  
 Nassau Community College  
 Garden City, LI, NY 11530

I BOARD OF DIRECTORS MEETING -- Tentative Agenda

10 A.M. Administrative Tower, Nassau Community  
 College, Twelfth Floor.

*All business at the Annual Meeting is conducted by  
 outgoing officers.*

1. Call to order - Dr. Angelo Scordato, Chair
2. Report of the Nominating Committee (J. Malone, L. Aufiero, A. Catania), and proposal of a slate of Officers:
 

Board Chair	ALL
President	TO BE
Vice President	ANNOUNCED
Secretary	
Treasurer	
3. Election of said Officers (who will be installed later in the Meeting).

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  $1/2 = 0.5 = 0;6$ .

## SCHEDULE, 1989 ANNUAL MEETING, Continued

4. Remarks
  5. Appointments to various Committees. (For current Committee appointments and Chairs, see *Bulletin* number 61; pages 5 and 6.)
 

Committees include:

Annual Meeting  
 Finance  
 Awards

Other positions include:

Parliamentarian  
 Editor of the *Duodecimal Bulletin*  
 Reviewers of articles for the *Bulletin*
  6. Further affairs and business of the Board
  7. Adjournment
- II ANNUAL MEMBERSHIP MEETING -- Tentative Agenda
1. Call to order - Fred Newhall, President
 

Attendance
  2. Minutes of the 1988 Annual Meeting - Larry Aufiero
  3. President's Report - Fred Newhall
  4. Treasurer's Report - Tony Catania
  5. Reports of other Officers and individuals, as called for.

Continued . . .

SCHEDULE, 1989 ANNUAL MEETING, Continued

## 6. Committee Reports:

Annual Meeting - B. Smith, L. Aufiero, A. Catania

Finance - P. Zirkel, L. Aufiero, A. Catania, D. George,  
J. Malone, A. Razziano, A. Scordato

Awards - A. Scordato, J. Impagliazzo, J. Malone, P.  
Zirkel

Other Committees, as called for

## 7. Report of the Nominating Committee for 1990 - J. Malone, L. Aufiero, A. Catania:

a) Nomination and election to the Board of the Class of  
1992 -- SLATE TO BE ANNOUNCED

b) Election of a Nominating Committee for 1989-1990

## 8. New Business

III FEATURED PRESENTATION

Topic: A SURVEY OF DUODECIMAL NUMBER THEORY

Speaker: Jay L. Schiffman  
Department of Mathematics  
Jersey City State College  
Jersey City, NJ

Jay will discuss ideas such as: prime numbers in base twelve, duodecimal divisibility tests, prime factorization, and the resolution of some "mind boggling" involving duodecimal primes which were proposed by Shaun Ferguson in the *DSGB Journal* (Summer 1988 edition).

IV DINNER (Time and place to be decided by attendees).

End

NOT TRUE!

Jean Kelly  
New York, NY

In the last issue of the *Bulletin* the article "10;0 = ONE DOZEN" states that money will simply be converted to base twelve "without altering at all the relative possessions of people."

But such is not the case. Suppose that Gene, Fred and Tony each have \$100 before the suggested conversion takes place.

If Gene has a single one-hundred-dollar bill, Fred has ten ten-dollar bills, and Tony has one hundred singles, then after the suggested conversion takes place:

Gene will have a \$100;00 bill (or \$144.00)

Fred will have dek \$10;00 bills = \$\*0;00 (or \$120.00)

Tony will have 8 dozen and 4 singles = \$84;00 (or \$100.00)

The moral of this story is:

*Change all your cash into big bills before the conversion!*

End



Newly-elected DSA  
President Fred  
Newhall, with  
Jamison Handy at  
the 1988 Annual  
Meeting.

CONSTITUTION  
OF  
THE DOZENAL SOCIETY OF AMERICA

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*Incorporated under the laws of the  
State of New York  
16 July, 1160;  
18 July 1944*

*Revised  
15 October 1197;  
17 October 1987*

ARTICLE I.

