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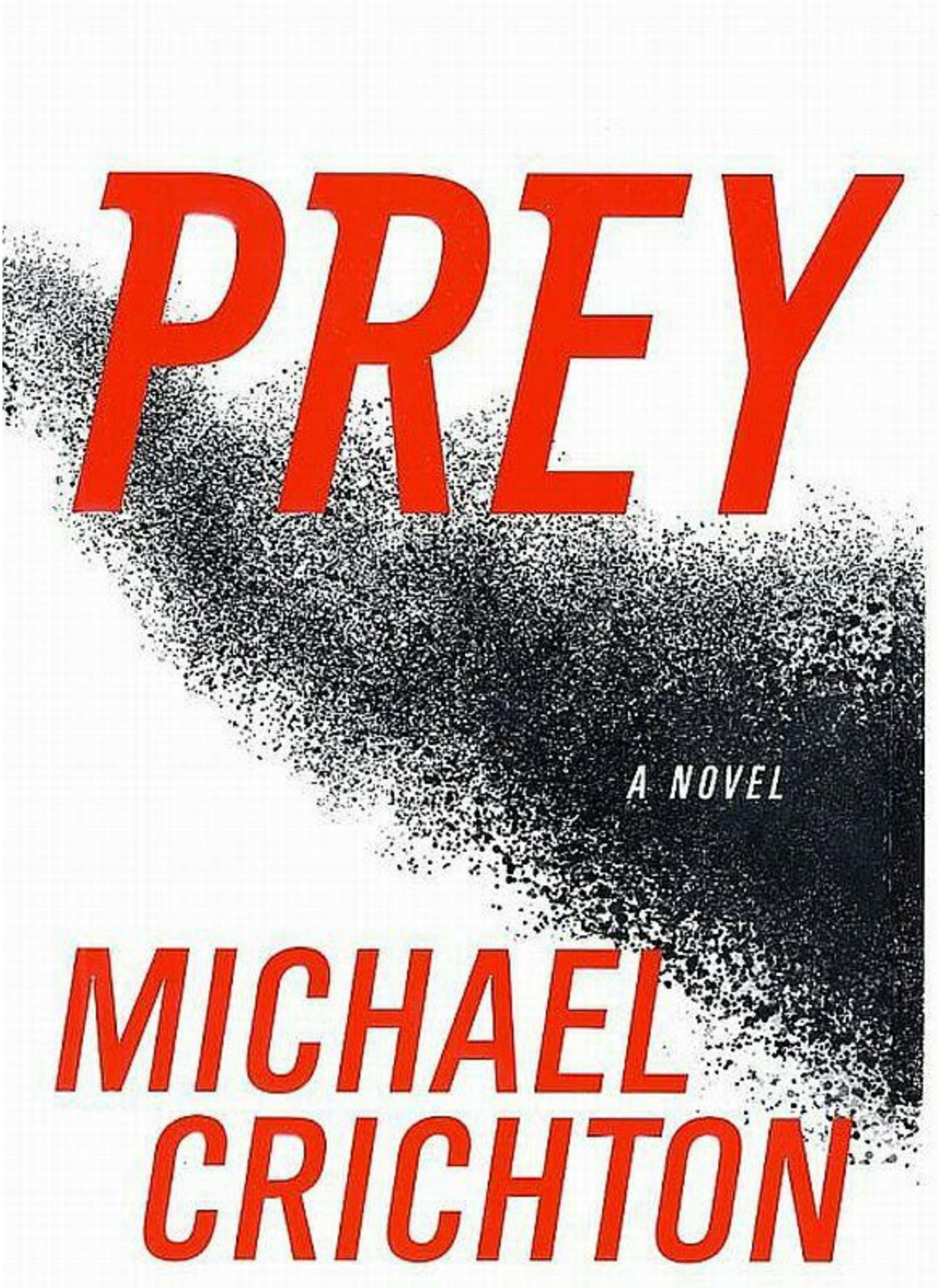
MICHAEL CRICHTON

PREY

"TERRIFYING . . . IRRESISTIBLY SUSPENSEFUL."
New York Times Book Review


PREY
A NOVEL
MICHAEL CRICHTON

PREY

By Michael Crichton

Within fifty to a hundred years, a new class of organisms is likely to emerge. These organisms will be artificial in the sense that they will originally be designed by humans. However, they will reproduce, and will “evolve” into something other than their original form; they will be “alive” under any reasonable definition of the word. These organisms will evolve in a fundamentally different manner.... The pace... will be extremely rapid.... The impact on humanity and the biosphere could be enormous, larger than the industrial revolution, nuclear weapons, or environmental pollution. We must take steps now to shape the emergence of artificial organisms....

