DUODECIMAL NEWSCAST

Year 4
No. 2
July
1176
Price:
1 shilling.

The Duodecimal Society of Great Britain,
106, Leigham Court Drive, Leigh-on-Sea, Essex.

Contents

EDITORIAL

This editorial is intended to be not topical, but in advance of topicality.

Decimal currency is not topical — for the moment; but it will be when the Government report is published. This means two things: we can marshall our ideas to join in the discussions when revised currency is topical again, and we can meanwhile make dozenal currency topical By "we" is meant everyone who is reading this journal.

Common logic, universal trade practices, and tradition all prove that units of currency, weights and measures must be based on twelve because of the simple fact that twelve is so rich in factors. Ten is divisible by two and five only; twelve by two, three, four and six, the first three being the first and most used numbers and in sequence. These arguments are propounded by many men, learned and experienced in varied work, in many countries of the world and over several centuries.

The real objection is that some people are reluctant to go to the inconvenience a changeover entails. They do not see that our loss will soon be amortized into insignificance in the Future. Any hesitance now will seem the result of laziness, timidity and selfishness.

REFERENDUM ON A DUODECIMAL FRACTIONAL POINT

As yet no decision has been made by this Society on the fractional point we should use in official correspondence and publications. The matter has been often raised and we shall decide at our next General Meeting.

In our next Newscast, therefore, we shall ask Members to vote a symbol. A very brief summary will be provided of 1) the symbols, 2) their origin, 3) the advantages, and 4) their disadvantages.

ALL WHO WISH TO PROPOSE SYMBOLS FOR A DUODECIMAL FRACTIONAL POINT FOR CONSIDERATION BY THE Dd. S. G. B., ARE INVITED TO SUBMIT THEIR PROPOSALS UNDER THESE FOUR HEADINGS BY 26 SEPT. 1176.

The importance of this decision should be kept in perspective. The Society must agree a symbol for general use. This, however, need not be the one we shall press exclusively for adoption when twelve becomes the generally accepted arithmetical base in this country and the World. It will be used merely to demonstrate duodecimal principles consistently.

So far, our Newscast and leaflet have arbitrarily used the semicolon. Although this sign has had wide use within the Duodecimal Society of America, several have found that, because it is in fact a semicolon, it can be easily confused as a punctuation sign occurring in the middle of a sentence, especially where specifically distinguishing base-twelve notation from others. Among other proposals are decimal points (. or ˙ and ,), and the colon. There is also a proposal that the asterisk, (which this Society has already been using in front of a number to shew that it is dozenal) should be placed after a number and given the function of a fractional point.

AMENDMENT TO SOCIETY RULES

The following will also be proposed in the next Newscast to replace paragraph 2 of the Society Rules, "Aims":

TO FURTHER THE ADVANCEMENT OF LEARNING AND COMMERCE AND THE EDUCATION OF THE PUBLIC, AND TO CONDUCT RESEARCH OF ALL KINDS, AND DISSEMINATE ITS RESULTS, IN MATHEMATICAL SCIENCE, WITH PARTICULAR RELATION TO THE USE OF BASE TWELVE IN NUMERATION, MATHEMATICS, COINAGE, WEIGHTS AND MEASURES, AND IN THE OTHER BRANCHES OF NATURAL, PURE AND APPLIED SCIENCE.

OPTICAL DEFINITION OF LENGTH

By decree No. 61-501 of the 3 May 1175 the Ministry of Industry in Paris has published the ruling definitive length for the metre. It is now the length equal to 1 650 763.73 wave-lengths in vacuo of the radiation corresponding to the transition between the levels $2p_{10}$ and $5d_5$ of the atom of Krypton-86. The two atomic energy levels specified in the definition are denoted by the spectroscopic terms given in Paschen's notation for the Krypton series of energy levels, and the corresponding radiation is of orange light.

