“The EPSRC Nuclear Community”

Some personal remarks

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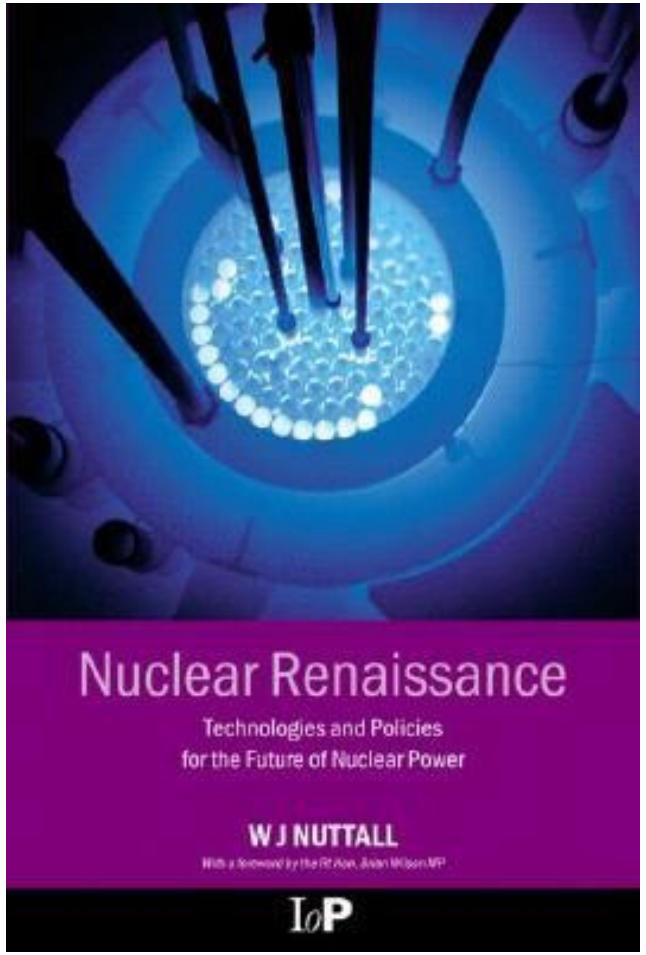
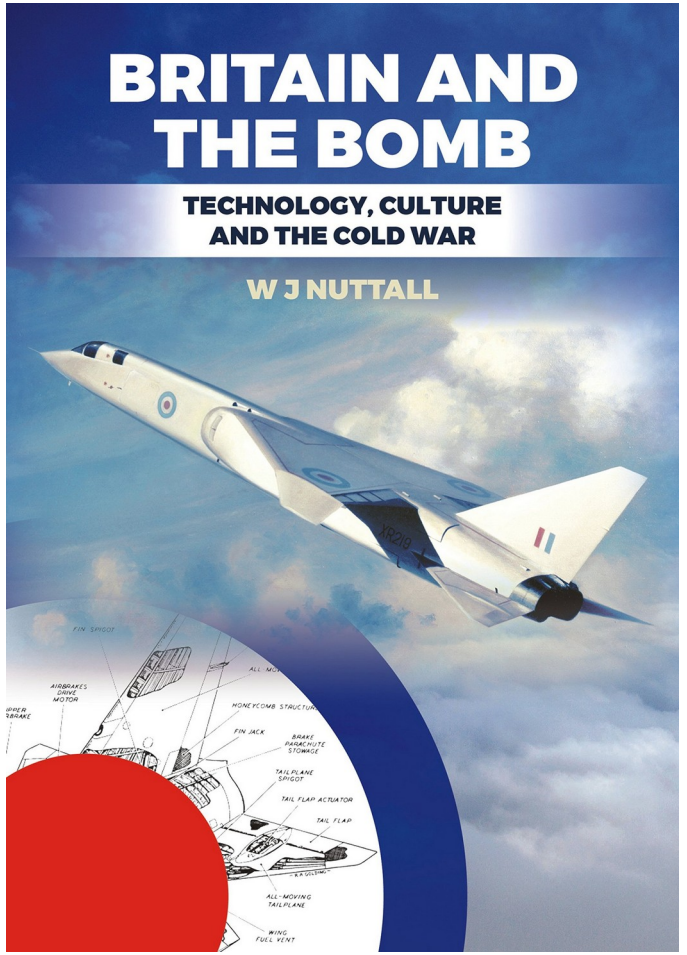
About me ... two books ...





Nuclear Renaissance (2005)

Britain and the Bomb (2019)

The Nuclear Engineers

- Actually a much more diverse community than that phrase implies
- Predominantly it is an applied research community spanning a wide range of STEM disciplines

Main focus areas:

Reactor Physics and Engineering

Nuclear Materials Science and Engineering

Thermal Hydraulics

Nuclear fuel cycle (chemical engineering)

Radioactive waste science (geology, biological impacts etc.)

