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## PROVEN FACTS AND BELIEFS



On the 8th June a well-known American scientist, Neil de Grasse Tyson bemoaned the lack of science in the education system of so many countries, leaving a population unable to examine and analyse 'facts' or claimed 'truth' critically. He was speaking on the Today programme on BBC Radio 4. Neil was saying that the distinction between proven facts and firmly held beliefs was lost on many people, and so politicians and other leaders could follow their convictions, their firmly held beliefs without the challenge of a public which can understand facts.

### Is global warming one such situation?

On behalf of their education system in the USA he accepted some blame himself for this situation. Neil likened their approach in schools to 'unzipping the brain, pouring in information and facts, closing the zip and handing over a certificate' where what is really needed is to develop understanding and the ability to reason, rationalise and recognise inconsistencies with factual truth.

There is a parallel of a kind between the politicians he worries about and the officials we come up against in our business ventures who reject our proposals because they do not match their standard specifications. These people are unable to reason and understand what has been put in front of them because it is new and creates a conflict with their 'firmly held beliefs'. This is not a new problem for us because we have always been looking at new ways of doing things but when Ivor started work we were trusted and allowed to go ahead with what we were proposing. The current attitude is so different, if a box cannot be ticked then you are stopped dead in your tracks even if what you propose is based on good science. Dogged insistence on firmly regulated belief or opinion gets in the way of scientific evidence.

Neil went on to argue that no-one can educate young people with all they need to know in their future lives and careers – computers, for example, were still at the mainframe and terminals stage when he was at university and wind or solar energy was for hippies and eco-warriors. The best that we can now hope for is an education which equips young people to inquire, absorb, understand and evaluate what is yet to come to them. If we are lucky, the combination of that education and the experiences that follow will combine to allow us to keep up (or not too far behind!) with the pace of change.

For some time Ivor has felt strongly and spoken about his fear that regulation and regulators cramp curiosity and innovative thinking in young scientists. In several of our newsletters we have commented on the problems associated with adherence to 'facts' and the desire to 'tick boxes'. Applying standard regulations to individual unique situations is all too common when basic scientific knowledge and understanding should have been recalled and used as a starting point.

Kind regards

**Idris**

Chief ranter and problem solver  
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## "Engineers can change the world"

Jay Leno, a well-known American

Engineers do change things and at RML we talk about us consciously creating our environment. Andrew indicated in his newsletter about the value of landscapes how important these elements of our daily life are in having an impact on our well-being. RML has witnessed and dealt with the debilitating impact of uncaring mineral exploitation on both a regional and local scale and highlighted opportunities that have been missed by engineers to use simple techniques that would improve engineering performance and impact rather than making things worse.

Along with RML and my work before RML's establishment in 1984 I can claim that I have changed some small parts of the world, beginning with Corris, Blaenau Ffestiniog and Tredegar in the 1970s and Minera and Fan lead mines 25 years later. There are many more 'spots' where we have made changes but I do not want to bore you with a long list of sites. When I stop to think about it, I find it's 'funny' that although we changed these places to a significant degree today's casual visitors would not appreciate the changes that were made. So our impact has been rather different from what many of our brother professionals have been involved in when they have built cities, railways and power stations.

'Claims to fame' that I refer to frequently when discussing our work are the occasions when commercial photographers were commissioned to record the condition of two of our completed reclamation schemes. One failed to recognise our site from the air and returned to base with nothing. A wave of satisfaction swept around the office when we heard the news. Have a look at Y Fan, near Llanidloes, on Google Earth. Our site lies downstream of the lake. The second photographer failed to recognise our work at ground level, "Oh I know where it is" he told a national organisation and photographed the totally wrong site on the shore of Llyn Padarn near Llanberis. We received a national award for that particular project even though the local man didn't recognise it. It was commended as an excellent example of how to spend public money well.



When people from the National Rivers Authority visited our completed scheme at Bwlch lead mine for the first time they complained that they couldn't understand or see what had been done and they had just spent more than £200,000. Samples of water taken from the river showed what impact we had achieved. 'Before and after' photographs showed the physical changes, but they did not in fact help much because of our 'brush' with lichenologists who wanted nothing to change in order to protect their precious lichens. We made a special effort to protect the lichens.

Our impact has been different too in that we have changed the way in which other engineers work. Providing national guidelines on good practice which were based on our direct experience of designing and managing works that were to be carried out in unusual circumstances. Writing the guidelines has been rewarding in a professional sense. You will find our name on a number of reports and guidelines that advise on how nature can help engineers in the rehabilitation of mineral wastes and abandoned coal mines and steel works, one favourite, 'Working with nature' was first produced in 1982.

We have also enjoyed the challenge of working outside the UK and transposing UK guidelines for use abroad where cultures and practices were very different. I mentioned in February the work that Andrew and I were involved in in the city of Metz where German and French were spoken equally widely. On another occasion colleagues in Nord Pas de Calais wanted to know what a kissing gate was and dear clients in Tuscany were determined that Marj and I should enjoy the delights of their region as well as walk around abandoned pyrite mines.

Kind regards

**Ivor**

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