Doyne Farmer and Alletta Belin, 1992

There are many people, including myself, who are quite queasy about the consequences of this technology for the future.

K. Eric Drexler, 1992

Introduction

Artificial Evolution in the Twenty-first Century

The notion that the world around us is continuously evolving is a platitude; we rarely grasp its full implications. We do not ordinarily think, for example, of an epidemic disease changing its character as the epidemic spreads. Nor do we think of evolution in plants and animals as occurring in a matter of days or weeks, though it does. And we do not ordinarily imagine the green world around us as a scene of constant, sophisticated chemical warfare, with plants producing pesticides in response to attack, and insects developing resistance. But that is what happens, too.

If we were to grasp the true nature of nature-if we could comprehend the real meaning of evolution-then we would envision a world in which every living plant, insect, and animal species is changing at every instant, in response to

every other living plant, insect, and animal. Whole populations of organisms are rising and falling, shifting and changing. This restless and perpetual change, as inexorable and unstoppable as the waves and tides, implies a world in which all human actions necessarily have uncertain effects. The total system we call the biosphere is so complicated that we cannot know in advance the consequences of anything that we do. That is why even our most enlightened past efforts have had undesirable outcomes-either because we did not understand enough, or because the ever-changing world responded to our actions in unexpected ways. From this standpoint, the history of environmental protection is as discouraging as the history of environmental pollution. Anyone who is willing to argue, for example, that the industrial policy of clear-cutting forests is more damaging than the ecological policy of fire suppression ignores the fact that both policies have been carried out with utter conviction, and both have altered the virgin forest irrevocably. Both provide ample evidence of the obstinate egotism that is a hallmark of human interaction with the environment. The fact that the biosphere responds unpredictably to our actions is not an argument for inaction. It is, however, a powerful argument for caution, and for adopting a tentative attitude toward all we believe, and all we do. Unfortunately, our species has demonstrated a striking lack of caution in the past. It is hard to imagine that we will behave differently in the future. We think we know what we are doing. We have always thought so. We never seem to acknowledge that we have been wrong in the past, and so might be wrong in the future. Instead, each generation writes off earlier errors as the result of bad thinking by less able minds-and then confidently embarks on fresh errors of its own.

We are one of only three species on our planet that can claim to be self-aware, yet self-delusion may be a more significant characteristic of our kind. Sometime in the twenty-first century, our self-deluded recklessness will collide with our growing technological power. One area where this will occur is in the meeting point of nanotechnology, biotechnology, and computer technology. What all three have in common is the ability to release self-replicating entities into the environment.

We have lived for some years with the first of these self-replicating entities, computer viruses. And we are beginning to have some practical experience with the problems of biotechnology. The recent report that modified maize

genes now appear in native maize in Mexico-despite laws against it, and efforts to prevent it-is just the start of what we may expect to be a long and difficult journey to control our technology. At the same time, long-standing beliefs about the fundamental safety of biotechnology-views promoted by the great majority of biologists since the 1970s-now appear less secure. The unintended creation of a devastatingly lethal virus by Australian researchers in 2001 has caused many to rethink old assumptions. Clearly we will not be as casual about this technology in the future as we have been in the past. Nanotechnology is the newest of these three technologies, and in some ways the most radical. It is the quest to build man-made machinery of extremely small size, on the order of 100 nanometers, or a hundred billionths of a meter. Such machines would be about 1,000 times smaller than the diameter of a human hair. Pundits predict these tiny machines will provide everything from miniaturized computer components to new cancer treatments to new weapons of war.

As a concept, nanotechnology dates back to a 1959 speech by Richard Feynman called “There’s Plenty of Room at the Bottom.” Forty years later, the field is still very much in its infancy, despite relentless media hype. Yet practical advances are now being made, and funding has increased dramatically. Major corporations such as IBM, Fujitsu, and Intel are pouring money into research. The U.S. government has spent $1 billion on nanotechnology in the last two years.

