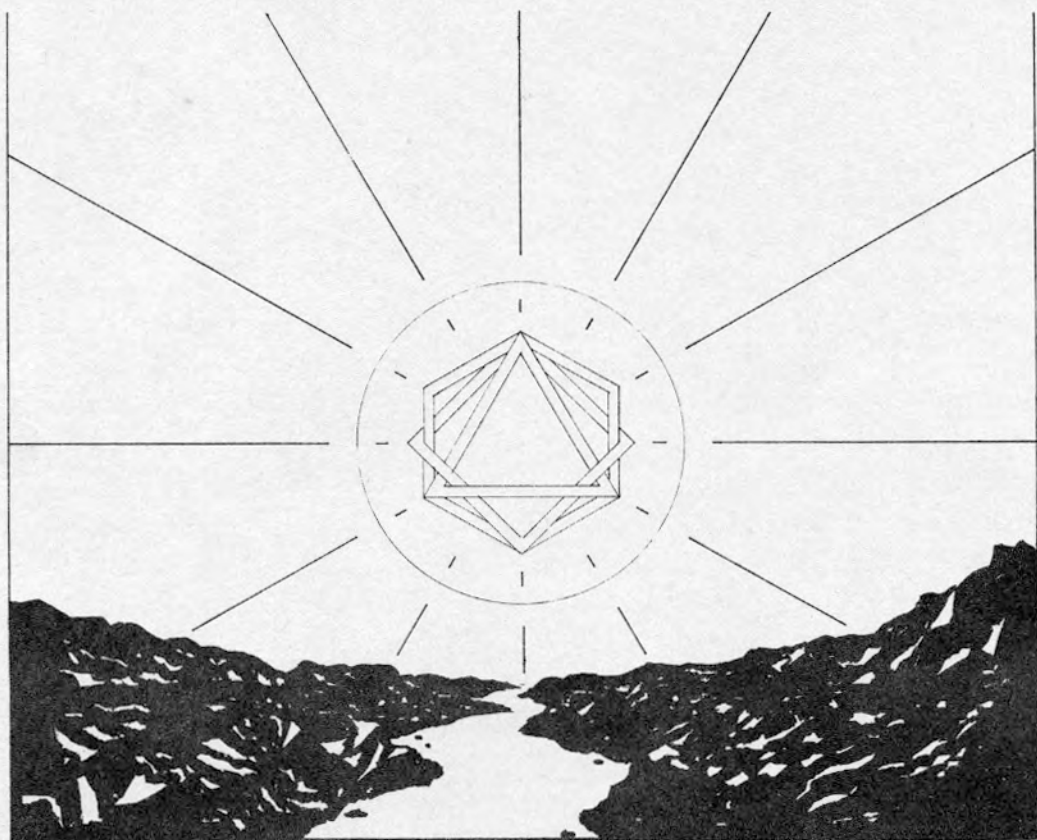


# THE DOZENAL JOURNAL



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THE DOZENAL JOURNALNumber 71199/1989C O N T E N T S

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\* \* \* \* \*

I'VE GIVEN HIM A BRAIN, SO  
THAT HE CAN LEARN, AND  
UNDERSTAND IT ALL...

- BUT WHEN YOU  
WEREN'T LOOKING,  
I GAVE HIM  
FIVE FINGERS!



EDITORIALLAND OF THE FREE?

IS THIS THE MOMENT in history at which the citizens of the United States of America finally lose that freedom from government by decree for which they fought in 1776 - and which they have so far maintained - and sink into the same lumpen, bemused acquiescence which is now so shamefully characteristic of what used to be called Great Britain?



**MORE than 14 years after legislation allowing voluntary conversion, it seems that the United States is getting serious about switching to metric measurement. The motivation, finally, is a 1992 deadline, when a law requiring the government to buy only metric products comes into force, and when America will have to compete in, and with, a United Europe.**

There have been occasions - usually during the latter half of October each year - when I have wished for a Time Machine in which to go back to that morning in 1805, to the seas off Cape Trafalgar, where the Royal Navy stood, resolute and alone, between the free,

English-speaking world and the Napoleonic hegemony which had engulfed Europe. Having presented my credentials to Lord Nelson, I could then advise him not to sacrifice all those lives, including his own, to save the liberty and independence of Great Britain, because these would be weakly given away in the future by opportunistic, craven politicians to the very powers he was about to defeat.

Americans are about to suffer the same insidious encroachments as we in Britain have had to endure; the creeping advance of alien ways and the accompanying eradication of free-thinking individuality and native culture. Make no mistake! The metric system as an option is one thing (it has been so for more than a century); but as an enforcement is quite another, being thus a profound and brutal obliteration of cultural tradition (and never forget that traditions are actually solutions to problems encountered in the past) which affects the whole population. That is a large part of the reason for its existence: the French,

at the time of the Revolution, fully understood the need to sever the people's connections with their own history; to convince them that what they had done before was wrong; to leave them insecure and dependent on the State for their ways of thinking. Abolishing not only their currency, but also the very measurements used in their everyday lives, was - and still is - an appallingly effective device for the purpose. The Bolsheviks in Russia imposed the metric system as one of their earliest acts, for just these reasons.



Nowadays, the metric screw is tightened step-by-step, driven by an administrative ratchet whose teeth are 'cut-off' dates, whereby Acts prohibiting the use of customary measures are set to activate at a future date; by which time it becomes too late to organize effective resistance. Remember the 4oz. tea-packets, which vanished just as we were thinking they had escaped, because of an Order made a year or so previously?

Children are the main - and softest - targets: teachers are often too frightened (quite justifiably) and harassed to depart even occasionally from the grimly and wholly metric syllabus; and many, regrettably, are ignorant in such matters. Local Education departments may not supply rulers showing inches: two identical metric scales are inscribed, with the other face blank. Has this act of castration occurred yet in the USA?

In this Trade Bill, America has her first cut-off date. It was signed by President Reagan; and is a case where the 'Great Communicator' failed to live-up to his reputation, for the people know little of it. They will come to know, however, as smug little bureaucratic gnomes dig themselves into the Federal Government and State Legislatures to plan the programmed seduction of the last free nation on earth from the rational modes of thought upon which her freedom and greatness are based.

\* \* \*

### METROPOLIS

I have at last been able to see the uncut version of Fritz Lang's memorable film, which depicted a dreadful future scenario of mankind controlled by the Machine. It was no accident that the sequence which emphasized this point showed a decimal clock... I have drawn this from memory (p.30), complete with stylized numerals. It is, of course, the basis of the metric system; and Lang saw the menace clearly.

\* \* \*

Please send your subs. if there is a 'D' on the address label; and, above all, try to send-in something for No.8: we want your thoughts, long or short, literary or pictorial...

The Editor.

## Land buyer misses the point

AN ASIAN who thought he had secured a "beautiful piece of Berkshire" for £1,400, large enough on which to build a house, found himself the owner of a flower-bed measuring 43 square feet.

A missing nought in the auctioneer's brochure apparently led him to believe that he was bidding for 0.01 of an acre of land at Thatcham, near Newbury, instead of 0.001.

THIS CUTTING, from a recent DAILY TELEGRAPH, shows how an easily-made error in decimals led to the purchaser of a plot of land buying 43 square feet at a price for which he thought he was getting ten times that amount (0.001 of an acre instead of 0.01).

Since becoming a member of the Dozenal Society recently, I have read through the back issues of periodicals published by the Society, and have given some thought to the theories promoted in them.

In the first place, it seems to me conclusive - as I already believed - that the switch to decimalization in coinage and measurements is completely unsound from a number of different points of view, and is categorically a retrograde step.

In the second place, however, whilst I am very pleased to be a member of the Society, I have also formed the view that the proposal to switch from a decimal to a duodecimal counting system is also misconceived; or at least it would be if it were accompanied by a return to traditional systems of measurement, which is what I gather the Society has in mind. I do not think that the objection that I have to the duodecimal system has ever been raised in any of the Society's publications, so perhaps it would be helpful if I state it now.

The traditional methods for measuring money, distance, area, weight, volume, time and anything else one can think of vary widely: they include divisions into 2, 3, 4 (gills to a pint), 6, 8, 12, 14, 16, 20, 22, 60, 360, 640 (acres to a square mile), 1760, 2240 (pounds to a ton), 6080 (feet to a UK nautical mile) and, no doubt, many more. However, there

is one thing they seem to have in common: none of them is a division by ten (and even if one or two such can be located, they will not invalidate the general rule).

Obviously, this omission is not because nobody ever thought of using ten. Our ancestors must have fully appreciated that ten was not a convenient number; and almost equally obviously there must be a reason why people intelligent enough to avoid ten-division for measurement did not, generally, avoid it for counting. Why?