Section 1. The name of this organization shall be "The Dozenal Society of America."

ARTICLE II.

Section 1. This Society 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.

ARTICLE III

Section 1. The functioning of the Society shall be the responsibility of the Board of Directors, subject to the policy directives of the membership. It is in the membership that supreme authority resides, as expressed at the Annual and Special Meetings of the Society.

CONSTITUTION OF THE DOZENAL SOCIETY OF AMERICA, Continued

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Section 2. The Board of Directors shall consist of not more than twelve persons, and shall initially be composed of the incorporators of the Society, and such others as shall be elected from the voting membership, serving overlapping three-year terms.

Section 3. The Board shall elect the officers of the Society, and may fill any vacancies in the Board until the next annual election.

Section 4. The Board shall meet annually or oftener. Its meetings may, at its option, be held by correspondence under procedures which it shall establish.

Section 5. The Board shall have the power by two-thirds vote, to remove from office, and/or discharge from membership, anyone found guilty of actions discreditable to the Society or its purpose.

ARTICLE IV.

Section 1. The officers of the Society shall be a Board Chair, a President, a Vice-President, a Secretary, and a Treasurer. Any two of these offices may be held by the same person.

Section 2. The Chair: shall see that the officers perform their duties in accordance with this constitution. The Chair or the Chair's delegate shall preside at meetings of the Board.

Section 3. The Board may appoint such other officers, agents, and committees as it may deem expedient. Any such appointive offices, agencies, and committees may be vacated at the pleasure of the Board.

*Continued . . .*

CONSTITUTION OF THE DOZENAL SOCIETY OF AMERICA, Continued

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Section 4. The President: shall be a member, ex-officio, of all committees; shall be responsible to the Board for the furtherance of the purposes of the Society; may delegate to the other officers such duties as are deemed fitting and suitable.

Section 5. The Vice-President: shall assume the presidential duties in the absence of the president, and shall perform such other duties as may be delegated.

Section 6. The Secretary: shall

a) Conduct the correspondence of the Society, of the Board of Directors, and of the Executive Committee, and shall maintain the records of their proceedings and actions.

b) Maintain the membership records.

c) Have custody of the physical property of the Society.

d) Perform such other duties as may be delegated.

Section 7. The Treasurer: shall

a) Collect, disburse, and hold all monies and securities of the Society in such manner as the Board shall direct.

b) Maintain a true record of all financial transactions, and of the funds in the Treasurer's custody, and take such action as to members in arrears as the Board shall direct.

c) Furnish such bond as the Board shall direct.

CONSTITUTION OF THE DOZENAL SOCIETY OF AMERICA, Continued

---

d) Have accounts audited whenever so directed by the Board. The report of the auditors is to be made directly to the Board.

e) Perform such other duties as may be delegated.

Section 8. The Executive Committee shall consist of the Officers of the Society. It shall meet annually or oftener for consultation, coordination, and the establishment of administrative policy.

Section 9. Budgets for each office, committee, or project shall be approved by the Executive Committee. The responsible officer, Chair, or project head may incur within this budget such expenses as are proper, approving the bills for payment by the treasurer.

ARTICLE V.

Section 1. Voting privileges shall be limited to Members and Fellows, in good standing.

Section 2. The Board of Directors shall have the power to establish other grades of membership, and the terms and qualifications for these grades.

Continued . . .

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Remember -- your gift to the DSA is tax deductible.

CONSTITUTION OF THE DOZENAL SOCIETY OF AMERICA, Continued

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ARTICLE VI.