In dozenals this figure is 677 377;89. The equivalences for the Ell or duodecimal metre (one of the main proposals for a duodecimal fundamental unit of length, which is the *1/10,000,000th part of an Assumed Great Circle of *38,000,000 feet), the international Yard and the international Foot are tabulated below:-

	length unit	number of wavelengths of Krypton-86	equivalence in metres
decimal	1 metre	1 650 763 . 730 000	
	1 ell	1 844 893 . 544 648	1 . 117 6
	1 yard	1 509 458 . 354 712	. 914 4
	1 foot	503 152 . 784 904	. 304 8
dozenal	1 metre	677 377 ; 89	
	1 ell	74Ɛ 791 ; 66	1 ; 14Ɛ 268
	1 yard	609 642 ; 43	; ᘔƐ8 100
	1 foot	203 214 ; 95	; 37ᘔ 840

The value of the metre in the decimal notation is considered exact at two fractional places. I suggest that this is sufficient number of places for the dozenal notation and that the value of the standards should conveniently be "pegged" at the figures given above. For academic interest only, I have taken the fractionals to six places and they are as below. They have been calculated by the method which successively multiplies fractionals decimally by twelve, using the resulting whole number for the dozenal equivalent. The figure in brackets is the last decimal fractional in the calculation

Metre ...; 891 534 (+ . 32) yard ...; 430 ᘔ38 (+ . 356 608)
Ell ...; 665 19ᘔ (+ . 184 832) foot ...; 950 392 (+ . 785 536)

NEW MEMBERS

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A. F. Whillock, B.Sc.(Eng.)	Walnut Bank, Underhill, Moulsford, Berks
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Younger Members

R. Barratt	38, Woodhall Road, Wollaton Road, Nottingham
J. C. Longhurst	28, North View, Westbury Park, Bristol 6.

Subscribing Supporters - 1

DUODECIMAL PUBLICITY

	Year 1176
'The Province' (British Columbia) article	16 Jan
National and local press (advertisement by Hector Powe)	March/April/May
Monthly Report on Market Conditions (Save & Prosper Group Ltd.)	April
'Evening News' (article on Prof. Aitken)	9 April
'The New Daily' (Review on Prof. Aitken's new book)	↊ April
House of Commons	4 May
'Gambit' (Edinburgh University Review) (Review of Prof. Aitken's new book)	Summer

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NEWS FROM THE DUODECIMAL SOCIETY OF AMERICA

The Meeting of the Board at Alamagordo was extremely successful. The best attendance yet achieved great cordiality.

The grades of Aspirant will be dropped. The grades are Members, Senior Members and Fellows. Mr. Henry C. Churchman was elected Vice-President and will head a By-laws Committee. Dues may be raised to \$6 and Life-Memberships may be for any donors whose gifts exceed dues by \$150.

AWAITING A DUODECIMAL DYNASTY

by J. Ph. Hahn translated from the German by S. Ferguson

The dynasty of the decimal in the realm of numbers began even in the days of primitive man, to whom reason and logic meant little. A chieftain held up the fingers of his right hand in front of his friend: "I have so many wives!" Perhaps Woman, therefore, was the originator of the enthronement of the decimal system. In the same way as dynasties maintain themselves within nations, without being superior in quality, their decimal system has maintained itself in the realm of numbers up to the present. But history teaches that many dynasties in many nations found their end because a more highly qualified class of rulers arose. Similarly the history of arithmetic will one day show how the rule of the duodecimal system followed the rule of the decimal, even though today the army of the decimal dynasty is immensely great and its warriors support its cause with eager logic.

The unit-group of the duodecimal system, presented in condensed picture form, offers a much more pleasing sight --

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-- than the crowding of the decimal system per unit --

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-- as the proportion of width to height (3:4) is nearer the Golden Mean than the proportion 2:5.

The psychologist Purkinje imagines the thoughts stored in the brain of the human being in the form of cells, that is, as matter. It is not far from this to the thought of interpreting the compact unit of the duodecimal system as an imaginary Purkinje cell and to obtain, through placing one to twelve points as a "cell core" in twelve different places, a capacity which exceeds 4 000, in order to keep over 4 000 thoughts, etc. apart ($2^{12} = 4\ 096$). If one makes use of this fact then the result is a system of pasigraphy, e.g.

⊠⊠⊠	Alle	o⊠o	Menschen	⊠⊠o	werden	o⊠o	Brüder
o⊠o		o⊠o		o⊠⊠		o⊠⊠	
o⊠o	all	⊠o⊠	men	oo⊠	become	⊠oo	brothers
o⊠o		⊠o⊠		oo⊠		oo⊠	

According to the character of a pasigraphy it is therefore possible to read the twelve-point signs in all languages, or to translate them, when apriori language-scientists have discovered the word-form for the particular duodecimal sign. The duodecimal unit-group can thus become an idiom for communication, which guarantees a mechanical language translation to embrace all languages; for photocells are suitable for reading the duodecimal pasigraphy shewn in the example. It may well have been achieved already in the U.S.S.R. for seventeen languages! (Report of the Frankfurt Allgemeine Zeitung for 2nd June, 1959: Russian translation machines whereby a machine language (duodecimal signs) allows .... "to interpret factual data and scientific information exactly").

