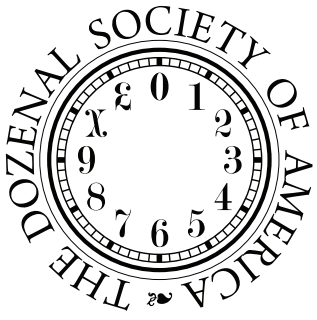

The Dozenal Society of America

Collected Works on Reckoning Reform

Sir Isaac Pitman

A New and Improved System of Numeration

If Mr. Willcox thinks that it would be necessary to adopt a new method of writing figures, while passing from the old to the new notation for numbers, he could suggest a plan. Without it, his scheme lacks completeness. It would be no easy task to furnish 8 or 12 facile script, and beautiful type, forms, as new signs for figures. *The adoption of the new numeration together with phonetic spelling*, makes new signs for figures, bearing new values, unnecessary. The new spelling and the new numeration would go together, and the one would be a sign of the other. A reformed orthography it is impossible to prevent, and the adoption of phonetic spelling will prove a convenient means of introducing a new arithmetic. It would be only in a *series* of figures (two or more) that their values would be changed. The simple numbers, 1, 2, 3, etc., whether an *eight* or a *twelve* scale be adopted, would mean the same as they do now.

We have well considered the merits of the five practicable scales, 8, 10, 12, 14, 16,—for anything below 8, or above 16 may be pronounced impracticable—and we prefer *twelve* to any other number for the repeating figure. *Ten* has no advantage over *fourteen* except that which arises from its being a smaller number,—an advantage only to learners and dull brains, and a disadvantage to arithmeticians. How inconvenient a *fourteen* system of counting would be, anyone may judge. Our present decimal system is equally inconvenient. We commend to the notice of Mr. Willcox a Duodecimal Scale, with the following signs and names:

1	2	3	4	5	6	7	8	9	ε	V	10
one	two	three	four	five	six	seven	eight	nine	ten	eleven	twelve

11	12	13	14	15	16
one-one	one-two	one-three	one-four	one-five	one-six, that is, one dozen and six, etc.

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20 to be called *two dozen* or *two-nought*, 100 a gross, 1,000 a myriad, 10,000 a dozen miriad, 100,000 a gross myriad, 1,000,000 a million. No other denomination is required. Higher numbers than millions are best spoken of by calling over the figures in order, and adding the word "millions." Billions, trillions, and all the other -illions are only so much literal lumber. The words are not used in common life because they are not wanted. In the new numeration, with *twelve* as a basis, a million would be nearly three times its present amount, or ¢2,985,984, which is a larger number than can be brought within the scope of vision, or distinctly conceived.

We propose to place the subject of a new arithmetic before our readers this year, and next year employ it in the Journal and recommend it. Dates need not be altered at present, but a new period from which to reckon the year must be adopted when the public have been brought to see the superiority of the new numeration. We may, perhaps, look forward to the year 1900 as the commencement of the new era, and either call that the year 1, or, which would be preferable, through the reckoning back 100 ¢144 years, and commence with the year 101. The new era, extending back to 1757, would embrace all the great changes that have occurred in modern times, including the American Revolution,—the first outcry for liberty on the part of oppressed humanity. Dates from the birth of Christ up to 1900 might continue to be quoted on the old plan, and enclosed between ¢ ; from 1757 forwards to 1900, on either plan, using ¢ for the old style; and from 1900 forwards on the new plan only.

We think that the series of names for numbers, weights, and measures, proposed by Mr. Willcox, is unsuitable. The simple terms *one-four* for 14 ¢16, *four-nine* for 49 ¢57, *three-eight* for 38 ¢44, *seven-ten* for 7ε ¢94, *four-nought* or *four-dozen* for 40 ¢48, six gross, four dozen and two, or six gross and four-two, or simply six-four-two, for 642, etc., would be more readily received than Mr Willcox's *terone* ¢9, *tertwo* ¢10, *terthree* ¢11, etc., on an *eight* basis.

