William has nothing to Prove

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When Philippa and Tom asked me to speak tonight I remembered the Festchrift dinner for Richard Bird thirteen years ago at which I also spoke. Philippa and Tom must have already been warned of the inordinate length of my performance, because the very next thing they said to me was: "please keep it short!" I understand any anxiety you might feel if you were at that dinner – but you needn't worry: I'm just the warm-up act for Jay, although we did briefly discuss giving our talks concurrently ...

There's a lot that *could* be said, because I have known Bill for 38 years: we both arrived at the PRG in Michaelmas 1978.

Everybody here knows what the PRG was: the Programming Research Group of the Computing Laboratory – the home of Computing research in Oxford. It has been called the Computer Science Department for quite a long time now, and I get strange looks from people when I forget, and call it "the Lab".

But I'm beginning to sound like one of those people who boast that their great grandfather had, as a child, sat on the knee of a very old man whose great aunt said she remembered someone who said he had debated Gauss.

So I should talk about Bill.

At times like this it is tempting to start by rehearsing the *bi*ography of the guest of honour, and follow that with a technical appreciation of his *bibli*ography. But I have resisted the temptation.

On the one hand Bill already knows where he was born, where he went to school, what his parents' professions were, the class of his undergraduate degree, and the title of his DPhil thesis.

And on the other hand his bibliography is just too outrageously extensive: technical retrospectives are not for after dinner in any case, and as a writer and researcher Bill has nothing to prove.

His mathematical intrepidity and engineering inventiveness have helped transform the science of computing as well as the craft of programming. It would be hard to count the numbers of teachers,

engineers, and programmers his work has influenced – directly, transitively, or by osmosis.

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What's he like as a teacher?

Writing of tutorials with Bill, Ranko remembered that once the stock problem sheets had been demolished they would spend the remaining 45 minutes or so solving puzzles together. After this afternoon's "Ackermanic" performance from Ranko it's stating the obvious to say that these were not jigsaw puzzles, though I don't know how often the continuum hypothesis was invoked.

Several of his colleagues and distinguished collaborators told me tales of his patience with them, of his tolerance of their slowness to understand things that were perfectly obvious to him, of his determination to find better ways of explaining, and of his invariable success at this.

One of my own abiding memories is of Bill at the lunch room whiteboard going hammer and tongs at a difficult problem with many ramifications, and keeping up a running commentary to his colleagues. Somehow he kept his place in the problem structure until all the 37 individual conundrums had been cracked. He was a model checker avant le lettre.

I only remember the event at all because the number of cases was prime, but I daresay *he* still remembers what the problem was!

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We will turn to his phenomenal memory in just a moment.

Some of you will have noticed that while many trombonists play the piano extremely well, it is a rare pianist who plays the trombone with any skill.

So it is with mathematicians and cooks. While many mathematicians cook extremely well, it is a rare cook who can do more than the most elementary mathematics.

Coby tells me that Bill is an enthusiastic and brilliant cook, and that his memory is so good that he never has to use a recipe more than once before he becomes fluent with it. Steve Brookes tells tales of memorable dinner parties in their graduate accomodation where Bill always used all the pans.

Yet it seems that he has never been able to dispense with a commis-chef: the cleanup artist; the one whose skills always go unreported.

I don't know how competitive he is as a chef, but perhaps he learned more than just mathematics from Michael Collins[1]

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The professional history we have shared is a history that encompasses the growth of Computing Science as an academic discipline within Oxford, a spectacular growth in the power of computing

[1] Michael once won the the title of "Sunday Times Amateur Chef of the Year", and was runner-up on MasterChef

machinery, and an incredible growth in people's reliance on computing.

Speaking of this reliance, I was recently at the memorial service of a distinguished historian. One of our former students arrived in the College Chapel, and called to me: "Hey, Bernard. Can you tell me the WiFi password?". I was taken aback a bit and said: "Look! We're in a Chapel. For goodness' sake have some respect for James's memory." only to be asked "Is that all in lower case?"

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When we arrived at the PRG in 1978, there were two fulltime members of staff: Joe Stoy and Tony Hoare. I was one of two postdocs. Half a dozen or so DPhil students started in the same year, and for several years we graduated no more than three or four DPhils each year.

Of necessity we had to be narrowly focussed if we were to remain excellent. But we were excited about what we are doing, we were ambitious to change the world, we spent plenty of time talking over exactly how we were going to accomplish that, and we were small enough for us all to fit round a single lunch table. The atmosphere was infectious! That is what I mean by osmosis.

These days we have about 75 fulltime academics and around 150 postdocs. Nearly 50 doctoral students are expected to graduate this year.

And the academic year before last the Lab generated more research grant income than in the 7 years to 2008.

Even if you don't believe that excellence coincides with volume you have to admit that this is remarkable.

How did we get here from there?

One day someone might write up the history of our long march, though if you can do that you would probably better be occupied in making more history.

The long and short of it is that the Lab has been blessed for the last 40 years with academic leaders who understood how to help us take the actual opportunities that presented themselves, rather than whistling in the wind or stamping their feet.

They also understood the difference between academic leadership and industrial management. They understood that leadership requires the provision of clarity and support to one's colleagues, not the issuing of distracting detailed instructions or demoralising threats from on high. They appointed the best people they could find, then trusted them to get on with doing their best work.

This doesn't happen in every academic institution.

Bill's role in this for the decade that he was head of Department was decisive.

I can do no better than plagiarize his successor's description of it "The change [from being a narrowly-focussed department] did not happen by accident, and was not handed to us on a plate. It was the result of a process during which the department had determined and focussed leadership. At

times it must have been tiring, and sometimes dispiriting for Bill, and it would have been very easy for him to walk away after five years. But the results speak for themselves. The Department and the University owe Bill a tremendous debt. Even if you ignore all [his] other work as researcher and entrepeneur the department would be a fitting legacy for his career."

But this youth's career has not yet reached the stage where we can talk of legacies. It's clear to those of us who have been watching him recently that the best may yet be to come. Let us raise a glass to him, to Coby, and to their future.