- Section 1. At the Annual Meeting of the Society, a Nominating Committee of three of the voting membership shall be elected. The Nominating Committee shall forward to the Secretary, at least one month prior to the Annual Meeting, its nominations for the Board of Directors, and for the new Nominating Committee, for election at the next Annual Meeting of the Society.
- Section 2. Any other voting member of the Society shall be eligible for election, if the nomination is endorsed by five of the voting membership.
- Section 3. Each one of the voting membership shall be entitled to one vote.
- Section 4. Newly elected members of the Board of Directors shall assume office upon election.

ARTICLE VII.

- Section 1. The order of business at any and all meetings of the Society, its Board of Directors, and committees, shall be:
1. Roll call.
  2. Reading of minutes.
  3. Reports of officers.
  4. Reports of committees.
  5. Elections.
  6. New business.
- Section 2. All questions of procedure not covered by this Constitution shall conform to Robert's Rules of Order.

CONSTITUTION OF THE DOZENAL SOCIETY OF AMERICA, Continued

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ARTICLE VIII

- Section 1. This Constitution may be amended or changed at any Annual or Special Meeting of the Society, provided that notice of the proposed change be stated in the announcement of the meeting.
- Section 2. When such amendment or change is properly before the meeting, the amendment or change may be passed by a two-thirds vote of those present.

ARTICLE IX.

- Section 1. The Board of Directors may organize local branches of this Society, but the Society's dues and fees shall be due the Society from each of its membership, of whatever class of such local branches, regardless of any local fees or dues.
- Section 2. All of the membership of the local branches must be of the membership of the Society.
- Section 3. The By-Laws of the local branches must be subject to the approval of the Board of Directors and may not become effective until so approved.

End

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Do you know of a friend who would appreciate a sample copy of our *Bulletin*? Just send us his or her name and address and we'll be happy to oblige.

BY-LAWS  
OF  
THE DOZENAL SOCIETY OF AMERICA

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*Revised: October 1986*

1; NAME

The name of this society is the Dozenal Society of America. Its permanent address is Nassau Community College, Stewart Avenue, Garden City, New York 11530.

2;0 MEMBERSHIP

Membership shall be open to any person in the world interested in the dozenal system of notation and in upholding the aims of this Society as expressed in its Constitution. Our official language is English.

2;1 Member. This grade shall include all applicants who have been duly accepted for Membership until they shall have attained a higher classification.

Applicants for Membership should be able to demonstrate to the satisfaction of the duly elected officers of this Society, or one or more authorized persons selected by them, a knowledge of base-twelve arithmetic, a suitable knowledge of duodecimal terminology and practices, a determination to explore the dozenal system of notation and discover its advantages for enrichment of all people.

Husbands and wives of any of our membership may be granted membership with their respective spouses at no additional cost. This does not apply to other members of the family.

*BY-LAWS OF THE DOZENAL SOCIETY OF AMERICA, Continued*

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2;2 Honorary Member. This grade of members includes those individuals that have been designated by a majority vote of the Board of Trustees of the Society as exemplifying the goals and ideals of the Society.

With the exception of the right to vote at any special or regular meeting, this membership entitles the individual to all other rights and privileges of the Society.

2;3 Fellow. This grade shall include those of our membership who shall have demonstrated to the satisfaction of the duly elected officers of this Society, or six or more authorized persons selected by them, sitting as a Fellowship Board, some major contribution to the literature of the duodecimal system, to the applied science of the dozenal system of notation, or to the furtherance of enjoyment of base-twelve arithmetic.

3;0 VOTING RIGHTS OF MEMBERSHIP

Voting rights of the membership of this Society are extended to all Members and Fellows in good standing with equality in value of each vote.

4;0 DUES OF THE MEMBERSHIP

4;1 The annual dues of all Members and Fellows of this Society shall be set by a two-thirds vote of the Members present at the annual meeting and shall be due on the first day of January, delinquent on the first day of March, and, lacking such payment, such person's name may be removed from the membership rolls on and after the first day of the following November.

