



*The new 'Diamond Light Source' synchrotron at Harwell, Oxfordshire.  
The subject of one of our visits in 2007*

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See <http://eng.iop.org> for further details about the Engineering Physics Group.

## A note from your chair

*John Battye*

### **Misunderstanding of the quarter?**

After the interesting reports, about fifteen years ago, of 'Cold Fusion' as a new cheap means to get almost unlimited power, and the more recent reversion to 'Creationism' as an explanation for the origins of the universe, I notice that we now have Transcendental Meditation (TM) as a means for investigating the origins of the universe ---- Ref. a BBC radio report on Tuesday 23.10.2007. An ex. pop star guru announced that TM was, "great and should be taught in British schools as a means to reaching the inner self, the area that science calls the Unified Field". I guess he had heard someone mention Grand Unification Theories (GUT's). Clearly some of us are wasting our time and money building the LHC, it would be cheaper to sit under a tree with a Guru.

### **Concerning Engineers:**

A recent BBC radio programme mentioned that unlike in Britain, engineers in Germany and France are prefixed with the title "Ingineer" just as medical doctors in the UK, and I think all other parts of the world, are prefixed with the title "Doctor".

Recent research carried out by the Engineering and Technology Board and the Royal Academy of Engineering found that almost three-quarters of young people don't understand what engineers do. They discovered that they were confused by the common usage of the word engineer to describe activities from financing (as in 'financial engineering') and motor car repair.

Might not these two facts be related and also related to the steady decline of engineering in the UK over the last half century?

Incidentally, for those who don't realise it there are a great many other countries of the world, not least all over the Middle East, where professional engineers are similarly addressed by the title 'Engineer'. Forget the semantic subtleties argued by some, they are irrelevant. Also, do you realise that a medical doctor's degree has written on it, 'Bachelor of Science'. Even lawyers in Portugal, and some other countries, are referred to as "doctor". Don't you think that engineers have perhaps lost the public relation battle in the UK?

Perhaps engineers trouble in the UK is partly that they tend to be too isolationist. How many medical doctors and lawyers can you think of that are Members of UK Parliament? How many engineers can you think of that are? On the international scene only Sheikha Lubna al-Qasimi, the Economics and Planning Minister of the

UAE, immediately comes to mind. Yes, she is also a woman and, I might say having heard her at a conference in Oxford last year, she seemed the smartest and most eclectically minded and enlightened of all those making the presentations.

We are always looking for articles. Do any of the above comments stimulate any? If so please forward your submissions to me John Battye ([john.battye@physics.org](mailto:john.battye@physics.org)).

As I've previously mentioned our group membership includes those working in widely diverse fields. Here Catherine Wells ([c.wells@ischus.co.uk](mailto:c.wells@ischus.co.uk)), the Financial Director of a computer software company, outlines the sort of activities the company she works for does to make a living.

## A specialist computer programming company

*Catherine Wells*

Our speciality is analysing, updating and improving old programs and turning them into high performance software solutions.

Maybe it's as simple as needing a more user-friendly interface or improving the data handling side of the program, or adding a database. But it could be that an answer to a much more complex problem is needed — such as why the software won't work with a newly upgraded operating system.

With considerable experience in ancient and obsolete computer systems and languages we're able to work with existing code and where existing documentation or source code has been lost.

We are also able to emulate plant ---- both in hardware and software ---- while writing the program at our offices. This cuts down on the access we need to our clients' equipment and our presence on site ---- so minimising possible downtime of the client's equipment.

Our knowledge of computer languages is extensive. Our scientific background also means that we are able to communicate with engineers about all engineering aspects of the work.

We believe in partnership working which is why we've developed a customized project management tool which gives our clients secure and exclusive access to their project via our server. Using the system, they can see what's happening day-

to-day, log tasks, ask questions and talk to us at more or less anytime. We are highly flexible at best serving our client's wishes and needs. We combine the analytical skills of physics and our in-depth knowledge of engineering with many years of programming expertise to create software solutions, an extremely rare formula in the programming industry.

