

# BOOK REVIEWS

## Nuclear power

**Taming the Atom: Facing the Future with Nuclear Power** Ian Blair 1983  
Bristol: Adam Hilger ix+247 pp price £15 (£6.60 paperback) (IOP members' prices £12 and £5.48, respectively)  
ISBN 0 85274 414 5 Hdbk, 0 85274 483 8 Pbk

Psychologists observe that *energy* means something helpful and beneficial but *atom* means something harmful and malevolent to the people in the street. Those who feel alienated from civilisation and who are afraid of high technology base their decisions on emotion, without much rational consideration. What else can they do, if school did not offer them enough information to understand these last decades of the 20th century?

This book is written precisely to offer this relevant information to concerned, clever people. It is an enjoyable read, explaining facts about the nucleus, nuclear energy and nuclear power. It contains facts but no formulae: even numerical data are rather few. The argument is qualitative, but logical. It does not present a rosy scenario where everything is easy and everyone may be satisfied: it offers a realistic account of the energy alternatives and their preconditions. The writer is an expert on nuclear power stations who understands, and certainly likes, the atom. But he has participated in public hearings and debates: he knows that honest objections are worthy of honest explanations. You will enjoy the book, even if you are anxious about problems like nuclear waste disposal.

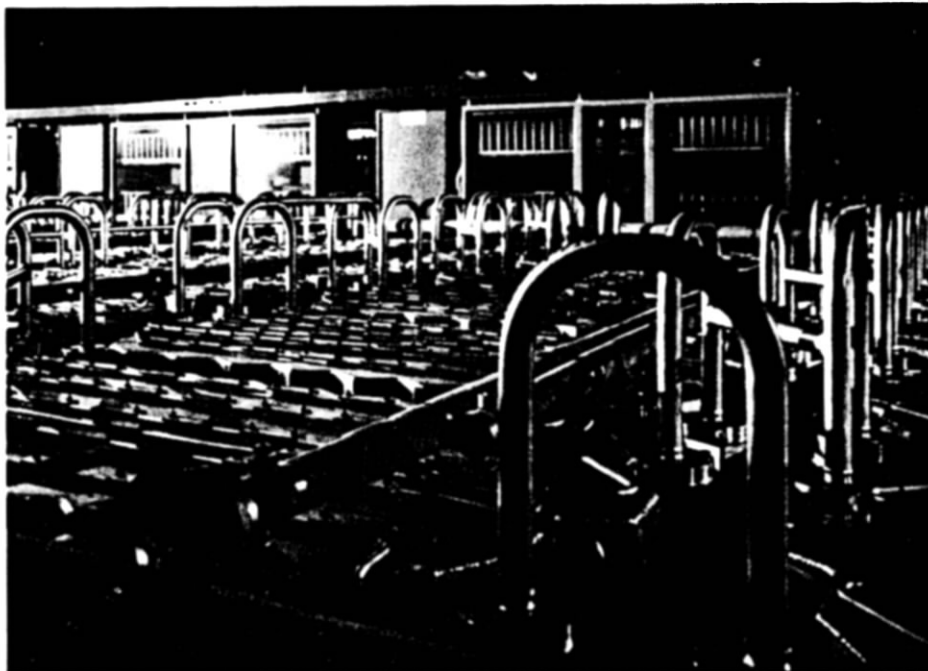
If you are a physics teacher you have the moral duty to offer an honest view of the nuclear issue. This book offers you up to date facts in a scientific context, which you can present to your pupils to help them make their own decisions.

**George Marx**

## Chaos and chance

**Universality in Chaos** Predrag Cvitanović (ed) 1984 Bristol: Adam Hilger xii+514 pp price £28 (£11.50 paperback) (IOP members' prices £22.40 and £9.20, respectively) ISBN 0 85274 766 7 Hdbk, 0 85274 765 9 Pbk

This collection of important papers, about the explanation and applications



Isotope enrichment: the gas centrifuge plant at Capenhurst in Cheshire, from *Taming the Atom: Facing the Future with Nuclear Power*, see review left (photograph courtesy of BNFL)

of unpredictability in dynamics generated by simple mathematical systems, marks the emergence of 'chaology' as a mature discipline within applied mathematics.

Mathematical analysis is centred on what in the jargon is described as Feigenbaum's cascade of period-doubling bifurcations. This refers to qualitative changes in the nature of orbits when a parameter in the dynamical equations is varied. At a succession of parameter values, a periodic orbit to which the motion is attracted doubles its length; these doublings accumulate at a critical parameter value beyond which the motion is chaotic and confined to a 'strange attractor'. The significance of Feigenbaum's scenario is that the details of the later stages of the bifurcation cascade are the same for all dynamical equations within a very wide class, i.e. the process possesses 'universality'. The theory has been helpful in understanding the development of fluid turbulence as a parameter (e.g. the Reynolds number) is changed. Other applications include chaos in chemical reactions, lasers, electronic circuits and physiology (heart attacks).