Someone has suggested to me - validly, I think - that, whatever measurement system might be used, it should be different from the counting system. There would be good reason for this because, with the same system for measuring and counting, the chances of having the sort of accident reported in the TELEGRAPH cutting (or the kind noted in one of the Journals, whereby a life was lost because of a drug overdose resulting from decimal-point error) might become too common to be acceptable.

So, now we can see the problem of the duodecimal system. There would be no objection to it if all the other measures were kept decimalized; but if they were not, and some of them were to consist of divisions into twelve units, as did many of the traditional ones, there would be precisely the same risk of irritating, costly and potentially disastrous mishaps that exists at present with measurements having the same divisions as the counting system. I should add that, although I said that there would be no objection to duodecimal numbering if measurements stayed decimalized (and that is true as far as it goes), there is, nevertheless, a strong objection to measurements' so remaining; and this is because, as the Society's periodicals have proved over and over again, measures based on ten-units are very inefficient.

That summarizes my case, and I hope I have set it out clearly. I look forward to any observations on it that anyone may care to make.

\* \* \* \* \*

Mr. Gwynne's article was sent to two senior members for their comments, which are reproduced here in slightly abridged form.

### Shaun Ferguson

What Mr. Gwynne is driving at is that though a basal system of measures is logical, it is the 'illogical' patterns in our traditional units that prevent accidents, since units are distinctly named, and so there is no 'point' (dozenal or decimal) to misplace. The methods of dividing units do not follow any consistent pattern (though halving predominates), since many units "just grew" and some arose from the amalgamation of different systems.

If we want to avoid problems that arise from misplacing the point then we need only make sure that each subdivision in common use has a distinctive name; purists might disagree, and Tom Pendlebury would not have been happy, but I see no reason why the zenigrafut\* should not be called 'inch' and the divisions O'Ol Gf 'line', O'OOl Gf 'point' or whatever. Commonsense and simplicity should take precedence over rigid rules. This is also the argument for a set of 'popular' names for everyday use - 'pint', 'ounce', etc. Scruples, drachms and grains cannot be confused (as can the points), and from the general public's point of view would be simpler.

The other question Mr. Gwynne raises is why grouping in tens was acceptable to the ancient world, but not division by ten. Division being most apparent in the market-place, it is not surprising that division by 2 or 3 was more common (being more useful) than division by 5 - so we find sixteen or twelve as frequent divisors for sub-units. The only civilization to have consistently applied decimal divisions is the Chinese.

Should the method of dividing in the measuring system be the same as in the counting system? Mr. Gwynne thinks not. It never mattered to the man in the street that £1 was 240d. (if indeed he ever thought of it in that way). It is convenient and tidy to rationalize all to one base; but it isn't really necessary... The important thing is that there should be no way of confusing units, whether by mishearing a word (metre...litre) or misplacing a point, particularly where such an error - in medicines - can mean death or serious disablement.

As for the man with his 0.01 or C.OOl of an acre - well, would he have understood had fractions been used instead? The use of square yards would have been more sensible, but how many salesmen make things easy to visualize?\*

\* Or O'l of whichever foot is finally established. -Ed.

\*\* I think square yards are now illegal for land use. -Ed.

### Arthur Whillock

It is an important and interesting point that Mr. Gwynne has raised, but the reasons for ignoring multiples and divisions of ten when systems of weights and measures were becoming established may have been

because there were few of the latter. Most of the values mentioned had historical derivations based on established practices or needs, with some regard to the properties of numbers.

For example: the furlong, or furrow-length, was the distance an ox could pull a plough with short rests while it was being turned round. This was 200 Northern yards, which became 220 English yards. Since the furlong was also 40 rods, and the acre an area of 40 rods by 4 rods, the rod now became  $5\frac{1}{2}$  English yards, and the acre 1 furlong by one-tenth of a furlong.

Following this, the Roman mile of eight stadia was - keeping the notion of eighths - changed to the Statute mile (Elizabeth I) of eight furlongs. Hence the acre now fitted the square mile (1 sq. mile = 640 acres).\*

English weights and volumes have been varied even more than have lengths, by being subject to commercial pressures and the need to relate to standards of other trading areas. The whole subject requires a substantial book to do it justice (and such are available).

Time, however, as a cyclical measure is associated with angular measurement and navigation: its sexagesimal base derives from ancient Sumerian practice. Attempts to incorporate time into the decimal-metric system by ardent metricists have so far failed; but they are still trying to introduce a decimal clock. Until then, if you travel one minute-of-arc on a great circle of the earth (a distance of 6080 feet, or nautical mile) in one hour, your speed is one knot.

Imperial measures - such as the foot-pound-second system for technical calculations - do have the merit of being self-checking (errors become more apparent when important factors are not powers of the base); and such recommended metric approximations as taking the value of 'g', earth acceleration, as ten instead of 9.81 can even confuse different physical entities (weight and mass).

Even so, a measuring system that is integrated with its numbering scale has advantages for technical calculations, particularly where size-order is as important as size, and for thermo-electric concepts which are outside normal experience. Thus decimal-metric has acquired 'squatter's rights' on technical and scientific work, to the exclusion of practical everyday needs: difficulties in co-ordinating a numbering scale with usable measures have been transferred to the less sophisticated of us; just as decimal currency favoured money-counters at the expense of money-users.

The merit of a dozenal scale is that it can combine regular size-orders needed by science with a facility for branching-off at moderate levels to obtain manageable quantities, plus the ability to allow concise representation of the primary ratios that occur so often in all our affairs and in mathematics.

\* But note also the touch of practical genius in that figure of 5280 feet: in the first twelve numbers, only 7 will not divide the mile exactly. - Ed.

CORRESPONDENCE appears occasionally in 'THE TIMES' under the general heading: 'Measure for Measure' in which resentment against creeping metrication is well to the fore. The example given here, from 2 September 1988, shows how a doctrinaire pursuit of uniformity, plus an arrogant dismissal of practicalities, is not only irrelevant but is also costing us dear. I can add that when abroad I like to inspect building sites for the latest practices: pipework

## Inching forward

From Dr J. H. Millar

Sir, You report (August 25) that the US is on the way to going metric. It is important for Britain to know whether they will adopt the European plumbing sizes — which were based, of course, on the English inch sizes, because they were standard throughout Europe for many decades — or whether they will adopt the new British metric standards which are not the same.

For many years our French plumber always spoke in the French words for the English sizes: *demi-pouce* (for half-inch); *pouce* (for one inch); *pouce et demi* (for inch and a half).

After we went metric and our French plumber received his first delivery of the newly-sized British valves, he came to me in despair. They would not fit on the French-made English-sized piping. Three months later he was all smiles, and back in business with the old, English-sized valves — made in Japan!

The value of all European business we have lost must run into many millions.

Yours sincerely,  
J. H. MILLAR,  
19 Boulevard de Suisse,  
Le Schuykill,  
Monte Carlo 98000,  
Monaco.

for water, etc., is invariably inch-based as regards fittings (for example, a small tap bought in an Italian store, and threaded 3/8" BSP).

The inch is a tactile unit that has a life of its own, forming as it does a basis for the sizes of many everyday objects and engineering fittings. With its binary, dozenal and decimal divisions a wide range of readily-visualized dimensions and intervals can be defined. The binary divisions from halves to sixty-fourths form a helpful 'decision-maker' for the draughtsman and, within the foot, mid-, third- and quarter-points can readily be obtained (regular requirements in design work). A metric 'inch' of 25mm now helps to keep the facility going but lacks the range of divisions needed for comprehensive use.

Screw-threads in both British and American systems are designated as so many threads-per-inch, forming a Renard (R20) series. The centimetre is too small to serve as a dividend (and in any case its use is deprecated in pure S.I.). Metric threads are defined by their pitch in millimetres to two decimal-places, which masks any systemic meaning that may be present.

