Todd's process. *Math. Gaz.* **80** (July 1996) pp. 333–344.

2. John Todd, A problem on arc tangent relations, *Amer. Math. Monthly* **56** (1949) pp. 517–528.

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Correspondence

DEAR EDITOR,

In the March 1994 issue of *The Mathematical Gazette* your predecessor published a couple of articles about barcodes, one by Robert Pargeter and one by me. He also arranged for a barcode to be printed on the cover of the *Gazette* and he challenged readers to decode it.

As far as I am aware no one responded to the challenge, and frankly I am not surprised. Although converting a barcode number to a pattern of stripes is fairly straightforward once you know the rules – I have written various computer programs in BASIC that do the job – the converse problem involves fairly accurate measurement of the width of the stripes before they can be decoded.

However, as part of my continuing interest in barcodes in general - ARP and I only described one particular system – I recently acquired a Hewlett-Packard HP7 1B computer/calculator which has the ability, via a plug-in barcode 'wand', to read and decode the pattern of stripes for many of the common coding systems.

So having applied some SnoPake to a photocopy of the cover of the *Gazette* – the Editor inconveniently printed 'the mathematical gazette' over the barcode – I can now tell you that the magic number is 3141592653582 i.e. the digits of π with the appropriate checksum digit. Clearly Nick MacKinnon understood the system!

I am *not* claiming the prize which, since Nick said that it would be an appropriate one, was no doubt a pie!

Yours sincerely,

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DEAR EDITOR,

When reading 'The truth behind "famous name" mathematics' by Keith Louma in the July 1996 *Gazette*, I was reminded of two other places where I have read of celebrated misnamed mathematical achievements.

The first is in *Boundary value problems* 2nd edition, by David L. Powers (Academic Press, 1979) page 271: 'Laplace had virtually nothing to do with the Laplace transform .... The real development began in the late nineteenth century when Oliver Heaviside invented a powerful, but unjustified, symbolic method for studying the ordinary and partial differential equations of mathematical physics. By the late 1920's, Heaviside's method had been legitimised and recast as the Laplace transform which we now use.'

The second place is in Albert H. Beiler's *Recreations in the theory of numbers* 2nd edition (Dover Publications, 1966) page 248: 'The equation $x^2 - Dy^2 = 1$ is known as the "Pellian Equation" apparently because Pell neither first discussed it nor first solved it! .... The mathematician Euler erroneously attributed Brouncker's method of solving the equation to Pell, and although history has unearthed the error, the equation is now irrevocably Pell's ....'

There are doubtless many more examples, and I am waiting with interest for someone to compile a more comprehensive collection of such mistakes in attribution.

Yours sincerely,

MARVIN LITTMAN

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DEAR EDITOR,

It is possible that the *Observer* article quoted in the Gleanings on page 478 of the November 1995 *Gazette* is correct. According to this article the quantity of oxygen required to keep a resting individual alive for 39 hours (presumably at atmospheric pressure) occupies a volume of 585 litres ($0.25 \times 60 \times 39$). Provided that, at the ambient temperature, oxygen is compressible according to Boyle's law this quantity of gas can be made to occupy a volume of less than 12 litres by increasing its pressure by a factor of 49. Gases behave in this way at temperatures sufficiently greater than their critical temperatures ($-115°$ C for oxygen). Below their critical temperatures they can be liquefied by increase of pressure in which case there would be no further significant reduction of volume.

Yours sincerely,

I. C. MALCOLM

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DEAR EDITOR,

I am writing to you about the problem in the *Mathematical Gazette* (March 1995 p. 55 and November 1995 p. 532) about values of n such that $10n + 1$, $10n + 3$, $10n + 7$ and $10n + 9$ are all prime.

Some years ago, I calculated all the primes less than 503400 so it has been very easy for me to make a list of all values of n (less than 50340) having the above required property. I enclose a copy of my list for you.

Regarding the question in the November 1995 *Gazette* about whether the set of values of n is infinite, I found in my papers the following note.

'From a certain conjecture of A. Schinzel concerning the prime numbers (*Acta Arithmetica* **4** (1958) pp. 185–208 and **5** (1960) p. 259) it follows that there are infinitely many positive integers n such that each of the numbers $n + 1$, $n + 3$, $n + 7$, $n + 9$ and $n + 13$ is a prime.'

I can't remember anything about this note and I am not now in a position to follow up the references.

Below I list the values n I have found such that $10n + 1$, $10n + 3$, $10n + 7$, $10n + 9$, $10n + 13$ are all prime.

1	2101	10111	20149	30049	40213
10	2227	10984	20182	30199	40276
19	2530	11653	21736	32614	41203
82	3172	11929	22534	33442	41905
148	3484	12220	24004	34093	42085
187	4378	13546	24370	34639	42724
208	5134	14416	24760	34798	44257
325	5533	15727	24799	35425	44434
346	6298	16570	25786	35890	45253
565	6721	16684	26041	36121	46345
943	7222	17116	26668	37525	46516
1300	7726	18763	26881	38869	46747
1564	7969	19486	27604	38956	47008
1573	8104	19573	28474	39226	47701
1606	8272		28528	39481	49057
1804	8881		29431	39754	49561
1891	9784		29587	39775	50023
1942	9913		29947		

Yours sincerely,

D. M. HALLOWES

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DEAR EDITOR,

In the second part of Note 80.20 (July 1996), the author has located the Fermat point (i.e. the point of least aggregate distance from the vertices) of an isosceles triangle by differential calculus. The result can be obtained geometrically without involving calculus in the following manner.