What can be better than the following series of names for money, weights, measures, and time, each containing twelve (10) of the next lower denomination, with intermediate divisions, when required for convenience. Such intermediate denominations are here enclosed between brackets.

Money.—Mite (one twelfth of a penny, a useful coin for the poor), [farthing or fourth-thing, or one-fourth of a penny, hapenny or half-penny,] penny, [three-penny and sixpenny silver pieces,] shilling, [florin or 2s., dollar of 6s., made of gold,] mark (12s), [two marks 24s,] bank note of 100 ¢144 shillings, or any multiple of this sum.

Weights.—Grain, scruple, dram, ounce, pound, stone, fother, ton, load.

Measures of Length.—Fourth (or any smaller measure,), third, second, inch (or prime), foot, [yard, el,] fathom, rod, furlong, mile.

Measures of Capacity for Liquids and Solids.—Drop, minim, (this not required for solids,) jill, pint, gallon, ferkin, barrel, pipe.

Time.—Fourth (or a smaller division), third, second, minute, beat (ten old minutes), hour, day. The hour would be equal to two hours of present time, and the minute would be $\frac{5}{6}$ of the present minute. Time would be kept in hours and minutes, with beat and minute figures being placed together to mark minutes. Clocks would require a shorthand

to cue the hour, and two long hands,—one black, to mark beats, the other yellow, for minutes. The short hour hand would make one revolution in the day, the long black beat hand 10 ϕ12ϕ, and the long yellow minute hand 100 ϕ144ϕ. As the minute hand would pass over the face of the clock six times as fast as it does now, (the present hour figures marking minutes,) time would be more accurately ascertained by a glance at a clock or watch. Indeed[,] the hour hand would seldom need to be looked at, because one can tell within *two hours* of present time, what is the period of the day, and the black beat hand would with sufficient accuracy cue the minutes. Thirteen months of 28 days, with an extra day (and two days in leap year,) for the last month, would be a convenient method of dividing the year. The days of the week would then always fall on the same days of the month. The thirteen month might be called Admonth, or the added month. The months might be named as now, either by their common heathen names, or as First-month, Second-month, etc.

One denomination more or less may be used in any part of either of these scales, in order to make the name express, as nearly as possible, the same quantity as it does now, and if this cannot be done, some other name might be chosen. Let each nation have its own series of names till one language shall swallow up the others.

The new figures we propose for ten and eleven have been received from the type-founder this week. We have had them prepared in Minion, Brevier, and Bourgeois. They are,—

Minion	type	ɛ	ten,	V	eleven.
Brevier	"	ɛ		V	
Bourgeois	"	ɛ		V	

Some delay has occurred from our trying, at first, the forms P, V: finding P unsuitable, we had ɛ cut.

New Arithmetic

We *commenced* working for a reformed Arithmetic before this winter's busy season set in, in December, but to *continue* this extra labor, or indeed to do anything to the subject, till the annual subscriptions of the members of the Phonetic Society were collected, and the List of members for 1856, published, was impossible. Now these matters are cleared of, we promise ourselves and our readers another "new pleasure," in a more useful, more harmonious, and more comprehensive system of calculation by figures. We take it for granted that every spelling reformer has already found one "new pleasure" in phonetic writing. The following observations were written as a continuation of the remarks on Mr. Willcox's scheme in the Journal No. 6, page 68, but the necessity of concluding the interesting story of "Gentle Ruth" in that number, caused their omission. Mr. A. R. Gacon has entered into the Reckoning Reform with energy, and has prepared for the Phonetic Journal a series of pa-

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pers under the title of the "Phonetic Mathematician," in the duodecimal scale. Its design is to conduct the reader from the simplest principles of Arithmetic to the higher branches of mathematical science. We solicit from our readers papers on the new arithmetic, and on the best means of bringing it into use.