*Continued . . .*



BY-LAWS OF THE DOZENAL SOCIETY OF AMERICA, Continued

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5;0 MEETINGS

5;1 An annual meeting of the membership shall be held each calendar year at a suitable time and place to be fixed by the Board of Directors, or by a board selected by them to determine the matter, and shall be duly publicized.

5;2 Special meetings of the membership may be held at a suitable time and place. The membership shall be informed by mail of the agenda of such special meetings at least 30 days in advance.

5;3 Regional Meetings shall be encouraged by the Society. These gatherings should be planned to publicize the work of the Society, to interest new membership applications and to further dozenal accomplishments in mathematics and the other sciences.

5;4 A quorum for a meeting of the Executive Board shall consist of 1/3 of its members. A member holding two offices shall not be counted twice for a quorum. A quorum for a meeting of the Board of Directors shall consist of 1/3 of its members. A quorum for a meeting of the membership shall be one-two dozenth (1/20;) of the members in good standing. The Executive Board may waive this if necessary. Attendance at any of the above-mentioned meetings may be by phone or by mail.

6;0 AMENDMENTS

These By-Laws may be amended in whole or in part by a majority vote of the membership present at any annual or special meeting provided all proposed amendments shall have first been submitted and approved by the Board of Directors.

BY-LAWS OF THE DOZENAL SOCIETY OF AMERICA, Continued

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ADDENDA

A motion was passed in October 1983 to increase the DSA dues to \$12.00 (U.S. Dollars) per calendar year as of January 1985. Student dues will remain at \$3.00 per calendar year. Life membership will be available at a cost of \$144.00.

Postscript:

The Constitution of the Dozenal Society of America was modified by Resolution on the following dates:

23 January 1161; (27 January 1945)  
 22 January 1170; (26 January 1956)  
 10 April 1176; (12 April 1962)

The Constitution was revised:

13 May 1192; (15 May 1982)  
 15 October 1197; (17 October 1987)

End

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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.

## IN MEMORIAM - CHARLES W. TRIGG

It with sadness that we announce the death of one of our *Bulletin's* regular contributors, Charles W. Trigg of California. Although he never formally joined our Society, (he recently commented that it was about time that he did) he was one of our most active contributors. His love of numbers was evident in all that he did.

In Fred Newhall's comprehensive index of our *Bulletin* there are dek references to Trigg from volume 14; (1960) to volume 30; (1988).

His considerate widow was kind enough to send us Charles's file of DSA materials including three articles which will be published in the near future. (One of these appears in this issue. -Ed.) We are very grateful to her for her thoughtfulness. His regular submissions to this journal will be sorely missed.

End

## A BASIC SOLUTION

In a recent issue of the *Mathematics Teacher*, this problem was posed:

Move one digit to make the expression true:

$$101 - 102 = 1$$

The solution offered was:  $101 - 10^2 = 1$

Taoufik Nadij of Mount Pleasant, MI suggested another solution:

$$101 - 10 = 21 \text{ (base three).}$$

Are there any other solutions?

## CONSECUTIVE-DIGIT INTEGERS

Charles W. Trigg  
San Diego, CA

There are 92 duodecimal integers in which the digits are consecutive and in order of magnitude. Of these, 12 are prime, namely: 45, 67, 87, \*#, 321, 987, 9\*#, 4321, \*987, 12345, 54321, 789\*#, 7654321, and #\*98765. Three of the consecutive-digit integers are powers:  $21 = 5^2$ ,  $23 = 3^3$ , and  $54 = 2^6$ . In two cases the factors are consecutive primes:  $65 = 7 \cdot \#$  and  $89 = 3 \cdot 5 \cdot 7$ .