Meanwhile, nanotechniques are already being used to make sunscreens, stain-resistant fabrics, and composite materials in cars. Soon they will be used to make computers and storage devices of extremely small size.

And some of the long-anticipated “miracle” products have started to appear as well. In 2002 one company was manufacturing self-cleaning window glass; another made a nanocrystal wound dressing with antibiotic and anti-inflammatory properties. At the moment nanotechnology is primarily a materials technology, but its potential goes far beyond that. For decades there has been speculation about self-reproducing machines. In 1980 a NASA paper discussed several methods by which such machines could be made. Ten years ago, two knowledgeable scientists took the matter seriously:

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These organisms will be artificial in the sense that they will originally be designed by humans. However, they will reproduce, and will "evolve" into something other than their original form; they will be "alive" under any reasonable definition of the word.... The pace of evolutionary change will be extremely rapid.... The impact on humanity and the biosphere could be enormous, larger than the industrial revolution, nuclear weapons, or environmental pollution. We must take steps now to shape the emergence of artificial organisms....

And the chief proponent of nanotechnology, K. Eric Drexler, expressed related concerns:

There are many people, including myself, who are quite queasy about the consequences of this technology for the future. We are talking about changing so many things that the risk of society handling it poorly through lack of preparation is very large.

Even by the most optimistic (or dire) predictions, such organisms are probably decades into our future. We may hope that by the time they emerge, we will have settled upon international controls for self-reproducing technologies. We can expect such controls to be stringently enforced; already we have learned to treat computer virus-makers with a severity unthinkable twenty years ago. We've learned to put hackers in jail. Errant biotechnologists will soon join them.

But of course, it is always possible that we will not establish controls. Or that someone will manage to create artificial, self-reproducing organisms far sooner than anyone expected. If so, it is difficult to anticipate what the consequences might be. That is the subject of the present novel.

Michael Crichton

LOS ANGELES, 2002

It's midnight now. The house is dark. I am not sure how this will turn out. The kids are all desperately sick, throwing up. I can hear my son and daughter retching in separate bathrooms. I went in to check on them a few minutes ago, to see what was coming up. I'm worried about the baby, but I

had to make her sick, too. It was her only hope. I think I'm okay, at least for the moment. But of course the odds aren't good: most of the people involved in this business are already dead. And there are so many things I can't know for sure.

The facility is destroyed, but I don't know if we did it in time. I'm waiting for Mae. She went to the lab in Palo Alto twelve hours ago. I hope she succeeded. I hope she made them understand how desperate the situation is. I expected to hear from the lab but so far there has been no word.

I have ringing in my ears, which is a bad sign. And I feel a vibrating in my chest and abdomen. The baby is spitting up, not really vomiting. I am feeling dizzy. I hope I don't lose consciousness. The kids need me, especially the little one. They're frightened. I don't blame them.

I am, too.

Sitting here in the dark, it's hard to believe that a week ago my biggest problem was finding a job. It seems almost laughable now.

But then, things never turn out the way you think they will.

HOME

DAY 1

10:04 A.M.

Things never turn out the way you think they will.

I never intended to become a househusband. Stay-at-home husband. Full-time dad, whatever you want to call it-there is no good term for it. But that's what I had become in the last six months. Now I was in Crate & Barrel in downtown San Jose, picking up some extra glasses, and while I was there I noticed they had a good selection of placemats. We needed more placemats; the woven oval ones that Julia had bought a year ago were getting pretty worn, and the weave was crusted with baby food. The trouble was, they were woven, so you couldn't wash them. So I stopped at the display to see if they

had any placemats that might be good, and I found some pale blue ones that were nice, and I got some white napkins. And then some yellow placemats caught my eye, because they looked really bright and appealing, so I got those, too. They didn't have six on the shelf, and I thought we'd better have six, so I asked the salesgirl to look in the back and see if they had more. While she was gone I put the placemat on the table, and put a white dish on it, and then I put a yellow napkin next to it. The setting looked very cheerful, and I began to think maybe I should get eight instead of six. That was when my cell phone rang.

It was Julia. "Hi, hon."

