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

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THE DUODECIMAL BULLETIN 64;

ALICE BERRIDGE, GENE ZIRKEL and TONY SCORDATO were named Fellows of the Dozenal Society of America for their efforts on behalf of the organization. . . .

OTHER AWARDS, Page 6

ANNUAL MEETING REPORT
begins on Page 4

Volume 33;
Number 1;
Winter 1990
199*;

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.

THE DUODECIMAL BULLETIN

Whole Number Six Dozen Four

Volume 33; Number 1;

Winter 119;*

FOUNDED 1944

IN THIS ISSUE

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West Islip, NY 11795
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DOZENAL SOCIETY OF AMERICA

MINUTES OF THE ANNUAL MEETING - 1199;

Saturday, October 14, 1989
Nassau Community College
Garden City, New York 11530

Twelfth Floor - Tower

I BOARD OF DIRECTORS MEETING

Fred Newhall opened the meeting at 10:20 a.m. He drew attention to articles in yesterday's New York Times (10/13/89) reflecting interest in basic science and concerning the 1989 Nobel Prizes. He also spoke about the President/Governors' recent meeting on education. He suggests that teachers encourage the use of dozens in their classrooms as a way to practice basic math.

The following Board Members were present:

Dr. John Impagliazzo
Fred Newhall
Dr. Angelo Scordato
Gene Zirkel

Continued . . .

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.

1989 ANNUAL MEETING, Continued

Chair Tony Scordato called the meeting to order. It was determined that according to the By-Laws section 5;4 a quorum did exist.

It was determined that election of Officers would be deferred until later in the day.

The following Committee appointments for 1989-1990 were made by the Board:

Annual Meeting Committee:

Barbran Smith, Chair
Larry Aufiero
Anthony Catania
Anthony Razziano

Awards Committee:

Gene Zirkel, Chair
Dr. John Impagliazzo
James Malone
Dr. Angelo Scordato
Dr. Patricia Zirkel

Finance Committee:

Dr. Angelo Scordato, Chair
Larry Aufiero
Anthony Catania
Dudley George
James Malone
Anthony Razziano
Dr. Patricia Zirkel

Parliamentarian:

Dr. Patricia Zirkel to the Chair

Editor:

Dr. Patricia Zirkel

Continued . . .

Reviewers of Articles for the Bulletin:

Anthony Catania
Dr. John Impagliazzo
Kathleen McKiernan
Fred Newhall
Barbran Smith
Gene Zirkel

OTHER BUSINESS:

1. Awards

The Chair of the Awards Committee, Dr. Angelo Scordato, reported that there is no ~~James~~ Ralph Beard Memorial Award for 1989. (This was formerly known as the Annual Award.)

Several people were named as Honorary Members:

Charles W. Trigg (posthumous)

Volume 63; p. 16 of the *Bulletin* cites the important contributions of Mr. Trigg. Gene mentioned that a letter of thanks will be sent to Mr. Trigg's widow for sending his Dozenal files to the Society.

Donald Hammond and Arthur Whillock

Both for their work with the Dozenal Society of Great Britain.

Several people were named as Fellows of DSA:

Alice Berridge
Kathleen McKiernan
Dr. Angelo Scordato
Gene Zirkel

Congratulations were extended to all!

Continued . . .

2. Miscellaneous

a) Gene said that the Society has heard via Alaska of another Dozenal group in Australia. The Australian group, known as the "Modular Conversion Bureau," sent copies of a newsletter which was distributed to those present at the meeting.

b) The Board extended special thanks and commendation to Dr. Patricia Zirkel for her work on various committees and with the *Bulletin*. The Board also congratulated Pat, who earned her doctorate on May 20 of this year from Fordham University.

c) The Board decided to plan a meeting of the Board in March, 1990.

d) The Video Committee is now defunct.

The Board meeting was adjourned at approximately 10:45 a.m.

II ANNUAL MEMBERSHIP MEETING

Following a brief coffee break, Fred gavelled the meeting to order at approximately 11 a.m.

In addition to the Board members listed above, the following members were present:

Alice Berridge
Mary Newhall
Anthony Razziano
Jay Schiffman and Dr. Patricia Zirkel joined us after the conclusion of business.

