

Life's print-out **When God created Man, he may have done Himself out of a job**

by Margaret Wertheim

"When I say that I want to build a machine that can be proud of me, I'm not joking. That's something that drives me emotionally and I would feel good if it happened," says Danny Hillis. He is an artificial life researcher and he is actively trying to create life. But the life that he's trying to conceive is a very unusual type, for unlike all organisms we know so far, his will not be based on DNA. It will not even be carbon-based. In fact, it will be grounded in silicon. Hillis is part of a small but increasing group of people who believe that they can create life inside a computer. Their field is known as artificial life (or a-life), and as Steven Levy points out in his newly released book, *Artificial Life — The Quest for a New Creation* (published by Pantheon Books, a division of Random House), rather than trying to create life in vitro, a-life practitioners are trying to create it in silico.

A-life is no gimmick. This is serious science and it's attracting some of the best and brightest in computing around the world (Hillis, for instance, is the inventor of the Connection Machine, one of the world's best parallel processing super-computers). At thirty-six, Hillis is head of his own multi-million-dollar company and an industry legend. He and others are beginning to say that a-life creations will be the next step in the process of evolution, and that one day, a-life creations may even supplant mankind.

What a-lifers do is create artificial worlds with computer programs. In a way, it's like playing very sophisticated computer games, except that the world is not controlled by a person: once it is set up, it evolves under its own steam. Within these worlds are artificial "life forms" — in reality, small programs capable of reproducing themselves inside the computer's memory. They are programmed so that mutations occur and they evolve by natural selection. Much to their creators' surprise, these worlds and the life forms which inhabit them mimic

the real process of evolution in astonishing ways. New kinds of "creatures" quickly emerge with very different characteristics from the ones originally programmed. Predators and parasites appear, while other life forms have symbiotic relationships. The way in which these worlds evolve is so realistic that biologists are now using them to test out theories about the evolution of real life on earth.

At present, the life forms which evolve in these artificial worlds are extremely primitive — not really life at all. But a-lifers foresee a rapid evolution in their field: they see a future where extremely sophisticated software life forms will be programmed into robots. These would be truly new species, ones that may well be in competition with humans. "I see no reason to believe that we're the end of the chain," says Hillis, "and I think that better than us is possible." Like many a-lifers, he is not content to merely create life, he wants to improve on the natural kind.

Why do people want to create new life forms? It's not as if there's any lack of interesting natural varieties. One reason is undoubtedly the challenge. If nature can do it, then why not Man? But there are other reasons. Hillis, for instance, yearns for an electronic friend. "It would be nice to have one of my machines be such a friend." He acknowledges that the desire for a computerised companion is similar to the desire many people feel to meet an alien, presumably a benevolent one.

The problem is that we are just as likely to create monsters as friends. Recalling Frankenstein and others, tales of humans creating life have generally ended in turmoil. But apart from nightmare visions of monsters out of control, there is something else

deeply troubling about humans trying to create life. After all, we are currently engaged in wiping out untold numbers of species each year. Surely we should learn to live in harmony with the life forms which already exist before we create any more. ●



Computer-generated plants: a-life creations.

