

Book Reviews

STRUGGLE FOR INITIATIVE

Atomic Shield 1947/52

(A History of the United States Atomic Energy Commission, Vol. 2.) Pp. xviii+718. (Pennsylvania State University Press: University Park and London, November 1969.) \$11.95.

THE possibility of war between the United States and the Soviet Union—real or imagined—was the background against which the atomic energy programme developed in the United States during the period covered by this volume. It seems inevitable therefore that, once the attempt to set up under the United Nations a system of control acceptable to both sides had failed, there was little chance of success for those who hoped that the newly formed Atomic Energy Commission would be able to concentrate on the peaceful uses of atomic energy, free from military pressures. The main theme of the book is the response of the commission to the continuous demands for increased weapons production.

In this context, the appointment of Lilienthal as the first chairman of the AEC was surely a mistake. He was an idealist who had achieved great success as chairman of the Tennessee Valley Authority for fifteen years—but the circumstances were quite different, and he seems always to be struggling against the tide. He was succeeded by Dean, who was more realistic and provides an interesting contrast in personality.

An account is given in considerable detail of the relations between the commissioners and the general manager (at first appointed by the President, later by the commissioners), and between the commission in Washington and their staff and contractors in the field. As in volume one, the authors present the detailed statements and attitudes of the principal characters, leaving the reader to form his own picture of each one, and to judge the correctness or otherwise of the decisions taken, political or administrative. Unfortunately, very few technical details can be given: most of them are still classified, as the authors explain in their preface. The interest must therefore chiefly lie in the interplay of personalities. One chapter deals with unclassified research in radiation biology, high-energy physics, and the transplutonium elements; but these and some references to radioisotopes and research reactors are not in the main theme.

The Atomic Energy Act, 1946, set up the commission and defined its powers, duties and organization in considerable detail. It also established a Congressional Joint Committee to make continuing studies of the commission's activities. Throughout the period they increased the scope of their interaction with the commission and the degree to which they took the initiative in directing and pressing the commission on matters of policy and sometimes of detail. This direct interference by a congressional committee in the affairs of a branch of the executive is unusual and makes most interesting reading.

The Atomic Energy Act also provided for a General Advisory Committee. Among its first members were people who had been long in atomic energy work, such as Conant, Fermi, Oppenheimer and Rabi. Though the committee had no executive powers it is very clear that the great scientific prestige of their members made them a powerful influence in determining the course to be followed by the commission.

With each successive demonstration of Soviet nuclear capability, the work of the commission increased to provide the new levels of materials and weapons requested by the military. On the naval side, Rickover's drive to develop nuclear powered submarines was already showing results.

Towards the end there is increasing emphasis on the activities of two men who are making special contributions: McMahon as the dedicated chairman of the JCAE, convinced that only the thermonuclear weapon can save the peace of the world; and Teller, resigning from Los Alamos in frustration at what he considered to be a totally inadequate scale of effort on the thermonuclear project, and getting support from McMahon and from Lawrence for setting up a new laboratory at Livermore.

The chapters on British proposals for re-establishing an effective interchange of information are interesting, but the wording of the Atomic Energy Act would have made it very difficult even without the strong opposition that existed in many places, including the commission itself. It seemed that on each occasion when a formula had been found which promised some relaxation, there would be some incident that confirmed the views of those who held that it would be against US interests.

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THE BERNOULLI SAGA

Die Werke von Jakob Bernoulli

Herausgegeben von der Naturforschenden Gesellschaft in Basel. Band 1. Pp. xii+541. (Birkhäuser Verlag: Basel, 1969.) Sfr 76.

Hydrodynamics

By Daniel Bernoulli. And Hydraulics. By Johann Bernoulli. Translated from the Latin by Thomas Carmody and Helmut Kobus. Pp. xv+456. (Dover: New York; Constable: London, November 1969.) 142s 6d; \$15.

THE history of the Bernoulli family is well known; starting with a burst of genius in the two brothers John and James, it included two of nearly equal talent in the next generation (Nicolas and Daniel) and continued a tradition of excellence down to this day. To these first two generations goes much of the credit for the creation of the modern science of rational mechanics. The story has been well told by Truesdell: taking physical ideas from Newton and Huygens, and mathematical tools from Leibniz, they achieved effective methods for the solution of many deep problems. Their student and successor, Euler, then brought the science near to the classic form finally achieved in the nineteenth century. It should not be thought that theirs was a happy family endeavour; John and James quarrelled over priority, and late in life John tried to steal credit for achievements in hydrodynamics from his son, Daniel.

These two volumes which have recently appeared provide material on very different periods in the history of the family. The first volume of James Bernoulli's *Works* is devoted to "Juvenalia": material dating from the period before his discovery of Newton's mechanics and Leibniz's calculus. The editor's modest title for this work may be misleading: Bernoulli was long past his schooldays by this time, and the pieces (most of them published) show full mastery of the mathematics and natural philosophy (speculative and experimental) of his time. In metaphysics and logic, his work shows a mixture of the remnants of a scholastic type of philosophy (which flourished in German universities through the seventeenth century, following its renovation in the sixteenth) and Cartesianism. The shock of the complementary achievements of Newton and Leibniz must have been great. We know that by 1690 Huygens was too old to adjust to them, but the young Bernoullis rose to the challenge and developed the elements of a new synthesis.