Gene moved to accept the minutes of 10/15/88. So approved.

Continued . . .

REPORTS OF OFFICERS AND INDIVIDUALS:

President's Report - Fred Newhall

Fred announced that the Society has received 97 items of correspondence. Many student teachers (45 persons) requested information and 188 copies of "An Excursion in Numbers" have been sent out. A number of articles were submitted to the *Bulletin*. The Society has received inquiries from South Africa, Iran and China, among many other requests. It was suggested that the Society may need a Corresponding Secretary.

Attention was drawn to a newsletter published by the Goudreau Museum of Math which is located in New Hyde Park, NY. Fred suggested that we might present a Dozenal exhibit to the museum. He will visit the museum and decide whether this is feasible.

Fred mentioned that he has the only complete set of Dozenal indices. It is hoped that the listing will be computerized in the future.

It was reported that the DSA archives remain in the library of Nassau Community College on the second floor. Also, the last dozen issues of the *Bulletin* have been bound as Volume Six. There are few complete sets of all the bound volumes.

Fred said that he felt that this has been a very successful year for the DSA. We have reached member number 304; and there are about 6 dozen active members receiving the *Bulletin*.

Treasurer's Report - Anthony Catania (presented by Alice Berridge)

Tony submitted copies of a Treasurer's Report dated 10/14/89 for comparison with the report of 10/15/88.

Dues collected, total assets, and total value of the DSA all increased in 1989 over 1988. Tony asked the members to note

Continued . . .

that the dollar value was up $2,414.90. He felt that this was due to the increase in revenue from dues, the fact that the stock value was up and that there was a decrease in expenditures. Members noted that the increase in dues revenue might be due to the more efficient dues solicitation program that was instituted this year. The question as to whether there were 3 or 4 issues of the *Bulletin* included in the report will be forwarded to Tony.

Editor's Report - Dr. Patricia Zirkel (presented by Gene Zirkel)

There have been no equipment purchases during the past year. Several issues of the *Bulletin* were delayed this year because of Pat's obligations for her degree. (The members present expressed delight that Pat was able to render the full complement of issues.) It was reported that there is now a backlog of long articles. John Impagliazzo suggested that some of the short articles from previous issues might be reprinted if there is a shortage of brief articles in the future. Fred offered part of his book as short articles. Gene said that the Editor needs assistance in the production of articles. Individuals are requested to contact Pat.

REPORTS OF COMMITTEES:

Annual Meeting Committee - Barbran Smith, Anthony Catania, Larry Aufiero, and Alice Berridge, Consultant

Thanks were extended to the Committee for their efforts at this meeting. It was decided that the Annual Meeting will be held on Saturday, October 13, 1990 at approximately 2:00 p.m. with dinner paid by individuals followed by a show or evening activity. The speakers' charges would be paid by the Society. At the request of the President a Board of Directors' meeting will be held on a Friday evening in March, 1990, at 4:30 p.m. Dinner at 6:00 will be at member's expense followed by an evening's entertainment.

Continued . . .

*

John suggested that the Hofstra University Club might be a good place; he agreed to look into the matter and report back to Barbran and to Fred. The possible dates in March are: 3/2, 3/9, 3/23 or 3/30. [It was later determined that the March meeting of the Board of Directors will be March 9th, 1990. -Ed.]

Finance Committee

There was no report. After discussion the President charged the Committee to establish the calendar year as the fiscal year for the Society and to audit/review the books of the Society just prior to the Annual Meeting.

Nominating Committee

The members for 1989-1990 will be James Malone - temporary Chair, Larry Aufiero and Anthony Catania. (The appointment of the Chair needs to be confirmed by the members of the Committee.)

The following slate was proposed for the Board of Directors, Class of 1992:

Alice Berridge
Dr. John Impagliazzo
Robert McPherson
Gene Zirkel

The slate was elected unanimously.

Continued . . .

DON'T THROW THIS *BULLETIN* AWAY --

Give it to a friend or

Leave it in your dentist's office.

