Letters

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Radar history

The invention of radar, as mentioned in Chris Lavers' article on warship stealth technology (March pp21–25), continues to be a subject of discussion. Here in Malvern we have just unveiled a blue plaque to commemorate the physicist Albert Percival Rowe, who arrived in 1942 as the head of the Telecommunications Research Establishment (TRE), which was the Air Ministry research facility responsible for the first British radar systems.

During the Second World War, I was privileged to work at TRE with Rowe. I was interested, therefore, to read recent letters about the invention of radar (May pp22–23). Rowe was in no doubt who invented radar – we did. By "we" he meant the group of scientists, initially based at the National Physical Laboratory in Teddington with Robert Watson Watt, who designed the radar equipment used in the Battle of Britain.

Rowe never claimed that we were the first to observe radio waves reflected off aircraft or other objects. When people told him that they had done this before we developed our radar, his abrupt reply was "Then why didn't you do something about it?". To Rowe, radar was not just equipment that employed reflected radio waves but also the system of operational procedures for using it. As we all know, a computer is one thing, but to employ it we need the software for a particular application. So it was with radar.

Probably the first to realize this was Sir Henry Tizard, who had been chairman of the committee on the scientific study of the defence of Britain that was responsible for launching Watson Watt on the path to development of radar. To tackle the problem, Tizard obtained the use of the Royal Air Force's No 32 Squadron, then stationed at Biggin Hill in Kent. They carried out a series of trials using the first Chain Home radar system, developing the control procedures to intercept unsuspecting targets such as innocent Dutch KLM airliners. (They kept well away from Lufthansa flights to Croydon to avoid alerting the Germans!) The procedures developed during this experiment were those used by our aircraft controllers during the Battle of Britain.

It was this combination of the hardware and the software to use it that Rowe meant when he said we invented radar. For this reason, by the end of 1940 both our American allies and our German foes gave us the palm for the invention of radar.

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GCSE lacks diversity

What a thing it is to suggest there might be flaws in the current provision of GCSE science! I was interested to note the lack of support from Jonathan Osborne and Gren Ireson (June p20), who are both in departments of education.

Ireson says that the national curriculum in the UK does not apply to independent schools, which in theory is true. In practice, however, it constrains all schools from the compulsory-for-all Foundation Stage for nursery children through to GCSE, where most independent schools are bound by league tables. He goes on to say that "good teaching can make this material interesting and intellectually satisfying".

What, then, are we to make of the low uptake of science? That teachers are not good enough to make the curriculum interesting? My own view is that primary science is fatally flawed and that children would get a better science education were they to arrive at secondary school without a collection of confused ideas.

Osborne is right to point to those who are "passionately committed" to improved courses like *Twenty-First Century Science*, which is offered by the OCR examining board. But his suggestion that we should wait a year or two before "systematically collecting evidence from students, teachers and examiners about outcomes" sounds risky if we are on the wrong course.

What both Osborne and Ireson ignore is the lack of diversity in the national curriculum for science, and in the current GCSE structure in particular. A single (untested) curriculum model has been imposed on the whole country. If schools had the choice, would they really impose a watered-down grammar-school science course on the whole ability range? Wouldn't such a strategy inevitably bore the bright students and be inappropriate for the weak ones? Might it not be better to allow a range of curriculum models, to see which produce the greatest interest and the largest uptake of science?

Meanwhile my daughter, despite being convinced from before the age of 10 that she would not be a scientist, has found AS science to be such a stimulating replacement for GCSE that she is now seriously contemplating a science degree. Might I suggest that more would be interested in science if they did not have to suffer the present GCSE?

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Luck and genius

Giorgio Margaritondo's article (June pp26–28) provides an excellent review of Henri Becquerel's discovery of radioactivity. However, I disagree with his answer to the central question of whether it was through genius or serendipity that the finding came about. Margaritondo proposes the former for two reasons: "a less experienced physicist would have disregarded a plate that was likely to produce a null result"; and "the realization that he had found a phenomenon different from his expectations…and took steps to validate his discovery".

Both of these observations point to a talented, methodical scientist, but they do not in themselves constitute evidence of genius in the normal sense of the word. Surely a fairer assessment would be that Becquerel was both talented and lucky? In other words, I respectfully disagree with Margaritondo's conclusion that "serendipity requires a genius to be realized". This is not to begrudge Becquerel his Nobel prize, as such prizes primarily recognize the importance of a scientific discovery (rather than the manner of its achievement).

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Moving walls

Having read Robert Crease's very interesting article on the design of scientific laboratories (April pp19–21), I agree with the general premise that if you are not very careful, a big shiny building is often less suited to doing research than a cheap boring one. This is because a cheap building is also flexible, as you can relatively easily move walls and so forth.

I have worked at the Cavendish Laboratory at Cambridge University for a few years and I have found that the one thing that it does not do is to force people to cross one another's paths – all the exits lead outwards and it is very warren-like, which discourages social interaction. The new Cambridge maths department, on the other hand, has a well thought out central cafeteria/pigeon-hole area, which at the very least causes people to pass one another a lot.

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