"Hi, Julia. How's it going?" I said. I could hear machinery in the background, a steady chugging. Probably the vacuum pump for the electron microscope. They had several scanning electron microscopes at her laboratory.

She said, "What're you doing?"

"Buying placemats, actually."

"Where?"

"Crate and Barrel."

She laughed. "You the only guy there?"

"No..."

"Oh, well, that's good," she said. I could tell Julia was completely uninterested in this conversation. Something else was on her mind. "Listen, I wanted to tell you, Jack, I'm really sorry, but it's going to be a late night again."

"Uh-huh..." The salesgirl came back, carrying more yellow mats. Still holding the phone to my ear, I beckoned her over. I held up three fingers, and she put down three more mats. To Julia, I said, "Is everything all right?"

"Yeah, it's just crazy like normal. We're broadcasting a demo by satellite today to the VCs in Asia and Europe, and we're having trouble with the

satellite hookup at this end because the video truck they sent-oh, you don't want to know... anyway, we're going to be delayed two hours, hon. Maybe more. I won't get back until eight at the earliest. Can you feed the kids and put them to bed?"

"No problem," I said. And it wasn't. I was used to it. Lately, Julia had been working very long hours. Most nights she didn't get home until the children were asleep. Xymos Technology, the company she worked for, was trying to raise another round of venture capital-twenty million dollars-and there was a lot of pressure. Especially since Xymos was developing technology in what the company called "molecular manufacturing," but which most people called nanotechnology. Nano wasn't popular with the VCs-the venture capitalists-these days. Too many VCs had been burned in the last ten years with products that were supposedly just around the corner, but then never made it out of the lab. The VCs considered nano to be all promise, no products.

Not that Julia needed to be told that; she'd worked for two VC firms herself. Originally trained as a child psychologist, she ended up as someone who specialized in "technology incubation," helping fledgling technology companies get started. (She used to joke she was still doing child psychology.) Eventually, she'd stopped advising firms and joined one of them full-time. She was now a vice president at Xymos.

Julia said Xymos had made several breakthroughs, and was far ahead of others in the field. She said they were just days away from a prototype commercial product. But I took what she said with a grain of salt.

"Listen, Jack, I want to warn you," she said, in a guilty voice, "that Eric is going to be upset."

"Why?"

"Well... I told him I would come to the game."

"Julia, why? We talked about making promises like this. There's no way you can make that game. It's at three o'clock. Why'd you tell him you would?"

"I thought I could make it."

I sighed. It was, I told myself, a sign of her caring. “Okay. Don’t worry, honey. I’ll handle it.”

“Thanks. Oh, and Jack? The placemats? Whatever you do, just don’t get yellow, okay?”

And she hung up.

I made spaghetti for dinner because there was never an argument about spaghetti. By eight o’clock, the two little ones were asleep, and Nicole was finishing her homework. She was twelve, and had to be in bed by ten o’clock, though she didn’t like any of her friends to know that.

The littlest one, Amanda, was just nine months. She was starting to crawl everywhere, and to stand up holding on to things. Eric was eight; he was a soccer kid, and liked to play all the time, when he wasn’t dressing up as a knight and chasing his older sister around the house with his plastic sword.

Nicole was in a modest phase of her life; Eric liked nothing better than to grab her bra and go running around the house, shouting, “Nicky wears a bra-a! Nicky wears a bra-a!” while Nicole, too dignified to pursue him, gritted her teeth and yelled, “Dad? He’s doing it again! Dad!” And I would have to go chase Eric and tell him not to touch his sister’s things. This was what my life had become. At first, after I lost the job at MediaTronics, it was interesting to deal with sibling rivalry. And often, it seemed, not that different from what my job had been.

At MediaTronics I had run a program division, riding herd over a group of talented young computer programmers. At forty, I was too old to work as a programmer myself anymore; writing code is a young person’s job. So I managed the team, and it was a full-time job; like most Silicon Valley programmers, my team seemed to live in a perpetual crisis of crashed Porsches, infidelities, bad love affairs, parental hassles, and drug reactions, all superimposed on a forced-march work schedule with all-night marathons fueled by cases of Diet Coke and Sun chips.

But the work was exciting, in a cutting-edge field. We wrote what are called distributed parallel processing or agent-based programs. These programs