III RECONVENING OF THE BOARD OF DIRECTORS

The General Membership Meeting was adjourned at 12:00 noon, and the Board of Directors reconvened in order to elect the following Officers of the Society for the coming year:

James Malone	Board Chair
Fred Newhall	President
Gene Zirkel	Vice President
Anthony Catania	Treasurer
Larry Aufiero	Secretary

The officers were elected unanimously.

Dr. Patricia Zirkel was named Parliamentarian to the President.

The Board of Directors was adjourned at 12:10 p.m., and participants met at the Marriott Hotel Restaurant for luncheon.

Respectfully submitted,

Larry Aufiero (ab)
Secretary

Continued . . .

BOARD OF DIRECTORS TO MEET

There will be a Board of Directors meeting on March 9, 1990 at the Hofstra Club, Garden City, LI, NY.

Details will be announced.

End

IV AFTERNOON PRESENTATION

Jay Schiffman was the featured speaker at the DSA Annual Meeting.

We reconvened after lunch to hear an excellent presentation by Jay Schiffman entitled "A Survey of Duodecimal Number Theory." His fine paper addressed the issue of divisibility tests, including tests for divisibility by 5 and by 7.

Those present unanimously agreed that Jay's was an excellent presentation.

End

DSA ANNUAL MEETING -- 1990 (119*;)

The next Annual Meeting of the Dozenal Society of America will be Saturday, October 13, 1990.

Plan to spend your afternoon and evening in Dozenal discussion and fun!

End

DOZENS IN AUSTRALIA

The DSA recently learned of an Australian group which promotes dozenal counting and measurement. Called the "Modular Conversion Bureau," the group is small, but quite active in the fight against forced decimal metrication.

Peter D. Thomas, a leader in the Australian "Dozenal" movement, has written a recent book on the subject: The Modular System: A Preview of the Counting and Measurement System of the 21st Century. He and his colleagues have opposed compulsory metric conversion in Australia since it was first proposed, on the grounds that decimal-based metric is an inferior, clumsy and inefficient system. Though a majority of the Australian people supported this opposition, the metric legislation was forced through by a minority of metric advocates. The Modular Conversion Bureau was formed initially to fight metric conversion, and then positively to advocate base twelve numeration and measurement.

Says Mr. Thomas: "Experience gained in Australia from metric conversion has proved vital in working out techniques and policies for advocating the introduction of a base twelve system. We have to anticipate the reactions of politicians, bureaucrats, and the public, and a huge body of data and experience is available here to predict just how and why they will react."

Several publications are available from the MCB, among them two books by Mr. Thomas:

MODULAR COUNTING	$3.00 (US) Airmail
THE MODULAR SYSTEM	5.00 (US) Airmail

Write to: Modular Conversion Bureau
Box 61, Post Office
Clarence Gardens, 5039
South Australia

to order these books, or to request other information. Checks should be made payable to Modular Electric (U.S. dollars OK).

Continued . . .

DOZENS IN AUSTRALIA, Continued

Peter D. Thomas has been working on the modular system of counting and measurement since the 1940's, after trying to use the metric system for practical work and finding it wanting -- its worst feature being the lack of factors, particularly 3 and 6. He evolved a tentative range of modular symbols in the 1950's, and refined and improved them to provide a workable range for demonstration purposes. He then explored the practical range of measurement units, and having rejected the metric standards as hopelessly archaic and impractical, realized that the inch and foot were the perfect basic units of length.

The forced imposition of metrication in Australia in the 1970's led him to retaliate by waging, with other concerned citizens, a campaign against this undemocratic move. In the process of refuting metric propaganda, he researched the basis of the metric system thoroughly. To show that metric was neither unique nor perfect, he restructured the customary units and linked them into a truly coherent system which he referred to as the "Modular System."

Trained in electronics, he pursued a career which embraced many branches of the field, from design and manufacture to broadcasting. In all this work, metrology was of prime importance. He is joined in the MCB by David Caldbeck, Editor of the MCB Newsletter, and Ian B. Patten of Anchorage, Alaska, who was responsible for initial contacts with the DSA.

The MCB's motto is "Don't yield an inch!"

