

# TSN News

## Schools, Science and the Public Understanding of Science

It would be difficult not to notice the nation-wide outbreak of school-linked activity presently being generated by the scientific and industrial communities—workshops for teachers, science clubs, booklets and kits for schools, competitions, ‘hands-on’ science centres, open days and science road-shows and fairs. Of course, these things are not new, and Norfolk’s industrial and academic establishments have long supported education in many of these ways. But why this sudden explosion of activity? Why now?

In the past, commercial considerations often demanded that when organisations produced a package for schools, or sponsored some activity for children, they needed to make sure their own interests were promoted in some way—e.g. to advance their product, or to enhance their public image.

There is now another reason for organisations to become involved in education, and it is to do with the *Public Understanding of Science Engineering and Technology* (PUSET), an initiative that encourages science, engineering and technology to communicate with the general public.

### Wolfendale Report

A year ago a committee that had been looking at the way scientists and engineers had contributed towards PUSET published its findings: the Wolfendale Report<sup>1</sup>. It reviewed and described the work done in the ‘public understanding of science’ since the establishment of COPUS (Committee on the Public Understanding of Science) some years before. The pertinent parts of the report...

- say the ‘public understanding of science’ in years to come will be conditioned by the standard of science and technology taught in schools, but
- suggest that there is some concern over the shortage of well-qualified, motivated and “provisioned” teachers, and so
- encourage all those engaged in the professional science community to take part in PUSET activities, and therefore
- recommend that research grants for scientific institutions should include provision for PUSET projects.

The Office of Science and Technology, in response to the Wolfendale Report, published *Going Public*<sup>2</sup> a booklet for scientists in which many of the report’s proposals are endorsed.

### Purposes of PUSET

Paralleling the rise of green politics, the past decade or so has seen school children encouraged not to take anything for granted, and taught to question and to make independent but informed judgements about what they do in their science lessons. When you put this scepticism alongside the widespread ‘boffin’ image of science no-one should be surprised if the science establishment itself is scrutinised and asked to account for its activity.

And so some see PUSET as the way to approach an increasingly doubtful and bothersome public, one that will not be fobbed-off with paternalistic reassurances

from the establishment, and a young public that often perceives science—especially science in the commercial domain—as not properly in control and sometimes unsafe.

A broader view is that PUSET is linked with the notion of scientific literacy, and how ordinary people might use their knowledge and understanding of science to help them solve daily problems and enable them to make informed decisions in everyday contexts. Science is considered to be an *entitlement* toolbox for all.

The liberal view is that science, like literature, art and music, is a major cultural achievement and as such, is something to which all in a liberated society should have access. PUSET expresses this.

These views are not mutually exclusive, and they are not the only ones. But isn’t it all a bit academic? As long as schools benefit does it matter what views people hold? Yes it does...

### Need for Agreement

Most Research Councils and other professional bodies have responded to the PUSET invitation in one way or another, often by allocating funds and other resources. Many scientific organisations have now included support for the public understanding of science in

#### CONTENTS

Steering Group Statement	2
BBSRC starts networks	2
Partnership news	3
New Members	3
Mini-grants	4
Redundant Equipment	4

their mission statements. These commitments are beginning to be translated into practical activity and we are now seeing the start of a flood of 'science understanding' projects aimed at the public, and at schools in particular (schools hold the public of the future). So is it good news? Well yes, it could be, but in an unwary haste, there is a very real danger that some projects will be misconceived and wonderful opportunities and precious resources misdirected. The reason is this: The purposes of Puset activity have not properly been thought through; it is not yet clear to those involved in the practical delivery of Puset events exactly *what* it is of science that the public is supposed to understand, precisely *why* it needs to understand it, and for *whose benefit* it all is. A provider's stance in these matters, naturally, will affect a project's substance, style and ultimately how effective and useful it will be. Clearly, the best chance of success and the most efficient use of the many resources now becoming available will be when both providers and recipients are in agreement about purposes. And that, of course, implies partnerships and collaboration between those involved rather than a 'top-down' design by the provider.

The meanings and purposes of Puset have been debated at an academic level for some time<sup>3</sup>, but what we surely need now—if we are to make best use of the many opportunities becoming available, and to make sure that everyone involved gains maximum benefit—is similar debate amongst its practitioners, in this case teachers and scientists. And it should be soon. ◇

<sup>1</sup> *Report of the Committee to Review the Contribution of Scientists and Engineers to the Public Understanding of Science, Engineering and Technology*, Oct. 1995. (Now at <http://www.open.gov.uk/ost>)

<sup>2</sup> *Going Public: An Introduction to Communicating Science, Engineering and Technology*, Sept. 1996. DTI/Pub 2392/5k/9/96N.

<sup>3</sup> For example: *Towards a Science Curriculum for Public Understanding*, Robin Millar, School Science Review, Mar. 1996.

## From the Steering Group

After reviewing the work of TSN so far, looking at similar activities by others and listening to what TSN members have said, the Steering Group has prepared the following statement. It outlines our present standpoint and our thoughts for future directions.

