

I do and I understand: 50 years of curriculum development.

Anthony Tomei, Tuesday 8 May 2012

It's a great pleasure to welcome you all to this event. We're having the celebration now because it was in April 1962 that Sir David Eccles fired the starting gun for modern science curriculum development by announcing in the House of Commons that the Foundation was committing £250,000 in support of a long term programme to improve science and mathematics teaching.

Of course we should own up to the fact that 50 years is an approximation. The exact starting point is a matter for conjecture. Some would link it to the launch of the Sputnik, but whatever the truth of that there's no doubt that an important element was a general sense of dissatisfaction with the state of science education in the UK. This is a quotation from Roland Clark's Biography of the Nuffield Foundation, written in 1972:

“The enthusiasts, who ...looked upon at least a basic understanding of the sciences as an essential part of the complete life, saw a sorry spectacle when they regarded the teaching throughout the greater part of the country.”

Those of you who heard Robin Millar's wonderful presidential address at this year's ASE conference will know that sentiments like those seem to have been around forever and I'm afraid there seems little sign of them abating.

Of course different people had different ideas about the causes of the problem. Here's an extract from a letter from Sir George Thomson, the Nobel prizewinning physicist, to my predecessor Leslie Farrer-Brown. He thought the problem lay with:

“...the schoolmaster himself, who does not as a rule compare well with his classical colleague in intellectual ability...”

An important figure in those early days was John Lewis, at the time the senior science master at Malvern College. He had recently returned from a tour of Germany and Russia where he had been greatly impressed by the teaching of physics that he had seen in both countries. He became a key figure in the story of Nuffield science and all those who were involved in the early years remember him as a source of inspiration. Unfortunately he is not

well enough to be with us today, but we should not let the occasion pass without marking his contribution.

It's interesting to note, incidentally, that the theme of comparisons with other countries (and usually unflattering ones) remains a key driver of change. Our predecessors didn't have to worry about TIMSS and PISA, but they were certainly aware that things were being done differently and arguably better elsewhere. The fear of being outmanoeuvred by the foreigner seems to be a common theme in science education, and not just in the UK.

The Foundation's plans were ambitious. They started with O level courses in physics, chemistry and biology. But from the outset they were aware of the need to go beyond that and before long they had started on other science courses for CSE, for 11-13 year olds, and for Primary children.

Mathematics was in the frame from the beginning and Nuffield Primary Maths was a huge success, the first editions selling over 1 million books. That's where the phrase "I do and I understand" comes from – it was the guiding philosophy of that course.

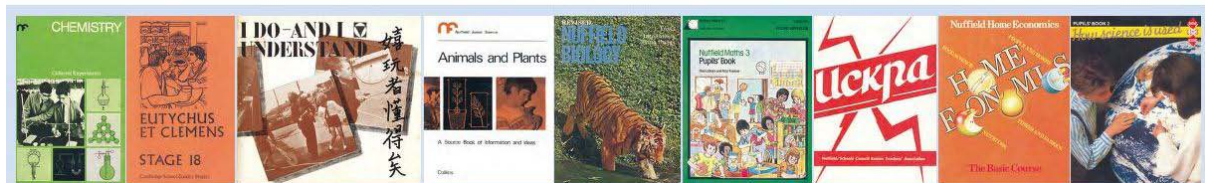
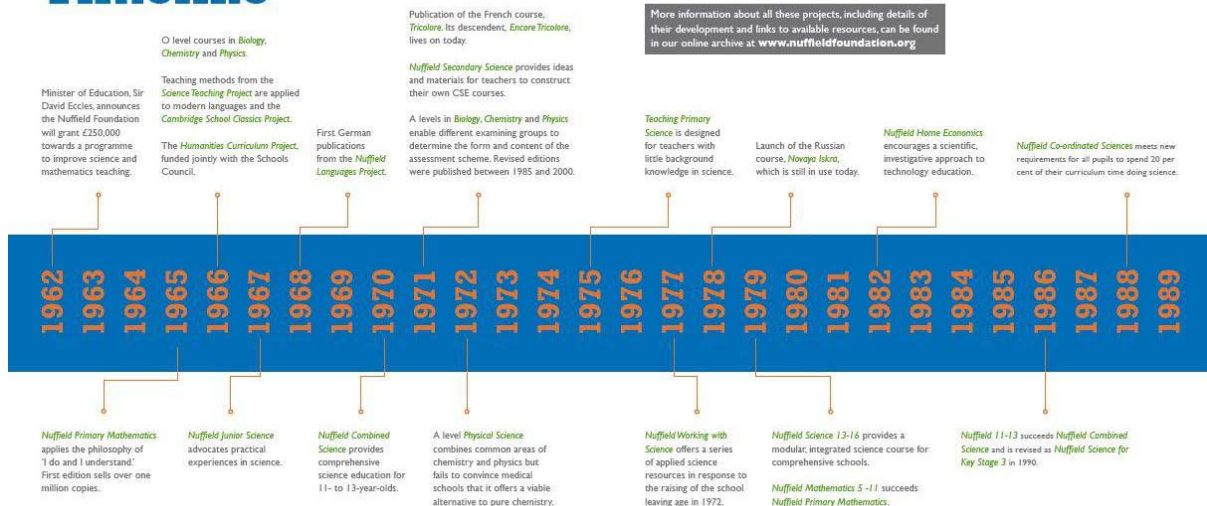
Impressive though all that was, the Foundation's ambitions went further. The Annual Report of the time reveals an equal interest in the teaching of modern foreign languages, starting with primary French. They quickly moved on to the development of secondary courses in French Spanish and German and eventually Russian. It wasn't long before they moved on to the humanities and classics. And of course the Nuffield A levels in science were not far behind.