End

The French metric system? Oh heck --
Of measuring it's made quite a wreck.
It's a pain; it confuses;
And it's offered by losers
*Who can't count with # or with *!*

SQUARE ROOT OF TWO -- REVISITED

Brian M. Dean
Kent, Ohio

In a previous issue (62; Summer 1989, p. 1*) Brian gave the square root of two correct to 18; places.

However, using an arbitrary precision arithmetic software package on a mainframe, he has now computed the square root of two to 600; places.

He inserts a blank space between each six digits to facilitate reading, and a blank line between each six lines so that a block of type contains 200; digits.

```
1;4#7917 0*07#8 573770 4#0854 868535 045636 50#559 #8#79*
  401387 #34238 0*998* 173*95 130343 4821#5 5419*0 688169
  58#642 82342* 358*89 47369# 97237# 9#04#6 56*072 334932
  8*2190 13*8#2 1*#428 44*575 8#*27# 3*1431 7#17#2 8*4354
  #79626 013626 9*55*7 9598*4 619#*2 352*31 0*3373 251#05
  98676# 453768 1*191* 690156 0#1336 2953*3 #37305 425159

  369305 141042 565652 708087 1*6207 66432# 006383 *27287
  6409*# 560250 154713 65346* *731*9 248#86 #00997 2*5059
  115*10 537765 *37273 00#716 157985 51101# #025#5 *11978
  108369 974648 4*9*0* 580796 0910#9 45*#25 0#74*6 594723
  624594 035156 ##3*6* 96559* 453899 500#6# #88110 32#233
  2*74## 807040 1#50*8 *15#*2 096184 636714 *#8894 749356

  151*36 #*8**4 24#651 1*6**3 5635*5 5848#5 #4*995 3#9647
  8#3172 23#627 00#284 559#59 *0**34 #67244 97*247 #53#82
  568819 93#18* 90*575 862342 586554 334*#* #283** 091186
  977782 ##9973 4#1637 3*27#6 0*8829 353333 25*116 7*98*4
  2#0538 316349 48*444 *7572* 993929 440*41 229699 7#297*
  *1810# 79145# 399749 88#968 #67313 435322 691423 683367
```

End

NU-AGE WORLD CALENDAR

Fred Newhall
Smithtown, LI, NY

At the 1989 Annual Meeting, DSA President Fred Newhall described what he called a "Nu-Age Calendar." He proposed five six-day weeks in each month plus five extra days per year (four "Season Days" and New Year's Day), so that the total coincides with the 265; days in the solar year.

What was unique about Fred's proposal was the idea of an "ite." He noticed that we now divide our days into daylite and nite, and he suggests that we formalize that concept so that each week of one half-dozen days will also contain one dozen "ites."

The year would start, as it once did, in the Spring with New Year's Day. Then there follow four groups of three months each. Each group of three months is separated by a "Season Day," for a total of four Season Days. Thus we have:

New Year's Day

Season Day number 1 [Spring day]
- March
- April
- May

Season Day number 2 [Summer day]
- June
- July
- August

Season Day number 3 [Autumn day]
(Leap Year Day when appropriate)
- September
- October
- November

Season Day number 4 [Winter Day]
- December
- January
- February

Continued . . .

NU-AGE WORLD CALENDAR, Continued

Fred pointed out that under his system September, October, November, and December once again become the seventh, eighth, ninth and tenth months respectively.

He suggests that the six days of the week be called 1day, 2day, 3day, 4day, 5day and 6day.

The calendar illustrated below certainly has many advantages!

ANYMONTH - ANY YEAR

1day	2day	3day	4day	5day	6day
1	2	3	4	5	6
7	8	9	X	Ɛ	10
11	12	13	14	15	16
17	18	19	1X	1Ɛ	20
21	22	23	24	25	26

End

MUSIC, SCALES AND DOZENS

Part I -- Mathematical Considerations and Pythagorean Scales

Dr. John Impagliazzo
Hofstra University
Garden City, LI, NY

INTRODUCTION

In Plato's "Republic," Socrates expresses the following to Glaucon concerning music:

> Then beauty of style and harmony and grace and good rhythm depends on simplicity. I mean the true simplicity of a rightly and nobly ordered mind and character, not that other simplicity which is only an euphemism for folly [Jowett, p. 104].