For most triangles (i.e. when each angle is less than $\frac{2\pi}{3}$) the Fermat point is the point at which each side of the triangle subtends an angle of $\frac{2\pi}{3}$. In the case of an isosceles triangle, the Fermat point F naturally lies on the axis of symmetry. If the apex is A and the midpoint of the base BC is M, then $\angle BFC = \frac{2\pi}{3}$ and the triangle FMC is a right triangle with angle $\frac{\pi}{3}$ at F. The position of F is then given by $\frac{FM}{MC} = \cot\frac{\pi}{3} = \frac{1}{\sqrt{3}}$ as verified by the author.

For very obtuse triangles (i.e. with the obtuse angle greater than or equal to $\frac{2\pi}{3}$) the Fermat point coincides with the obtuse vertex, which is the author's case $\{x = s \text{ when } 0 < s < \frac{1}{\sqrt{3}}\}$ for the isosceles triangle.

Yours sincerely,

CYRIL F. PARRY

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DEAR EDITOR,

As I teach both Physics and Applied Mathematics, whenever a student asks 'what is an elastic collision?', I always have to stop and think, as the phrase is used in two different ways. In Mechanics texts, all collisions are 'elastic', that is, there is some loss of kinetic energy, unless the collision is 'perfectly elastic'. Physics texts use 'elastic' for situations in which there is no loss of kinetic energy, all other collisions being 'inelastic'. Can anybody suggest why this different usage should have developed in what are, after all, related fields of study?

Yours sincerely,

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DEAR EDITOR,

Language in mathematics

The proposal for publishing a document on 'aspects of language in mathematics' (MA Annual Report 1995/96, p. 4) is most opportune, since it always requires an effort to maintain standards. One important aspect of language, in any subject, is that it should neither confuse nor mislead the learner. Such misleading or confusion can be caused by:

(1) ambiguous use of English syntax;

(2) inexact or incorrect usage of terminology;

(3) archaic expressions;

(4) impenetrable jargon.

All of these (among others) occur all too often even in modern textbooks. I give just a few examples. Many more will occur to MA members!

1. 'one must be careful about one's logic when proving something impossible' (quoted from a book by one of our top present-day mathematical writers).
2. 'Side' of square and also of cube; failure to distinguish where necessary between 'line' and 'line segment'.
3. 'Extract' a square root; 'produce' a line segment (surely it is time that this usage, introduced in 1570, was banished).
4. The instruction 'draw the line which passes through the given point A and is at right angles to the line (segment) BC' is no doubt unambiguous and clear to most learners. Naturally it will gradually be shortened to something like 'Draw through A the perpendicular to BC'. Unfortunately, long use, even in the most reputable textbooks and journals (!) has apparently sanctioned the expression 'Drop a perpendicular from A to BC'. Thanks to the grossly incorrect use of the first two words, the instruction has now become a piece of impenetrable (not to say inane) jargon, completely misunderstood by many students.

This last example illustrates the need for adapting phraseology to the level of concept formation achieved by the learner, and also the fact that my four categories overlap considerably. However, I should like to suggest that the proposed publication should contain a list of unacceptable words and/or phrases, and certainly a list of absolutely TABOO expressions. Perhaps there could be a 'booby prize' for the worst offender? If so, my candidate would undoubtedly be 'Drop a perpendicular'. Can any member provide a worthy rival?

Yours sincerely,

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DEAR EDITOR,

Two conjectures, or how to win £1,000

The letter from Sir Bryan Thwaites, in a recent issue of *The Mathematical Gazette*, together with the article [1] in the same issue, show that the problem of iterated differences, posed again by Sir Bryan, in [2], earlier in the year, is still capable of generating lively interest. It is curious then that such a naturally appealing problem is not better and more widely known, for the principal result appeared as early as 1937 in [3]. Moreover, extensions and generalisations of the problem remain topics of current research, as can be seen, for example, in [4].

Yours sincerely,

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References

1. F. Pompili, Evolution of finite sequences of integers ..., *Math. Gaz.*, **80** (1996) pp. 322–332.
2. B. Thwaites, Two conjectures or how to win £1,000, *Math. Gaz.*, **80** (March 1996) pp. 35-36; (July 1996) p. 420.
3. C. Ciamberlini and A. Marengoni, Su una interessante curiosita numerica, *Periodiche di Matematiche*, **17** (1937) pp. 25–30.
4. H. Glaser and G. Schöffl, Ducci sequences and Pascal's triangle, *Fibonnacci Quarterly*, **33** (1995) pp. 313–324.