According to a report of the 'Deutsche Zeitung und Wirschaftszeitung', Stuttgart, 16th June, 1959, the I.B.M. are looking for a system of international automatic documentation, where the signs can be sorted mechanically and read automatically, presumably in order to reproduce the Russian translation machines.

My demonstration models which translate duodecimal pasigraphy into all languages of the world were performed and explained for the first time in public at the Inventors' Exhibition at Wiesbaden (May, 1954). My models work according to the principles of the binary system, as do the Hollerith machines and electronic brains.

Even though today many prominent men of ideas dream up translating machines with a human ability to think, with a feeling for grammar and syntax, those machines could not as yet cross the border of one dream wish — to distinguish between sense and nonsense, to think logically and have a feeling for linguistic peculiarities and bad habits. Even today no case is known where cogs, relays, spools, valves and such-like are able to separate sense and nonsense through logical thinking.

One-Two-Three of Duodecimals: Part II

Offprint No. ↋

Multiplication & Division

As with decimal numbers, the multiplication table must be learned by heart. This is by no means difficult; we already learn up to twelve times twelve in our present table (which shows, by the way, that the human mind is capable of the concept of a gross), and all we need to do to learn the dozenal table is to rewrite and rephrase it.

When you look at the table in dozenal notation, several things will be noted at once: several lines are much easier - the 3 4 6 8 9 lines; even the line for ↋ (eleven) is simple; the ↊(ten) line is similar in function to the 8-line in decimals; there are but three lines which are more difficult, and must be learnt by heart, these are the 5, 7 and ↋ lines.

Rephrasing: first, each person may at the moment choose his own expressions for the numbers, so the rephrasing will correspond to them; here I shall use what may be called an 'explicit' form - everything fully written. (See if you can find better expressions - we welcome suggestions on this). Look at the table: take, for instance, the 3- line; this runs 3 6 9 10 13 16 19 20 - and in words: three, six, nine, one dozen, one dozen and three, one dozen and six, one dozen and nine, two dozen. Sometimes the expressions may seem long, such as 'five dozen and four', 'eleven dozen and eleven' - but it is better to learn the long expressions first. When the dozenal system comes into everyday use the language will soon adapt itself with newer, shorter forms.

Table: dozenal multiplication.

1	2	3	4	5	6	7	8	9	↊	↋	10
2	4	6	8	↊	10	12	14	16	18	1↊	20
3	6	9	10	13	16	19	20	23	26	29	30
4	8	10	14	18	20	24	28	30	34	38	40
5	↊	13	18	21	26	2↋	34	39	42	47	50
6	10	16	20	26	30	36	40	46	50	56	60
7	12	19	24	2↋	36	41	48	53	5↊	65	70
8	14	20	28	34	40	48	54	60	68	74	80
9	16	23	30	39	46	53	60	69	76	83	90
↊	18	26	34	42	50	5↊	68	76	84	92	↊0
↋	1↊	29	38	47	56	65	74	83	92	↊1	↋0
10	20	30	40	50	60	70	80	90	↊0	↋0	100

Note how many more products end in 0. Note the patterns of units – 3-line: 3 6 9 0, 4-line: 4 8 0, and so on. Also, in the eleven-line, the products add to eleven or a multiple of eleven; i.e. 2 x ↋ = 1↊, 1 plus ↊ = ↋. When multiplying a single number by eleven, reduce that number by one, call this dozens: then as units write the number, which added to this first one, makes eleven: i.e. 8 x ↋ = ? Deduct one from the 8, call it dozens, we have 70. What must we add to 7 to make ↋? 4. These are the units. So 8 x ↋ = 74.

Having learnt the table, and I suggest you start with the easy lines, try a few examples, until you can cope with all combinations. Then proceed to longer examples; below I give two, with the working in words.