Surely, in contrasting the works of early mathematicians such as Euclid and Pythagoras with early composers such as Antonio Vivaldi and J.S. Bach, one cannot but pause and reflect on the beauty and simplicity of perfection of the work of these persons of genius.

MATHEMATICAL CONSIDERATIONS

When a string is set into vibration, it produces overtones or harmonics. These overtones occur as multiples of their corresponding frequencies. For example, the first overtone of a fundamental frequency or tonic is its octave which is twice the fundamental frequency. The second overtone is three times the frequency of the tonic. Interestingly enough, these ratios form a sequence

$$1/1,\ 2/1,\ 3/1,\ 4/1,\ \ldots$$

which is an arithmetic progression.

Continued . . .

Their reciprocals

$$1/1,\ 1/2,\ 1/3,\ 1/4,\ \ldots$$

form a harmonic progression.

The frequency of overtones can be formed by the proportion

$$f_{n+1} \,/\, f_n = (n+1) \,/\, n$$

where f_n and f_{n+1} are the frequencies of the n^{th} and $(n+1)^{th}$ overtones respectively [Lawlis, p. 593]. Thus, using a tonic frequency $f_1 = 110$ Hertz,

$$f_2 = 2/1\ (110) = 220$$
$$f_3 = 3/2\ (220) = 330$$
$$f_4 = 4/3\ (330) = 440$$

etc. Similarly, $f_5 = 550$, $f_6 = 660$, $f_7 = 770$, $f_8 = 880$, etc. All octave frequencies are a power of two of the tonic. Specifically, these are f_2, f_4, f_8, etc. The ratios formed by these frequencies are

$$f_1 / f_1 = 110 / 110 = 1/1$$
$$f_2 / f_1 = 220 / 110 = 2/1$$
$$f_3 / f_2 = 330 / 220 = 3/2$$
$$f_4 / f_4 = 440 / 440 = 1/1$$
$$f_5 / f_4 = 550 / 440 = 5/4$$
$$f_6 / f_4 = 660 / 440 = 3/2$$
$$f_7 / f_4 = 770 / 440 = 7/4$$
$$f_8 / f_8 = 880 / 880 = 1/1$$
$$f_9 / f_8 = 990 / 880 = 9/8$$

Clearly, relative to octaves, the ratios are those of small numbers.

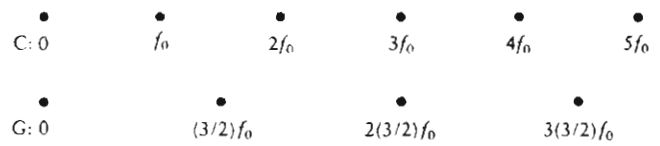
Continued . . .

PYTHAGOREAN SCALES

Overtones of a vibrating string produce tones that are harmonious with the tonic. The octaves are the most harmonious. Other than octaves, the tone of best consonance with the tonic is that which is in a ratio of 3/2 of the tonic and the octaves of 3/2 of the tonic as shown in Figure 1 [Pierce, p. 65]. Pythagoras reasoned that since the ratio 3/2 produced the tone of best consonance, then 3/2 of 3/2 or 9/4 is the next tone of best consonance. Keeping tones within a single octave, divide 9/4 by 2. Hence, this proper tone has a relative value of 9/8.

Figure 1

The frequencies of two notes (such as C and G) that are an interval of a fifth apart are always in the ratio of 100:150. Their harmonics will be in the same ratio; so the second, fourth, and so forth, harmonics of G will coincide with the third, sixth, and so forth, harmonics of G, because at each of these coincidences $3f_0 = 2(3/2)f_0$.



In a similar fashion, 3/2 of 9/8 is 27/16 is a ratio of the next proper tone. Continuing, 3/2 of 27/16 is 81/32 is a next proper tone. Since 81/32 is greater than 2 (the octave), divide this ratio by 2 so that the tone of ratio 81/64 is a next proper tone. Similarly, 3/2 of 81/64 or 243/128 is a next proper tone.