The value of this volume is enhanced by the fact that some of the seminal papers originally appeared in journals and proceedings that are not readily available. My only (minor) criticism is

the lack of emphasis (only two papers out of 40) on nondissipative (hamiltonian) systems and mappings, in spite of their intricate and subtle theory and important applications in celestial mechanics, accelerators, plasmas and quantum mechanics. Nevertheless the book is recommended to all who work on chaos, and especially those new to the subject.

**Michael Berry**

**Causality and Chance in Modern Physics** David Bohm 1984 Henley on Thames: Routledge and Kegan Paul xv+170 pp price £3.95 ISBN 0 7102 0031 5

This is not a new book, nor even in any real sense a new edition. It is a reprint of a book published 25 years ago with a new preface summarising, very briefly, some of the developments during that period. This is a pity, because much of the book is now seriously out of date. Except for a passing reference in the preface, there is for example no mention of Bell's inequality. Nevertheless, the book provides an interesting perspective on the still-unresolved controversy about the meaning of quantum mechanics. It is clearly written and easy to read.

**T W B Kibble**

# Announcements

## PAY DATE

This month's pay date is 26 November.

## INAUGURAL LECTURE

An Inaugural Lecture will be given by Professor Richard Peace, Professor of Russian Studies, on the subject *Is there a Russian threat?* on Thursday 22 November at 5.15 pm in the Reception Room, Wills Memorial Building.

## W. H. WHITTARD MEMORIAL LECTURE

On Thursday 22 November, Professor H. B. Whittington, Emeritus Woodwardian Professor of Geology in the University of Cambridge, will give the W. F. Whittard Memorial Lecture on *Early marine life as revealed by exceptional fossils* at 5.15 pm in the Large Engineering Lecture Theatre, Queen's Building.

## ART LECTURES

The series on *The Age of Henry VIII* continues with lectures on *The art of the Nation State: the invention of the portrait miniature* by John Murdoch of the Victoria and Albert Museum on Tuesday 20 November, and on *English architecture and sculpture in the time of Henry VIII* by Dr Peter Cannon-Brookes, Keeper of Art at the National Museum of Wales, on Tuesday 27 November.

Two Perry Art Lectures will be given by Dr David Thomson of the

University of East Anglia: *The Anti-Renaissance* on Thursday 29 November and *Was there a Renaissance of the visual arts in France or England?* on Friday 30 November. All lectures will take place at 5.15 pm in the Reception Room, Wills Memorial Building, and admission is free (no tickets required).

## TUCKER-CRUSE LECTURE

Dr Malcolm Andrew of the University of East Anglia will give a Tucker-Cruse Lecture on the subject of *The Gawain-poet: setting and context in Patience and Sir Gawain and the Green Knight*, on Thursday 29 November at 5.15 pm in Lecture Room 1, 3/5 Woodland Road. All are welcome and admission is free.

## CORRIGENDA

The following amendments should be made to the *Committee Supplement* published in the *Newsletter* of 1 November. The name of Mr P. F. Powesland should be deleted from the membership of the General Purposes Committee. His successor has not yet been appointed.

In the Bristol University Film Service Management Advisory Committee the name of J. W. Thomson should read J. W. Thomson.

## ACCOMMODATION VACANCIES

There are vacancies in University accommodation, both catering and self-catering. Applications should be

made to the Accommodation Office, 8 Priory Road.

## WOMEN'S CLUB INTERNATIONAL GROUP

A coffee morning for the wives of overseas postgraduate students is held on Wednesdays during University terms. Wives and small children are welcome between 9.30 am and 12 noon in the coffee lounge at the British Council, 7 Priory Road (near Senate House).

This International Group is run by Elizabeth Ingham and other wives of University staff to offer friendship and a meeting place, especially to those newly arrived in Bristol. Help can be given with such problems as learning English, shopping and finding nursery schools. If it is difficult to get to the British Council on Wednesdays, a lift by car can sometimes be arranged.

Meetings are advertised in the Events column of the *Newsletter Advertising Supplement*. Further information may be obtained from Mrs E. Ingham on 776588.

## ACCIDENTAL INJURY TO STUDENTS

For some time, the Students' Health Service has been aware of the morbidity amongst students associated with accidental injury. Together with the President and Vice-President of the Union, the Students' Health Service is attempting to obtain some figures, during the 1984-85 session, of the incidence of injury in traffic accidents, muggings, etc which students suffer, often as innocent victims.

To this end, questionnaires will be circulated to this year's University

intake and help is requested from all those concerned in completing and returning them. The respondents may remain anonymous if they wish, but it is hoped that the maximum co-operation will be given.