We must add a word upon the Money Reform, but cannot here give the new duodecimal scale at length, and enforce its adoption by the numerous arguments which favor it. One great merit of the duodecimal system of arithmetic is, that it gives us decimal money (or duodecimal money, the same thing in principle,) which our merchants and accountants (but not the people generally,) so ardently desire, *without a change of coinage*. It also adapts itself to the French and American money, by considering two sous in France, and two cents in America, as equivalent to the English penny. The English *mite*, *penny* (the unit of accounts), *shilling*, *mark*, and *bank note*, might be adopted in all countries, both as to value and name. We respectfully urge upon the consideration of all who are interested in the Money Reform, the question, Which of the following courses is the most practical,—*to change the value of the penny*, and issue a new copper coinage, or *to change the manner of keeping accounts*, and carry twelves in all our reckoning, instead of tens. Certainly the thing itself, money, is greater than its written sign; and the inconvenience of changing the money must be immensely greater than that of changing the manner of entering it in books. With a duodecimal system of arithmetic every English coin would remain unchanged in value, and although it would be necessary in the course of time to issue 24s. and 12s. gold pieces, (written on the new plan, 20s. 10s.,) instead of the present sovereign and half-sovereign, yet these coins are not necessary for the immediate adoption of duodecimal money: 14s. 6. could be entered today as 126p. ("p" signifying *pence*,) the first figure representing 12s., the second 2., and the third 6d.: £3 18 $11\frac{3}{4}$ would be (reducing £3 18 to shillings, and expressing the number in the twelve notation,) $66\frac{3}{4}$p. In ordinary account, we think that the usual $\frac{1}{4}$d., $\frac{1}{2}$d., $\frac{3}{4}$d., would be more distinct, and therefore be more readily cast up, than ·3, ·6, ·9, in the pence column; but the method of writing fractions of a penny in twelfths, separated by a point, would be best in many arithmetical operations. The ruling of the present account books appeared to be well adapted for the new method of keeping accounts. The pounds column would contain bank notes; the shillings column, marks and shillings; and the pence column, pence and farthings.

Reckoning Reform

As at the commencement of this new age, in the latter half of the last century, Dr. Franklin, one of its earliest and brightest luminaries, said of our orthography, "something must be done" to remedy its defects, so now all nations say, Something must be done to remedy the intolerable evils of the complicated and varying systems of Money, Weights, and Measures in use throughout the world. The author of the article "Weights and Measures" in the "Penny Cyclopædia" says—"The subject of Weights and Measures is one the actual state of which is prosperous in the inverse ratio of the number of books or the length of articles which are written upon it:" that is saying, in scientific phraseology, the present system is so confusing by its multiplicity of contradictory details, that in common phrase, as we say of the evils of others, "the less said about them the better." "But," says this writer, "there is nothing in the subject of Weights and Measures which might not, if the most natural and simple system were adopted, be described in very few pages." I consider Coins as being, equally with Weights and Measures, included in this opinion ; for Coins are really weights of some of the most valuable metals; and I shall presently attempt, in two or three pages, to lay before the reader "the most natural and simple system" in itself, and the one which best fits in with the usages of the two nations which are at the head of the commercial world—England with her colonies, and America. "We are speaking," continues this author, "of course only with reference to a possible time; for let that time arrive when it may, the history of the past must be a confused and repulsive subject." On this important social, commercial, and scientific question, we are now at "fives and sixes" among ourselves, and the whole world is at "loggerheads."

Every one who is conversant with the properties of numbers, knows that the value of any number, as a basis for calculation, depends on its composition, or on the simple lower numbers which enter into it. We reckon by tens because, before writing was invented, and before the powers of numbers were understood, all counting was done upon the ten fingers and thumbs of the two hands. But the number *ten* (written 10), has no more virtue as a basis for counting than 8 or 14. Each contains but two lower numbers; 10 contains 5 and 2; 8 contains 4 and 2; and 14 contains 7 and 2. There are no other multiples in these three numbers 8, 10, and 14. But there is a number lying between 10 and 14 which contains within it the harmonies and proportions of four other numbers, namely, 12 or the familiar dozen; and it has worked its way into general use on this very ground. Twelve contains the numbers 2, 3, 4, and 6 repeated, and therefore may be divided by these numbers without leaving fractions. Every mathematician knows the superior value of *twelve* over *ten* as a basis for calculation; but *ten* has possession of the field. It had not once. I sup-

