

## Nuclear science in war and peace

Philip Davenport

### The Making of the Atomic Age.

By Alwyn McKay.

Oxford University Press: 1984. Pp.153.

Hbk £12.50; pbk £3.95.

FORTY years is an expedient interval after which to commemorate an important international event. The main figures, heroes and villains alike, tend to have expired, while there are enough younger participants still around to ensure authenticity and fair play. This year we have remembered the invasion of Europe on D-day 1944; next year will see the fortieth anniversary of not only the end of the war in Europe but also the surrender of Japan. To the vast majority this last event came as a complete surprise and with devastating suddenness. We may expect next year a resurgence of public interest in the discoveries and developments which led to the production of the first nuclear weapons and a corresponding demand for non-specialist books on the subject.

Dr McKay's book is well suited to meet this need, especially in its reasonably priced paperback form. He tells the story of early nuclear science from the discovery of radioactivity to the concept of nuclear fission with little technicality and much human interest. As befits a chemist, he stresses the importance of chemical expertise in these pioneering researches,

when minute quantities of nuclides had to be isolated and identified. As the reality of nuclear fission became substantiated the behaviour of scientists diverged, some rushing to establish priority of publication, others covertly seeking to corner supplies of uranium ore. Then followed caution and voluntary censorship as the possibility of chain reactions and hence nuclear explosives became apparent.

The middle chapters provide a readable and fast-moving description of the Allied wartime activities and the Manhattan Project which produced the bombs dropped on Japan in 1945. For those who have read the official histories and the biographical accounts of this enterprise there will be few surprises. The history of the German efforts, hampered by Nazi politics and anti-semitism, is also quite familiar. But the general public must be largely unaware of the wartime existence of a Japanese atom-bomb project which they managed to conceal so successfully that it did not come to light until the mid 1970s.

In his final chapter Dr McKay surveys world energy resources, including the so-called "alternatives" of solar, geothermal and tidal energy. He suggests that Divine providence has enabled man to extract energy from uranium, so that we can survive when fossil fuels become exhausted. I find it a pity that he expresses no such confidence in the future role of nuclear fusion. □

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## Physics and faith

Ziauddin Sardar

### Ideals and Realities: Selected Essays of Abdus Salam.

Edited by Z. Hassan and C.H. Lai.

World Scientific/Wiley: 1984. Pp.369.

Hbk £32.20, \$37; pbk £16.10, \$18.50.

A PHOTOGRAPH in *Ideals and Realities* shows Abdus Salam, wearing a "fez" cap and academic gown, looking rather reflective at receiving his honorary degree of Doctor of Science at the Aligarh Muslim University, Aligarh, India. The Aligarh Muslim University was founded, exactly a hundred years ago, by Sir Sayyid Ahmad Khan, a man who not only looked a bit like Salam but also shared his passion for learning. Sir Sayyid, a deeply religious man, was an advocate of "modernism" in the Muslim world. Abdus Salam, also highly religious, has pioneered science in Muslim countries. Both men have built institutions and have been honoured internationally for their endeavours. Both have become controversial figures within their own communities — Sir Sayyid for his faith in

Westernization and Salam for his heterodox religious beliefs.

But there is a radical difference between the two men. Sir Sayyid was a born optimist: although he was upset about conditions in Muslim societies, he believed in the future. Salam is a pessimist: he plods along despite his increasing conviction that science will never take root, given present trends, in Muslim societies.

It is his pessimism that comes out most strongly in this collection of essays. Written over the past 25 years, they cover wide ground, ranging from international cooperation in science, science in the Muslim world and at the International Centre for Theoretical Physics (his own institution), to "perspectives" on physics. The first section of the book contains four introductions to "Salam the Man".

Although there is a great deal of repetition of material, one is quite happy to bear with this because of the conviction and insight that each essay carries. It is fascinating to read the book from cover to cover and see the shaping of Salam's outlook. The scene is set by the brief opening essay entitled, "The Less-developed Countries: How Can We Be Optimists?". Written some 20 years ago for Nigel

Calder's anthology *The World in 1984*, the article gives the reasons why Salam is so "utterly pessimistic": "the agricultural production of all but the richest countries is static"; "there are none among the rich nations willing enough to sponsor a fair price structure for the commodity market"; "the battle to keep the trickle of foreign aid programmes flowing becomes



Abdus Salam — how can we be optimists?

fiercer and fiercer"; men of "passionate fury" are not coming forward from the Third World to fight poverty; and where there is a realization of the struggles ahead, "it has not been purposeful enough yet to bring down the internal, social and the organisational barriers to be able to defy external pressures". From here on, in essay after essay, powerful but gloomy, he pleads the case for the poor — arguing for more spending on science and help for scientists in developing countries, making suggestions that this or that institute should be set up to promote science in the Third World, that new technological universities should be established and that the policy makers of developing countries should pay more attention to pure sciences and the development of indigenous talents and resources.

Yet, in his own life Salam has nothing to be pessimistic about. The young lad from a small Pakistani village, Jahlam — not

renowned for producing great scholars — has reached the heights of scientific achievement. His life is full of lucky turns. He could have easily ended up as a scholar of Urdu or Persian; or worse still, grazing in the offices of the Indian civil service, on which his father was very keen. On his return from Cambridge, after finishing his doctorate, he could well have disappeared into the anonymity of the colonially inherited educational institutions of Pakistan. But fortune was on his side and he escaped.

Perhaps fortune has little to do with it. It is Salam's hard work and remarkable intelligence that eventually brought him the Nobel Prize (awarded in 1979 for his work on the theory of electro-weak force). Or perhaps it is his sincerity of purpose and deep humility combined with a love for beauty and learning that is the driving force behind his achievements. Whatever the reason, Salam could not have overcome his own lugubrious nature without deep faith. Over the years, as this book shows so convincingly, his faith in science as the ultimate pursuit of objective truth, and his belief in Islam as the world-view of compassion, have increased not diminished.