Decommissioning science and technology

Safety and Security

Economics, Law and Public Policy

The NADM – “the nuclear academics discussion meeting”

- The key annual event usually held in September.
- Most recently held at Bangor University 10-11 September 2019
- Next NADM will be at Cambridge University 8-9 September 2020

Origin of NADM

- The EPSRC Nuclear Champions grant
- It was largely the initiative of Professor Robin Grimes of ICL
- There is also a very long-standing PhD student meeting ‘UNTF’ led by the ‘NAILS’ group.
- And more recently a post-doc forum – a spin-out from NADM

NADM – 2019 - Bangor

- Andy Boston kindly attended and gave an update from the STFC Nuclear Physics community
- NADM considered:
    - The Welsh context – especially with respect to Trawsfynydd site options
    - The EPSRC major research consortia (TRANSCEND [waste and decommissioning] , CAFFE [carbide fission fuels], ATLANTIC [fuel cycle], MAINTAIN [structural integrity])
    - UK Government stakeholders represented: BEIS, NIRO, NDA, EPSRC, Welsh Gov't, UKAEA, ONR
    - Special environmental session
    - Example international collaborations: Japan, USA, Canada, and the IAEA
    - Industry concerns

My sense of the issues key 2020 facing the NADM community

- Nuclear renaissance beyond Hinkley Point C
- Future of UK fuel cycle capability as Sellafield exits reprocessing
- Small and Advanced Modular Reactors (not the same thing)
- Fusion – a UK strength (noting emergence of the private sector start-ups)
- Getting to deep geological radioactive waste disposal
- Keeping skills alive and maintaining innovation
- International engagement

Things that particularly interest me

- The role of nuclear energy in deep decarbonisation
- Non-electrical applications of nuclear energy
- India’s energy future – and UK India civil nuclear co-operation

In my opinion we are too focussed on low carbon British electricity – we should find more difficult challenges ideally with a greater industrial willingness to pay.

Two difficult challenges for a net-zero world – zero carbon marine transport and reliable low carbon high temperature process heat.

India faces key energy policy choices, especially concerning the role for coal.

The UK has now properly rejoined the Generation IV International Forum

- Two particular UK interests:
  - Sodium Cooled Fast Reactor
  - Very High Temperature Reactor

Nuclear Energy is a special part of Brexit

- 2020 is an important transition year for Brexatom
  - See Title IX of the Withdrawal Agreement

New UK Infrastructures?

- There is growing discussion around the need for a new small reactor to meet UK needs primarily for medical isotopes as used in diagnosis and therapy.
- Also the Applied Nuclear community would benefit from a ‘flagship’ facility.
- I am personally focussed on a longer-term, but related, goal – the design and development of a new highly proliferation resistant research reactor to meet growing global medical isotope needs.
- The UK has been building up nuclear engineering technical capabilities such as the NAMRC in Rotherham and the NNUF consortium.
- Harwell and Winfrith are gone for good … but a new and much more open set of infrastructures is being developed.

Points of Contact NPCM to NADM

1. There is growing NADM interest in nuclear cross section measurements of unusual isotopes at unusual energies and at unusual temperatures (Doppler) – we have an embryonic collaboration with BARC India and we hope to grow it in Round VI of that collaborative framework.
2. Improved detector systems – including for post-accident mitigation
3. The NADM community makes great use of the people trained to PhD level in nuclear physics. They have wonderful analytical skills and they learn the engineering really fast… and, of course, they know the physics.

UKRI

- I hope that the creation of UKRI will remove the harmful boundary effects that have sometimes existed between STFC and EPSRC.
- It should be possible to develop applied nuclear physics ideas without any sense of being out of scope, or even worse their being any sense of some kind of threat to the interests of others.

NIRAB

- The main body advising government on nuclear energy research technology policy is NIRAB – the Nuclear Industry Research Advisory Board
- NIRAB is chaired by Mike Tynan – bringing much experience of the UK civil nuclear sector.

Motivation

- I enjoy applied science, and its policy issues, because it addresses pressing society needs.
- I note that Rutherford is widely reported to have said that:

  "***All science is either physics or stamp collecting*".**

  As an FInstP I see the truth in the statement.
- In my experience if my current world is indeed a bit like stamp collecting, then I would only point out that we are collecting some really cool stamps …


АТОМНАЯ ЭНЕРГИЯ-НА СЛУЖБЕ НАРОДУ
Здание первой в мире атомной электростанции Академии Наук СССР
1955
1 РУБЛЬ
ПОЧТА СССР


ATOMIC REACTOR
TROMBAY
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भारत INDIA


LABORATOIRE INTERNATIONAL DE RADIOACTIVITE MARINE (A.I.E.A)
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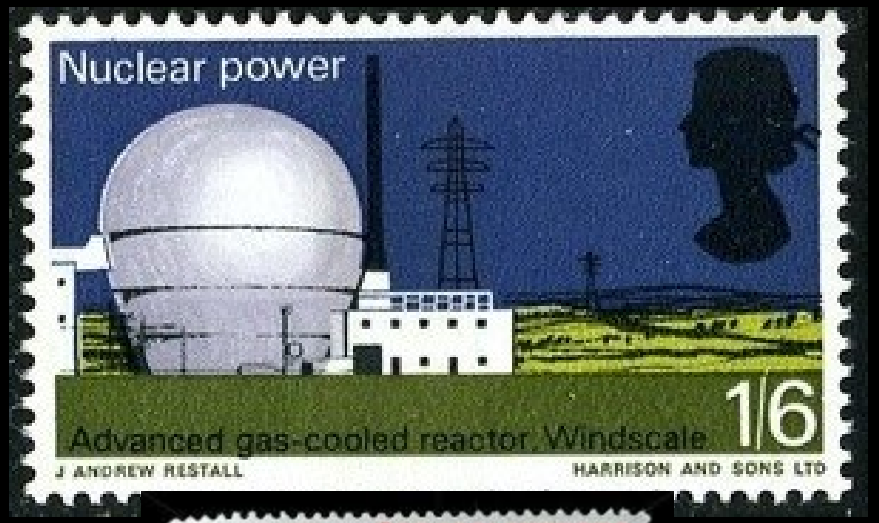
Nuclear power
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30 NOVEMBER, 2017
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ROOPPUR NUCLEAR POWER PLANT, FIRST CONCRETE CEREMONY

Thank you

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