## A consideration of the growth of the science in Arabic – Islamic and Western civilizations between AD 700 and AD 1800

*M. I. Sanduk*

Our present natural sciences, on which our technology is based, are largely founded on the scientific achievements of western countries over the last couple of centuries, but their roots extend far back in world history. Some of these roots lie in the Arabic-Islamic world of the Caliphate, which picked up, carried and greatly developed the torch of world progress from roughly the time of Christ until the Renaissance in the west. In earlier times the Chinese, Greeks, Indians and Romans had made important discoveries but as these centres declined there was significant likelihood that what had been learnt would be lost to mankind. The sudden arrival of the Islamic Empire in the first half of the seventh century --- spreading out, within a hundred years, from the Arabian peninsular to extend from the Atlantic in the west, to the Oxus River (lying southeast from the Aural Sea) in the east, and from mid France in the north to North Africa (modern Libya and Egypt) in the south --- acted as a focus to gather, save and move forward earlier discoveries. In spite of the common modern belief that the expansion, ruled over by the Caliphate, was narrow minded and intolerant, it was in fact quite the opposite. As with the world's first great empire founded by the Iranians a millennium earlier, the Islamic empire adopted their innovation of a highly tolerant attitude towards the 'subject peoples' as a practical means to deflecting internal insurgency. As with the Iranian empire, an efficient taxation system operating over such a vast area resulted in central courts becoming exceedingly rich so that leaders of the right frame could, and did, indulge themselves and their courts with the pursuit of knowledge and learning. In the case of the courts of the Islamic empire one prominent facet of this was the development of knowledge and learning in the area of mathematics, science, technology and medicine.

Within the Islamic empire great wealth and strong scientific development began with the arrival of the more egalitarian, refocused Islamic, Abbasid Dynasty in AD 750 --- as opposed to the initial 'Republican' phase and the racially selective first dynasty of the Umayyads. The Abbasids started their dynasty by founding as its capital the new, model city of Baghdad. By AD 830 the city was already well

established and had already attracted many of the best minds of the day. To further promote knowledge and learning the Caliph ordered and funded the foundation of the Bayt Al Hikma (House of Learning) to translate Greek and Syriac works into Arabic; and otherwise act as a focus and research centre. It wasn't long before similar centres of culture developed in other Islamic hubs, notably Cordoba (AD 970) and Toledo in the break away Umayyad state in the Iberian peninsular. In effect these establishments constituted the world's first universities. The highly educated who steered clear of political sensitivities moved freely between the various centres so it is largely by way of Iberia that the west came to learn not only what was known and discussed in Iberia, but what was known and learnt elsewhere within the Islamic Empire, e.g. at Kairwan (in modern day Tunisia), Cairo (in Egypt) and the major centre of Baghdad in Asia.

The growth reached its zenith in the eleventh century. Decline started when many small states maneuvered to get independence from central control. The majority of the small states tried to develop and encouraged scientists themselves but they were weakened by internal and external conflicts brought about by political and religious conflicts. Between AD 945 and AD 1055 the Sunni-Shiite divide in Islam became fully established resulting in the ultimate fall of the Abbasid Caliphate. Outside pressure on the empire as a whole increased from as early as the eighth century. In Europe, Christian forces fought first slowly south into, and down the Iberian peninsular from a frontier originally in mid France. They then began launching a series of Crusades to strike from the west hard into the Islamic heartland of the Middle East. Meanwhile the Mongols attacked the Middle East from the vastness of the Asian Steps to the north. Toledo was lost in 1074, Sicily in 1091, the first Crusade started in 1095. The Mongols sacked Baghdad in 1258, the eighth Crusade, started in 1270. In spite of the founding of the Islamic Ottoman Turk Empire, in 1288 the number of scientists generally continued to fall within Islamic lands as a whole. Granada, Islam's final foothold on the Iberian Peninsula fell in 1492. The decline was catastrophic and remained to the beginning of twentieth century.