For accurate measurement the inch micrometer is a tool

much favoured, with direct divisions down to thousandths of an inch. In normal good class work, 'half a thou' is, perhaps, the smallest variation that can be appreciated by 'feel' or visually; closer finishes need special equipment for machining or measuring. A dozenal micrometer would have as its smallest scale reading the equivalent of half a thou. Metric micrometers - made in 25mm steps, be it noted - have direct readings down to 1/100mm: approximately a quarter of a thou. By quoting sizes in this range, components would be specified to a greater degree of accuracy than commonly justified.

| FRACTION | S.W.G.<br>MORSE | M/M | DECIMAL | TAPPING<br>SIZE FOR |       |      | CLEARING<br>SIZE FOR |       |      |
|----------|-----------------|-----|---------|---------------------|-------|------|----------------------|-------|------|
|          |                 |     |         | B.A.<br>WHT.        | BRASS | M/M  | B.A.<br>WHT.         | BRASS | M/M  |
| 1/2      | 41              |     | 0.500   | 1/2                 |       | 12.7 | 1/2                  |       | 12.7 |
| 1/2      | 40              | 2-5 | 0.508   | 1/2                 |       | 12.8 | 1/2                  |       | 12.8 |
| 1/2      | 39              |     | 0.516   | 1/2                 |       | 12.9 | 1/2                  |       | 12.9 |
| 1/2      | 38              |     | 0.524   | 1/2                 |       | 13.0 | 1/2                  |       | 13.0 |
| 1/2      | 37              |     | 0.532   | 1/2                 |       | 13.1 | 1/2                  |       | 13.1 |
| 1/2      | 36              |     | 0.540   | 1/2                 |       | 13.2 | 1/2                  |       | 13.2 |
| 1/2      | 35              |     | 0.548   | 1/2                 |       | 13.3 | 1/2                  |       | 13.3 |
| 1/2      | 34              |     | 0.556   | 1/2                 |       | 13.4 | 1/2                  |       | 13.4 |
| 1/2      | 33              |     | 0.564   | 1/2                 |       | 13.5 | 1/2                  |       | 13.5 |
| 1/2      | 32              |     | 0.572   | 1/2                 |       | 13.6 | 1/2                  |       | 13.6 |
| 1/2      | 31              | 3   | 0.580   | 1/2                 |       | 13.7 | 1/2                  |       | 13.7 |
| 1/2      | 30              |     | 0.588   | 1/2                 |       | 13.8 | 1/2                  |       | 13.8 |
| 1/2      | 29              |     | 0.596   | 1/2                 |       | 13.9 | 1/2                  |       | 13.9 |
| 1/2      | 28              | 3-5 | 0.604   | 1/2                 |       | 14.0 | 1/2                  |       | 14.0 |
| 1/2      | 27              |     | 0.612   | 1/2                 |       | 14.1 | 1/2                  |       | 14.1 |
| 1/2      | 26              |     | 0.620   | 1/2                 |       | 14.2 | 1/2                  |       | 14.2 |
| 1/2      | 25              |     | 0.628   | 1/2                 |       | 14.3 | 1/2                  |       | 14.3 |
| 1/2      | 24              |     | 0.636   | 1/2                 |       | 14.4 | 1/2                  |       | 14.4 |
| 1/2      | 23              |     | 0.644   | 1/2                 |       | 14.5 | 1/2                  |       | 14.5 |
| 1/2      | 22              |     | 0.652   | 1/2                 |       | 14.6 | 1/2                  |       | 14.6 |
| 1/2      | 21              | 4   | 0.660   | 1/2                 |       | 14.7 | 1/2                  |       | 14.7 |
| 1/2      | 20              |     | 0.668   | 1/2                 |       | 14.8 | 1/2                  |       | 14.8 |
| 1/2      | 19              |     | 0.676   | 1/2                 |       | 14.9 | 1/2                  |       | 14.9 |
| 1/2      | 18              |     | 0.684   | 1/2                 |       | 15.0 | 1/2                  |       | 15.0 |
| 1/2      | 17              |     | 0.692   | 1/2                 |       | 15.1 | 1/2                  |       | 15.1 |
| 1/2      | 16              | 4-5 | 0.700   | 1/2                 |       | 15.2 | 1/2                  |       | 15.2 |
| 1/2      | 15              |     | 0.708   | 1/2                 |       | 15.3 | 1/2                  |       | 15.3 |
| 1/2      | 14              |     | 0.716   | 1/2                 |       | 15.4 | 1/2                  |       | 15.4 |
| 1/2      | 13              |     | 0.724   | 1/2                 |       | 15.5 | 1/2                  |       | 15.5 |
| 1/2      | 12              |     | 0.732   | 1/2                 |       | 15.6 | 1/2                  |       | 15.6 |
| 1/2      | 11              |     | 0.740   | 1/2                 |       | 15.7 | 1/2                  |       | 15.7 |
| 1/2      | 10              |     | 0.748   | 1/2                 |       | 15.8 | 1/2                  |       | 15.8 |
| 1/2      | 9               | 5   | 0.756   | 1/2                 |       | 15.9 | 1/2                  |       | 15.9 |
| 1/2      | 8               |     | 0.764   | 1/2                 |       | 16.0 | 1/2                  |       | 16.0 |
| 1/2      | 7               |     | 0.772   | 1/2                 |       | 16.1 | 1/2                  |       | 16.1 |
| 1/2      | 6               |     | 0.780   | 1/2                 |       | 16.2 | 1/2                  |       | 16.2 |
| 1/2      | 5               |     | 0.788   | 1/2                 |       | 16.3 | 1/2                  |       | 16.3 |
| 1/2      | 4               | 5-6 | 0.796   | 1/2                 |       | 16.4 | 1/2                  |       | 16.4 |
| 1/2      | 3               |     | 0.804   | 1/2                 |       | 16.5 | 1/2                  |       | 16.5 |
| 1/2      | 2               |     | 0.812   | 1/2                 |       | 16.6 | 1/2                  |       | 16.6 |
| 1/2      | 1               |     | 0.820   | 1/2                 |       | 16.7 | 1/2                  |       | 16.7 |

The table reproduced here (in part) was sold in folder form for 6d. by a popular chain store in the days when an engineer had an unquestioned range of rational sizes at his disposal. It displays clearly the relationships between inch-based drills, gauges and fixings that are still available in tool shops for use by discerning mechanics (myself included) when a wide range of closely-related sizes is required.

The British Standard Wire Gauge was simplified from the older Birmingham Wire Gauge to a series of uniform differences in size: a plot of diameter versus gauge-number being in short groups of

straight lines with overall trend an R20 series. Morse twist drills - American in origin - are in an R80 series for the 'numbered' sizes and are useful by bracketing both binary-inch and SWG sizes, thus enabling either a free or tight fit to be obtained.

## NOTABLE QUOTES

"The requirements of ordinary life in Babylonia, as everywhere else, demanded the use of the common fractions of a measure, in this case  $\frac{1}{2}$ ,  $\frac{1}{3}$  and  $\frac{1}{4}$ ."

"But why precisely twelve? The importance of this number in the daily lives of common people, in commercial transactions, and in legal affairs is probably due to its easy divisibility in so many ways..... The commonly used fractions of the tylft or the shilling could all be expressed in terms of whole numbers of pennies:

|               |               |               |               |               |               |   |
|---------------|---------------|---------------|---------------|---------------|---------------|---|
| $\frac{1}{2}$ | $\frac{1}{3}$ | $\frac{1}{4}$ | $\frac{3}{4}$ | $\frac{2}{3}$ | of a shilling | " |
| 12            | 6             | 4             | 3             | 9             | 8 pennies     |   |

Both the above from Karl Menninger: Number Words & Symbols  
(M.I.T. Press 1969, 1970, 1977.)

\* \* \*

"The Government has no intention of imposing compulsory metrication. Their (sic) policy is to allow those industries who wish to go metric to do so. The factors which determine whether it is advantageous to trade and industry to change to metric measures vary as does the optimum time for making any such change. These decisions are better left to the judgment of the enterprises concerned, who are in the best position to assess the costs and benefits."

(Letter from the Department of Trade and Industry, May 1985)  
Fact: the sale of goods by oz. and lb. will be illegal by 1995.

\* \* \*

"The 'Spirit of the 60s' was a noxious wind which blew across the face of civilization, leaving it pock-marked and disfigured; destroying in its wake the last vestiges of innocence and decency, elegance and sanity. It changed nothing which it did not change for the worse. Before the 60s there was, albeit on its last legs, a civilization of which, with many reservations, I could have consented to be a part. After them there was not; and to this day there is not. It is as simple as that."

(A young correspondent, to THE ROMANTIC magazine.)

\* \* \*

# POINT, LIGN & PICA

## Dozenal Words

Troy

IT IS SOMETIMES very hard, when looking back to events at the end of the eighteenth century, to forgive the French for their facile retreat into decimals. Although French measures were rather chaotic - by comparison with English measures, which were already quite organized on a national basis in those days - there was in existence a recognized Paris unit, called a toise (Toise de Perou), which was six French feet (pieds) long. Each pied was twelve French inches (pouces) and each pouce was twelve lignes; and so was not dissimilar to the English measures: 1 yard equals three feet, each foot equals twelve inches and each inch has twelve ligns\*.

Thus, there was a duodecimal system of length units in place, which merely needed standardizing (indeed, even when the new metre was legalized, it was subdivided into three (new) pieds of twelve pouces each - to avoid antagonizing the population - and it was not until 1840 that the decimal trap was finally sprung for compulsory public use).