Continued . . .

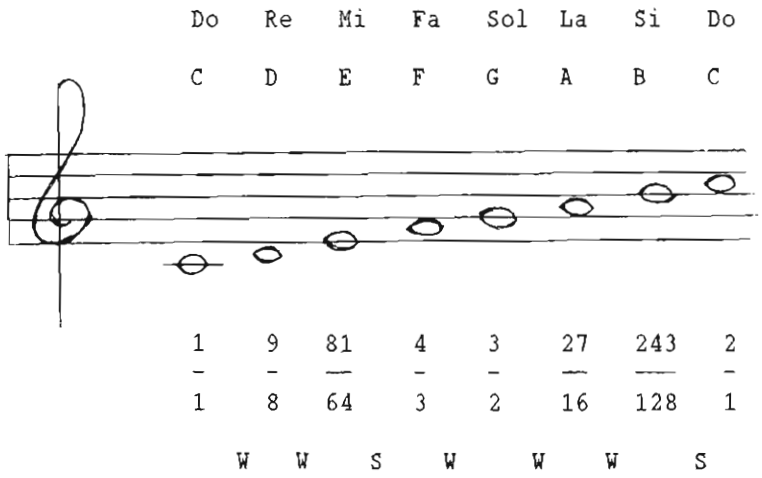
The difference between an octave and a fifth (ratio = 3/2) is called a fourth. Therefore, instead of multiplying the tonic 1 by 3/2, divide the octave by 3/2. Hence, (2/1)/(3/2) = 4/3. Based on the tonic, the ratios of best consonance with the tonic are 2/1, 3/2 and 4/3 which are respectively the octave, the fifth and the fourth [Malcolm, p. 612].

Placing the ratios of best consonance and of proper tone in mathematical order results in

1/1 < 9/8 < 81/64 < 4/3 < 3/2 < 27/16 < 243/128 < 2/1

Tones correponding to these ratios form the Diatonic scale of Pythagoras. Using the familiar (Do, Re, Mi, Fa, Sol, La, Si, Do) to identify the corresponding ratios and using the note C as the tonic produces the diatonic scale as shown in Figure 2.

Figure 2



To be continued . . .

MUSIC, SCALES AND DOZENS, Continued

"Music, Scales and Dozens" was first presented at the DSA Annual Meeting of 1988.

Part II: "Just Intonation and the Chromatic (Dozenal) Scale" will appear in the next issue of the Bulletin.

BIBLIOGRAPHY, Part I

Coxeter, H.S.M. (1968). "Music and Mathematics." Math Teacher, March.

Jeans, Sir James (1953). Science and Music. Cambridge.

Jowett, B. (1920?). Plato's Republic, Book III. Modern Library

Lawlis, F. (1967). "Basis of Music and Mathematics." Math Teacher, October.

Malcolm, P.S. (1972). "Mathematics of Musical Scales." Math Teacher, November.

Pierce, J.R. (1983). The Science of Musical Sound. Scientific American Publication, W.H. Freeman.

THE FARMYARD -- *A Solution*

The Fall 1989 issue contained the following puzzle: *A farmyard contains chickens and cows. There are 7 dozen legs and 3 dozen heads. How many cows are there?*

Answer: There are 6 cows and 30 chickens, a solution easily verified.

Charles Ashbacher
Hiawatha, Iowa

DOZENAL JOTTINGS

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

DSA Vice-President **GENE ZIRKEL** was at a training conference recently, and he was asked to give a brief presentation on any topic he chose. Of course he gave the attendees a five minute summary of why counting and measuring in twelves was superior to tens! We don't know how many converts he made, but a half dozen people were impressed. They spoke positively about the idea, and one person asked for more information. Be prepared, you never know when the opportunity may present itself to you to make a convert!
. . .

ARTHUR WHILLOCK, Fellow of the DSA, officer of the DSGB, (and recently named Honorary Member of the DSA), wrote in response to **DAVID FAIRCHILD**'s inquiries published in our last Bulletin. Arthur writes that Tom Pendlebury did indeed design a slide rule, as mentioned on page ii of Tom's TGM. A folded print is pasted in the inside back cover of each copy of Pendlebury's book. Arthur sent us several copies, and David - or any other reader - may have one for the asking.

