

(repeated below) quoted in my article in *Math. Gaz.* **80** (November 1996) entitled A Mathematician's View of Bowling. Had he done so, he would have learned from [1] that Professor Bolt and I did not attempt to predict the total length of the path from the initial velocity, something which would indeed have required introducing air resistance. We actually measured the length and running time, and used them to estimate the resistance of the green. We were then able to find the equation of the bowl path, without recourse to a computer. This enabled us to predict the path and end position of the bowl with great accuracy, on greens of various speeds and on two bowls test tables. Our model also predicted accurately the total angle of precession of the bowl. The infinity which arises in Mr Williams' work (which he regards as 'no embarrassment'!) stems from the inadequacy of his model of a bowl as a sphere with an offset weight inside it, a model long discarded as unsuitable by serious bowls analysts.

Mr Williams writes at length about a bowl running with tilt. From [2] he would learn that the tilted bowl is a myth. Any bowl delivered with tilt becomes just a wobbling bowl as soon as it starts to roll. [2] includes calculations of the effect of wobble (and hence of initial tilt) on the end position of a bowl.

References

1. M. N. Brearley and B. A. Bolt, The dynamics of a bowl, *Quart. J. Mech. Appl. Maths.* **11** (1958) pp. 351-363.
2. M. N. Brearley, The motion of a biased bowl with perturbing projection conditions, *Proc. Camb. Phil. Soc.* **57** Pt 1 (1961), pp. 131-151.

Yours sincerely,

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DEAR EDITOR,

Back in March 1994 you published a pair of articles by Robert Pargeter and me about barcodes – we both concentrated on EAN13, the commonest system seen in supermarkets.

Since then I have continued my interest in things of this nature but have not come across anything of particular note until recently, when I noticed that more and more mail order firms and other organisations are using a system of which this is a typical example:

A D COX ESQ &
MRS M V COX
PEN Y MAES
OSTREY HILL
ST CLEARS
CARMARTHENSHIRE
SA33 4AJ



The most obvious aspect of this system is that, in contrast to all the others I have come across so far, it uses a quaternary set of digits (and if binary digits are bits, then surely quaternary digits are *quits*?). It turns out, after some study, that the quits provide a representation of the postcode of the addressee, together with some additional information that I have not yet understood. With the plausible assumption that a dot equates to 0, that an up-bar equates to 1, that a down-bar equates to a 2 and that an up-and-a-downer equates to three then:

- (a) there is always a start quit of 1 and a stop quit of 3
- (b) between these the remaining quits are in sets of four, which by analogy with binary 'nibbles' we can call 'quibbles', each of which corresponds to one of the alphanumeric characters 0 to 9 and A to Z.
- (c) each quibble is self-checking to an extent, since the sum of its quits is always six.

If anyone is interested then I would be happy to pass on my decoding (but the more I look at this sort of thing the less sure I become of the difference between a code and a cypher) but with sufficient material it is not a difficult task to work out the system.

BUT – there are certain contradictions in my list – for example the same quibble can apparently represent S or B or H. I speculate that the encoding is sometimes done using an optical character reader, and that these glitches are due to imperfect OCR software.

I have also noted that Royal Mail themselves use a quit-based system – the pinkish marks frequently seen on envelopes, replacing the earlier blue fluorescent(?) dots – but they seem to use a different, and less efficient, coding system.

Finally, I have still not had any luck with my attempts to disentangle the Videoplus+ system, but my interest has been revived by noting in the Radio Times that the programme broadcast between 6.30 and 7.00 pm on Channel 4 on Tuesday 1 September had a Videoplus+ code of 1. It is also noticeable that on channels 1 to 4 programmes that run from the hour to the half hour or vice versa have relatively low codes.

I wrote to Gemstar, the proprietors of the Videoplus+ system, but not surprisingly they declined to tell me the algorithm that they use. However, the general tone of their reply suggested to me that they use a cipher, rather than a code, so in principle it ought to be possible to unravel it, particularly since one appears to have complete information i.e. date, channel and start and end times.

Yours sincerely

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