The deliberate casting-aside of this historic chance to reinforce the steady development of dozenal measurement becomes even more disgraceful when one learns that the new survey of the Dunkirk-Paris-Barcelona arc (to check the previous survey of 1739 and thence to establish the length of the metre) was begun by the measuring of two base-lines, using a double-toise unit. This double-toise was twelve feet long; so, with each foot being twelve inches and each inch being twelve ligns, there was a duodecimal system with four orders of magnitude actually in use... Think about it. These measurements were meticulously noted and added, in perhaps such a table as this:-

|       | Double-toises | pieds | pouces | lignes |
|-------|---------------|-------|--------|--------|
| A     | 3             | 9     | 10     | 4      |
| B     | 5             | 6     | 1      | 9      |
| A + B | 9             | 4     | 0      | 1      |

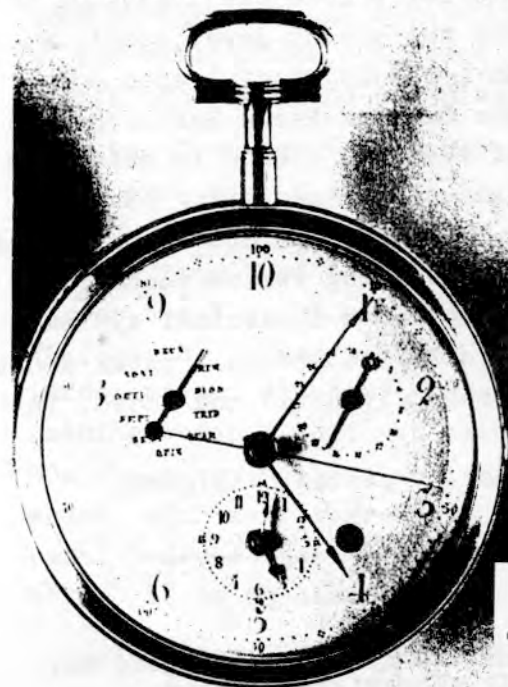
\* I have adopted this alternative spelling to avoid any confusion with 'line'. It abbreviates to 'lg.'

The table needs only the '10' to be written as a single symbol to be a wholly base-twelve addition. The French were the most powerful nation in continental Europe and could so easily, at that moment in history, have instituted duodecimal numbering. Instead, the Napoleonic Empire imposed the metre upon such of Europe as was dominated by France - which, by 1812, was most of it.

Thus, led by a combination of hot-headed revolutionaries determined upon change for its own sake and ambitious academics whose contact with the practical world was slight, the governments of Europe began the retreat into decimals and the abandonment of the lessons of history and reason. Professor Connor, in his (pro-metric) "Weights and Measures of England", admits that "The pressure to go metric.....was aimed at facilitating computation and accounting procedures." Not, one notes, to facilitate actual weighing and measuring.... So the tail wags the dog.

It is no little pleasure, therefore, to discover that the decimal steamroller missed a bit. No, not time and angle: these were changed in France (which is not surprising, seeing that it was precisely the decimalizing of angular measure which underlay definition of the metre) to the decimal clock and Grade protractor which, though withdrawn

temporarily as a result of confrontation with established usage, are merely waiting 'on the back burner' until the kilometre is adopted as the unit for navigation (schoolchildren are being taught NOW to use only kilometres in navigation problems and geographical exercises).



A silver decimal watch, made by Berthoud Freres, Paris, during the French Revolution. It follows the Republican calendar which had twelve months of thirty days and divided the day into ten hours of 100 minutes. The Republican decimal system lasted only a year (1793-1794).

The practice which did survive in an unmolested state was - and is - the Didot point (corps) system of typographical measurement used for printing throughout continental Europe.

Movable-type letterpress printing had, since its inception by Gutenberg and Fust (c.1450), developed into a competent and well-understood technology by the time of the French Revolution. Presses were, of course, still hand-operated; but the principles of type-casting were fully established, as was standardization of type sizes and styles: compositors set separate letters into lines of type, lines into pages in a chase, printed a proof, corrected it as necessary and then set up the press to print from two to sixteen pages at a time on each sheet of paper according to the page sizes needed. The paper - printed on both sides - was then folded appropriately, set into the book, etc., and the edges cut to separate the leaves.

An interesting aspect of this folding is that although usually a binary operation (2, 4, 8, etc., called folio, quarto, octavo...) because folding into halves is simple, it was also observed that folding into threes is feasible (see Journal 1, p.53), and so there is a twelve-page-per-side format, called duodecimo. (There never has been a decimo size, of course: ten is far too awkward a number for paper-folding, as it is for almost everything else.)

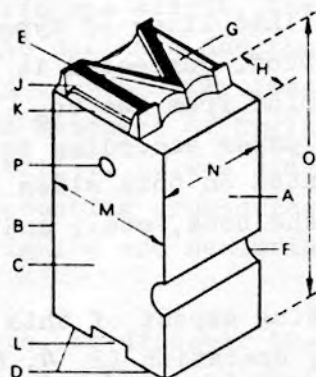
|   |    |       |   |
|---|----|-------|---|
|   | 2  | 11,12 | 1 |
| V |    |       |   |
|   | 11 | 21,11 | 2 |
| R | 6  | 17,16 | 7 |

|   |    |       |   |
|---|----|-------|---|
|   | 10 | 11,20 | 1 |
| R |    |       |   |
|   | 6  | 11,16 | 4 |
| V | 8  | 15,18 | 5 |

The two sides of a sheet to be printed and folded duodecimo. A booklet of two dozen pages results after cutting.

Each letter of movable type is formed on one face (the type face) of a metal block called a type body. Thus, each line of print involves a row of such

blocks. Successive lines of type can be set one upon the other (solid) to give the minimum spacing between lines, or separated by metal strips (leaded) to increase line-spacing. The minimum spacing, therefore, is determined by the size of the type body; and it is this body size that is measured by the point system (the actual letter is smaller than the body, of course), so that the point size gives the spacing of successive lines of print at minimum setting.

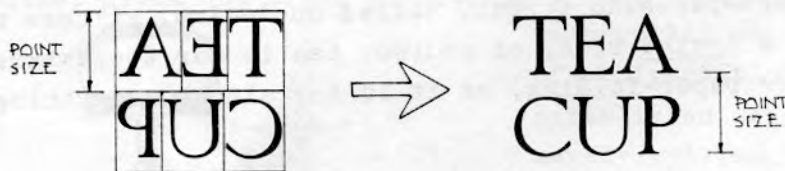


### A TYPE BODY

(Diagram: Everyman Encyclopaedia)

|                    |                                                                                                                                                                                                               |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A Front (of body)  | L Groove                                                                                                                                                                                                      |
| B Back (of body)   | M Point size                                                                                                                                                                                                  |
| C Shank            | N Set width                                                                                                                                                                                                   |
| D Feet             | O Height to paper (distance from the surface on which the feet of the type rest to the face, i.e. the surface which takes the ink and prints the paper) equals 0.918 in (23.32 mm approx.) (British standard) |
| E Face (of letter) | P Pin mark                                                                                                                                                                                                    |
| F Nick             |                                                                                                                                                                                                               |
| G Counter          |                                                                                                                                                                                                               |
| H Beard            |                                                                                                                                                                                                               |
| J Bevel            |                                                                                                                                                                                                               |
| K Shoulder         |                                                                                                                                                                                                               |

Type and Typesetting.



The European (continental) point system presently in use was instituted by Francis-Ambroise Didot (1730-1804) as a numerical standardization of type size (though he was not the first to think of it, as we shall see) to replace a range of sizes which had evolved during three centuries of printing, but which were simply known by names (Pearl, Brevier, Pica, Paragon, etc.) and stood thus in need of precision for use in the composition of such as books and newspapers to a more rigorous standard of presentation. This exactness of sizing was a final stage in the specification of type (as opposed to its production and manipulation), however,

since the design of typefaces was well advanced by the time Didot came upon the scene; and a brief chronology of some of the important typographical events may now be of interest.

Printing from a figured block has been known since antiquity and is still the method used, in essence, for the reproduction of such as pictures, maps and diagrams, whether by means of woodcuts, linocuts, copper plates, lithography, etc., whereby the original is cut/drawn by hand and may be used to produce single-page illustrations, titling patterns, wallpapers and so on. Carving a page of script, however, is an appallingly laborious task - far more difficult than writing - and has been done but rarely: books, until the middle of the fifteenth century, were handwritten. What Gutenberg saw was that it should be possible to carve a very small block with a single letter on it, then find a method of mass-producing such blocks, or types, from the original, so that whole pages of (type)script could be set by assembling these separate types in a suitable frame (forme), printing as many copies as required and then dismantling back into separate types for re-use.

So, a punch, or patrix, was first made (by hand, the hard way) for each letter in reverse form; this was then used to impress a matrix of softer metal (copper, for example) which, in turn, formed one end of an adjustable mould in which a type could be cast from molten alloy to a standard height and with a face carrying an exact duplicate of the original punch. That, essentially, is still how hot-metal type is made: the process is mechanized and matrices are usually cut rather than punched; but the principle is the same.