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pose that the power which brought it into use can bring in a better number. A world armed with "knowledge," which is "power," must be strong enough to change a custom which was adopted by a world in ignorance. Dr. Thompson, in his popular "Treatise on Arimetic," page 232, enters upon a consideration of the value of each number, as a basis for counting, from *two* to *twelve*. He observes—

> "The *senary* (six) and *duodenary* (twelve) scales, having each so many integral aliquot parts in proportion to its magnitude, and those of so convenient a kind, give origin to much fewer interminate fractions than any others. These two scales are preferable, therefore, in a considerable degree, to any of the others that have been mentioned. The duodecimal has the advantage of expressing numbers concisely, saving one figure in fourteen or fifteen, as compared with the decimal scale. To introduce either of these scales now, however, when men are accustomed to the decimal scale; when the languages of all civilised nations are suited to it; and when so many valuable works, particularly tables, in which it is adopted, would be rendered comparatively useless—would be unadvisable, and perhaps impracticable: but we must regret that the decimal scale was adopted at a time when any other might have been introduced with equal facility."

I think it is possible both to add two figures to the numerical scale, and to enlarge the English alphabet to the number of distinct sounds that exist in the English language. (See the "Phonetic Journal.") Twelve is the number for a perfect and easy arithmetic. We can take a *third*, and especially a *fourth* of twelve, and keep clear of fractions; but we cannot take a quarter of ten without a fraction; and we cannot get a third of ten without plunging into the abyss of interminate fractions, nor even then, for it eludes our grasp.

Dr. Thompson thought it would be "unadvisable" to increase the scale of figures from ten to twelve. This is certainly a more reasonable opinion than Lord Brougham's concerning the introduction of gas. He said that if it were brought into London for general consumption, the city and the people would some day be blown to atoms. The difficulties (only the difficulty of labour) that would attend the introduction of a new arithmetic, remind us of Dr. Lardner's opinion on the possibility of navigating a vessel across the Atlantic Ocean by steam; and of the opinion of the British Houses of Parliament on the introduction of railways, and travelling at the rate of thirty miles an hour. Both projects were pronounced to be impossibilities. But Dr. Thompson, with his characteristic openness to conviction, says that it is "*perhaps* impracticable." As to the tables now in existence, the alteration of them to suit a new system of money, weights, and measures, would add but little to the labour of printing new editions, which we are doing every day.

If all weights and measurements were reckoned and written by twelves, and if all denominations of money, weights, and measures, consisted of twelve of the next lower, we should possess all the benefits of a decimal coinage without altering the

value of a single coin, or any of the common measures and weights, except the ounce, which would be one-third heavier. I recommend the penny, the pound weight, and the foot measure, as the integers, or roots, or units, on which to base a universal system of money, weights, and measures, which would be gradually adopted by all nations. The yard would, of course, be preserved to us for measuring cloth, &c. I have inquired of drapers whether the English yard or the French metre of about 3 feet $3\frac{1}{3}$ inches, is the most convenient for handling, and they unanimously pronounce the "French yard" to be too long for the arms.

To preserve the pound of twenty shillings intact, and deduce the cent, penny, and mill from it, is like producing the centre of a circle from the circumference. It is the penny that produces the shilling, and the shilling the pound, and not the contrary. We have made twelve pence constitute a shilling because it is a more convenient number for divisions of a shilling than ten would be.

The two new figures necessary for a twelve system of arithmetic might be ↄ ten, ε eleven, something like the writing forms of T and E, recommended by a correspondent of the "Times." They work well, for I have employed them about five years, and have added them to the figures of all my book fonts, from Nonpareil to Small Pica. All counting would be done in twelves; the scale of figures is given in the third line below.

Roman, Denary	I,	II,	III,	IV,	V,	VI,	VII,	VIII,	IX,	X,	XI,	XII.
Arabic, Denary	1,	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12.
Arabic, Duodenary	1,	2,	3,	4,	5,	6,	7,	8,	9,	ↄ,	ε,	10.

