

LANBRIA

The newsletter of the Lancashire & Cumbria branch of the Institute of Physics

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Newsletter contributions stimulate physics debate

This issue has some firsts for LANBRIA. We have had our first feedback from a reader (on how to pronounce Huygens), and our first contributed article that was not commissioned (on the need for nuclear-fission power).

We have also received a complaint about the article that appeared in the August issue on three physics myths, claiming that it could put people off studying physics. We will return to this topic in the next issue to

give an opportunity for both sides of the relativistic-mass debate to make a contribution.

The article “Nuclear power could be the green answer to global warming” on p2 is by Peter Morris, who graduated from Lancaster University in the early 1990s. He obtained an MSc and then a PhD in nuclear-reactor physics at Birmingham University and has been working in the Advanced Reactor Physics Group at BNFL near Preston for a

few years now. He writes forthrightly on the need for the UK to invest in nuclear-fission power stations. Perhaps you have an opinion on this subject. Why not let us know what you have to say.

If you would like to make a contribution to this newsletter – we especially welcome articles with a Lancashire or Cumbria connection – then contact me to discuss how to proceed. Chris Bowdery, **Chair and editor**

LETTERS TO THE EDITOR

How do you say Huygens?

I read the piece on the pronunciation of Huygens in issue 10 of LANBRIA and, not believing it, e-mailed a Dutch friend. For your possible interest, this is her reply:

“[The Netherlands] is a strange country, with strange pronunciation. We even have sounds in [our] language that no other language has, such as the pronunciation of Huygens.

As far as I know the “uy” sound does not exist in English. The French pronunciation of *liqueur* (liquor) or *chaleur* (warmth) comes nearest, but it is not perfect either. The “g” in Huygens is very precisely the “g” in the Hebrew *echad*, meaning the number one. But if someone says Huygens as you describe, everybody will understand. Though a person of

Dutch extraction will smile and be proud that he has at least one sound that almost no-one [else] can pronounce.”

I think it’s quite a nice reply. As a result, I shall continue to say Hoy-gens!
Mark Williamson

The “g” should never be pronounced as a “k”. A person from the south of the Netherlands will pronounce it as a soft “g”, as in the Scottish pronunciation of loch.

It is difficult to explain how to pronounce “uy”. You need to watch somebody’s lips. It is neither an “o” sound nor hoy. It is the same sound as in sluice and in the name of the architect Luytjens. One should shape the lips as pronouncing burn, replaced by hurn, replaced by hug/huchen, then by huchens.
H van Kerkoerle

Visit the LANBRIA branch website to win a book token



Each month, LANBRIA runs a competition on its website (lancashire.iop.org) that is open to children attending school in Lancashire and Cumbria.

Just answer the two questions on the site correctly and you will be entered into a draw to win a £10 book token.

So far this month very few people have entered the competition, so your chance of winning is excellent.

Nuclear power could be the gr

“Only nuclear power can now halt global warming!”

This statement by Prof. James Lovelock, the developer of Gaian philosophy and hitherto champion of the Green movement has captured the minds of the public, provoking intense debate among pressure groups from across the whole political spectrum.

It has been prompted by an increasing body of evidence that the consequences of global warming are coming, and are advancing faster than we think.

The climate is changing. The evidence is all around us; with each passing year, record high temperatures and ever increasing sea levels are recorded. The hole in the ozone layer is increasing in size. The global weather system is in a state of turmoil, with record highs and lows precipitating natural disasters and increasing scales of human suffering.

The way forward is only now becoming apparent. We must change our way of thinking about power generation and usage. We must move away from the old principles of isolationism and short-term gain and channel our thoughts to a consideration of the long-term effects on our world as a whole. The favourable economics that currently drive the burning of fossil fuels as our main source of power may soon be forced to take second place to the practicalities of ensuring the safety of future generations.

Scientists, in particular we physicists and engineers, have so far played a key role in this paradigm shift. Indeed, much intellectual effort has been invested over the last generation or so in the development of sustainable and renewable non-nuclear energies such as wind and solar power in tandem with ever decreasing limits imposed on greenhouse gas emissions from transport and industry sources.