The typescript printed by Gutenberg's office in Mainz was based upon the Gothic handwriting of the time, which had become heavily stylized away from Roman forms. (Those who wonder why the DSGB uses something like an inverted '2' for ten may note the shape of the Gothic 'T', here shown. The Gothic face spread in Germany and thence to England, where William Caxton, who had been instructed by Ulrich Zell of Cologne, produced (1477) the first book ever

printed in England - and in English - which bore the title: "The Dictes and Sayengis of the Philosophres". The Wars of the Roses were still being fought, and the robust Tudor times about to dawn; so, did Caxton have a shrewd eye for a best-selling title, or did this widely-circulated, printed book play a part in the literary flowering which, a century later, produced William Shakespeare? Wynkyn de Worde, Caxton's foreman, took-over the business when Caxton died: his output, though mostly unremarkable, was prolific and certainly so put about the notion of public access to literature.

\* \* \*

Meanwhile, however, Nicolas Jenson, who had been sent by Charles VII of France to learn printing at Mainz, set up his printing-house in Venice. Here he designed and cut, in about 1460, a fount of type whose letter-forms reached back to earlier epochs: it used the fine capital letters exemplified on Trajan's Column and what are now called 'lower-case' letters based on the Carolingian script of the ninth century. This remarkable creation, soon known as Roman typeface, formed the basis of all subsequent Western typefounding; and is a perfect example of how it is sometimes necessary to search the past to find how to improve upon the present (Who knows? One day, someone may rediscover shillings...).

#### ROMAN CAPITALS

Classic letters found cut in marble at the Forum of Trajan. J, U and W were added some time later.



Next, we find Francesco Griffo, an Italian inspired by Jenson's Venetian work, who made not only an improved Roman face - called Bembo - but also the first Italic face (based on the sloping Italic handwriting developed during the Renaissance). Eighteen years later, Richard Pynson introduced the Roman face to England, including ligature types (the diphthongs æ and œ) as single units; and another half-dozen years brought Italic type to England.

#### EARLY ITALIC HAND

(Though in this case the sample is from Spain.)

~ Bastarda grande llana. ~  
 Obsecrote domina sancta  
 Maria mater Dei pietate  
 plenissima, summi regis fi-  
 lia, mater gloriosissima, m<sup>a</sup>-  
 ter orphanorum, consola-  
 tio desolatorum, via erran-  
 tium  
 Franc<sup>co</sup> Lucas lo escreuia en  
 Madrid año de MD LXX

The work of Claude Garamond, c.1550, resulted in Roman and Italic typefaces of such clear elegance as to displace the Gothic face from virtually every European country except Germany (where it persisted at least until 1940); and further French progress was made by Christopher Plantin, who established his office in Antwerp five years later, again designing Roman and Italic alphabets. When Robert Barker, in 1611, printed the first Authorized (King James) Version of the Bible, it may well have been set in Plantin type, which had almost certainly been used for printing Shakespeare's earlier works (Love's Labour's Lost, 1591). The first collected edition of Shakespeare, printed by Messrs. Iaggard & Blount in 1623, would have been set in either Plantin or Jean Jannon's recut version of Garamond, both of which still exist in use.

It is inconceivable that, after nearly two centuries of development, some classification of print sizes would not have been attained; and indeed it was so. The English, in their pragmatic way, had begun to order the named sizes numerically: Pica was, and is, the name of a good-sized book type, readily legible and suitable for use as a reference. ('Pica' seems to have the same Latin root as 'maggie' and 'piebald', meaning 'black-and-white.') Looking at some of the old names, we find:

|                       |   |                      |
|-----------------------|---|----------------------|
| Gem                   | = | 1/3 pica             |
| Nonpareil             | = | 1/2 pica             |
| Pica                  | = | about 1/6" body size |
| Great Primer          | = | 1½ pica              |
| Two-line pica         | = | 2 pica               |
| Two-line Great Primer | = | 3 pica               |
| Canon                 | = | 4 pica               |
| Five-line pica        |   |                      |
| Six-line pica         | = | about 1" body size.  |

The design of typefaces is of necessity largely a matter of art. Letters are designed on an aesthetic basis: they must look right, read well and harmonize with each other to make a pleasant, relaxing image on the printed page. The printed matter, it has been said, must not come between author and reader, but rather should unobtrusively and effectively connect the two. Nevertheless, ideal proportions can often be rigorously analysed; and to this end Louis XIV directed the French Academy of Sciences in the 1690s. With the sensible approach to matters of proportion which was quite common in those days before measurement became a political matter, and was based on reason, the Academy designed letters on a square, subdivided each way by four dozen... The resulting grid, with its comprehensive choice of ratios, afforded adequate proportioning and the resulting typeface, called 'Romain du Roi' was cut and cast into type by Philippe de Fouchy in 1702.

Further progress in design was now to come in England. William Caslon (1692-1766) and John Baskerville (1706-75) both produced Roman and Italic faces of great excellence. Caslon, in particular, produced a face he

called 'Pica Roman No. 1', cut in 1730, of which we shall hear more later. Baskerville not only cut his own typefaces but also made-up his own ink and developed a technique for glazing paper by hot-pressing between copper plates. Both men are remembered today in the names of their typefaces.

\* \* \*

The human eye is particularly perceptive of changes in area. Two adjacent straight lines with a minute difference in length may appear at a glance to be about the same; but if squares are erected on the lines, the difference, now in two dimensions, becomes apparent. So, a typeface which is very slightly different in height from another looks distinctly larger or smaller. This effect is well-known to typographers: a named face called 'Small Pica' is merely a six-dozen-th part of an inch lower than Pica, but is nevertheless convincingly smaller. The gradation of type sizes, therefore, needs a fairly fine unit if one is to avoid fractions, yet also one which is not so small that a single unit is imperceptible. In other words, a 'tailor-made' unit that fits the work is required for efficiency. (Why is it that nobody seems able to explain this to the metric jackasses in the government?)

The first 'point' system was devised by Pierre-Simon Fournier in 1737. He took two (common) French inches as a maximum body-size for ordinary type and divided this into one gross of equal parts, which he called points. The common French inch was very close to the English inch in those days, and six dozen Fournier points come out at 0'22 in. (0.986 in decimal terms). Twelve-point Fournier type approximated to English pica.

The stage was now set for the entrance of M. Didot, who was mentioned earlier. The Didots were a successful family of typefounders, supplying a large sector of the printing market. Francois-Ambroise saw, if I may be forgiven, that Fournier had a point with his system; but decided that such measurements were better tied to the legal French inch, based on the Toise de Perou. This legal (Paris) inch was larger than the common one used by Fournier

and larger, too, than the English inch (by just over one-sixteenth). A type-body size of two lignes - one-sixth of the legal inch - was, and still is, a cicero. The cicero is twelve Didot points and the Paris inch six dozen Didot points. By 1775, Firmin Didot (Francois' son) was producing all the company's typefaces to this scale; and the system soon became standardized, first throughout France and subsequently over most of continental Europe as France gained dominance during the early part of the nineteenth century. It was unscathed by the inception and later imposition of the decimal-metric straitjacket after the French Revolution and remains so to this day as the standard for printing-type in Europe. (We may draw some wry amusement from the thought of imperious metric decalogues, emanating from Paris during the 1790s and again in the 1840s, being printed and published via an entirely dozenal system calibrated from a French inch...)

|                |                 |
|----------------|-----------------|
| 6 Didot points | = 1 ligne       |
| 2 lignes       | = 1 cicero      |
| 6 ciceros      | = 1 Paris inch. |

\* \* \*

These Continental developments were noted by, but failed to enchant, English printers: the original Fournier system had almost fitted the English inch, but Didot's was different; and an industry thriving in an England free of French dominion was not inclined to destroy its massive investment in the named sizes and start again to an alien standard. The English-speaking world - for we must now include the new, expanding United States of America - was content to remain for the time being with the status quo.

Even before the War of Independence, printing was well-established in the American colonies, using type imported from England. Benjamin Franklin himself had run a successful printing business from 1728 to 1748, prior to devoting his life to public service, and he it was who brought from England the Caslon type in which was printed the Declaration of Independence. It was, moreover, American innovators who brought forth most of the next phase in the history of printing: mechanization during the nineteenth

century. Development of the great printing machines is well documented elsewhere and can no more than briefly be touched-upon here.

The London TIMES was printed on a cylinder press by steam-power in 1814, using hand-set type. An American, Bruce, came-up with a practicable type-casting machine in 1838 (type was made-up as required from stocked matrices, then melted-down again for re-casting). 1846 saw the first rotary press, invented by Richard M. Hoe, which - with many improvements - eventually became universal for the printing of newspapers. High-speed type-casting combined with composition resulted from the work of Mergenthaler and Tolbert Lanston - both Americans - who invented respectively the Linotype machine (1886) and the Monotype (1896). These, and many other developments - both sides of the Atlantic - meant that mechanization of letterpress printing was more or less completed by the turn of the century.