The numeration table would be—Units, dozens, grosses, *triples* (a new term to signify the third power of twelve), dozens of triples, grosses of triples, *sexiads* (a new term signifying the sixth power of twelve). Only these two additional words would be required in the place of *thousand* and *million*. I recommend that no higher denomination than sexiads (in the place of millions) be employed. For higher numbers, call over the figures and add the word sexiads. Thus we might say, the American war debt has reached 4 (5, &c.) figures of sexiads of dollars. When we ascend to the region of billions, trillions, and all ' the other *-illions*, up to dodecillions, or the twelfth degree above millions, we are lost in a maze of figures and words. Besides, the very meaning of these words is disputed; one method of employing them is adopted in this country, and another in France and the States of America. In England we take six figures for each denomination above 3 million, but in France and America only three are taken. The consequence is, that "a billion dollars" in America means only the thousandth part of what it means in England. There it means a thousand millions, but here it means a million millions.

As everybody who can cypher has learned the pence table, he may employ this in addition to the ordinary multiplication table, in performing multiplication by twelves, until the twelve table shall be learned.*

This table is to be repeated thus:—

* The multiplication table has been moved to page 8.

Duodecimal Multiplication Table.											
1	2	3	4	5	6	7	8	9	ᘔ	Ɛ	10
2	4	6	8	ᘔ	10	12	14	16	18	1ᘔ	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	ᘔ	13	18	21	26	2Ɛ	34	39	42	47	50
6	10	16	20	26	30	36	40	46	50	56	60
7	12	19	24	2Ɛ	36	41	48	53	5ᘔ	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
ᘔ	18	26	34	42	50	5ᘔ	68	76	84	92	ᘔ0
Ɛ	1ᘔ	29	38	47	56	65	74	83	92	ᘔ1	Ɛ0
10	20	30	40	50	60	70	80	90	ᘔ0	Ɛ0	100

Three ones are three, three twos are six, three threes are nine, three fours are a dozen, three fives are one-and-three (that is, one dozen and three), three sixes are one-and-six, &c.; nine ones are nine, nine twos are one-and-six, nine threes are two-and-three, nine fours are three dozen, &c. Obsolescent numbers may be marked thus ϕ ϕ, as ϕ1,728ϕ = 1,000, or one triple.

In Money, the only alteration required by this reform would be to replace the ten and twenty shilling gold pieces by others of twelve and twenty-four shillings value. The twelve shilling piece would be the principal or the highest coin of account, and might be named a *Mark*. There should also be a smaller gold coin of six shillings, about the size of a fourpenny piece, to supersede the present lumbering silver coin of 5s., which can scarcely be called "change." France and America could reconstruct their money on the basis of the English penny, which is equal to two cents in America, and nearly equal to the French penny of ten centimes, 25 French pennies being equal to 24 English ones. The English £5 note would be replaced by one bearing the value of £7. 4s., or 100 (one gross) shillings. It might be called a *Banko*.

In Weights, I recommend the present pound, and that there be no other higher denomination than a *load*, or a triple pounds, that is, a dozen gross pounds, or 1,728 pounds, which make a light cart-*load* of 15 cwt. 1 qr. 20 lb. Intermediate weights would be expressed with sufficient convenience by dozens and grosses of pounds. I would fix the pound at its present weight, and have it registered in several places, rather than introduce a new and different pound. The word pound would thus be properly restricted to the meaning of a weight, and would pass out of use as the name of a coin. The present convenient *cwt.* (hundredweight) would be replaced by a gross pounds, which would be but thirty-two (or two-and-eight) pounds heavier.

In Liquid Measures the present pint, which weighs about 1 lb. $3\frac{1}{4}$ oz., might be taken as the unit. Dozens and grosses of pints would be suffieient for all higher measures till we reach a dozen gross pints, which might be called a *tun*; the difference between the old and new tun of wine, being that between ϕ2,016ϕ and

(1,728) pints, or 2 gross pints, or 3 dozen gallons. The word *ton* or *tun* (both pronounced *tun*) would thus signify a liquid measure only, and not 20 *cwt.* also.

