

## BOOK REVIEWS

## Physicist extraordinary

Rudolf Peierls

MARK Oliphant is one of the great personalities of the world of physics, whose career has had many very different facets. Original research in nuclear physics in the Cavendish Laboratory under, and in close collaboration with, Rutherford, was followed by leadership of the radar team at Birmingham which produced the cavity magnetron and by work with Lawrence at Berkeley on the electromagnetic isotope separation for the atom bomb. After the War came the idea of the synchrotron, conceived independently and probably before others, and the creation of a nuclear physics school at Birmingham, with the construction of a cyclotron and a proton synchrotron; then, after the return to Australia, a major share in the development of the National University and, after retirement from the laboratory, a term as Governor of his native state of South Australia.

But no list of this kind could bring out Oliphant's most characteristic quality, the fearlessness with which he speaks his mind, no matter whether his thoughts are popular or unpopular, never calculating their effect on his image. While therefore what he says and writes does not always please his listeners, they always respect his intrinsic honesty. This quality came out perhaps most strongly, and created the greatest surprise, in his last, most exalted position as Governor. The men chosen for such representative positions are often senior statesmen or military men, very conscious of protocol, and maybe stuffy. Stuffiness is a quality completely lacking in Oliphant, and his direct and outspoken ways went over well in a country where stuffiness is not welcomed.

He speaks with equal directness about his failures and errors of judgement, and this has made it easier for the authors to write this biography in his lifetime. Writing about living people who can answer back, can be embarrassing, but evidently not in this case.

The authors have interviewed Oliphant and members of his family, as well as many colleagues in his different spheres, and they have had access to many letters and other documents. As a result the book brings out Oliphant's personality vividly. Perhaps the best part of the book is the account of his ten years in Cambridge. The authors do not give much detail of his papers on nuclear physics, but then they are not writing for physicists. What comes out so well is the atmosphere in the Cavendish, and Rutherford comes completely alive. Oliphant was perhaps Rutherford's

*Oliphant: The Life and Times of Sir Mark Oliphant.* By Stewart Cockburn and David Ellyard. Pp.369. ISBN 0-9594164-0-4. (Axiom Books, Australia: 1981.) A\$19.95.

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Oliphant in 1950, the year of his move from Birmingham to Canberra.

favourite pupil, and we understand why. The characters of these two men had much in common in their directness, and in their enthusiasm for the work. A lecture by Rutherford had made a deep impression on Oliphant when still a student, and had led to his resolve to get to Cambridge and work under Rutherford; the great respect and awe gradually gave way to genuine affection.

Yet he left Cambridge, as other collaborators of Rutherford had done, to branch out on his own in Birmingham. He took up his new post just before Rutherford's death in 1937. His intention was to build up nuclear physics in Birmingham, but the process was soon interrupted by the War. The book describes the radar work, and his abortive trip to Australia to offer his services to the Australian government when the radar problems at Birmingham had lost their urgency and the war in the Pacific was approaching his native country. Finding that no one was prepared to arrange for his services to be used, he returned to England, and soon afterwards joined E. O. Lawrence at Berkeley in work on the electromagnetic isotope separation for the atom bomb. Lawrence was another colleague to whom Oliphant had great affinity, and their relationship is also brought out very vividly here. The authors

describe the shock Oliphant felt when he heard of the use of the atom bomb on Japan, and his determination to work for solutions that would make future atomic war impossible or at least unlikely.

Back to academic life, to complete the construction of the cyclotron started before the War, and to start the proton synchrotron, based on an idea proposed by him but published by others first. The construction of two machines in a very confined space, and in a Britain beset by post-War shortages, using do-it-yourself methods as far as possible, was a typical Oliphant act of courage and optimism. The less ambitious of the machines, the cyclotron, gave little trouble; the proton synchrotron took much longer to complete than had been hoped for, and was ready only long after the similar, though somewhat larger, "cosmotron" at Brookhaven.

In fact the machine was completed only after Oliphant had left for his next assignment, the Australian National University at Canberra. The book describes the part he played in building up the spirit of the new institution, with all the struggle that involved, and also his choice of a machine for the physics department, a 10 GeV synchrotron powered by a homopolar generator. Looking back, this was clearly an error of judgement. He was again over-optimistic about the prospect and the time scale. If the machine had been completed as planned, it would have been by some years the first to reach this energy range, though even then the slow repetition rate would have made it difficult to use. As it is, only the homopolar generator was completed, but it will not drive a synchrotron and has instead found application in work on plasma physics. In spite of this disappointment, he succeeded in creating a physics department with many activities in different fields, and a staff of high quality.

Last, but not least, comes his term as Governor, which I have already mentioned. This again is described with warmth, though without glossing over some errors and embarrassments.

Taken as a whole, the book is perhaps a little longer than necessary. But it is a pleasure to read, and it does justice to a great character, whose integrity, frankness and directness set an example to us all. □

*Sir Rudolf Peierls was with Oliphant in Cambridge from 1935 to 1937, and in Birmingham from 1937 to Oliphant's departure for Australia. He moved to Oxford in 1963, where he is now Emeritus Wykeham Professor.*

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