The complete set of consecutive-digit integers and their prime factors follows:

$12 = 2 \cdot 7$	$21 = 5^2$
$23 = 3^3$	$32 = 2 \cdot 17$
$34 = 2^3 \cdot 5$	$43 = 3 \cdot 15$
45 prime	$54 = 2^6$
$56 = 2 \cdot 3 \cdot \#$	$65 = 7 \cdot \#$
67 Prime	$76 = 2 \cdot 3^2 \cdot 5$
$78 = 2^2 \cdot 1\#$	87 Prime
$89 = 3 \cdot 5 \cdot 7$	$98 = 2^2 \cdot 25$
$9* = 2 \cdot 4\#$	$*9 = 3 \cdot 37$
*# Prime	$\#* = 2 \cdot 5\#$
$123 = 3^2 \cdot 17$	321 Prime
$234 = 2^3 \cdot 35$	$432 = 2 \cdot 217$
$345 = 5 \cdot 81$	$543 = 3 \cdot 195$

Continued . . .

## CONSECUTIVE -DIGIT INTEGERS, Continued

456 = 2·3·8#	654 = 2 <sup>5</sup> ·25
567 = 15·3#	765 = 5·7·27
678 = 2 <sup>2</sup> ·17#	876 = 2·3 <sup>3</sup> ·1#
789 = 3·7·45	987 Prime
89* = 2·5·*7	*98 = 2 <sup>2</sup> ·285
9*# Prime	#*9 = 3·3#7
1234 = 2 <sup>3</sup> ·195	4321 Prime
2345 = 7·3*#	5432 = 2·7·471
3456 = 2·3·68#	6543 = 3·3#·67
4567 = #·4*5	7654 = 2 <sup>5</sup> ·#·31
5678 = 2 <sup>2</sup> ·147#	8765 = 15·611
6789 = 3·37·75	9876 = 2·3 <sup>3</sup> ·21#
789* = 2·35·117	*987 Prime
89*# = 85·107	#*98 = 2 <sup>2</sup> ·45·81
12345 Prime	54321 Prime
23456 = 2·3·468#	65432 = 2·5·789#
34567 = 25·148#	76543 = 3·4#·617
45678 = 2 <sup>2</sup> ·5·7·471	87654 = 2 <sup>5</sup> ·329#
56789 = 3·1#·#71	98765 = 17·617#
6789* = 2·33·4#	*9876 = 2·3 <sup>3</sup> ·7·415
789*# Prime	#*987 = 5 <sup>2</sup> ·5867

## CONSECUTIVE -DIGIT INTEGERS, Continued

123456 = 2·3·5·5867	654321 = 377·1937
234567 = 3*5·70#	765432 = 2·392817
345678 = 2 <sup>2</sup> ·#·#051	876543 = 3·#·15·37·75
456789 = 3·145·1107	987654 = 2 <sup>5</sup> ·5 <sup>2</sup> ·18##
56789* = 2·57·5#75	*98765 = 13#·8197
6789*# = 5·13#447	#*9876 = 2·3 <sup>3</sup> ·25·27·51

Continued . . .

## A SOLUTION

Charles Ashbacher  
Hiawatha, IA

The following problem was posed by R. M. McPherson in the Winter 1199; issue of the *Bulletin*:

What prime number is the product of three distinct integers which are consecutive terms in an arithmetic progression?

A solution is:

$$3 = (-3) \cdot (-1) \cdot 1$$

Can anyone provide another solution?

End

## CONSECUTIVE -DIGIT INTEGERS, Continued

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$1234567 = 61 \cdot 24207$   
 $2345678 = 2^2 \cdot 6 \cdot 147\#$   
 $3456789 = 3 \cdot 115 \cdot 26\#$   
 $456789* = 2 \cdot 17 \cdot 1\# \cdot 67 \cdot 141$   
 $56789*\# = 5 \cdot 7^2 \cdot 95 \cdot 41\#$   
 $12345678 = 2^2 \cdot 12\# \cdot 2 \cdot 571$   
 $23456789 = 3 \cdot \# \cdot 67 \cdot 8\# \cdot 205$   
 $3456789* = 2 \cdot 7 \cdot 3\# \cdot \#7 \cdot 921$   
 $456789*\# = 1 \cdot 5 \cdot 511 \cdot 577$   
 $123456789 = 3 \cdot 15 \cdot 237 \cdot 15661$   
 $23456789* = 2 \cdot 1405 \cdot *2 \cdot *7$   
 $3456789*\# = 5 \cdot 8113\#447$   
 $123456789* = 2 \cdot 7^3 \cdot \# \cdot 17 \cdot 20951$   
 $23456789*\# = 1281 \cdot 1 \cdot 4746\#$   
 $123456789*\# = \# \cdot *07 \cdot 16730 \cdot *7$

