originators, but partly it was a matter of good luck. While the organization was in its birth throes it became increasingly clear that during the following decades the real frontier of fundamental science would shift more and more towards high-energy physics and that would make large accelerators indispensable. It was equally fortunate that during that period a new technique — strong focusing — made its appearance. It promised to make accelerators much more efficient, and while it also made designing and building them perhaps more of a risk the task certainly became more of a challenge.

As to the relations with national governments, the authors point out that although the governments were by no means passive, they reacted to events rather than taking the initiative. Plans were mainly drawn up by the scientists and discussed at Council meetings. After agreement had been reached, the government representatives communicated the proposals back home, trying to get them approved. As the authors put it, these representatives often acted more like representatives of CERN trying to influence their governments, than like representatives of their governments trying to influence CERN. Why did the national governments accept this situation? On the one hand research at CERN was not expected to lead to any results of direct industrial, commercial or military importance, so governments did not feel obliged to exert rigorous control. On the other hand a high level of competence in many branches of technology as well as in high-energy physics properly speaking was seen to be potentially very useful in the long run; therefore they were willing to give support. The book also draws attention to the remarkable stability of the Council, a feature that certainly contributed to CERN's efficiency.

On one matter I disagree with the authors. On page 534 they state: "Hence we find a number of provisions inserted in the convention early in 1953 which (retrospectively) appear rather unusual — no national quotas in the recruitment of personnel . . . no attempt to correlate the value of industrial contracts awarded with a country's level of contribution to the CERN budget . . . no right of veto in the Council including the vote on the budget . . . ". I do not find these provisions unusual at all. I am even convinced that it has been the bane of many international organizations that they have tried to stipulate in detail the rights of each of the participants. At the end of page 535 I read "A decade later when scientists connected with CERN tried to pull it off again, tried to set up a comparable body, The European Space Research Organization (ESRO), the member states were on their guard, and laid down a number of restrictions in advance — a fixed total budget for the first eight years, a 'just return' on contracts etc. Governments also learn". Unless this is meant ironically — and I don't think it is — I disagree. Even though I have to admit that the commercial aspects of space research are more important than those of high-energy physics, I would have been inclined to write "Unfortunately the success of CERN was insufficient to teach governments a lesson".

This is a very valuable book. It gives a clear, readable, well-documented and — as far as I have been able to ascertain — accurate and impartial account of the history of a remarkable organization. The authors do not indulge in speculation and do not really try to characterize the dramatis personae, but because actions and opinions are described in detail the protagonists become far more real than the dedicated and unselfish heroes of the traditional myth.

The history of CERN is interesting for its own sake but the importance of this book goes beyond that. All scientists involved in management and all managers involved in science will stand to profit by studying this lesson of the past. □

H.B.G. Casimir, De Zegge 7, 5591 TT Heeze, The Netherlands, studied theoretical physics at Leiden, Copenhagen and Zürich, and from 1946 to 1972 was Research Director of the Philips Company at Eindhoven. In 1953 he was among those approached for the job of CERN's first Director General.

Trouble in the far north

Bernard Stonehouse

The Fourth World: The Heritage of the Arctic and its Destruction. By Sam Hall. *Bodley Head, London/Knopf, New York: 1987. Pp. 240. £12.95, $17.95.*

THIS book is a denunciation of the white man's influence on Arctic peoples, cultures and landscapes. The author, a journalist and reporter, has travelled widely in the north and has read a great deal about it. His message is clear. Southerners, from seventeenth-century whalers to twentieth-century oilmen, have invaded and exploited the north. The result has been a cumulative destruction of northern cultures from Alaska to Svalbard and across Asia. Diseases, religion, alcohol, money, greed, land-grabbing and bureaucratic insensitivity have all made their contributions. There is nothing in the present situation to suggest that it is improving. In Sam Hall's eyes the north is in a mess, southerners are unequivocally to blame, and it is time that those responsible did something to try and put things straight.

The book is in three parts. The first contains a brief history showing how Eskimos (now Inuit) spread from Siberia to North America and Greenland only a few thousand years ago, developing their skills and cultures for dealing with the Arctic as they went. Part 2 tells of the explorers, missionaries, whalers, hunters and traders who headed north with a variety of motives, and the consequences of their depredations on both Inuit and Indian. Part 3 describes how new southern threats, from war games to wind-blown pollution, are maintaining the pressures, how unsettled and miserable indigenous folk have become, and how new political and social groupings are arising among them to counter southern hegemony. A selected bibliography and index round off the book.

Hall's views are not new but they are timely and valid. There are mistakes and purple passages that almost convinced me to give up at first reading, but I'm glad I didn't. *The Fourth World* is an up-to-date exposition of the problems facing Arctic and sub-Arctic humanity, written vigorously, unpretentiously and with conviction, and it is worth reading by anyone who cares about the Arctic, culture conflicts or misruled minorities. It is not without bias — but let those who feel misrepresented write an equally vigorous defence of their viewpoint. □

Bernard Stonehouse is at the Scott Polar Research Institute, University of Cambridge, Lensfield Road, Cambridge CB2 1ER, UK.