It was by any standards an extraordinary burst of creativity. It can reasonably be said to have started the modern idea of curriculum development.

On your way in you were given a commemorative booklet that gives some of the background and the history of the Nuffield projects. I would draw your attention in particular to the timeline at the end of the booklet:

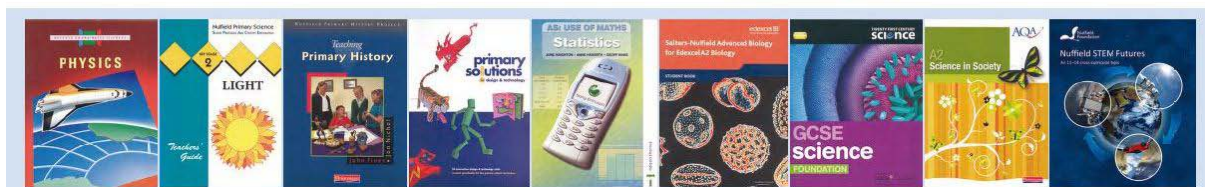
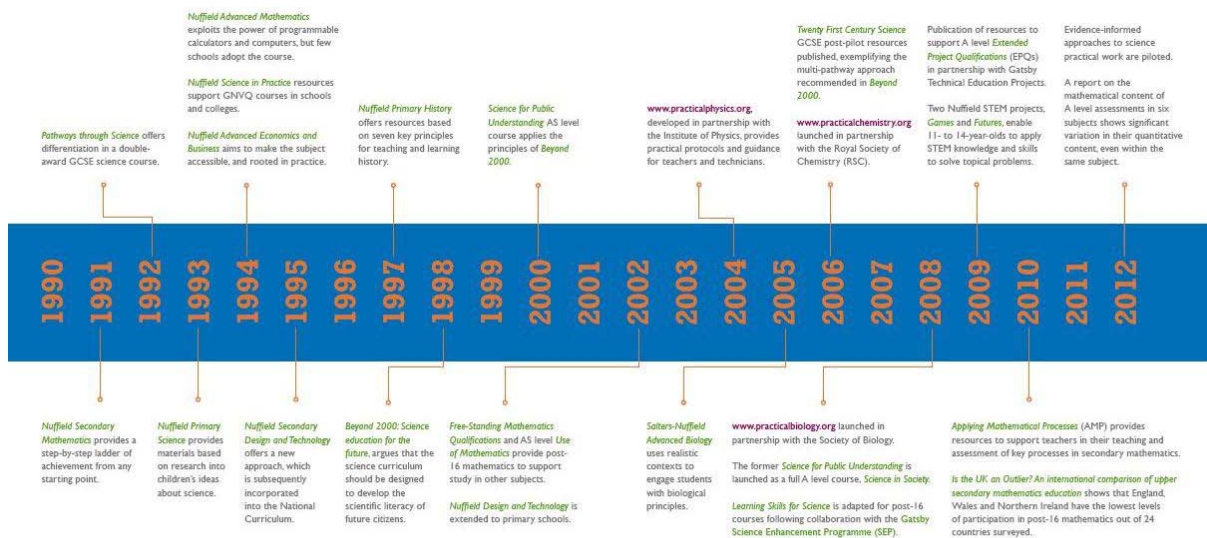
Timeline

"I do and I understand"
Half a century of curriculum development
11



Timeline continued...

