

JOSEPH F. COATES reviews  
*The Giant Leap Mankind Heads for the Stars*  
by Adrian Berry

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If you have had little or no interest in space, space travel, the long term future of humankind, or the future of the universe, 'The giant leap' will ignite your interest. For the novice, it is straightforward and lucid, as only a professional journalist can be. The logic of the flow is clear, and yet one can pick and choose different topics of special interest without having to have read previous chapters. For the space enthusiast, it is a marvellous compilation of thinking and will undoubtedly be a permanent reference in that person's library. Adrian Berry is catholic in his interests, drawing upon allusions, references, and quotations from all areas of the intellectual landscape. He has done his homework and supplied the reader with definitive references for each chapter on where to dig deeper, and ends the book with a bibliography, obviously chosen to balance comprehensiveness and general reader interest.

The appendices themselves merit high praise. The first appendix is a history of milestones to the stars, beginning with the formation of the universe, and then quickly turning to the intellectual achievements in understanding the universe, principally from the fifteenth century on. The second appendix is a reference to one of the later chapters in which Berry enumerates the stars that are likely to be the beacons in interstellar travel. There is a useful glossary.

The comprehensiveness of the work is charmingly counterpointed by a note of humility. For example, in the introduction Berry points out that since nobody knows exactly how space travel will occur, he outlines different schemes which would allow spaceships to travel at a substantial percentage of the speed of light. But the book is not merely a technological treatise popularised for a lay audience. Berry does the unusual. He explores the social, political, and organisational aspects of the topics that he covers. His grasp of such matters is firm and his conclusions stimulating. For example, he points out that 'Interstellar flights are going to happen because governments, in their present overweening form, are going to vanish from the Earth' (p. 30).

For this reader, the most interesting chapters are those with the freshest, least familiar insights, in the second half of the book, where Berry discusses truly long space flights and how people might weather the tedium of seemingly infinitely long flights. He has great hope for relieving the tedium with supersophisticated computer managed games. He looks at the possibilities of extended sleep, and even cryogenics as a way to preserve the crews on long trips. What he ignores, however, is the possibility of human cloning of the crew on these long flights, with the purpose of cloning

being to reproduce a crew as much like the original as possible, since the original crew would have been chosen for its skills and interpersonal compatibility.

His chapter 18 goes into the question of the long term future of the universe and introduces an interesting temporal concept, the cosmological decade, a concept he picks up from Fred C. Adams and Gregory Laughlin ('A dying universe', *Rev Mod. Phys.*, April 1997). The cosmological decade is the number of years expressed in powers of 10, so that the 15 billion years since the universe was created (his reckoning) put us in decade 10. He traces out using the best of current scientific knowledge and speculation the evolution of the stars, and predicts the ultimate fate of the universe in an everlasting dark era by decade 100.

One strength of 'The giant leap' is that it is not science fiction, nor is it quite science fact. It is perhaps best characterised as scientific conjecture based upon current scientific knowledge and the direction that knowledge seems to be taking. The couple of chapters dedicated to long distance space travel within our galaxy are fascinating, insofar as he presents the first description I have seen of what happens as one approaches 92% of the speed of light. The changing view of the astronomical environment — the Doppler shift in the colour of stars, the changing patterns of light, the concentration and diffusion of light — is described in a detailed panorama as one accelerates from solar system speeds to extra solar system speeds. This is followed by a beautiful chapter on how one would navigate in space when the stars that one would normally navigate by recede into a background of hundreds, if not thousands, of similar stars, making recognition and hence calculations difficult. Obviously, if one is travelling at 92% of the speed of light, the tiniest of errors can lead you literally nowhere.

Another strength of the book is Berry's ability to make unexpected links, where those links serve the purpose of showing that future actions and developments have historic precedents. For example, in chapter 4 on the migratory imperative he draws on the work of Clive Gamble, who in 'Timewalkers' described the four main phases of prehistoric migration: the earliest spreading out of east Africa; later the extended wanderings of people to west Africa, China, the East Indies; then more recently the colonisation of all of Europe, Asia, and Australia; followed from some 40 000 years ago to the present day by the spread across the Americas and the Pacific. This, for Berry, is more or less a continuous part of a migratory imperative of people. He complements that look backward with a neat discussion of whether there are habitable planets, where they might be, and how we might find them.

This most commendable book has something for everyone. For the science fiction fan, 'The giant leap' is valuable in that it gives weight and credibility to some ideas popular in science fiction and at the same time as a minor theme dismisses others as excessively speculative or totally implausible.