Lineal Measures might be—the foot of twelve inches, dozens and grosses of feet, which would serve to measure buildings; and for distances on land, the foot, dozens and grosses of feet, and a *triple*, or 1,000 (1,728) feet, about $\frac{1}{3}$ of a mile, which might be called a *long*. The mean diameter of the earth (7,912) miles is 11,2E7 longs.

In Land or Square Measure, the denominations might be,—a square foot (of twelve inches on each side), dozens and grosses of square feet (the side of which would be found by extracting the square root), and a *plot*, or a square of a gross feet on each side, that is, 10,000 (20,736) square feet, a little less than half an acre.

Celestial distances might be measured by the diameter of the earth as a unit; thus, the sun is 6,256 (11,875) diameters distant from the earth.

In Time, no change for the better could be made except that of counting the hours of the day forward to two dozen, and thus doing away with the troublesome, and to many persons unintelligible *a.m.* and *p.m.* (the former being sometimes read as a contraction signifying *after morning*); dividing the hour continuously into twelfths, and giving thirty ($2\frac{1}{2}$ dozen) days to each month, with (35) to December. The last five (in leap-year *six*) days of the year might be considered a national festival; interest for money being reckoned the same for December as for any other month. The year should commence at the winter solstice, on the 22nd of December. The only change necessary in clocks and watches would be the division of the space between the hour figures on the dial, into six parts instead of five. Where there is a seconds movement, the seconds hand must be surrounded by the twelve numerals, and the movement adjusted thereto. Chronology in history, and the reckoning the day of the month and the year, might be brought into conformity with the new arithmetic, and a New Style inaugurated, about the year (2000) = 1128, or as much earlier as public opinion might demand. The oldest date in Arabic figures in this country is 1454, which is inscribed on a brass plate commemorating the death of Ellen Wood, in the church of Ware. The Arabic figures were not generally adopted in England till the sixteenth century.

Divisions, in twelfths, of the several units (hour, foot, pint, pound), to be called primes, seconds, thirds, fourths, &c., not discarding the additional terms half, quarter, ounce ($\frac{1}{12}$ of a pound), inch, line ($\frac{1}{12}$ of an inch), gallon, quart, drop, &c. These would be measures of convenience, but not measures of account, except when they are twelfths.

I will now illustrate this duodecimal arithmetic by a few examples.

What is the price of a load of coal, weighing 1 ton 16 cwt. 3 qrs. 24 lbs., at (10$\frac{1}{4}$d.) per cwt.? The bill would be delivered as 2,490 pounds of coal (or 2 loads, 4 gross, 9 dozen pounds), at 1s. 1$\frac{1}{2}$d. per gross (pounds). The operation is

New Method.

24
11

264
$\frac{1}{2} = 5\frac{1}{2}$ nearly

$269\frac{1}{2}$
9d. for the 9 doz. pounds

$276\frac{1}{2}$

or 2 marks 7 shillings and $6\frac{1}{2}$d.

Present Method.

1 ton 16 cwt. = 36cwt.
$10\frac{1}{4}$

360
$\frac{1}{4}$ = 9
---
12) 369
20) 30 9
---
1 10 9

for the 3 qrs. 24 lb. 9d.

£1 11 6

There is a difference of $\frac{1}{2}$d. upon the two calculations, because 1s. $1\frac{1}{2}$d. per gross is a little higher rate than $10\frac{1}{4}$d. per cwt.

What is the value of 38 ϕ44ϕ pounds of sugar at 7d. per pound?

New Method

38
7
---
218 or 2 marks 1 s. and 8d.

Present Method

44 lbs.
7
---
12) 308
20) 25 8

£1 5 8

What is the value of 132 ϕ182ϕ yards of cloth at 3s. 2d. per yard?

New Method

132
33

396
396

4136

Present Method

182 yards
3

546
3d. = $\frac{1}{4}$ of 1s. = 45 6
---
20) 591 6

£29 11 6

The hour might also be divided into twelve "beats" (or primes, a beat or prime being five of the present minutes), and the beat into twelve minutes (each equal to nearly one-half of the present minute), the minute into twelve thirds, &c.