By complete contrast with the situation in the Middle East there were no significant scientists in the west before about AD 1100. Although there had been a continuous small 'leakage' of knowledge to the west from such centres as Toledo and Cordoba in the Iberian peninsular it was not until Christian forces captured Toledo in AD 1085 that the west really realized how far they had been behind in virtually all areas of science and technology. For the following 155 years they translated numerous Arabic works into Latin and made great efforts to educate themselves. The Holy Roman Emperor Frederick II (1194-1250) learnt fluent Arabic and Roger Bacon (1214-1292) referenced Arabic scientist in his works. The west adopted the idea of 'Houses of Learning', i.e. universities, so that in AD 1200 the University of Paris was founded, Oxford University in 1214, Padua University in 1222, Naples University in 1224, and Cambridge University in 1231. The dress ---

still used today --- was styled on that of such establishments in the break away Mammuluk Caliphate of Egypt.

After the occupation of Constantinople by the Ottomans in 1453, the west's Renaissance, which started in northern Italy, was supported by immigrant scholars and scientists from Constantinople. As the influence of the renaissance spread throughout Europe the number of scientists grew steadily until the nineteenth century. In spite of the domination of the theological studies in the west, science still found a suitable place to grow.

The decline in Arabic-Islamic science may be attributed to the domination of the theological studies and the domination of the clerical influence after the tenth century. During that time the Sunni/Shiite split became established. Sufi (spiritualist) orders established and religion began controlling all parts of daily life. Worship became more important than more everyday affairs of life.

These features did not exist during the periods of Islam growth, 600 to 1000. As time passed the interest in science and philosophy reduced in comparison with the interest on theology. After the tenth century the schools focused only on the pursuit of theological or linguistics studies.

In the west, after the middle Ages, the church's influence on western civilization, and hence science, declined. In addition the separation of church and state in most countries allowed more freedom for science to grow --- in spite of the fact western societies faced many social and political problems, including wars. Freedom of thought and expression became slowly easier.

Today the Islamic countries are thought of by the majority of the technologically advanced west, as a backwater as regards scientific and technological development. However, of interest is that in earlier times the Islamic empire allowed the great flowering of science and technology to a level of undisputed world supremacy.

## Visits

On the 28<sup>th</sup> February a visit was organised at QinetiQ's 5 metre Wind Tunnel at Farnborough. More visits are currently being planned to sites of scientific and engineering interest in the UK. One 'in pipeline' is to the Jodrell Bank Radio Telescope, a little south of Manchester.

As always with these visits it is very desirable that we get a fair attendance in order to justify our request. This is particularly so in the case of the visit to Jodrell Bank because it is only being organised, by those willing to show us around, on the understanding they we can show sufficient interest. In addition the organisers are charging a fixed fee which we plan to cover from EPG funds. Hence the more heads the fee is spread over the better.

## Grants

For those of limited financial means we offer a few travel grants. Please e-mail our secretary, Samantha Davidson ([s.davidson@physics.org](mailto:s.davidson@physics.org)) both if you wish to apply for a place on a visit and, making your case, if you wish to request assistance with travel costs.

## Bursaries

A poster for the Research Student Conference Fund. The top section has a black background with the text "Supporting research students" in white. Below this is a grayscale image of a complex, fibrous network. The main title "Research Student Conference Fund" is in large, bold, black font. Below the title, the text reads: "Providing financial support to research student members, to attend international conferences and major national meetings." followed by "Apply for up to £250 during the course of your PhD." and "Applications are considered on a quarterly basis and should reach the Institute by: 1 March, 1 June, 1 September or 1 December". At the bottom, it says "For further information see [www.iop.org](http://www.iop.org) or contact [supportandgrants@iop.org](mailto:supportandgrants@iop.org)". The footer has a black background with the text "IOP Institute of Physics" in white.

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**IOP** Institute of Physics

## Thoughts, comments and ideas please

We, your committee, are very keen to hear of any thoughts, comments or ideas you may have. Perhaps some have been stimulated by the reading of this Newsletter. Please e-mail them to our secretary, Samantha Davidson.

## Events of interest

Please see our website at: <http://eng.iop.org>

## Your Engineering Physics Group Committee 2007/08

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This newsletter is also available on the web and in larger print sizes

The contents of this newsletter do not necessarily represent the views or policies of the Institute of Physics, except where explicitly stated.

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