Salam has achieved a remarkable, personal synthesis of Western science and Islam. It manifests itself in all that he preaches and in his own work. His involvement with symmetries in physics, he has said, stems from

my Islamic heritage for that is the way we consider the universe created by God, with ideas of beauty and symmetry and harmony, with regularity and without chaos. The Koran places a lot of emphasis on natural law. Thus Islam plays a large role in my view of science; we are trying to discover what the Lord thought . . .

The fact that Salam was looking for unity in seemingly disparate forces of nature is considered by him to be part of his faith both as a physicist and a Muslim. In more than one essay, he quotes from the verse of the Qur'an that reads:

Thou seest not, in the creation of the All-Merciful, any imperfection  
Return thy gaze, seest thou any flaw  
Then return thy gaze, again and again  
Thy gaze comes back to thee dazzled, awestruck.

This is the faith of all physicists, Salam tells us. The deeper we seek the more is our wonder excited, the more is the dazzlement of our gaze.

*Ideals and Realities* provides a revealing insight into the mind of Abdus Salam. There is a great deal here that one can disagree with, argue against, even dismiss as too simplistic. But one cannot help being moved by Salam's compassion and conviction, his strong faith in science and in his religion, his concern for the developing countries, and by the facility with which he hatches one bright idea after another. My only hope is that his melancholy outlook is not contagious. □

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## Keeping the gates

Philip H. Abelson

### How to Edit a Scientific Journal.

By Claude T. Bishop.

ISI Press: 1984. Pp. 138. Hbk \$21.95; pbk \$14.95.

TO YOUNG scientists and others not well established, editors and their associated apparatus represent a fearsome and mysterious barrier to recognition and advancement. The continuing emphasis on publish or perish has enlarged the importance of the role of editors in decisions to accept or reject manuscripts. Hence, there should be a broad audience for a book that enables readers to look behind the scenes at the machinery that influences the fate of millions of scientists and the expenditure of billions of dollars. In addition, those scientists who are or may become part of the editorial machinery will find Dr Bishop's book helpful as a source of ideas and guidance about all phases of the editing of scientific journals.

The author brings to bear some 18 years of experience in editorial matters. For a number of years, he was editor of the *Canadian Journal of Chemistry*. Since then, he has had responsibility for 12 journals published by the National Research Council of Canada. These publications have circulations of 1,200 to 6,000, figures typical of most journals today. Dr Bishop's writing reflects his years of experience; that is, he seems conditioned to the problems faced by small journals with limited financial resources. Nevertheless, much of what he states is applicable to scientific journals of all kinds.

Discussion of the peer review system is especially good. In journals large and small the crucial factor in achieving good quality is the reviewing process. As Bishop points out, "All editors, and most authors, will affirm that there is hardly a paper published that has not been improved, often substantially, by the revisions suggested by referees". He further points out that,

One function of the refereeing system that is often overlooked is its indirect influence on the initial preparation of a paper. Established scientists write their papers with a critical sense that anticipates referees' questions. Without this subtle pressure in the background, there can be little doubt that the quality of presentation would deteriorate along with the content.

Because of the publish-or-perish syndrome, a minority of authors advocate abandoning the reviewing process altogether. They "regard all referees and editors as biased adversaries whose objectives are solely to reject, delay, or scoop all papers submitted to them". Bishop denies the validity of such views, stating that the common experience of editors is that "examples of intentional delay, biased reports, or unethical behaviour are extremely rare". It is, of course, one of the

important functions of editors to review the referees' reports to guard against delay or bias and to investigate allegations that material in a paper has been stolen.

The matter of ethics in the field of scientific publications has become of increasing concern. Furthermore, it is a matter on which editors have primary responsibility. Bishop devotes a chapter to the topic, pointing out that questions of ethics have been present throughout the history of scientific journals. However, scientists today are under enormous pressure to expand their bibliographies and a few cases of plagiarism and fraud have been uncovered. While calling attention to the situation, Bishop adopts a sensible view — on the matter of reporting fraudulent results, he notes that if the work is insignificant, the experiments may not be repeated nor will the paper necessarily mislead others; and if the claims in the paper are significant, the work will surely be repeated and its worthlessness exposed.

In the book the role of the editor is rather narrowly defined. Emphasis is on procedures to select and improve the manuscripts that are voluntarily submitted. But the active frontiers of science keep changing, and unless the content of a journal evolves it will become obsolescent and new publications will be created to fill the gap. It should be the responsibility of the editor to be alert to changes and if necessary to recruit manuscripts dealing with emerging areas related to the current content of the publication. The editor's flexibility is often limited by financial or political considerations. Thus if the editor is to be truly effective, he or she must be more than a custodian of manuscripts. Editors must be aware of — and participate in — decisions that affect their ability to produce a first-rate journal.

Although the basic processes of peer review and editorial decisions concerning manuscripts remain unchanged, the major journals in the United States have been modernizing their mechanism for accomplishing these procedures. They are incorporating the use of electronic devices — a matter that is barely touched on in this volume. Computer-assisted manuscript tracking and monitoring of reviewers' performance has been widely adopted, diminishing routine clerical tasks and improving selection of referees. The application of computer word-processing is beginning to transform the mode of transmittal of material from authors to editors. Already some manuscripts are being transmitted by diskette and ultimately the material will flow to the editor and to reviewers by computer networks.

However, though some of the mechanisms of editing may change, the basic relationships of authors and editors will remain largely the same. Bishop's book will continue to be a useful guide to authors and would-be editors. □

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