### 1 The Present Position

We believe the core activity of TSN should continue to be partnerships between teachers and scientists. Partnerships operate within a wide range of styles and vigour, and how they operate should continue to be decided by the needs of individual teachers and what individual scientists are able to offer.

There is an issue concerning the optimum size of the network that we will need to address at some time.

Activities such as the *ad hoc* workshops, talks and meetings we consider to be valuable and worth developing further.

We believe that TSN should continue to encourage the establishment of teacher-scientist networks in other regions.

Our experience so far suggests that classroom-based partnerships are usually more productive and valuable in supporting teachers in primary education.

There have been requests for teacher professional development in primary school science, particularly in relation to science topics and especially if there were associated kits for teachers to borrow. We would like to develop this idea, but it will need extra funding.

In secondary education more often the demand appears to be for one-off events that meet a particular need (such as 'master class' workshops for science teachers of particular disciplines).

It might be possible to undertake some of these activities in partnership with the Local Education Authority.

### 2 Medium Term plan

Within the next few years we would like to

- Continue to support teacher-scientist partnerships in all schools, but particularly in primary education.
- Develop a library of science kits for primary teachers and their scientist partners to use.
- Provide a range of professional development for primary teachers in association with kit-based resources.
- Provide for secondary teachers professional development in the 'master-class' style with hands-on work in professional laboratories when appropriate.
- Explore further the possibilities of developing partnerships at institutional level to help develop the above.

### 3 Long Term plan

- We would like to see accreditation for teachers who undertake certain professional development in science such as that envisaged above.
- Although there is a period of stability in science education at the moment, most people view the school science curriculum as, at best, a working compromise. Eventually there will need to be more debate about what school science should be. Our teacher-science community, with firm links with the education and the science establishment, is in a strong position to make significant contributions towards future science education reform. We would like to see a working group set up to see how this might be done. ◇

Steering Group, October 1996

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## BBSRC\* starts Nationwide Scientist-Primary School Links

As part of its programme to support public understanding of science, the bbsrc is establishing a nationwide network of TSN-style primary school links. There will be 14 regions, each with its own coordinator. There will also be some support materials supplied to the schools involved.

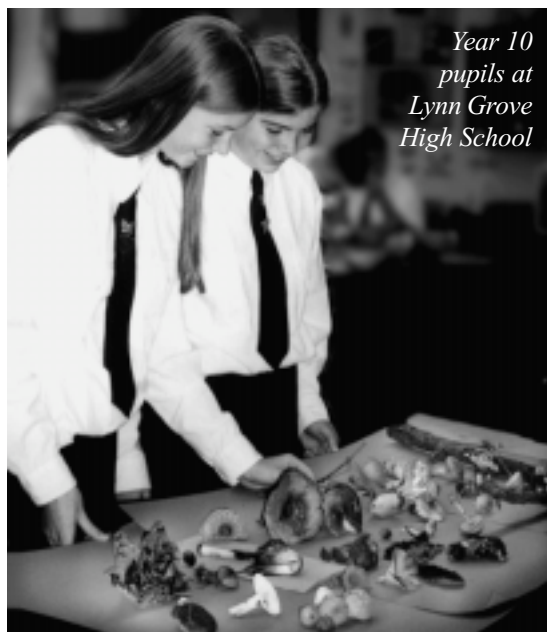
As an established, up-and-running network in this part of the Eastern Region the TSN will also be supported.

\*Biotechnology and Biological Sciences Research Council

# Partnership News

## Fungus, but no Bogeyman

Sarah Calne, Lynn Grove High School  
Pupils from Lynn Grove High School, Gorleston were in for a surprise when Dr. Paul Nicholson from the John Innes Centre arrived. He had come to lead practical work and give a talk entitled 'Fungi, friend or Foe?'



*Year 10  
pupils at  
Lynn Grove  
High School*

Previously, the pupils had described what their idea of a typical Scientist is. The usual tired old stereotypes abounded, comments ranging from 'someone really old and square with a white coat, thick glasses and a weird hairstyle', and 'a crazy boffin' to 'the bloke from *Back to the Future*'. But, of course, Paul Nicholson did not fit any of these images; pupils later describing him as 'relaxed' and 'normal'.

The pupils saw fungal spores under the microscope that Paul brought to the school and saw a demonstration of the effects of a powerful toxin on some respiring yeast cells. Pupils certainly found the event interesting and informative, and when asked later what they remembered of the lesson, they commented on the uses of fungi such as in making medicines and food.