The transfer of an old number into its corresponding new expression (when it is not a high number, say not exceeding three figures), may be accomplished in an instant by dividing by twelve, decimally, and throwing out the remainders, which form the new number. Thus—What is the duodecimal expression of 907? Answer 637; thus,

```
      7 5   R 7
12 ) 9 0 7

        6   R 3
12 ) 7 5
```

For high numbers of four figures and above, reference may be made to a series of tables, which could be prepared, exhibiting all numbers in the two notations from unity to ↊1,000,000↋, and sold for a few pence. To transfer a number in the new notation into the old notation, divide by ten *duodecimally*, and throw out the remainders, which make the old number. Fractions of a unit may be called "parts," answering to the present "decimals." To translate decimals into duodecimals, or parts, add one-fifth, cut off the first figure to the left, and continue the operation with the remainder until one figure remains: ↊3·14159265↋, the ratio of the circumference of a circle to its diameter = 3·1848094.

I would enforce the advantages of this scheme of notation by the consideration that as the shadow naturally follows the substance, so should the writing of money, or the keeping of accounts, conform itself to the money, the weight, or measure, in use, in general. It would be less trouble for the few who deal in figures to learn a new method of keeping accounts, and a new multiplication table, than for the whole nation to change its money, and all its weights and measures. An account in a ledger is, to the money which it represents, just what the money itself is to the property, houses, land, commodities, which *it* represents. It is just what written words are to spoken, and spoken words to ideas, and ideas to the affections that give them life. It is just what Nature itself is to poetry, or a man to his photograph. There is no complaint against the penny, the shilling, the pound weight, the inch, foot and yard measures, the twice twelve hours of the day, and the twelve months of the year. These have done no wrong, and caused no confusion. The trouble has arisen solely from the manner in which we combine these to make higher denominations, or divide them to make lower ones, and employ entirely different weights for a pound of tea, a pound of gold, and a pound of medicine.

Every one can aid this reform by giving precedence to the dozen over ten in all his counting. The practice of both the ten and the twelve scales by schoolboys, thus emulating the custom of our Universities, where arithmetic is practised in various scales, would be a great benefit to their reasoning and calculating powers. In thinking of what is possible in art and science, we should ever bear in mind the truism—the Future is greater than the Past.

The French system of money, weights, and measures, called the "metrical system," in which every coin, weight, and measure, is one-tenth of the next above it, is certainly superior to the English diversified system; but when we consider that to adopt it in this country we must change every coin, weight, and measure that is now in use, the question we should ask is, whether in passing from the "*good* old" system now extant in England, we should adopt the *better* one of France, or ask France to adopt the *best* from us?

On the occasion of the second reading of the "Weights and Measures Bill" in the House of Commons, 1st July, 1863, when a majority of 35 votes was given in favour of the bill, in a thin house of 185 members, the "Times" of 2nd July, in a leading article says:—

> "The very first step," in the proposed arithmetical revolution, "is the adoption of a new unit as the base of all other measures of length, surface, solidity, and weight. The unit, with-

out which it would be penal for a shopkeeper to sell the smallest quantity of tape, bread, sugar, or oil, is thirty-nine inches and thirty-seven thousand and seventy-nine hundred thousandth parts of an inch of the Imperial standard measure, and its name, we need not say, is to be 'Metre.' We will not here insist on the principle involved in adopting a basis selected on so recondite a principle as the calculation of the length of a quadrant of the earth's meridian. Why that should govern all transactions in comestibles and potables, in clothing, and every other affair of buying and selling, it is impossible to say. But we let that pass. Let one yard be as good as another. We speak on behalf of the already overworked and not very quick wits of our countrymen. We tremble to think of the softening of the brain, the confusion of ideas, the mistakes, the losses, this will occasion. How is Lord Dundreary ever to make it out? His is a much larger family than is generally supposed."

Letters from correspondents, practical men, and not deficient in arithmetical science, followed in abundance, all contending against *ten* as the repeating number of a system of money, weights, and measures. See the "Times" for July 4th, 9th (a long and powerful letter occupying three columns), 20th, 23rd, 24th, and 1st August. The last writer, "A Schoolmaster," says:—

> "Had we single marks for 10 and 11, our language and our notation would be complete in the duodecimal scale; and when the great body of the people are educated and taught arithmetic intelligently, and not by empiric rules and formulæ, the transition to that scale will most certainly come. In the meantime, to force the decimal scale on a nation which, by the light of nature, has pronounced so unmistakably against it (not one unit in the popular measures of space, time, weight, or value being divided, or bound up decimally), would be nothing short of insanity."

