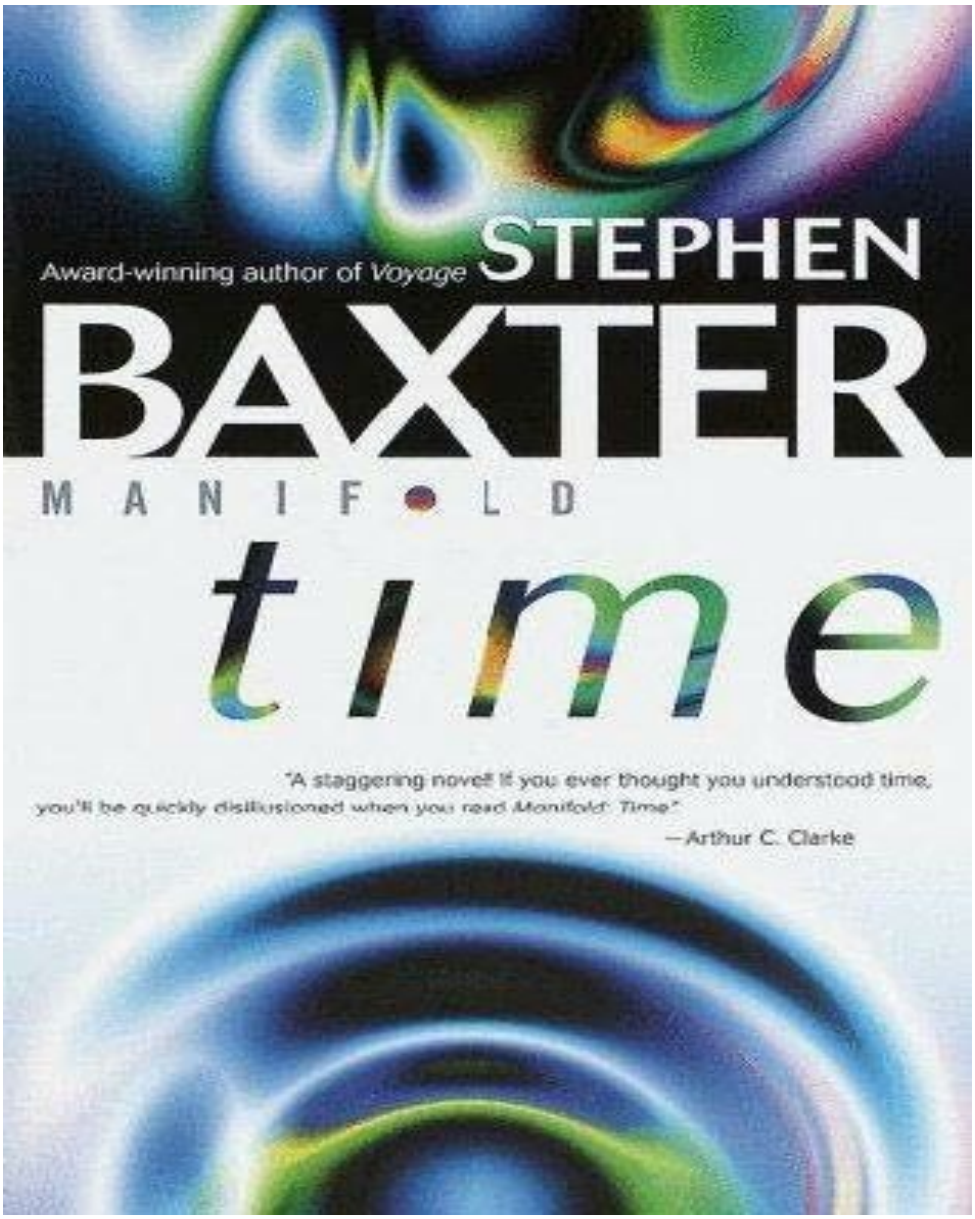

Manifold: Time

Stephen Baxter

Reid Malenfant

You know me. And you know I'm a space cadet.

You know I've campaigned for, among other things, private mining expeditions to the asteroids. In fact, in the past I've tried to get you to pay for such things. I've bored you with that often enough already, right?

So tonight I want to look a little farther out. Tonight I want to tell you why I care so much about this issue that I devoted my life toil.

The world isn't big enough any more. You don't need me to stand here and tell you that. We could all choke to death, be extinct in a hundred years.