Of course, during this period of expansion and innovation, various suggestions had been made regarding a typographical measuring-scale for Anglo-American use; but none found general acceptance. Didot sizes were largely incompatible with named sizes, as already noted. However, in 1871 fortune - or misfortune - precipitated the matter. The great type-foundries of Marder, Luse & Co., on which much US printing depended, were destroyed in the Fire of Chicago. Reconstruction afforded an opportunity which was boldly grasped. Caslon Pica No.1 type was found to have a body-size very close indeed to one-sixth of an inch (six picas equal 0'425 in. dozenal, or 0.996 in. decimal) and was taken as a standard: 'pica one' became twelve-point in the new US scale, thus giving six dozen points to the inch.

(It is of interest to note that the metric system was carefully considered at this juncture, but was rejected as unsuitable: a millimetre is too big as a size-interval and one-tenth of a millimetre (whatever would one call it?) too small. 'Metrication' would have resulted in decimal fractions or unnecessarily large numbers at every stage.)

So it was done. In 1898, the

British typefounders officially adopted the American standard (which, remember, was based on an English type-body) and the Anglo-American point system we have today gradually became established throughout the English-speaking world. Here, by way of interest, is a table of the old English names for type bodies and their approximate point equivalents:

| <i>Name</i>               | <i>Point size</i> | <i>Name</i>                                    | <i>Point size</i> |
|---------------------------|-------------------|------------------------------------------------|-------------------|
| Minikin . . . . .         | 3½                | English . . . . .                              | 14                |
| Brilliant . . . . .       | 4                 | Two-line brevier . . . . .                     | 16                |
| Diamond . . . . .         | 4½                | Great primer . . . . .                         | 18                |
| Pearl . . . . .           | 5                 | Paragon . . . . .                              | 20                |
| Agate (or Ruby) . . . . . | 5½                | Two-line small pica (or double pica) . . . . . | 22                |
| Nonpareil . . . . .       | 6                 | Two-line pica . . . . .                        | 24                |
| Emerald . . . . .         | 6½                | Two-line english . . . . .                     | 28                |
| Minion . . . . .          | 7                 | Two-line great primer . . . . .                | 36                |
| Brevier . . . . .         | 8                 | Two-line paragon . . . . .                     | 40                |
| Bourgeois . . . . .       | 9                 | Two-line double pica . . . . .                 | 44                |
| Long primer . . . . .     | 10                | Canon, or four-line pica . . . . .             | 48                |
| Small pica . . . . .      | 11                | Five-line pica . . . . .                       | 60                |
| Pica . . . . .            | 12                | Six-line pica . . . . .                        | 72                |

\* \* \*

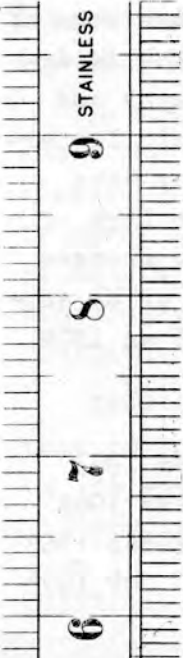
This article would be incomplete without mention of the typewriter — everyman's printing machine — whose importance both within and without the realm of professional printing and publication is now fundamental. Allied to such processes as stencilling, photo-lithography, offset-litho printing, xerography and the like, the modern typewriter is a basic tool of publication, as well as for individual communication.

Two principal origins led to separate strands of development: the 'typographer', invented in Detroit in 1829, brought its letters to the printing position by appropriate movements of a semicircular plate on which they were mounted; whereas the 'machine kryptographique' which was invented by a Marseilles printer in 1833 had each letter mounted on a separate type bar. C.S. Sholes, an American printer, developed his machine on the latter method, used a horizontal platen and an inked ribbon and was largely responsible for the QWERTY keyboard (mainly to facilitate ease and rapidity of fingering). It was Sholes's machine that the Remington Company manufactured from 1873 on.

The basic typewriter print size (thus also line-spacing) was twelve-point (hence called Pica, and still available); though this has been partly displaced by a smaller face - Elite - which is held to give a neater appearance. The same line-spacing is used for both, so the smaller face looks less 'crowded' at single-spacing and gives economy of use by virtue of more characters per line. The Pica type, however, is to be preferred for reprographic work, particularly if photo-reduction is involved, and is sometimes mandatory for legal work. The Dozenal Journal is typed in Pica and photo-reduced in production.

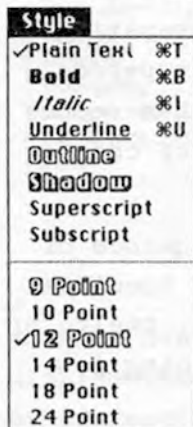
The Detroit machine, with the type fount on an easily-changed plate, gave rise to descendants such as Varityper and Justowriter (used for preparing offset-litho plates, etc.) where quick changes of typeface are needed. Nowadays, of course, this advantage has become available on most electronic machines in the form of changeable dot-matrix units or daisy-wheels.

Although, as a consequence of the way typewriters work, modern faces are usually specified by pitch and electronic machines can be set to ten, twelve or fifteen characters per inch horizontally, line-spacing is strictly pica-based:

|                                                                                     |                                                    |
|-------------------------------------------------------------------------------------|----------------------------------------------------|
|  | 1 'click' of platen roller = 1 lign (or 1/2 lign); |
|                                                                                     | single-space = 2 ligns = 1 pica = 1/6 inch;        |
|                                                                                     | 1 1/2-space = 3 ligns = 1 1/2 pica = 1/4 inch;     |
|                                                                                     | 2 -space = 4 ligns = 2 pica = 1/3 inch;            |
|                                                                                     | 3 -space = 6 ligns = 3 pica = 1/2 inch.            |

Note those fractions! Part of my work is the designing of forms, in which it is necessary to line-out (accurately) boxes and grids ready for the electronic typewriter. Beside this section is a 1:1 image of the engineer's steel rule used for this job (both rule and text will be photo-reduced together by the printers, so keeping the scale). With the typing set at 1 1/2-pica, the 3-lign, quarter-inch spacing should be evident. Is this not a wondrous irony? The very kind of

inch/lign measure presently being axed by the authorities is exactly the one needed for lining-out their forms (the scale shown is now generally unobtainable in Britain). This work cannot be done with a metric scale; hence, given the way our politicians are going, we seem to be approaching a situation in which official work necessitates the use of proscribed measuring-scales... Shall we see the birth of a black market in engineer's rules?



In case it might be thought that this mainly historical article is not up to date, I have shown the format menu (above) and style menu (left) used in Claris Macwrite word-processing on the latest Apple-Macintosh PC. It is clear that points and picas are alive, well and wholly in charge of the printed word.

Much, perforce, has been omitted from this brief survey of printing: the technicalities of ems (squares of point-size) and ens (halves of ems) and 'spaces' measured in sixtieths of an em have been left for further investigation by the interested reader, as have many other aspects of typography and the history and practice of composition, from classic letterpress to computer typesetting. Enough, though, has been included to show that printed communication, in the form of book, magazine, newspaper or letter; from the giant presses or the portable typewriter; written by decimalists or by anyone else, is governed by a DOZENAL system, based on an INCH.

#### SOURCES (Historical):

- Dictionary of Printing: Kenneison & Spilman. Newnes 1963  
 Practical Printing & Binding: Publisher. Odhams Press 1965  
 Introduction to Typography: Oliver Simon. Faber & Faber 1963  
 Short History of Technology: Derry & Williams. OUP 1973  
 Encyclopaedia Britannica. Everyman Encyclopaedia.

METRIC SENSE CAMPAIGN

- from the Information Secretary.

Through correspondence on British measures in THE TIMES last August, contact was made with the above organization which is directed by Anne, Countess Attlee.

In reply to a letter outlining our aims it was claimed: "Metric measures are perfectly handy when used in the traditional way as on the Continent.", that there are twelve (sic) reasons why, but only three work partly with our present S.I., that coherence is one "which most Britons do not understand anyway.", and "The Dozenal Society and I are at one with the wish to unify social and scientific practices, but this is best done through the metric system."

They seem to have a simplistic view of measurement needs, harking-back to early days before technology took over (the first definition of the kilogramme as a unit of mass did not occur until 1903). Coherence is poorly understood because it is irrelevant for ordinary use and overrated for most technical work (when not rendered unnecessary by computer use). Its best use, as always, is for electro/thermo-dynamics, which employ concepts unrelated to normal experience, and in the domains of the very large or very small; but rarely the twain do meet. It should be for Science to advance from primitive finger-counting, along the lines evolved for social weighing and measuring practices.

In the course of correcting some evident misunderstandings about the introduction of place-value arithmetic and the symbol for zero into Europe, we offered the use of our library to check historical facts, and suggested an exchange of papers as an aid to refining the truth and finding new words for old teachings; but there has been no response to this (or to other questions).