"I do and I understand"
Half a century of curriculum development
13



It covers over sixty projects, large and small and gives a good overview of how this work has continued over fifty years.

You will be relieved to know that I am not intending to go solemnly through this list of projects but I would like to mention that we have developed an on line archive that gives brief details of all the projects in the timeline. The entries look like this:

The screenshot shows the Nuffield Foundation website. At the top, there is a navigation bar with links for 'About us', 'Contacts', 'News', and a search box. Below this is a secondary navigation bar with categories: 'Social policy', 'Education', 'Capacity building', 'Teachers', and 'Apply for funding'. The Nuffield Foundation logo is on the left, and the tagline 'Improving social well-being through education, research and innovation' is centered. The main content area features a breadcrumb trail: 'Nuffield Foundation > Curriculum projects > Nuffield Primary Science and the SPACE project 1985'. On the left is a sidebar menu with links such as 'About the Nuffield Foundation', 'Lord Nuffield', 'Trustees', 'Directors and senior staff', 'Finance and investment', 'Publications', 'Curriculum projects', 'The Nuffield Council on Bioethics', 'Jobs at the Nuffield Foundation', 'Other Nuffield organisations', 'Data protection policy', 'Green policy', 'Complaints policy', and 'Contact us'. The main heading is 'Nuffield Primary Science and the SPACE project 1985', with directors 'Paul Black and Wynne Harlen'. A paragraph describes the project as a classroom-based research project. Below the text is a photograph of children making shadows on a wall, captioned 'Shadow-making in 1993'. To the right of the main text, there are sections for 'See also' (with a link to 'Download the SPACE research reports >>'), 'Also on the web' (with links to STEM Centre resources and 'Nuffield Primary Science >>'), and a 'Printer-friendly version' link.

The entries give access to the resources that were produced, mostly by means of a link to the e-library of the National STEM Centre.

I should say that while the archive is already pretty comprehensive we regard it as work in progress and if you have any comments or corrections to suggest do please get in touch and we will see if we can incorporate them. You will find the archive on our website.

Why did a Foundation do all this? Wouldn't a visiting Martian (or a Russian) have found it a bit odd that a charitable foundation rather than a government body, say, took it on? I think that as an independent foundation Nuffield had, and indeed has, a couple of important advantages.

The first is that we are not tied to any particular constituency. That means we can work across many different interest groups, facilitating connections and collaborations that bring different kinds of expertise and creativity to bear. We can act as brokers, networkers, and convenors. We can get access to different kinds of expertise and above all we can work across sectors. That, I think, gives us a real advantage.

The second is the ability to take risks. Many of the projects in our programme were too risky or speculative for a government body, for example, to take on.

But Foundations are supposed to take risks and so it is some ways natural territory for us. In fact it's something of a truism in the Foundation world that if all your projects are successes that's evidence that you haven't been taking enough risk. So among the Nuffield portfolio we do have a number of failures, some heroic, some less so. On that score I think we do ok.

The obvious thing about Foundations is that they have money. What that means is that they can pay for things, but for me that isn't the main point. The key driver, I think, is independence. Being free to work in a way that isn't driven by vested interests on the one hand and being free to try things and get them wrong on the other. That is the real treasure that the money provides.

My role here today is to be the warm-up act and I will shortly introduce the main attraction, who is Jonathan Osborne. But before I do that I would like to take the opportunity to make three general observations.

The first is about the balance of the work that the Foundation has been involved with. If you look at that timeline again you will see a great preponderance of projects in science. Why is that? I don't think it's just a consequence of Nuffield's interests. If you look across the scene at curriculum development, including what goes on in other countries, you will see that science seems much more active than other subjects. Why is this? What is it that makes science educators so restless? Is it because the boundaries of science are always expanding and there is a need to keep up? I don't have any very good answers but I do think it's an interesting question, and one we might reflect on later.

And a related question is; "why is it so hard to get mathematicians and science educators to work together?" I would like to turn that into a question for the panel to discuss at the end. Over the past few years we have heard a lot about STEM education. Does the panel believe that STEM has a real meaning in education, or is it just something dreamed up by policy

makers? In sort, are science, mathematics and technology forever going to exist in separate educational silos?