The "Saturday Review" of 16th May, 1857, also contains an able essay on the superior merits of a duodecimal scale of money, &c.

Spelling and Reckoning Reform

At St Martin's Town Hall, Charing Cross, on 21st May, a reception was given to a number of octogenarian teetotalers, under the auspices of the National Temperance League. It was announced that details had been received from nearly 200 octogenarian abstainers, and among the letters read was one from Sir Isaac Pitman, as follows:—

Bath, 11th May, 1896.

Dear Mr Rae,—I take pleasure in reviewing, at your request, the last sixty years of my life, that I may add my testimony to the many that will be given at your meeting in St Martin's Hall, that the drinking of diluted alcohol in the shape of beer, wine, and spirits, is the bane of civilized life. If the amount of labor, mental and manual, which is given to the manufacture, transit, and sale of alcoholic drinks were devoted to the cause of education in the reformation of our spelling, and the introduction of a natural, duodecimal or twelve notation by figures, in place of our unnatural, decimal, or ten notation, these two reforms (which would make two of the three R's—Reading, including spelling, and reckoning, or aRithmetic—toys for our children to play with and pleasant games for the exercise of reason) could be carried in about twenty years. But if people go on drinking these deleterious beverages, muddling their brains and sensualizing their minds, these two important reforms will probably not be accomplished in less than a hundred years; and all this time, learning to read and spell, and how to use the Tables of Money, Weights, and Measures, will continue to be a toil instead of a toy, and a torment instead of a pleasant game, to the millions and billions of children and teachers all over the world, who will have to learn and teach the noble English tongue, which is destined to be the one language of the world. The contemplation of it makes my heart ache. I look upon these two reforms as "fixtures" for the beginning of the next century.

I mention them here because I have spent sixty years in advancing the Spelling Reform. My hope for a Reckoning Reform, by counting dozens instead of tens, or I should say, of *writing* dozens, for the dozen and gross are more used in trade than ten and a hundred—my hope for this reform has been quickened in the past month by Herbert Spencer's letters on it in the *Times*. They are now published in a 6d. pamphlet.

I formulated a Reckoning Reform on the basis of Twelve forty years ago, used it for three or four years, advocated it in my *Phonetic Journal*, kept my accounts in it, and paged the Journal in it. The phonetic alphabet was then on the anvil, and as I could not do justice to both reforms I let the Reckoning Reform slide. A goodly portion of the brain of the English nation has now taken it up, and I hope we shall hear no more of changing our money, weights, and measures, which are mostly on a twelve basis; but instead of the intolerable confusion of al-

* Originally published in 55 The Phonetic Journal 382. (London: 11 June 1120). Text courtesy of Google Books (http://books.google.com). Originally published in Pitman's phonetic spelling; transliterated to American spelling by Donald Goodman, 1188.

tering the *value* and the *name* of every coin, weight, and measure, we shall simply change our mode of writing them, and introduce a few new coins, measures, and weights, on the present basis of value, and give them Saxon names.

I have mentioned this subject instead of dilating on the benefits of Teetotalism, on which you will have sufficient testimony from others. I have only to add my life-long conviction that the teetotal meaning of the word "Temperance" ministers a happy life, preserves health, and saves money.

If you print my letter, please give the reformed, or true, spelling in which it is written. Fairwell,

Isaac Pitman.

As noted at the beginning of each part, these articles were all originally published in different journals at different times. All but "Reckoning Reform" were originally published in Pitman's phonetic spelling; these have been rendered in standard American spelling for this collection. American rather than British spelling was chosen for this British work simply because the editor is American and is more familiar with one than the other; he sincerely hopes that this causes no ill will. This collection is set in DRM 12/15, and the entirety of the collection is in the public domain.