In another letter, Arthur refers to Bell Telephone's symbols (* and #, which the DSA has been using for dek and el): "They were used in The Main Stream in Mathematics, by E.A. Kramer, published in 1951 in the U.S. . . I presume this is the source they used; it might needle someone in the company to object if not!"

Arthur also informs us that the DSGB is producing a small booklet giving an overall exposition of the dozenal principle. Good luck! . . .

DONALD HAMMOND also writes from England that "It is a great pleasure and an honour to be awarded Honorary Membership in the DSA, and I should like to express my thanks and appreciation to your Nominating Committee." . . .

Continued . . .

Good news continues to come from **THE MODULAR CONVERSION BUREAU** in Australia. (See related article, this issue.) They sent us a dozen back copies of their AUSTRALIAN METRIC Record, and over a dozen back issues of their MCB Newsletter. They also forwarded several other papers, essays and advertisements. We are grateful for the gift, and excited to find a sister organization promoting duodecimals. Although few in number, they seem to be very active "Down Under." . . .

JAY SCHIFFMAN, recent speaker at the DSA Annual Meeting, sends "Best wishes to all Dozenal colleagues for a prosperous 119*;!" . . .

Continued . . .

IN MEMORIAM

BOB BOASE

From Australia we have been informed by Brian Boase of the death of his brother, Bob Boase, LL.B., F.A.S.A. Bob, member number 23#; died in Australia on July 30th, 1989. According to Brian, Bob was a man of wide-ranging interests who fought tooth and nail against Australia's unfortunate conversion to decimal metric measurement.

Bob had been an energetic member of our Society for one and a half dozen years. He was also active in the DSGB, the Australian Modular Conversion Bureau, and had served as the Secretary of the Australian Anti-Metric Association.

He was the author of a twelve page booklet, Metric Conversion in Australia, a Memorandum, which was published by the Modular Conversion Bureau.

End

CHARLES F. MARSCHNER (FL), who travels frequently, sent DSA President **FRED NEWHALL** the following observation: "Worldwide, I have noted people package things in 12s for obvious reasons and it appears that certain goods are still sold in 12s. The other day I met a man in the carpet business in N. Georgia where 75% of U.S. carpeting is made. They work almost exclusively in feet and yards since we have some 70 million dwellings to furnish and refurbish. Metric hasn't touched them, even though his company is Belgian owned.

"I think we must hang tough in packaging, carpeting, home building, time and navigation. Our worst problem is caused by millions of hand held calculators which are devoted to a tens system even though they are basically binary. . . "

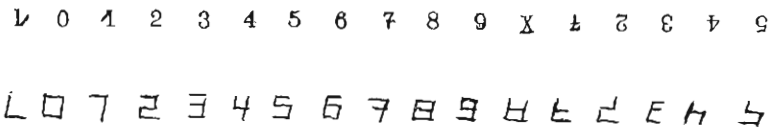
On the subject of Hexadecimal digits, **JAMISON HANDY** (CA) writes re the "use of the letters A thru F for the quantities ten thru dozen three (ten thru do-three or fifteen). I don't know the story of origin and would like to know sometime, but at Hughes many of my colleagues doing computer programming were quite fluent in octal (radix eight), which, as an adbidgement of binary, resulted in groupings of three. This apparently agrees with the American cultural practice of writing numbers larger than thousands in groups of three digits between commas. It appears (and this is speculation subject to confirmation or a better story) that someone at IBM (I say this only because it was in their manual I first ran into it) back in the punch-card tabulation days, saw the desirability for binary consistency groups of four, when expressed in written material, or graphically, and hurriedly and arbitrarily used the first six letters of our alphabet. It spread quickly because it filled a need for people who were busy on assignments who had no time for reflection or organizing committees to come up with a better way.

"To OMIT VOWELS would distinguish such numbers from words (and pronounceable abreviations such as acronyms) but spoil the humor of the story! Without harmless ambiguity there's no fun!" . . .