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## THE FARMYARD -- A Puzzle

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A farmyard contains chickens and cows. There are 7 dozen legs and 3 dozen heads. How many cows are there?

## CONSECUTIVE-DIGIT INTEGERS, Continued

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$7654321$  Prime  
 $8765432 = 2 \cdot 6\# \cdot 75995$   
 $9876543 = 3 \cdot 7 \cdot 591 \cdot \#6\#$   
 $*987654 = 2^5 \cdot 5 \cdot 15 \cdot 6 \cdot 4\#$   
 $\#*98765$  Prime  
 $87654321 = *\# \cdot 9598*\#$   
 $98765432 = 2 \cdot \# \cdot 169\# \cdot 3467$   
 $*9876543 = 3 \cdot 17 \cdot 1\# \cdot 37 \cdot 3\#87$   
 $\#*987654 = 2^5 \cdot 7 \cdot 13\# \cdot 5927$   
 $987654321 = 587 \cdot 184 \cdot 627$   
 $*98765432 = 2 \cdot 7^2 \cdot 35 \cdot 3\# \cdot 107 \cdot 117$   
 $\#*9876543 = 3 \cdot 95 \cdot 1825 \cdot 3005$   
 $*987654321 = \# \cdot 51 \cdot \#5 \cdot 147 \cdot 1921$   
 $\#*98765432 = 2 \cdot 5 \cdot 1\# \cdot 754\#2\#41$   
 $\#*987654321 = \# \cdot 10\#9618158\#$

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End

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

## 2B OR NOT 2B, THAT IS THE QUESTION

Gene Zirkel  
 Nassau Community College  
 Garden City, LI, NY

Computer scientists use the capital letters A through F for the hexadecimal digits dek through do-three. Some persons have proposed that therefore duodecimalists should adopt A and B for dek and el. But, consider the confusion caused by statements such as those that follow:

Does "HE COUNTED DEAF MICE" refer to animals that can't hear, or to 28#\*7; rodents?

Does "SHE SOLD BEADED VESTS" refer to a type of clothing, or to 4227839; garments?

Does "WE WANT BEEF SANDWICHES" refer to the type of meat desired, or to the need for 24353; comestibles?

Does "I SAW BAD APPLES" refer to rotten fruit, or to 1891; computers?

Similarly:

If you are counting, you might wind up with bewildering results such as

BAD GOOD ITEMS,  
 ACE KINGS,  
 etc.

And how should you interpret many other symbols such as FAD, COFFEE, CO2? Are they numbers or words?

It would seem that these alphabetical symbols are a poor choice for digits, and any suggestion that we use A and B for dek and el in base twelve should quickly be discarded.

End

## QUESTIONS ABOUT A DOZENAL SLIDE RULE

We have recently received some inquiries from David Fairchild in La Jolla, CA.

1. Did Tom Pendlebury of the DSGB mention a dozenal slide rule in his book, TGM? There is no index, so it is difficult to find a reference.
2. Did Tom Pendlebury ever produce such a device? We know that Tom Linton, past president of the DSA produced one, and prototypes were displayed at the Annual DSA meeting on 22 May 1958. It was manufactured by the Gilson Slide Rule Co. around 1969(?). Their last address was Box 1111, Stuart, Florida. The company has either moved or gone out of business. It may have been taken over by the Dietzgen Co. of Chicago, since the exact same booklet of directions was printed by both companies.
3. Are there any cylindrical (or spiral) slide rules available? A decimal rule was offered for sale by The Calculator Co., Dept. O, Box 593, Lakewood, CA 90714 in an ad found among Linton's papers in 1970.