## BOLLAND LECTURE

This year's Bolland Lecture at Bristol Polytechnic will be given by Mr John Prescott Thomas, Head of the BBC Network Production Centre at Bristol, on Tuesday 20 November. The lecture is entitled *Who's that out there?* and will deal with the relationship between broadcasters and their audience. It will take place at 5.30 pm in The Octagon, Bristol Polytechnic, and will be followed by an informal buffet supper. Tickets at £3.75 from Mr M. J. Pascoe, Information Officer, Bristol Polytechnic, Coldharbour Lane, Frenchay, Bristol BS16 1QY.

## ADDENDUM

The list of members of the Agricultural Committee given in the *Newsletter* of 1 November is incomplete. The complete membership is as follows: Chairman: Sir William Henderson, Dr P. A. Hallgarten, Professor E. A. Bell, Professor J. L. Monteith, Sir R. Riley, Mr S. H. Brookfield, Mr R. E. Jenkinson, Mr J. B. Foxlee, Mr P. Wheldon, Professor K. J. Treharne (*ex officio*), Professor J. MacMillan, Professor H. Pearson, Professor A. E. Walsby, Professor P. Haggitt (*ex officio*), Mr E. S. Carter, Mr J. N. Mostryn, Councillor J. A. Rudderham, Mr D. R. Henderson, Mr D. H. Hebditch, Mr A. G. Phillips, Mr J. C. G. Stocks, Professor F. E. Round, Dr I. J. Graham-Bryce and Mr E. C. Wright.

## Obituaries

### Prof P.A.M. Dirac

Paul Adrien Maurice Dirac, a theoretical physicist of extraordinary gifts and accomplishments, died in Florida on 20 October 1984, at the age of 82. He was born in Bristol on 8 August 1902, and during a solitary and not very happy childhood was educated at the Merchant Venturers' School (now Cotham Grammar) where his father taught French. At 16 he came to this University to study Electrical Engineering. After graduating three years later, he stayed on for a further two years to learn Mathematics. His career as a theoretical physicist began when he went to Cambridge in 1923 as a research assistant.

Those were years of growing intellectual excitement leading up to the creation of quantum mechanics in 1925 by Heisenberg and Schroedinger in Goettingen. Dirac seized upon this revolutionary theory and contributed much to its technical development. In particular, he clarified the theory of operators, thereby constructing what Einstein called 'the

most logically perfect formulation of quantum mechanics', and formulated the quantum statistics governing assemblies of particles.

His major achievement (which earned him the Nobel Prize), came in 1928 when, with reasoning of stunning virtuosity, he combined quantum mechanics with Einstein's relativity theory of 1905 to obtain a fully consistent microscopic theory of the electron. This made him one of the handful of scientists with the persistence, insight and good fortune to discover a fundamental law of nature. From the theory came the prediction of the existence of antimatter, subsequently verified by the discovery of the positron.

In 1931 Dirac gave a surprisingly simple argument suggesting that there should be magnetic monopoles and predicting their properties. These particles have proved elusive, and intense current activity, based on his ideas, is devoted to searching for them.

Dirac's approach to a problem was direct: he formulated it in the simplest and clearest way, and in the intense beam of his focused intellect worked undeviatingly to a definitive solution. As Wheeler wrote, 'Dirac

casts no penumbra'. This economy of style was matched by his personality, which was reticent to an extreme that gave rise to numerous legends.

Dirac did not allow his name to be used in any but the most strictly professional contexts, but in his last years he made an exception to this by welcoming the establishment of the 'Dirac Prize' for the best school science project in the Bristol area. For theoretical physicists, however, his memorial will be the continuing influence of his ideas on the technique and content of their science.

MVB

### Mr D.M. Gaunt

Many members of the University will have learned with deep regret of the sudden death on 19 October of David Gaunt, Lecturer and Senior Lecturer in Classics from 1965 till his early retirement in 1978. A graduate of Cambridge University, David joined the Department of Classics after 18 years as senior Classics master at Clifton College, preceded by distinguished work at Bletchley Park during the war for which he was

awarded an MBE.

He brought to the Department outstanding gifts as a teacher of languages, and a deep feeling for literature both ancient and modern. His high expectations of his students were matched by his kindness and concern for those who had difficulties, and by his scrupulous sense of fairness, animated as he was by a deep Christian commitment. The Arts Faculty as a whole benefited for several years from his service as Faculty Accommodation Officer.

David died at his home at Dent in Cumbria amid the beautiful surroundings he had loved for many years, though as a true individualist and Yorkshireman—he came from Ilkley—he never ceased to regret the removal by bureaucracy of his favourite village from the county to which it rightfully belonged. It was to the people of Dent that he dedicated his book on the *Odyssey*: for him, Dent was the Ithaca of his world to which he returned, and like Odysseus' Ithaca, it was, in his own words, 'more than a place: it [was] an idea'. His former colleagues remember him with affection and express their deep sympathy with his widow Eleanor.

BHW