Continued . . .

ARTHUR WHILLOCK also responded on the subject of hexadecimals: "It must be admitted that A and B are the de facto numerals for dek and el . . . but they cannot be used generally. Don (Hammond) and I also find that X and # are awkward to write, and in appearance, # especially is not a common typographical symbol over here.

"I think that Pitman's solution of inverting existing numbers could produce a set of numerals from minus one (for balanced ternary) to fifteen for hexadecimal, to meet all needs in the foreseeable future, but with the two and three transferred to twelve and thirteen for mnemonic advantages. Could we get the computer world interested?



They even work in seven segment." . . .

On the same subject, and contrary to every suggestion of Arthur's, **CHARLES MARSCHNER** urges "against the adoption of any strange looking numbers in the 1 thru 9 list," on the grounds that these (for example inverted numerals) are a mental turn-off. Charlie speaks "as an old, often burned, engineer and manager" . . .

Continuing the debate, **CHARLES ASHBACHER** (Iowa) says: "I also lament the decision by the individual(s) who first used the letters A - F in hexadecimal representations. I repeatedly tell my students that it showed a lack of imagination and goes against the basic idea of using disjoint sets of characters to represent the different concepts of words and numbers" . . .

PAUL RAPOPORT wrote from Canada concerning his many ongoing dozenal computer projects, including the computer-based dozenal calculator. (See related article, this issue.)

Continued . . .

Paul also writes: "Further news is that a friend of mine and I are working on a dual-base clock which is also software for the same line of computers. At the moment we have created a digital clock which has a small inaccuracy in the last digit, due to limitations in ROM calls which we may be able to get around. (The inaccuracy disappears every 50 seconds, but it still bothers me.) My friend and I are also working on a computer realizaton of an analog clock with four hands. . .I have always wanted a clock or watch with four hands in nested dozens; it looks as if this is going to be the way to achieve it. I can't exactly carry it around with me, but at least I will be able to run it whenever the computer is on." . . .

Continued on page 25; . . .

TO: Dozenal Society of America and
Dozenal Society of Great Britain

FROM: Paul Rapoport

RE: Dozenal Calculators

I have an announcement of prime importance. There is now available what is to my knowledge the first easily obtainable dozenal calculator usuable on a computer. According to my initial tests it is accurate, fast and easy to use.

Some years ago I heard that the creators of the software called the Calculator Construction Set (Version 1) were considering expanding the capabilities of that item. I wrote to ask for dozenals to be included as a fully operational number base (for floating point, not merely integers), and now we have all been rewarded: dozenal arithmetic to 16 dozenal places (18 decimal places)! What is more, the Calculator Construction Set (Version 2) allows the user to create, store and use a huge variety of calculators, whether simple, advanced scientific, financial, or whatever. A beginner may create a four-function dozenal calculator in about half an hour. An advanced user may programme a calculator to emulate many of the fancier commercially available models.

The operation of dozenal arithmetic is automatic and extremely fast. You can also convert dozenal to decimal and back in a flash.

The Calculator Construction Set (Version 2) is made specifically for the Apple Macintosh line of computers; its retail price is U.S. $89.95. (This price is often discounted by American software mail-order houses.)

Continued . . .

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

DOZENAL JOTTINGS, Continued from page 23;

Welcome to new members:

304;	JOHN STEWART	Cocoa Beach, Florida
305;	IAN B. PATTEN	Anchorage, Alaska
306;	PETER D. THOMAS	Clarence Gardens South Australia

End

DOZENAL CALCULATOR, Continued

I feel that both of our societies should not only encourage the use of this miraculous program but might officially thank its creators:

Cliff Joyce and Austin Durbin
Dubl-Click Software, Inc.
9316 Deering Avenue
Chatsworth CA 91311

Telephone: (818) 700-9525

I will report further on this program in the future as I explore it more fully.

End

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.

$12\overline{)365}$
$12\overline{)30} + 5$
$12\overline{)2} + 6$
$0 + 2$ 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).

-- DETACH HERE -- OR PHOTOCOPY --

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