Can any of our readers enlighten David?

*The DSA still has several dozenal slide rules which sell for only \$3 each.*

End

★★★★★★★★★★★★★★★★★★★★

See you at the DSA Annual Meeting!

Saturday, October 14, 1989 (1199;)

USING THE DOZENAL CLOCK: A Pedagogical Device

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Professor Gene Zirkel  
Nassau Community College  
Garden City, LI, NY

In one of my math classes, and in several of my computer science classes I teach the concepts of number bases including (of course!) base twelve. After they have learned duodecimals, I bring Dr. Paul Rapoport's Duodecimal clock<sup>1</sup> into class.

At the beginning of class, I set the time and have it run in the everyday hours and minutes mode that students are used to. I ask them if everyone including those in the back of the room can see it. This gets the attention of all of my students. I then switch it to dozenal time, and proceed with my lesson, ignoring the clock.

In a few minutes, interest has been aroused by this strange device, and the questions start. Usually at least one student will surmise that it is a dozenal clock. We then proceed to learn how to read it, and how to convert time from ordinary hours and minutes to dozenal time, and vice versa. Finally, I ask them what time the clock will read to signal the end of the class period. This always engenders class interest. After they figure it out, for the rest of the class I notice them looking at Paul's clock and comparing it with their watches. It never fails to arouse their interest in dozenals.

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1. See "The Dozenal Clock", This Bulletin, Whole number 5#; Volume 31; Number 3; Pages 10-14;.

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Q. What does it mean if a Roman centurion raises two fingers in a bar?

A. He wants five beers.

DOZENAL JOTTINGS

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. . . from members and friends . . . *News of Dozens and Dozenalists*. . .

DON HAMMOND, Secretary of the DSGB, referring in a letter to an Editorial in the most recent DSGB *Journal*, said:

"As you will see, the main part of the Editorial is addressed to U.S. citizens. You really are the metricators' last battle. If the USA succumbs, the decimal dark age begins, with the decimal clock and Grade protractor becoming merely a matter, in more ways than one, of time . . .

Continued . . .

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*, October 1934. (Free)
3. *Manual of the Dozen System* by George S. Terry. (\$1;00)
4. *New Numbers* by F. Emerson Andrews. (\$10;00)
5. *Douze: Notre Dix 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)

## DOZENAL JOTTINGS, Continued

RAE ELSA (NJ) sent us the following list of numerals:

1	7	
2	8	
3	9	
⊗	∇	(pronounced "ten" )
∩	ε	( " " "el" )
6	10	( " " "onti" ) . . .

Welcome to our new members:

- 302; BRIAN DEAN of Kent, Ohio, and  
 303; DORIS DEMAREST of Chaplin, Conn.

End

## INDIAN DOZENALISTS?

It has been reported<sup>1</sup> that every man, woman and child in the small village of Golida, India, has six fingers on each hand. The villagers consider less than a dozen digits abnormal, and young people short a digit or two are not deemed very attractive.

The villagers consider the additions a divine gift. But one researcher, Dr. Sabia Santhi, attributed it to a faulty gene handed down through the generations for hundreds of years.

The elated natives claim, "We are better able to grip the plow and sow the fields with our extra fingers, and our women find it simpler to cook and do the wash. It just makes sense that you can get more work done with six fingers than you can with five fingers. We have always found that to be true."

## 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 accomodated 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 accomodates 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 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.

<sup>1</sup>Weekly World News, 14 February 1989, p. 31.

## 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<sup>2</sup> (or 144) times the third figure, plus 12<sup>3</sup> (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 \_\_\_\_\_

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 -- OR PHOTOCOPY