These are good and noble actions. However, worldwide progress is slow, and research

indicates that these measures are now proving to be insufficient. More drastic solutions are called for in the shorter term to prevent (or at least minimize) more serious consequences in the medium- to long-term future. In the light of such prospects, the comments of Lovelock would seem to make very good sense indeed.

Alongside this most important of issues, political events worldwide over the last 10–15 years have prompted the growing recognition that the national security of energy supply must also be placed high on the political agenda to ensure its stability in the face of global realignments of national interests. The recent spate of power shortages resulting in “blackouts” across many parts of Europe and the US has recently brought this requirement into sharper focus.

This situation is exacerbated in the UK by the ongoing programme of closure of the existing reactor fleet – a number of which have already closed due to their operational lifespans being reached.

Fear of the unknown

Clearly, as an integral part of the solution to be found for the problems of climate change and energy stability there is an important future role to play by nuclear power and the nuclear industry as a whole.

What is it that is currently holding us back from fully utilizing this potential? Aside from the short-term influence of political expediency, the underlying reason for the uncertainties of the population at home and abroad is fear. That fear is engendered by much sensationalism (both fictional and factual) and uneducated reporting of past events involving nuclear power. This, when coupled with the growing (and principally sound) contemporary awareness of environmental issues, has resulted in nuclear power being given the cold shoulder by the general public.



The two nuclear reactors at Heysham, Lancashire, can produce enough electricity to feed a city one-and-a-half times the size of Manchester.

Green answer to global warming



Nuclear power has an important future role to play in helping to solve the growing problems of climate change caused by global warming.

To quote Lovelock further: “Opposition to nuclear energy is based on an irrational fear fed by Hollywood-style fiction, the Green lobbies and the media. These fears are unjustified, and nuclear energy from its start in 1952 has proved to be the safest of all energy sources.”

Such public opposition to nuclear power is understandable in part. Science fiction films from the 1950s onwards have, more often than not, assigned nuclear energy in the role of a

dark, indeterminate type of force, usually malignant and accompanied in practice by high-pitched eerie sounds designed to raise the hair on the back of the viewer’s neck.

Of course, all high-energy radiations are inherently dangerous and need to be avoided but, as most physicists know, with appropriate care taken, the danger to humans is minimal. Unfortunately, the general public do not have the benefit of a rigorous physics

“Opposition to nuclear energy is based on an irrational fear fed by Hollywood-style fiction, the Green lobbies and the media.”

James Lovelock

education to dispel their worries, and quite naturally tend to fear the worst. Inevitably, “the bomb” also contributes heavily to the list of down sides to nuclear power, if only by association and the use of common materials – but that is another matter entirely.

However, the real stumbling block in the minds of the people is the spate of highly publicized incidents involving early power stations, such as the 1952 Chalk River incident in Canada and the Chernobyl “melt-down” in the Ukraine in 1986.

These events struck at the very heart of people’s deep-seated fear of all things nuclear and, with help from the sensationalist media over the years, had effectively killed off all public enthusiasm for nuclear power. Make no mistake, these events were all serious incidents in their time and provoked consternation among the scientific community as well as the general public. Nevertheless, as the statistics now show, the ultimate consequences of these events on anything more than a short-term localized scale has born little relation to the magnitude of the adverse publicity the industry has since received as a consequence.

Progress

What has not been so highly publicized is the steady progress made by the international nuclear-energy community in addressing in part, if not all of the negative aspects of nuclear-energy generation discussed above. From the point of view of physics and engineering, the last 20 years have seen the steady development of new reactor systems concepts that have

directly addressed all of the issues of safety implicated in the incidents of the past, and reduced to an almost vanishingly small probability the likelihood of some similar unforeseen serious accident occurring again.

Nuclear waste, its generation and what options we have for dealing with it in the framework of a potential new programme of building reactors have also been extensively considered, with systems and concepts now in place to address this controversial issue. To cut a long story short, the global nuclear industry is now primed and ready to meet the challenges of the future.

