

PREFACE

There have been many books and television programmes about the origin of the universe, the early history of the solar system, and the origin(s) of life on Earth. They often mention the question of alien life, usually presented as 'life on other planets'. *Evolving the Alien* starts from the position established by such books and programmes: that there's a big universe out there with lots of planets more or less like Earth, and lots of other interesting things like neutron stars and solar atmospheres, Black Holes and immense dust clouds in which stars are forming. It addresses questions about life in that physical universe. How likely is it for life to appear on an aqueous planet, like Earth was four billion years ago? If we wait for evolution to proceed on such a planet, or look for one that's old enough already, will we find people? Klingons? ET? Unimaginable *somethings*? For that matter, what *is* life, anyway? Would we recognise alien life if we saw it? Given the rules that science has deduced about life here, can we work out what will happen, or *could* happen, elsewhere – and how it would be similar to, or different from, what has happened in our own little patch of universe? And what about other planets? Or places that aren't planets at all? Just how far away from our comfortable air-and-water world can we get, and still find life? Especially, intelligent life?

We will use serious science – orthodox biology, chemistry, astronomy, and physics – to offer some answers to these questions, but we don't think that being serious about an important subject forces us to wear a solemn face. Neither does it restrict us to sedate, difficult-to-understand scientific sources for our insights: we will also make use of ideas from the science fiction (henceforth SF) literature. We believe

that the best SF writers, editors, and – occasionally – film producers have made some useful contributions to the *scientific* understanding of possibilities for alien lifeforms. Unfortunately, the area has also attracted, and accreted, great piles of rubbish, from the cutesy ET and ‘alien’ characters in midday TV series to the claims of UFO enthusiasts and the excesses of the ‘aliens took my baby’ crowd. Some of this material can be fun, but scientifically it’s nonsense. That makes it a real challenge for both authors and readers to keep a clear head: to sort out the rational, exciting stories of what alien life might be doing, now, on other planets – and to distinguish them from wishful thinking about Paternal Aliens Come To Save Us From Ourselves, or other clichés like those of *Independence Day* and *Close Encounters of the Third Kind*. However enjoyable they might have been when you put your brain in neutral (‘park’ if you have automatic gears).

It’s a difficult challenge: one that we all like to duck if we can. So we’ve used SF elements to lighten up some parts of the argument. You probably won’t have read the same SF books as we have, though, so we’ve interspersed short synopses in boxes throughout the text. The aim of the boxes is to make it easy for you to relate to what we say about these books, even if you’re not familiar with their contents. If you want to know more, you could always consider reading them. If you need an excuse, you could explain to your friends that you don’t usually read rubbish like SF, but *this* is homework for a serious project. We have not given bibliographical details of these books because most of them are out of print, and all of them may reappear from new publishers at any time. Look on the internet. We’ve also started each chapter with a short piece of homespun SF: tales of two aliens, Cain and Abel, who are running tours to Earth’s ecosystems. These vignettes are intended to help us see ourselves as others might see us, and put ourselves in an appropriate mood.

The genesis of this book goes back a long way, to an incident during Jack’s first job. In 1958 he was a postdoc (‘post-doctoral research assistant’) at Birmingham University, in a Medical Research Council Unit run by Nigel Cruickshank. Jack was helping the British Association for the Advancement of Science to provide a Schools Lecture Service, involving local scientists and academics. Everyone taking part had to fill out a form describing their lectures, and Jack was

busy writing titles like 'How does hair grow?' (his research topic then), 'Eggs, embryos, and adults', and 'Apes, angels, and ancestors' (he enjoyed arguing with creationists). Like all research scientists, he was reading the professional journals, but unlike nearly all research scientists, he was also reading SF, mostly in 'pulp' magazines like *Galaxy* and *Astounding Science Fiction*. There was a copy of *Astounding* on the lab bench next to the form, and Cruickshank noticed it. He picked up a pencil, and wrote, 'What does a Martian look like?' at the bottom of the lecture form. He and Jack looked at each other, suddenly seeing the possibilities, and Jack left the title in. In 1962, the first year of the Schools Lecture Service, this belated addition to the form received more requests than any other title except 'Science in the detection of crime'. In the second year, the physicist John Fremlin did a survey with the administrator, and called Jack into his office.

'Perhaps you could have a less . . . umm . . . populist . . . title? Give some of the other lecturers a chance? What's the lecture actually *about*?'

'It's about evolution, and what planets are like, and what we'd get if we evolved life in different circumstances . . . Actually, the circumstances wouldn't have to be very different to get different kinds of creatures, because evolution is as much accident as environment . . .'

The lecture was duly renamed 'The Possibility of Life on Other Planets'. In 1963 it beat the 'Science in the detection of crime' lecture as well, because all of the schools who'd been put off by the populist title asked for it under its new, respectable one. Between 1962 and 1986 Jack gave an evolving series of lectures with that title, and it became known to many organisations as POLOOP. He gave it to Astronomical Societies, Ladies' Sewing Groups, Biology Societies, an Evangelical Society, and a Jewish Society. He also delivered it as an adjunct to professional lectures when he visited the United States. It was given at least 360 times, and it changed as the scientific orthodoxy changed.