Pupils said how much they appreciate having an expert come into the school. 'It gives us an idea of what goes on in the real world,' and 'You get a professional view' and 'it makes a change to hear it explained in other ways' were some of the comments. ◇

## New TSN Members

### WELCOME

Mrs Ali Bevan Research Assistant, John Innes Centre  
Mrs Anna Hallam Teacher, Hethersett Middle School  
Miss Clare Fordham Teacher, Hethersett Middle School  
Mrs Angela Farrington Teacher, Hethersett Middle School  
Mr David Murtagh Science Coordinator, Hethersett Middle School  
Ms Lynne Symonds Head of Science, Hethersett Old Hall School  
Dr Scott Wymer Computer Consultant, John Innes Centre  
Dr Clare Robinson Science Writer, John Innes Centre  
Dr Carol Wymer Post Doctoral Fellow, John Innes Centre  
Mrs June Forsyth Science Coordinator, Diss Church First School  
Mrs Catherine Bates Teacher, Lodge Lane First School  
Mr Graham Wardle Science Coordinator, St Mary's Primary School, Beetley  
Mrs Jan Horn Science Coordinator, St Mary's Primary School, Beetley  
Ms Gillian Baker Headteacher, St Andrew's School, E. Runton  
Mrs Pat Chapman Science Coordinator, Hunstanton First School  
Ms Sharon French Teacher, Cawston Primary School  
Ms June Milward Teacher, Ranworth First School

## Making Waves at Caistor-on-Sea

Anna Cullingford JIC

I joined the TSN having a pretty good idea of what I would be in for. I worked in a school environment for 6 years before coming to the John Innes Centre, both as a special needs welfare assistant and as a senior science technician, and I found I enjoyed working with children.

Before my first visit to Caistor-on-sea Middle School, my teacher partner asked the children in year 7 to draw what they thought I, their scientist, would look like, and what work I might do. I was not surprised to see that nearly all the drawings show middle-aged males, balding with beards and wearing glasses. They were a bit vague about what they thought I did: 'test things to see if they work out' was the general opinion.

So far, I have talked to them about how we carry out experiments, the importance of keeping detailed notes, and health and safety issues etc. My last visit, which was to do with their current topic, sound, saw me arrive with a car load of bits and pieces: my daughter's electric guitar and amplifier, an acoustic guitar and a borrowed oscilloscope as well as a load of everyday objects such as bottles, elastic bands, and wine glasses. I took small groups of children out of the lesson to expand the topic further with them, and using the guitars and objects I had brought with me, we investigated the sounds they made and found out about pitch and loudness and looked at their waveforms on the oscilloscope. ◇



*Anna Cullingford back at work*

## Eye opener for Scientist

Jan Peart, JIC

I am partnered to teachers in a school serving a small village where there is a lot of community involvement, for example many Mums help in the classroom and in the playground. As I also happen to have a child at the school, many children regard me during my 'scientist' visits as another helping mum—the one who comes with a microscope. But when I went in one day wearing full laboratory gear (labcoat, gloves and mask) it was brought home to me just how alien the concept of a scientist mum is to children. On this occasion my dramatic entrance made their eyes boggle, and they were stunned into silence! We went on to explore their ideas of why I wore these clothes, and found that the notion of protecting what I deal with *from me*, rather than protecting me *from it*, created some puzzlement.

Using a microscope with young children is great fun, with a whole new world opening up to the children. Low magnification is an idea they seem to be able to grasp fairly readily, but when their eyes were opened to the truly microscopic world of their school pond life—one that is invisible to the naked eye—they became quite confused. I was quite unprepared for the way they became very uncertain, even disbelieving if they couldn't see a smaller, 'real' version of the magnified image.

We all had our eyes opened that day. ◇



## A Week with Wheat

Yvonne Gafford, Thorpe House School

16 year-old Kirsty Bedder spent some time away from School to work with scientists at the John Innes Centre. The first couple of days she spent with Dr. Paul Nicholson's plant pathology team looking at wheat disease and learning to use a range of equipment not available back at school. She then travelled on to the Morley Crop Research Centre with Dr. John Flintham and his team to work in the laboratories there.

That wasn't the end of the story though, once back at school she had to explain all that she had done to her classmates. 'My week at The John Innes Centre was an enjoyable and valuable experience' said Kirsty, 'It helped me to see a different aspect of science that I do not see at school. It also made me more interested in biochemistry, which is what I would like to pursue as a career.' ◇



## Partnership Grants

Has your partnership had a good classroom idea? Did it work well? Well, don't forget that there are mini-grants of up to £200 to help you develop a successful curriculum package. The money could buy you equipment, or pay for production costs, or used for other incidental expenses. The main condition attached to the grant is that your bright idea must be 'exportable' in the sense that duplicate packages (produced by TSN) would be available for other schools to use. Further details from Frank Chennell.

Other teacher-scientist project grants up to £1,500 are available from the Royal Society. (See leaflet with this newsletter) ◇

## More things to give away

- 2 Analogue analytical balances (1mg)
  - 1 TP electronic balance
  - 1 Dessicator (w. vacuum attachment)
- Plastic ware:
- 50 ml tubes with screw caps,
  - 10 cm and 5 cm Petri dishes
- Journals: a number of HE, nutrition and food science journals.
- Contact Frank Chennell

*Teacher Scientist Network*

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