Or we could be on our way to populating the Galaxy.

Yes, the Galaxy. Want me to tell you how?

Turns out it's all a question of economics.

Let's say we set out to the stars. We might use ion rockets, solar sails, gravity assists. It doesn't matter.

We'll probably start as we have in the Solar System, with automated probes. Humans may follow. One percent of the helium-3 fusion fuel available from the planet Uranus, for example, would be enough to send a giant interstellar ark,each ark containing a billion people, toevery star in the Galaxy. But it may be cheaper for the probes to manufacture humans in situ, using cell synthesis and artificial womb technology.

The first wave will be slow, no faster than we can afford.It doesn't matter. Not in the long term.

When the probe reaches a new system, it phones home, and starts to build.

Here is the heart of the strategy. A target system, we assume, is uninhabited. We can therefore anticipate massive exploitation of the system's resources, without restraint, by the probe. Such resources are useless for any other purpose,and are therefore economically free to us.

I thought you'd enjoy that line. There's nothing an entrepreneur likes more than the sound of the wordfree.

More probes will be built and launched from each of the first wave of target stars. The probes will reach new targets; and again, more probes will be spawned, and fired onward. The volume covered by the probes will grow rapidly, like the expansion of gas into a vacuum.

Our ships will spread along the spiral arm, along lanes rich with stars, farming the Galaxy for humankind.

Once started, the process will be self-directing, self-financing. It would take, the double-domes think, ten to a hundred million years for the colonization of the Galaxy to be completed in this manner.But we must invest merely in the cost of the initial generation of probes.

Thus the cost of colonizing the Galaxy will be less, in real terms, than that of our Apollo program of fifty years ago.

This vision isn't mine alone. It isn't original. The rocket pioneer Robert Goddard wrote an essay in 1918 --ninety-two years ago -- calledThe Ultimate Migration, in which he imagined space arks built from asteroid materials carrying our far-future descendants away from the death of the sun. The engineering detail has changed; the essence of the vision hasn't.

We can do this. If we succeed, we will live forever.

The alternative is extinction.

And, people, when we're gone, we'regone.

As far as we can see we're alone, in an indifferent universe. We see no sign of intelligenceanywhere away from Earth. We may be the first. Perhaps we're the last. It took so long for the Solar System to evolve intelligence it seems unlikely there will be others,ever.

If we fail, then the failure is for all time. If we die, mind and consciousness and soul die with us: hope and dreams and love, everything that makes us human. There will be nobody even to mourn us.

To be the first is an awesome responsibility. It's a responsibility we must grasp.

I am offering you a practical route to aninfinite future for humankind, a future ofunlimited potential. Someday, you know it, I'll come back to you again for money: seedcorn money, that's all, so we can take a first step --self-financing even in the

medium term -- beyond the bounds of Earth. But I want you to see why I'll be doing that. Why I must.

We can do this. Wewill do this. We're on our own. It's up to us.

This is just the beginning. Join me.

Thank you.

Michael

This is what I have learned, Malenfant. This is how it is, how it was, how it came to be.

In the afterglow of the Big Bang, humans spread in waves across the universe, sprawling and brawling and breeding and dying and evolving. There were wars, there was love, there was life and death. Minds flowed together in great rivers of consciousness, or shattered in sparkling droplets. There was immortality to be had, of a sort, a continuity of identity through replication and confluence across billions upon billions of years.

Everywhere they found life.

Nowhere did they find mind -- save what they brought with them or created -- noother against which human advancement could be tested.

With time, the stars died like candles. But humans fed on bloated gravitational fat, and achieved a power undreamed of in earlier ages.

They learned of other universes from which theirs had evolved. Those earlier, simpler realities too were empty of mind, a branching tree of emptiness reaching deep into the hyperpast.

It is impossible to understand what minds of that age -- the peak of humankind, a species hundreds of billions of times older than humankind -- werelike. They did not seek to acquire, not to breed, not even to learn. They had nothing in common with us, their ancestors of the afterglow.

Nothing but the will to survive. And even that was to be denied them by time.

The universe aged: indifferent, harsh, hostile, and ultimately lethal.

There was despair and loneliness.

There was an age of war, an obliteration of trillion-year memories, a bonfire of identity. There was an age of suicide, as the finest of humanity chose self-destruction against further purposeless time and struggle.

The great rivers of mind guttered and dried.

