Letters to the Editor

*From Dick Tahta, Cold Harbour,
Newton St Cyres, Exeter, England*

Among various things I found stimulating in the second issue were some ideas that led me to think about the way in which we often seem to atomise thoughts (or feelings) where perhaps it would be more fruitful to try to maintain wholes. Thus, in David Tall's valuable account of some mathematical research we are given a relatively rare — but welcome — dimension of time. The developments of each separate day are carefully recorded and we are aware of the nights silently punctuating the paragraphs. Inevitably, the author does not say much about them. But he reports — as many mathematicians do — that his ideas seem to be not invented but discovered and in the same section he suggests that much of his work must have been always "deep in his psyche". There are lots of things that could be said about this but here I only stress that the main hint for me seemed to be that we should take account of the whole self — whether sleeping or waking, past present — that must have been engaged on the problem.

I brought this thought to my reading of the interesting and many-sided article by Peggy March on heuristics. (It seems a delightful feature of your selection of articles that they permit — suggest — cross-resonances.) She asks whether heuristics can be taught and follows this question up with a thud of others that seem relevant as soon as the first is posed. But I found myself wondering whether there was not here a premature split in our conception of students as those to whom heuristics need to be taught and our knowing that when they were very young they must have used a lot to even survive. The problem of teaching problem-solving seems to demand starting with the fact — which we can all verify in ourselves — that we have solved very difficult problems as babies with seemingly very little help from others. It should be possible not to split this knowing. Perhaps others will be able to help me further with this.

One other split might be mentioned, though I hesitate before contributing to the spate of writing (which we are obviously destined to suffer) that will try to accommodate the lessons of non-standard analysis to our customary accounts of mathematics. The split I am thinking of is that between informal and formal mathematics — and indeed between these and what Lakatos has called post-formal mathematics. One of the interesting things about non-standard analysis seems to be that formal foundational studies have now begun to inform mathematics itself and, in particular, the history of mathematics. To put it simplistically, infinitesimals are OK after all; Leibniz *et al* were not the fumbling, though clever, innocents *some* historians — or indeed first-year-university-course lecturers — would have us believe.

What particularly interests me is that the current rehabilitations being proposed are still rooted in nineteenth-century thinking. If I understand it right, Tall, though using all sorts of geometric imagery in his private thinking, works hard to safeguard this with a classical epsilonology. No doubt this is wise; but I would like to know whether the rehabilitations will extend to Newton's fluents in the sense that *motion* also becomes "respectable". I imagine there are many like myself who, though apparently accepting that limits and convergence and so on need to be defined without the notion of "moving" variables, in some way still continue to invoke such images in private.

What is exciting is that we may be able to relinquish the notion that in the history of mathematics things get progressively better in some way. We may more humbly reach back to the early mathematicians — whether in history or in ourselves. For this and other reasons it was good to find that some sensitive accounts of actual work with children played such a large part in three other articles in the second issue. May the journal thrive.

*From David Robitaille, 2125 Main Hall,
University Campus, Vancouver, Canada*

If one of John Mason's objectives in his paper, "When Is a Symbol Symbolic", (Vol. 1, No. 2) was to entice his readers to spend some time toying with the problem situations he posed, he certainly succeeded in my case. I spent so much time working with *Zeller's congruence* (to determine the day of the week for a given date) that I felt compelled to share my tale of woe with other readers.

I decided to write a FORTRAN program incorporating the formula given in the article (having changed the v to a y). It was only after a couple of hours of working with this program that I discovered an error in Mason's example (p.10). March 12, 1980 was indeed a Wednesday; but Wednesday is day 3, NOT day 4. Since all the calculations were correct, I concluded that something was wrong with the formula.

After considerable searching and numerous false starts, I finally got the formula to work. Here are the changes that must be made:

1) c = first 2 digits of the year (e.g. 19 in 1981)
2) y = latter 2 digits of the year (e.g. 81 in 1981)
3) January and February are the 11th and 12th months of the preceding year (e.g. to find the day on which February 16, 1981 falls set $y = 80$)

Even with these changes, my computer program still gave incorrect results at times. This resulted from the evaluation of the expression $2.6m - 0.2$, which makes special allowances for the months of July and December. Because of the way in which rational numbers are represented internally by computers, a truncation error was sometimes introduced when this value was changed to an integer. Replacing 0.2 by 0.199 appears to have overcome this difficulty.

I now know much more about Zeller's congruence than I ever wanted to know, but if any of your readers are ever in my office I will be happy to turn to my terminal and find out for them the day of the week on which they were born.

P.S. I was born on a Sunday.