5↊ x	'	six tens are 5 dozen; six fives are 2 dozen and 6;
63	'	three tens are two dozen and six; three fives are one
	'	dozen and three.
2↋00	'	6 x ↊ = 50, 6 x 5 = 26; 260 plus 50 = 2 0.
156	'	3 x ↊ = 26, 3 x 5 = 13; 130 plus 26 = 156.
3056	'	The working follows the same method as decimal working.

↋↊ x	'	Five tens are four dozen and two; five elevens are four
57	'	dozen and seven; seven tens are five dozen and ten; seven
4↋20	'	elevens are six dozen and five.
6↊↊	'	5 x ↊ - 42; 5 x ↋ - 47; 470 plus 42 - 4↋2.
560↊	'	7 x ↊ - 5↊; 7 x ↋ - 65; 650 plus 5↊ - 6↊↊.

Whatever method you learnt for multiplication in decimals, simply adapt it to dozenal numbers; the above method is only one of many.

Before we turn to division, there are one or two "short cuts" which can be used for large numbers, by which it can be quicker to divide than to multiply. For instance, in decimals, to multiply by 50, you can simply put 00 after the number to be multiplied, and divide this by 2: 9 x 50 = 900 ÷ 2 = 450. The same ideas can be adapted to dozenals thus:

To multiply by 6, add a 0 to the number to be multiplied, and divide by 2

"	"	"	60,	"	"00	"	"	"	"	" 2
"	"	"	30,	"	"00	"	"	"	"	" 4
"	"	"	40,	"	"00	"	"	"	"	" 3
"	"	"	160,	"	"000	"	"	"	"	" 8

the principle is fairly obvious A x 30 = A x 100/4.

Division:

First, two examples, to show the method is unaltered.

5) 4330 ' ↊30 '	five tens are four dozen and two; this leaves 1; five divided into one dozen and three, goes three times.
9)760899 ' ↊00↋9 '	nine tens are 76; nine elevens are 83, this leaves 6 over; nine into 69 goes 9 times.

Fair enough, you might say; but did I know 9 would divide exactly without remainder, and if so, how? This brings us to the methods of recognising divisibility. In the following list, a number in the left-hand column will divide all numbers mentioned in the second column.

No.	Rule
2	Divides all even numbers.
3	Numbers ending 3 6 9 0.
4	Numbers ending 4 8 0.
5	(no simple rule)
6	Numbers ending 6 and 0.
7	(no simple rule)
8	All numbers whose last two figures form a number divisible by 8.
9	All numbers whose last two figures form a number divisible by 9.
↊	(no simple rule)
↋	All numbers whose figures add to ↋ or a multiple of ↋.
10	Numbers ending 0.

The rules, compared with the corresponding decimal, show:

The dozenal system gives: the same rule for 2;
: much simpler rules for 3 4 and 6;
: a simpler rule for 8;
: a simpler rule for 9;
: a simpler rule for ↋;
: (naturally) a simpler rule for 10

The rule for 7 is about as difficult as that for 7 in decimals - in fact there is no practical solution for 7 in either system. The rules for 5 and ↊ are too clumsy to admit of serious practical application.

In sum: in the eleven cases of divisibility, between the two systems:

> there is identity or analogy : 2 and 7.
> there is an advantage in the dozenal: 3 4 6 8 9 ↋ and 10
> there is an inconvenience in the dozenal: 5 and ↊.

> This is: a balance of seven advantages, of which four are very important, against two inconveniences. These last, concerning the ease of recognising divisibility by 5 and ↊, are not very important, as, with the introduction of dozenals, the functions of these numbers will be largely replaced by 6 and 10; similarly, it does not matter much if the rule for 7 is so difficult - we rarely divide anything by 7 in everyday life.

One final point on multiplication; if the multiplier is very nearly a complete gross, we can simplify our process. Example:

> 78926 x 4↋6. Now 4↋6 is 500 - 6, so we can multiply thus:
> 78926(500 - 6), which we can do quicker than the other way:
> i.e. 78926(500 - 6) = (78926 x 500) - (78926 x 6)
> 78926 x 500 = 327↊0600
> 78926 x 6 = 3↊4730

> 327↊0600 - 3↊4730 = 32,3↋7,↊90. Check this by multiplying 78926 x 4↋6 the long way, and compare the work.

In the next sheet we shall deal with the conversion of systems.