In 1968 Jack became entangled in SF fandom, because a technician in the Zoology Department had spotted the two shelves of SF books that he was using to expand the intellectual horizons of his zoology tutorial students. The technician alerted Peter Weston, an authoritative local fan with an almost professional interest in the author Robert A. Heinlein, who told Jack that there would be a con (SF convention) in Worcester in 1971, with all the big name authors in attendance. Indeed,

in a week's time there would be a con in London with James Blish as Guest of Honour. That did it: Blish was Jack's most-admired author. So Jack went to the con, met Jim and Judy Blish, and started a close friendship that lasted till Jim's death in 1975. Jack's interest in alien design took a professional turn, and he has never looked back.

Previously, Jack had corresponded with and met the editor of *Astounding*, John Campbell Jr., several times between 1958 and 1964. During Campbell's editorship, *Astounding* was the premier SF magazine. In 1964 Jack also met and became friendly with the great Isaac Asimov, although Asimov was not primarily concerned with aliens – they hardly ever appear in his books. The main common interest was science, particularly its popular presentation. At the convention in Worcester, Jack met Anne McCaffrey, Brian Aldiss, Larry Niven, David Gerrold, Harry Harrison, Jim White and many other authors, and talked with them about credibility of aliens. POLOOP got its first feedback from SF fans, to mutual benefit. Then Jack spent nearly a week with Gerrold, setting up a credible, worked-out alien ecology whose creatures invade Earth. After some mishaps with publishers and long delays, this became the *Chtorr* series. The encounter with McCaffrey led to *Dragonsdawn* and other cooperations centred on the fictional world of Pern, which she had introduced in *Dragonflight* in 1968. Interactions with Harrison led to a highly credible biological background for the *West of Eden* trilogy. The relationship with Niven started slowly, when Niven found the McGuffin for *Legacy of Heorot* in some biology Jack was spreading around at the bar. (In SF parlance a McGuffin is a gadget or concept whose loss – or rumours of whose existence – causes the characters to search for it, fight for it, or flee from it, but which has no intrinsic meaning when the dust settles: Alfred Hitchcock originated the term in the context of thriller movies.) Niven then invited Jack to California to help design the ecology for the sequel, *Beowulf's Children* (*Dragons of Heorot* in the UK).

In 1995 Jack experienced a magical moment, of great significance for this book. He had been a poor boy in London at the end of the Second World War, and his father had been killed just after the war ended in 1945. So he earned money to go to university by collecting *Daphnia* (water-fleas) from local Emergency Water Supply ponds, and selling them to pet shops that dealt in tropical fish. He also collected balls of

Tubifex worms from sewage contamination along the banks of the river Thames, which gave a higher return on time and effort. Late one September afternoon in 1948, he had taken an SF magazine with a futuristic city on the front to the muddy, slimy riverbank, and tied his bicycle to a thick wooden beam projecting out of the mud. When he had collected a couple of jars full of worms he looked over at the bend in the Thames called the Isle of Dogs, just as the sun was illuminating its slums from behind his head. Inspired by the magazine cover, he vividly imagined the City of the Future that would rise there, with its impossibly tall buildings, helicopter pads, and elevated ramps for sleek, streamlined traffic. Nearly fifty years later, he was giving the POLOOP lecture to an SF audience at a con in Canary Wharf, a yuppie area of London on the site of the old Isle of Dogs, which looks remarkably like that SF City of the Future. He looked down from the futuristic hotel's twentieth floor at the bend in the Thames, and saw that very same wooden beam, still sticking out of the mud. He looked down into the eyes of his younger self. He told the audience what had happened – and realised that no editor would believe the story, just as the fifteen-year-old boy would never have believed his future.

This sounds like a prediction, but SF isn't really about predicting the future, although sometimes it manages to do just that *and* get it right. The true role of SF is more subtle: to explore the consequences of a 'what if?' assumption. But sometimes the answers have such a powerful effect on human minds that people *build* the future that the answer indicates. So it may have been with Canary Wharf, whose architects also grew up when the news-stands were full of pulp magazines with garish, futuristic covers. And so it may be with aliens: unless we have the imagination to understand their possibilities, we may never look for them in the right place, and so may never find them.

Ian's SF career started out much simpler than Jack's: from his early teens he collected and read thousands of SF books and magazines, and still does. He stayed away from cons and the other trappings of organised fandom. During a year in Connecticut in 1977–78 he met Ben Bova, the editor of *Analog* – the new name for the old *Astounding*. Bova convinced him to try his hand at writing SF short stories, and bought and published his first reasonable attempt, *And Master of One*. This was the first of several tales about a certain Billy the Joat (J.O.A.T.

– Jack of All Trades), a generalist of astonishing scientific and technological breadth with a well-honed contempt for bureaucrats.

Jack read the Joat stories, along with Ian's popular science book *Does God Play Dice?*, recognised a like mind, and got in touch. Together they produced two popular science books, *The Collapse of Chaos* and *Figments of Reality*. They also collaborated with Terry Pratchett on *The Science of Discworld* and its sequel *The Science of Discworld II: The Globe*; their SF novel *Wheeler* was published in 2000. When they started interacting and traded experiences, Ian was dragged into biological thinking much more happily than Jack had embraced mathematics, and became as frustrated as Jack was with sloppy thinking about aliens, particularly in the media. It therefore seemed natural, when publishers encouraged Jack to turn POLOOP into something more substantial, for Ian to come along for the ride: the collective entity that was Jack&Ian had already demonstrated how much bolder and brighter it was than either of us alone. So we decided to turn it loose on the question of alien life. As we expected, it didn't turn out entirely as we expected.

Jack&Ian
Coventry and Gorsley
in the auspicious year 2001