But some persisted: just a tributary, the stubborn, still unwilling to yield to the darkness, to accept the increasing confines of a universe growing inexorably old.

And, at last, they realized thatthis was wrong. It wasn't supposed to have been like this.

Burning the last of the universe's resources, the final down-streamers -- dogged, all but insane -- reached to the deepest past. And -- oh.

Watch the Moon, Malenfant. Watch the Moon. It's starting --

PART ONE

Bootstrap

What seest thou else

In the dark backward and abysm of Time?

-- William Shakespeare

Emma Stoney

Of course Emma had known that Reid Malenfant -- failed astronaut, her ex-husband, her current boss -- had been buying up space shuttle rocket engines and static-firing them in the California desert. She'd thought it was all part of an elaborate waste-disposal plan.

She hadn't known he was planning to use the rockets to reach the asteroids.

Not until Cornelius Taine told her about it.

About that, and a lot more besides.

"Ms. Stoney."

The voice was soft, dry, and it startled her. Emma straightened up from her softscreen.

There was a man standing before her, here in the pastel light of her Las Vegas office: a thin Caucasian, 1980s pinstripe suit, neatly cropped hair. "I surprised you. I'm sorry. My name's Cornelius," he said. "Cornelius Taine."

Neutral accent. Boston? He looked about forty. She saw no sign of cosmetic enhancement. High cheekbones. Stress muscles around his eyes.

How the hell had he gotten in here?

She reached for the security touchpad under her desk. "I didn't notice you come in."

He smiled. He seemed calm, rational, businesslike. She lifted her finger off the button.

He stretched out his hand and she shook it; his palm was dry and soft, as if even his perspiration was under control. But she didn't enjoy the touch. Like handling a lizard, she thought. She let go of the hand quickly.

She said, "Have we met before?"

"No. But I know of you. Your picture is in the company reports. Not to mention the gossip sites, from time to time. Your complicated personal history with Reid Malenfant."

He was making her uncomfortable. "Malenfant is kind of high profile," she conceded.

"You call himMalenfant" He nodded, as if storing away the fact.

"You're with the corporation, Mr. Taine?"

"Actually it'sDoctor. But please, call me Cornelius."

"Medical doctor?"

"The other sort." He waved a hand. "Academic. Mathematics, actually. A long time ago. Yes, in a manner of speaking, I am with Bootstrap. I represent one of your major shareholder groups. That's what got me past your very conscientious secretary in the outer office."

"Shareholders? Which group?"

"We work through a number of dummies." He looked at her desk. "No doubt when you get back to your softscreen you'll soon be able to determine which, and the extent of our holdings. Ultimately, I work for Eschatology, Inc."

Oh, shit. Eschatology, as far as she knew, was one of those UFO-hunting nut groups that were attracted to Malenfant's enterprises like flies.

He watched her, apparently knowing what she was thinking.

"Why are you here, Dr. Taine?"

"Cornelius, please. Naturally we wish to check on how your husband is using our money."

"Ex-husband. You can do that through the company reports or the press."

He leaned forward. "But I don't recall any news releases about this waste-reduction enterprise in the Mojave."

"You're talking about the rocket plant. It's a new project," she said vaguely. "Speculative."

He smiled. "Your loyalty is admirable. But you've no need to defend Malenfant, Ms. Stoney. I'm not here to criticize or obstruct. Divert, perhaps."

"Divert what?"

"The trajectory of Reid Malenfant's covert activities. I'm talking about his true purpose, beneath all the misdirection."

"True purpose?"

"Come now. You don't think anyone believes an entrepreneur with Malenfant's track record is reconditioning man-rated rocket enginesjust to burn industrial waste, do you?" He studied her. "Or perhaps you truly don't know the truth. How remarkable. In that case we both have much to learn." He smiled easily. "We believe Malenfant's motives are sound -- that's why we invest in him -- although his objectives are too narrow. I saw his speech in Delaware the other night. Impressive stuff: colonizing the Galaxy, immortality for humankind. Of course, he hasn't thought it through."

"Would you believe me if I said I don't know what the hell you're talking about?"

"Oh, yes." He eyed her. His eyes were a pale blue, the color of the skies of her California childhood, long gone. "Yes, now that I've met you, I believe you. Perhaps we understand your ex-husband better than you do."

"And what is it you understand about him?"

"That he's the only man who can save the human race from the coming catastrophe." He said it without inflection.

She had absolutely no idea how to reply. The moment stretched.