Lady Attlee had just returned from the USA, "converting them to the principles of handy metrication.". DSA should be on its guard and realize that measurement of the people, by the people and for the people is not an inalienable right, even in the Land of the Free.... By the nature of things political, Americans could, by stealth, be ushered into a

world in which anything not forbidden will be compulsory. Common measures, like common laws, provide a safeguard against restrictions on our liberties of thought and action by technical trickery.

\* \* \* \* \*

### THE ROMANTIC

Arising from a query over English measures by one of their readers, we have been approached by the Editor of the above publication. Hope was expressed that "we may find ways of mutually assisting and publicizing one another."

Its adherents value old ideas and traditions, judging new trends in this light: they listen to the wireless, not the radio, and operate an Imperial Home Service by tape (!), using early broadcasts with other material in the same style to emphasize "utter non-membership of the modern world". Lead-pencils are preferred to ballpoint pens (which always fail at a critical moment) and there is an aversion to plastics packaging. No doubt they agree with Hutber's Law, enunciated in the SUNDAY TELEGRAPH, that "Improvement means Deterioration".

There is a serious side in a refusal to use metric weights and measures. To this end, sheets containing an assortment of real-money prices and Imperial measures as shown can be obtained from their address, priced at £1 - 0s. - Od. for five.

£9-19-11½d ½oz 12/3d  
 2d 6d PRICE 17s.3d. PRICE 6d 50s  
 2/6 2/2½d 7/6 Offer  
 Price 9d 15/- PRICE 6/9d  
 2/8 3oz SALE £1-10s 7/6  
 NET WEIGHT 1lb 12oz 8/- PRICE  
 30s NET 18s 2/10d

*'Extracts from The Romantic's sheet of real prices. Useful for covering computer what-nots, pea-money prices and funny foreign weights, and for adding that reactionary touch to any acceptable tin or packet.'*

We have submitted some of our material for consideration, assuming that what seems to be a laudable (but presently no more than instinctive) rejection of alien impositions needs reinforcement by well-founded reasoning...

(The ROMANTIC, B.M. Perfect, London WC1N 3XX)

## SALUTARY SHILLINGS?

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 OOFY PROSSER

(Part of an article first published in PUNCH)

REGULAR READERS are only too well aware of my extraordinary capacity for producing original ideas at the drop of a hat. Even I am sometimes amazed at how often they are subsequently taken up and incorporated in our nation's legislation. Yet this time I think I have surpassed myself. For I have found an instant and almost painless cure for inflation. Can't be done? Of course it can. The problem, as I see it, is to drive home to people the terrible effect inflation has had in the past fifteen or twenty years.

So cast your mind back, if you will, almost two decades, to that fateful day when Britain went decimal. Out went our beloved £sd and in came those awful pounds and pees. It was just the beginning of the decimalization malarky which gives such a thrill to bureaucrats as they ram it down our unwilling throats. Not content with eradicating rods, poles, perches and chains, the gallon and the ounce are now under sentence of death and even so august a measurement as the mile is threatened.

I cannot expect the Government to turn the clock back completely, but I suggest that they insist that for, say, the next six months all prices on goods must be quoted not in pounds and pees, but in good old honest pounds, shillings and pence. The effect of this will be to turn overnight a nation of happy-go-lucky spendthrifts into a land of tight-fisted misers.

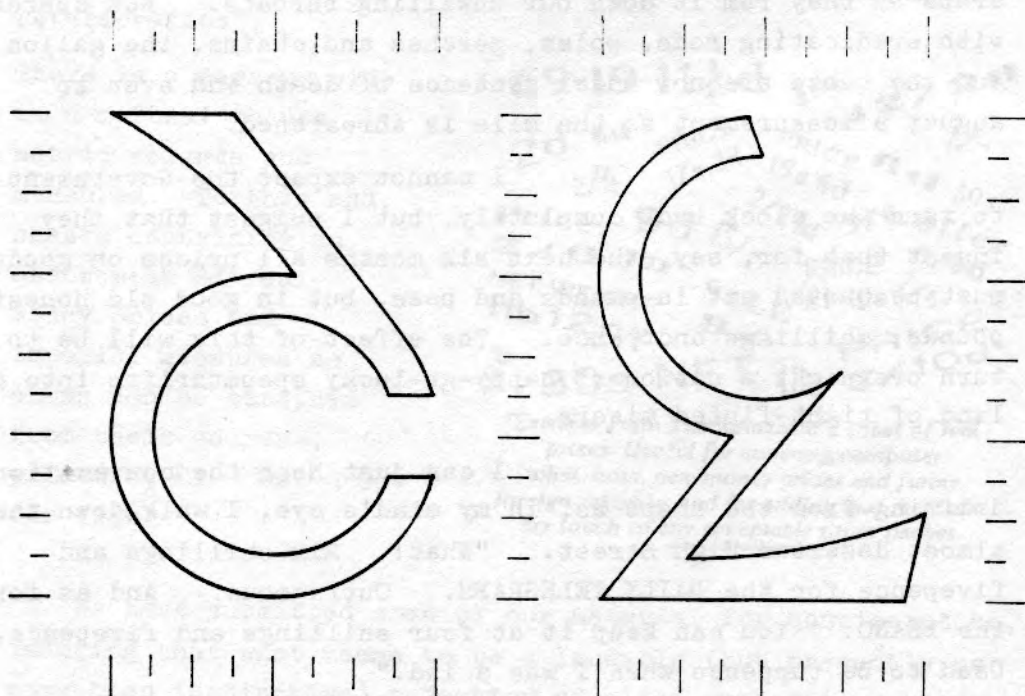
I can just hear the conversation drifting from the shops as, in my mind's eye, I walk down the almost deserted High Street. "What! Six shillings and fivepence for the DAILY TELEGRAPH. Outrageous. And as for the BEANO. You can keep it at four shillings and fivepence. Used to be tuppence when I was a lad."

Supermarkets, newsagents, confectioners, post offices ("Four shillings to post a letter? On your bike, son"), public transport ("I only want to go one

stop, I don't want to buy the bus"), all will be shunned by people terrified of discovering just how profligate they have become. Consumer spending will plummet while the savings ratio will soar. We will have achieved entry into that virtuous circle into which Nigel Lawson has been trying so hard to herd us.

You might not expect this startling innovation to have much effect on the spending of the under-twenty-fives. After all, they have never known any other system. In fact, my preliminary market researches show that it will hit Britain's youth hardest. Brought up on modern mathematics, how will they possibly cope with the complications of twelve pennies to a shilling and twenty shillings to a pound? They will be far too afraid of showing themselves up to venture anywhere near a till.....

\* \* \* \* \*



EDUCATIONAL COMMENTS

Further investigation of maths. syllabuses, including inspection of examination papers set in November 1988, confirms that 'Number-Bases' has been dropped as a topic for the brave new GCSE. There have been reports that number-base work will be included in the forthcoming Core Curriculum, however, so there may be a conflict. We shall see.

Also dropped from GCSE seems to be the concept of 'Scale-factors' (whereby, with a three-dimensional enlargement, surface area increases as the square, and volume increases as the cube, of the linear increase). I suppose this is too elitist nowadays: I used to find that this topic divided-up children pretty sharply, with most able to think in one dimension, some able to think in two, and a few - a very few - children with three-dimensional abilities.

\* \* \*

Lined paper supplied in pads and packets for schoolchildren and students has been spoilt by the metricators: 'feint' used to have lines one-third of an inch apart, and 'narrow feint', one-quarter of an inch. These have now been stealthily altered to eight millimetres for feint and six millimetres for narrow feint. The line-spacing used to fit typewriters, which was useful in a number of ways, but now, of course, does not. I expect this counts as another step forward by the gnomes who, without mandate or consultation, tamper with the details of our lives.

\* \* \*

What nowadays go under the grandiose title of 'Craft, Design and Technology' textbooks persist in describing hacksaw-blade pitches as 18, 24 and 32 teeth per 25mm. This is untrue, since they are actually 18, 24 and 32 TPI. The 24 TPI blade has teeth three-quarters of the pitch of the 18, and the 32TPI three-quarters of the 24. Any inquisitive child wanting to find the actual spacing of teeth on the basis of 24 per 25mm is going to conclude (a) that the teeth are 1.04166...mm apart and (b) that something must be wrong somewhere. Too right!

\* \* \*

Educational Comments (cont'd)

While the debate continues here about the possible virtues of the four-term-year, it seems that the French are seriously considering a FIVE-term school year. Who said the Jacobins had gone? Just as the educational establishment loves the five-day school week, which gives ten half-day attendances, so will decimalists leap at the chance of a five-term-year: it could be split into ten half-terms. Hurrah! (What would they call them? Decians?)

\* \* \*

Another cut-off.

Paper-cutting guillotines, used in schools and elsewhere: British make - Babs - has a scale of millimetres only; German make - Dahle - provides two dual scales, in both millimetres and inches, arranged so that either can be set against the paper edge.....