With foresight, the Institute has recently released a technical paper entitled “The future of fission power – evolution or revolution”, outlining the options and putting forward its views. This paper summarizes the physics, recent developments in design and operation of possible future nuclear-power reactors, and the fuel-cycle options. Choices for the future are considered in three stages, each stage is mapped out in terms of the development and implementation lead times for each solution.

The principal elements of each stage consist of reactor design solutions with ever increasing levels of safety, economics and degree of fuel-cycle closure. Each one of these solutions could play a part in providing a clean, efficient, plentiful and safe power supply for the human race well into the foreseeable future until such a time as other alternative power sources may have been developed and matured.

Peter Morris, BNFL, UK

**Visit the
branch
website**

<http://lancashire.iop.org>

Please check your e-mail address in your Institute details on the Web to ensure that you receive the e-mails that we send you

Physics and Music project gets Einstein funding

Next year, 2005, is the centenary of Albert Einstein's famous three publications on atoms, the photoelectric effect and the special theory of relativity. The Institute is funding, organizing and coordinating many events to celebrate his achievements and to promote physics.

We are pleased to announce that the branch has been awarded funding from the Einstein Year Branch Grants fund for its proposed project, Physics and Music.

The project involves staging events at junior schools in the region, demonstrating how physics is present in everyday things, especially in music.

These events will take place in collaboration with the art director of Lancaster Concerts, Tim Williams, whose chamber group has agreed to write and



perform the music.

We intend to target approximately eight schools in one week next year, possibly in April. We will go into interested schools and we hope to have a captive audience of about 30-40 pupils at each event, which will last between 60 and 80 minutes.

At Key Stage 1, students are required to know that there are different types of sound, and we will be trying to show them that sound travels in waves and explain the reasons why

different instruments produce different sounds due to pitch and frequency. We will also touch on the idea of beats and waves and how the ear reacts to unpleasant sounds. This project has a direct connection with Einstein as he was an accomplished musician.

We want this to be a fun experience that will also spark students' interest in other areas

of physics. Our main idea is for our chamber group to "travel through space" and "visit" planets on the way. Extraterrestrial beings (ETBs) on each of these planets will teach a particular lesson. The travelling will be indicated by music from Holst's planet suite, with the ETBs demonstrating ideas through the use of coloured tubes and projections. We also want the pupils to practise being scientists – for example, by playing an ocarina and changing its pitch.

Watch out for further news in LANBRIA and on the website. If you are a schoolteacher or school governor and want to get involved or find out more, contact us for details. Anne Small, **Physics and Music co-organizer**, and Chris Bowdery, **Chair**.

A calendar of October's Moon

- 5 October** – Moon at apogee: 251 248 miles from Earth
- 7 October** – Moon north of Saturn, early morning in the east
- 10 October** – Moon north of Venus, early morning in the east
- 12 October** – Moon north of Jupiter, early morning in the south-east
- 17 October** – Moon at perigee: 228 524 miles from Earth
- 28 October** – total lunar eclipse: 02.23 to 03.44 UT

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Accommodation
SYRA accommodation Inc. Evening meal £95. See website for further accommodation options.
<http://ypc.iop.org/ypc2004.htm>

Institute of Physics

YP Forum seeks nominations for new award

Are you, or do you know of, a great ambassador for physics? If so, the Young Professionals Forum wants to hear from you.

To match existing awards for young physicists who have demonstrated significant achievements in research, the Institute has introduced a new award – Young Professional of the Year – for outstanding community work or increasing public awareness of physics.

It is looking for a young professional physicist who has been involved in any of the following:

- improving the public perception of physics;
- organizing events promoting physics in their local area;
- working in schools to aid understanding of physics.

To nominate someone for this award, or to be nominated, contact Sarah Connolly (e-mail: sarah.connolly@iop.org) for nomination forms. One form is for the proposer and one is for the nominee. The forms need to be returned to The Institute of Physics, 76 Portland Place, London W1B 1NT by 30 October.