Once more she wondered if this man was dangerous.

On impulse, she decided to cancel the rest of her day and drive out to Malenfant's desert operation. Maybe, all things considered, it was time to see it for herself. And she invited Cornelius along for the ride.

She called ahead to let Malenfant know she was on the way. But, working on the principle that she should never miss a chance to make Malenfant's life more difficult, she didn't warn him about Cornelius Taine.

Out of Vegas she took the I-15, the main route to L.A. 300 miles away. Out of town she was able to cut in the SmartDrive. The car's limiter, controlled by the invisible web of satellites far above, switched out as the automatic control took over, and her speed rose smoothly through 150 miles per hour.

As the sun climbed, the air grew hotter. She rolled up her window, felt the air-conditioning cool and moisten the air.

Without warning Cornelius said, as if resuming an interrupted conversation, "Yes, the Delaware speech was interesting. But something of a throwback for Malenfant. He's usually much more discreet about his true ambitions."

When Malenfant had first started making money, as a small-scale aerospace consultant, he had spread himself over the media arguing for an expansion of American effort in space: a new generation of heavy launchers, new manned vehicles, a return to the Moon. He talked about the riches waiting in space, escape from Malthusian limits to growth, the ability to save the species from such calamities as an asteroid collision with the Earth, and so forth. The usual space-buff propaganda.

"The image Malenfant built of himself was clear," Cornelius said. "Here was a man who was rich and was destined to get richer, and who was clearly prepared to throw some of his money at the old dreams of space. But then his businesses started to struggle. Isn't that true?"

It was true. Investors had grown wary of this talk-show visionary. Space was important for business, but business only cared about the constellations of utilitarian satellites in low Earth orbit, for communications and weather and surveillance. Thus far and no farther.

And Malenfant attracted no support from serious agencies -- particularly from NASA. NASA had long grown wary of frightening away its political backers by thinking too big, and was focused on doing sexy science with small, cheap, unmanned probes while sustaining the careers and empires associated with the giant bureaucracy that ran the manned space program, with its aging shuttle fleet and a half-built and much-delayed space station.

In fact Malenfant himself started to attract unwelcome personal attention. There were barroom psychoanalysts all over the media who found a common pattern in his failure to have kids, his frustrated ambition to fly in space, and his lofty ambitions for the future of humankind. And then there were the kooks -- the conspiracy theorists, the UFO nuts, the post-New Age synthesists, the dreaming obsessives -- none of whom had anything to offer Malenfant but bad PR.

Then along had come the yellow babies in Florida, and even NASA space launches were suspended, and that seemed to be that.

As Cornelius talked, she discreetly booted up the car's soft-screen and referenced Cornelius Taine.

Thirty-eight years old. Born in Texas, not that you'd know it from the accent. Once a professional mathematician, an academic.Brilliant was the word used in the brief bio she found.

A full professor at Princeton at twenty-seven. Washed out at thirty.

She couldn't find out why, or what he'd been doing since then. She set off a couple of data miners to answer those questions for her.

After the yellow babies, Malenfant had regrouped.

He disappeared from the TV screens. He continued to fund educational efforts -- books, TV shows, movies. Emma, working within the Bootstrap corporation, saw no harm in that, nothing but positive PR, and tax-efficient besides. But in public Malenfant largely withdrew from his propagandizing, and withheld any investment from what he started to call the "pie-in-the-sky stuff."

And, quietly, he began to build a seriously large business empire. For instance, he had pioneered the mining of methane as a fuel source from the big high-pressure hydrate deposits on the seabed off North Carolina. He had leased the technology to other fields, off Norway and Indonesia and Japan and New Zealand, and bought up shares judiciously. Soon methane production was supplying a significant percentage of global energy output.

The giant tents Malenfant's companies had erected over the sea floor, to decompose the hydrates and trap the gases, had become a symbol of his flair and ambition.

And Malenfant was on his way to becoming remarkably rich.

Space, it seemed, was the place Reid Malenfant had started from, not where he was going.

Until, Emma thought, if Taine is right --this.

"Of course," Cornelius said, "Malenfant's ambition is to be applauded. I mean his real ambition, beyond this, umm...diversionary froth. I hope you understand this is my basic position. What grander goal is there to work for than the destiny of the species?" He spread thin fingers. "Man is an expansive, exploring animal. We conquered Earth with Stone Age technology. Now we need new resources, new skills to fund our further