

Confusion worse confounded

SIR—As the owner of a hardware store, I feel it is my duty to comment on the letter from C. H. Evans (*Nature* 345, 658; 1990). The writer waxes sentimental about the British 'system' of weights and measures to which the United States alone so obdurately clings.

Closer examination reveals that we don't have a system, we have a patchwork quilt of systems; systems whose units cannot be added, subtracted, multiplied or divided with ease, and hardly anyone knows how to use them. Learning a new system would come as a welcome relief to those who have actually learned the 'British system' and have to use it for complex operations.

The other day, a customer asked for a piece of lumber cut to "five feet two and a half inches and one of those little marks" (a sixteenth). What could be more elegant? A carpenter more familiar with the system could translate that to more manageable sixty-two and nine-sixteenths inches. Of course if he has to add the width of a "one-by-twelve" ($\frac{3}{4}$ " \times $11\frac{1}{4}$ ") and deduct the thickness of a "two by four" ($1\frac{1}{2}$ " \times $3\frac{1}{2}$ "), he figures $62\frac{9}{16} + 11\frac{1}{4} - 1\frac{1}{2} = 72\frac{5}{16}$. In building a house (or a space shuttle), thousands of these tedious computations are carried out and each one is a potential source of error.

We start to see that within the 'system', things are not what they say they are. Two-by-fours are not 2×4 and they haven't been for years. The two-by-fours in a hundred-year-old house are 2×4 , but the two-by-fours in a fifty-year-old house are $1\frac{3}{8} \times 3\frac{5}{8}$, and in a new house they are $1\frac{1}{2} \times 3\frac{1}{2}$. Half-inch galvanized pipe isn't half an inch anywhere. The inside diameter is about $\frac{5}{8}$ " and the outside diameter is about $1\frac{3}{16}$ ". Plumbers know what size to ask for, but most others make the mistake of trying to measure the pipe and become hopelessly confused.

Electrical wire comes in gauges. As the wire gets bigger, the gauge number gets smaller. 12 ga. wire will conduct $\frac{2}{3}$ as much current as 14 ga.; 10 ga. conducts $\frac{3}{2}$ as much current as 12. Crystal clear! Nuts, bolts and wood screws also have gauges. Of course now as the bolt gets bigger, the gauge number gets bigger. What could be simpler than nails? Nails are measured in pennies. The symbol is 'd' as in 'penny'. A 4d nail is $1\frac{1}{2}$ " long. 6d is 2", 8d is $2\frac{1}{2}$ ", 10d is 3". So, it should be perfectly obvious that a $3\frac{1}{2}$ " nail will be . . . that's right, 16d.

Drill bits cover all bases. There are of course fractional bits in increments of $\frac{1}{64}$ " where it is immediately obvious that $\frac{25}{64}$ is larger than $\frac{3}{8}$ but smaller than $\frac{13}{32}$. Among the interstices between fractions there are number drills, an inverse system with no. 1 a little smaller than $\frac{1}{4}$ " going

"down" to no. 80 a little larger than a hair. Also interspersed between fractions are the letter drills irregularly spaced from A to Z with A a little larger than a no. 1 going up to Z smaller than $\frac{1}{2}$ ".

Concrete comes by the cubic yard, lumber by the board foot, shingles by the square, yarn by the skein, but a sack of cement is always 94 pounds. The tape in your walkman travels at $1\frac{7}{8}$ inches per second, which adds up to quite a few furlongs per fortnight. It's a Jim Dandy system all right, and any country that would give it up for something as straight forward as metric has no sense of humour.

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Some good news

SIR—Seth Shulman, on the basis of a Carnegie Foundation report about nuclear smuggling, writes that the 1980s were a bad decade for nuclear proliferation ("Seven more nations nearly 'nuclear'". *Nature* 345, 4; 1990). The seven listed are Argentina, Brazil, India, Iraq, North Korea, Pakistan and South Africa.

Shulman's summary may be accurate, but the picture presented is unduly alarmist. In fact there was substantial progress in stemming proliferation during the 1980s (at the start of which I was assistant director general of the International Atomic Energy Agency).

Ten years ago, Argentina and Brazil seemed to be racing each other to be the first to carry out a nuclear test. Since the advent of democratic governments, each has undertaken several measures to promote confidence in the other's nuclear activities, and they are now cooperating in joint ventures. The Brazilian constitution now explicitly requires that all Brazil's nuclear activities be exclusively peaceful.

South Africa, far from being a "de facto nuclear power", is considering accession to the Non-Proliferation Treaty (which 27 nations, including Spain, Egypt, Turkey and Saudi Arabia, joined during the 1980s).

The danger in India and Pakistan is hardly a phenomenon of the 1980s. India tested in 1974, and several years earlier Zulfikar Bhutto declared that Pakistan would eat grass, if necessary, to catch up with India.

Because of the understandable suspicions about Iraq, Saddam Hussein has been unable to replace the large Tammuz reactor the Israelis destroyed in 1981 and thereby put an end to any plans Iraq might have had to take the plutonium route to the bomb. Besides the flurry about

smuggled capacitors, there have been reports that Iraq is now trying to acquire enrichment technology. They are as yet unsubstantiated and the general impression is that Iraq will give priority to developing its chemical warfare capabilities in response to Israel's nuclear arsenal.

The only new risk in the 1980s stems from North Korea. Disquieting though the reports about its actions may be, they are at least offset in the global balance by the improvement in nuclear relations between Argentina and Brazil and South Africa's retreat from the threshold.

Smuggling of nuclear technology has certainly reached disturbing proportions, but this is partly because exports that were legal in the 1960s and 1970s are (rightly) against the law today.

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A woman's place

SIR—Reviewing Michael H. Brown's book *The Search for Eve* (*Nature* 345, 395; 1990), J. S. Jones mentions the idea that the spread of one mother's genes accompanied the origin of language and thus, in M. H. Brown's words, "woman had the first word". It is surprising that this obviously wrong idea is surfacing again after having been buried before 1305 by Dante, who wrote in *De vulgari eloquentia* (I, IV, 3; my translation): ". . . while in the scriptures you find that the first to speak was the woman, it seems more rational to think that it was the man, because it is indeed inconsistent to assume that such an important human activity could have possibly derived from a woman".

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God and science

SIR—Scientists crusading against religion are sometimes inclined to throw out data points that do not fit a preconceived curve. Various kinds of fanaticism and obscurantism are given as examples of the bad effects of belief: instances of the relief of suffering, or resistance to oppression, are ignored. A causal link is assumed in the one case, but not in the other.

I applaud Christopher Lote's suggestion of an opinion poll on the religious beliefs of your readers, provided of course that it is designed well enough for the results to mean something. For example, if I simply say that I am a Christian, that tells no-one whether I am some kind of creationist, or whether I accept both Christianity and Darwinism as bases for further thought.

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