On the guillotine I use, I have replaced the original metric scale with a purely dozenal rule of inches/twelfths. This works perfectly with 'A' sizes, and is much easier to read than are millimetres.

\* \* \*

5. Add 3 ft. 7 in., 5 ft. 9 in., and 7 ft. 4 in.
6. Write the sum of 3s. 7d., 5s. 9d., and 7s. 4d.
7. Write in mathematical language the addition of  $3\frac{7}{12}$ ,  $5\frac{9}{12}$ , and  $7\frac{4}{12}$ .
8. Make a table of nine to show the costs of articles at  $4\frac{1}{2}$ d. each, 2s.  $10\frac{1}{2}$ d. each, and £2 7s.  $7\frac{1}{2}$ d. each.

**Expansion.** It is desirable to look forwards, and carry your thoughts beyond what you have just studied. Work the following exercises:

1. Examine table in page 27 and your expansion. Notice the diagonal sequence 1, 4, 9, 16. Carry it onwards. Find how it works. Notice the sequence 4, 10, 18. Carry it on. Find how it works.
2. Study the methods of recording temperatures on a thermometer, land heights and sea depths on maps, the amount of rainfall.
3. Study this addition and find how it works.

| gross | dozen | unit |
|-------|-------|------|
| 2     | 4     | 7    |
| 3     | t     | 1    |
| 4     | 9     | e    |
| <hr/> |       |      |
| e     | 0     | 7    |

Write the sum in ordinary numbers.

Days of Innocence.

On the left is part of an exercise in arithmetic from 'THE NEW POPULAR EDUCATOR', which was published in weekly parts in 1933-4. Note particularly Question 3, remembering that this was not specialized school work, but was aimed at the general public...

Tell 'em stories dept.

'Educational' TV programme, on 28 September 1988, called 'Mathematical Eye', showed an old-time village market, with baskets of fruit, vegetables, etc., displayed and marked with labels as follows:

$$\begin{array}{r} 217 \\ \underline{34} \end{array} \quad \begin{array}{r} 1 \\ \underline{5} \end{array} \quad \begin{array}{r} 157 \\ \underline{81} \end{array} \quad \begin{array}{r} 87 \\ \underline{16} \end{array} \quad \begin{array}{r} 333 \\ \underline{1000} \end{array}$$

with, of course, the hapless yokels standing about in arithmetical confusion (I am not making this up). Naturally, the gallant knight decimal comes to the rescue of the villagers. One wonders if there are any lengths to which these 'educators' will not go.....

\* \* \*

No, there aren't..

This really beats everything. In the course of a tape-slide presentation for children of artifacts recovered from the wreckage of Henry VIII's warship 'Mary Rose', a circular, graduated plate was shown. The comment was: "This is a kind of protractor, with graduations at every  $11\frac{1}{4}$  degrees around the edge." Think about it...

\* \* \*

**CAN ANYONE**  
**EXPLAIN TO ME WHY**  
**IT IS CONSIDERED**  
**EDUCATIONALLY GOOD**  
**FOR A YOUNG PERSON**  
**TO STUDY MORE THAN ONE**  
**LANGUAGE, YET**  
**EDUCATIONALLY BAD**  
**TO STUDY MORE THAN ONE**  
**SYSTEM OF**  
**MEASUREMENT ?**

(MEASUREMENT IS THE LANGUAGE OF SPACE.)

## PRESS CUTTINGS

# Non, je n'aime pas the grey, metric men of Brussels

● AS A member of the generation to whom "the future belongs," I was astounded and aggravated by your leader of September 23, "Good Sense, and a Sop," since I have no desire to give a resounding "oui" to the increased metrication of my country.

My reasons are partly, as the article put it, "sentimental" – but is this so wrong?

The English language's colour and variety is added to by our weights and measures – chains and furlongs, pints and gallons, stones and hundredweight.

Nowadays there is too much jargon, aided by the grey bureaucrats in Brussels.

Can there be anything more unromantic than the dull, dreary, endless repetitive centimetre, decametre, kilometre?

But even worse is the reason given, that it – the metric system – is easier to understand and use.

An illiterate populace managed with the Imperial system for centuries so it cannot be that difficult to understand.

# Advancing shadows of decimal dark age

● CONGRATULATIONS to Richard Moore for his brave letter on metrication! With the clear eyes of youth he sees the advancing shadows of the decimal dark age as the gnomes of Brussels – via their puppets in Westminster – prepare to complete the obliteration of our rational measures and hence also the Anglo-Saxon culture that goes with them.

Our native measures (used also by the Americans) are rational because they are based on useful ratios – a concept understood by practical people but not, it seems, by bureaucrats – as opposed to metrics, which are based on finger-counting.

Comparing decimal-metric with Imperial is like comparing a kiddicar with a bicycle: the former may appear easier to start with, but the latter, though more demanding to learn, is vastly more serviceable and elegant.

The agility with which rational weights and measures deal with fractions, scale, and three-dimensional problems in the practical realm is quite unknown in the metric world, which cannot even express the fraction one-third properly; which has been wholly defeated by the house-brick; and where kitchen-weighing is just a joke.

Metrication has NEVER been adopted by ordinary practical people on its merits, but has always had to be imposed by Governments, just as now. Napoleon imposed it on Europe. Nelson saved us from that and so enabled Britain to perform the Industrial Revolution.

Metrication was one of the first acts of the Communists when they gained power in Russia. It is inefficient, inhuman, and ruinous to dimensional understanding. The bureaucrats love it, of course. – Donald Hammond, The Dozenal Society of Great Britain, Incorporating the Duodecimal Association, Millside, Mill Road, Denmead.

This claim that the metric system is "easier" and so should be used, is a symptom of a sad decline which bodes ill for the future.

Instead of being taught to use the immense capacity of the brain, my generation is taught to rely on calculators to do maths, word processors to write letters, and, worst of all, filofaxes to tell them what they are doing even the next day.

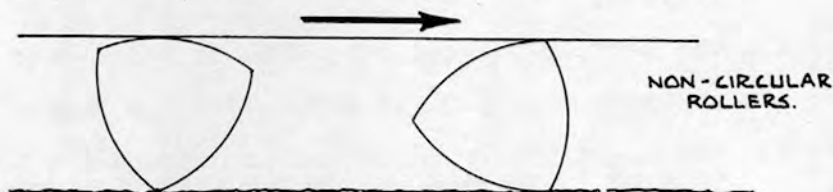
If this "oui" is said to metric, it will be a sad day – if modern man thinks it too difficult to use a system which mediaeval peasants used with ease.

In that case, there may be a less bright future than your editor predicts in his flush of Euro-enthusiasm. – Richard Moore (17), Southsea.

## INFINITELY ODD .....

Donald Hammond

A SCIENCE-FICTION STORY which I read some years ago (in ANALOG magazine, I think) featured a planet in a somewhat neglected region of space, whereon our intrepid adventurers discovered a local transport problem. A massive object had to be moved, but was too heavy to drag with a sled, the usual vehicle in those parts. The circle, it seemed, was a religious symbol whose sacred shape was banned for secular use; which put wheels and round rollers out of the question. Undaunted, our heroes solved the problem to the great acclaim of all by using non-circular rollers, whose cross-section was a trigonal curve of constant width.



A curve of constant width (CCW), as its name implies, is a closed polygonal curve which will fit in any rotational position between a given pair of parallels: it can thus be used as a roller (but not a wheel!) even though not circular. Some British decimal coins are heptagonal CCWs, including the first one introduced in 1969 (a piece of applied psychology: the interesting new shape was supposed to offset the inherent dullness of what the late Tom Pendlebury rightly called 'dismal' currency). Such coins will operate width-sensitive slot-machines and will roll, yet are not circular.

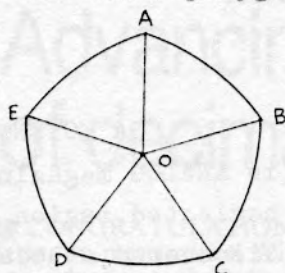


British heptagonal coin. One might think that a pentagonal version would have been more expressive of the denary base...

Now, such regular CCWs can be constructed from regular polygons; but since, for constant width, each curved side must be an arc centred on an opposite

vertex, it follows that the basic polygon must have an odd number of sides.

Construction of a pentagonal CCW.



Point D, for example, is the centre for arc AB.

It remains only to observe that the circle itself, of course, is a curve of constant width.

So:

- 1) a regular CCW can be constructed from a regular polygon;
- 2) the regular polygon used MUST be odd-sided;
- 3) a circle is a regular CCW;
- 4) the regular polygon needed to construct a CCW which is also a circle must have an infinite number of sides to give a circle, and an odd number of sides to give a CCW.

Therefore, infinity is an odd number..... Isn't it?

(This makes a nice symmetry with zero, which is an even number)

The  
METROPOLIS  
Clock.

See  
Editorial.