My second point is about definitions. We use the term “Curriculum development” as if it were a single entity, but in fact it covers a wide range of activities such as:

- shaping the curriculum itself, (that is to say the topics and their coverage);
- developing the resources to help teach these topics;
- the guidance for teachers in using the resources or conducting lessons (ie pedagogy);
- developing different approaches to assessment; and
- the research that underpins all these activities.

At different times the Nuffield projects have combined some or all of these in different proportions.

Related to this, one would have to point to the introduction of the ‘national curriculum’, somewhere around the mid-point of our story, as marking a pivotal moment. Up to that point there was freedom for developers to shape the curriculum itself. Since then the scope for imaginative rethinking of what should be taught has been much reduced, and while it hasn’t disappeared entirely the term “curriculum development” now has a very different meaning from what it did thirty or forty years ago. That too is something we might reflect on in the discussion.

My final observation is about people. What we are celebrating here today is not the Nuffield Foundation, but rather the hard work and inspiration of the many people who have contributed in ways large and small to the projects over the years. And when I say many people I mean that literally. Look again at that timeline and think what lies behind it. Each project will typically have involved all of these:

- **Development teams:** writers, developers, equipment designers, software developers.
- **Support teams:** planners, organisers, timetablers, etc.
- **Advisory and steering committees**
- **Trialling:** trial schools, teachers, pupils, teacher trainers, evaluators
- **Publication:** editors, designers, marketing, sales.

- **External supporters:** Companies, other foundations, livery companies, teachers associations, learned societies.
- **Dissemination and training:** local authorities, advisers, HMI, university teacher trainers.
- **Assessment:** Exam Boards, government agencies.

I won't run through them all, but that adds up to a lot of people who have contributed in one way or another. Many are in this room today. You know who you are! On behalf of the Foundation and on behalf of the literally millions of children who have benefited from your work may I say a warm thank you.

And before I close I would like just to mention four people whose contributions have transcended any particular project and whose names run through Nuffield's educational work like the lettering through rock.

The first is **John Lewis**, who I have already mentioned. The others I am pleased to say are all with us today. The second person is **Paul Black**. Paul's contribution to education over the best part of fifty years has been immense, starting with the extraordinarily creative work that he and Jon Ogborn did on A level physics, leading on through the SPACE project, Coordinated Sciences, Design and Technology, and on to his seminal work with Dylan Wiliam on formative assessment, and a great deal more besides. It's a source of great pride to the Foundation that we have funded so much of his work. We could easily have organised an event like this just to celebrate his achievements.

The third is **Andrew Hunt**. Andrew's involvement and contribution to Nuffield's work goes back almost as far as Paul's. He started by working with the A level chemistry team in the 1970s and has been involved more or less continuously ever since, including a stretch of ten years or so as Director of the Nuffield Curriculum Centre. While his contribution has been very different in kind from Paul's it has been no less profound for that. Andrew's hallmarks have been his enthusiasm, his energy, his critical intelligence and his extraordinary ability to get things done. But beyond that has been his willingness to take on and engage with new ideas and initiatives across a whole range of subjects. He does that from a base of a very clear sense of values and so he was the obvious person to turn to when we wanted someone to draft the booklet. Our thanks to him for that, and for his enormous contribution to education over forty or more years.

The fourth person is **Sarah Codrington**. Sarah has been a key member of the Nuffield team for over thirty years. Her name may be less well known than the others, but her contribution has been no less important. Complicated projects don't just happen; they need planning, budgeting, organising, timetabling. Lovely people though the team leaders, writers and designers are they have their foibles and they need cajoling, chasing and nudging. Believe it or not, their writing is not always perfect first time and someone needs to make gentle and diplomatic suggestions about improvements. All this and more Sarah has done with distinction for thirty years. She retires from the Foundation at the end of this month, so this seems a very fitting moment for us all to thank her.

And finally, talking of complicated things, I would like to thank the Nuffield team who organised this event, namely Angela Hall, Emma Palmer, Steve Steward, Fran Bright, Sharon Dabrowska and of course Sarah Codrington.

Another distinctive feature of the Nuffield projects has been the way they added to capacity, by bringing on new people who have gone on to contribute to science and mathematics education in many different ways. One of these is Jonathan Osborne, who cut his teeth on the SPACE project, under the guidance of Paul Black and Wynne Harlen.

Since then he has gone on to great things, including a spell as Professor of Science Education at King's College London, until he was seduced by the bright lights of California and took off for Stanford a few years ago.

As a Nuffield alumnus but with a strong international perspective he was the obvious person to ask to address this gathering, so it's a real pleasure to ask him to do so.