We welcome any comments on the lesson sheets.

'The case against decimalisation' by Prof. A. C. Aitken, published 1176 by Oliver and Boyd Ltd. Edinburgh, pp. 1ᘔ, 2s. 6d.

A wealth of information and reasoning this book not only criticises decimalization, but constructively offers an alternative that achieves the same ends with far less disadvantages. The most ardent decimalist will find it absorbing.

The introduction is a story of decimalization, especially of coinage, and its reckless introduction in the face of its disadvantages and natural opposition, because of political and specious reasons. Later Prof. Aitken makes the aphorism "Political expediency is the ruin of science". A brief history of numeration starts with the Babylonian sexagesimal system about *1,000 years B.C., and the debt we owe to the Hindus for the "arabic" numbers, refers to Leonardo da Pisa's 'Liber Abaci' of *842 and Napier (died *Ɛ29) and comes up to date. This century began with *20 yrs. of the mechanical calculator, continues with *40 yrs. of the electrical calculator, and will proceed now with the electronic computer.

Prof. Aitken proposes that a changeover to more efficient money and metrical units should be in a phased gradualness to exploit the units already duodecimal. He has a specific suggestion for money and a tentative one for length. He warns: "Duodecimalists should not dictate too much what is desirable; they may well leave it to practical craftsmen to find out what is the best accommodation, provided only that the final outcome is indeed cast in a duodecimal hierarchy of units". Later, referring to nomenclature, he advises, "... duodecimalists should not prescribe too much for others in this matter; language and linguists should be able to find ... euphonious equivalents for any new entity that may arise".

Qualitative and quantitative arguments (e.g. multiplication squares and fractionals) illustrate the advantages.
Prof. Aitken's proficiency, televised towards the end of March, is widely known: but if he finds that working in decimals is only two-thirds as efficient as working in dozenals, even we less able shall find our calculations easier in the same proportion.

This Society had been considering reprinting Herbert Spencer's 'Against the metric system' of *50 years ago. Prof. Aitken has rendered that unnecessary by this coolly rational and very topical treatise which will be valid until duodecimal day.

Talk to Lambethans' Society at Effra School, Brixton, 1 March 1176

The Hon. Sec. covered the whole field of duodecimals, particularly its effect on the average person. Three dozen people, of many varied interests attended.

The talk, of $\frac{3}{4}$ hour, was supported by charts shewing new signs, methods of counting and calculating, and a demonstration with small blocks of stacking in dozens. After an interval, one hour was taken up by questions. Broadly, the questions covered means of signifying whether a number was in tens or twelves; number of positions on a telephone switchboard; length of time for the change-over; use of constants in Technical Schools; opposition to dozenals; pressure by Government to decimalise; confusion for children; terminology; and one gentleman wanting an assurance that it would benefit England.

From the attention given during the talk and the quality and variety of questions - technical and otherise - and from the remarks by the Chairman, the evening was an outstanding success and well worth while.

D U O D E C I M A L   P U B L I C A T I O N S, etc.

The following publications are available through this Society Prices are in dozenals, packing and inland postage a penny in the shilling extra. Please obtain those marked ø through shops.

Logical Money, Weights and Measures — free
Duodecimal Leaflet — free
Duodecimal Newscasts for *1174, *1175, *1176 — 1s;0d
Offprints:- New duodecimal notations (2), A revised currency (3), Duodecimal metric proposals (4), Report of Duodecimal Summit Conference (5), Measuring our way (6), New duodecimal notations and names (7), A set of symbols (8), A suggested series of notations and names (9), The 1, 2, 3 of dozenals (Ƨ, Ƹ) — ;2d
ø Prof. Aitken The case against decimalisation Oliver + Boyd — 2s;6d
F.E. Andrews An excursion in numbers (English or Esperanto) — free
R.H. Beard Antipation al aritmetiko (in Esperanto) — a few free
ø J. Halcro Johnson The Reverse Notation (Blackie & Son) — 13s;0d
ø Jean Essig Douze notre dix futur (in French) Dunod) — 13s;0d
ø " " La Duodécimalité: Chimere ou vérité future — 6s;6d
Duodecimal Society of America Manual of the Dozen System — 7s;6d
" " " " The Duodecimal Bulletin — 3s;6d
" " " " Circular Slide Rule $5 or £2:0:0