

Red Plenty

by the same author

THE CHATTO BOOK OF CABBAGES AND KINGS:

Lists in Literature

THE CHATTO BOOK OF THE DEVIL

CULTURAL BABBAGE:

Technology, Time and Invention

(with Jenny Uglow)

I MAY BE SOME TIME:

Ice and the English Imagination

THE CHILD THAT BOOKS BUILT

BACKROOM BOYS:

The Secret Return of the British Boffin

RED PLENTY

Francis Spufford



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For my mother

The Cast

in order of first appearance

CAPITALS indicate the part of a name most often used in the book

* indicates a real person

(I.2, IV.1, etc) indicates the part and chapter numbers of further scenes in which the person appears

On the tram in Leningrad

* LEONID VITALEVICH Kantorovich, a genius (I.1, II.1, III.1, VI.2, VI.3)

Visiting the United States

* Nikita Sergeyevich KHRUSHCHEV, First Secretary of the Communist Party of the Soviet Union and Chairman of the Council of Ministers (I.2, III.2, V.1, VI.3)

* NINA PETROVNA Khrushcheva, his wife (I.2, VI.3)

* Andrei GROMYKO, Soviet Foreign Minister (I.2)

* Oleg TROYANOVSKY, Khrushchev's interpreter (I.2)

* Dwight D. EISENHOWER, President of the United States (I.2)

* Henry Cabot LODGE, US Ambassador to the United Nations (I.2)

* Averell HARRIMAN, a millionaire acting as East–West liaison (I.2)

At the American Exhibition in Sokolniki Park

GALINA, a student at Moscow State University and Komsomol member (I.3, V.3)

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VOLODYA, ditto, her fiancé (I.3, III.2)

KHRISTOLYUBOV, a minor apparatchik (I.3)

FYODOR, a Komsomol member from an electrical factory
(I.3, V.2)

ROGER TAYLOR, an African-American guide at the
exhibition (I.3)

Walking to the Village

EMIL Arslanovich Shaidullin, a well-connected young
economist (I.4, II.1, III.1, V.2, VI.2)

MAGDA, his fiancée (I.4)

Her FATHER (I.4)

Her MOTHER (I.4)

Her GRANDFATHER (I.4)

SASHA, her brother (I.4)

PLETKIN, the collective farm manager (I.4)

At the conference in the Academy of Sciences

* Vasily Sergeyevich NEMCHINOV, a reforming economist
and academic politician (II.1)

* BOYARSKII, a political economist of the old school (II.1)

In the basement of the Institute of Precise Mechanics

* Sergei Alexeievich LEBEDEV, a pioneering Soviet computer
designer (II.2, VI.1)

In Moscow on the day of the Party Congress

* Sasha/Alexander GALICH, a writer of stage comedies,
screenplays and ideologically acceptable song lyrics (II.3,
VI.2)

MORIN, a Thaw-minded newspaper editor (II.3)

MARFA TIMOFEYEVNA, a newspaper censor (II.3)

GRIGORIY, a doorman at the Writers' Union (II.3)

At Akademgorodok in 1963

ZOYA Vaynshteyn, a biologist (III.1, VI.2)

VALENTIN, a graduate student in mathematics (III.1, VI.2)

KOSTYA, a graduate student in economics (III.1, VI.2)

HAIRBAND GIRL, Valentin's would-be girlfriend (III.1)

* Andrei Petrovich ERSHOV, a computer programmer (III.1)

MO, a sardonic intellectual (III.1, VI.2)

SOBCHAK, an exasperated intellectual (III.1)

In Novocherkassk

BASOV, regional Party Secretary (III.2)

* KUROCHKIN, director of the Budenny Electric
Locomotive Works (III.2)

* Anastas MIKOYAN, long-serving Presidium (Politburo)
member (III.2)

* Frol KOZLOV, Presidium member and heir apparent to
Khrushchev (III.2)

The MONK-FACED MAN, a veteran operative of the
organs of security (III.2)

At Gosplan

Maksim Maksimovich MOKHOV, Deputy Director of the
Sector of Chemical and Rubber Goods (IV.1)

On the train from Solovets

ARKHIPOV, KOSOY and MITRENKO, the management of
the Solkemfib viscose works (IV.2)

PONOMAREV, an engineer and former political prisoner
(IV.2)

In Sverdlovsk

CHEKUSKIN, a *tolkach* or 'pusher'; a buying agent (IV.3)

SEÑORA LOPEZ, a Spanish dancing teacher (IV.3)

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RYSZARD, a junior manager in the chemical equipment division of Uralmash (IV.3)

STEPOVOI, an inexperienced executive (IV.3)

KOLYA, a king thief (IV.3)

The LIEUTENANT, a policeman (IV.3)

VASSILY, a truck driver and Spartak fan (IV.3)

At the leadership compound in Moscow

Khrushchev's CHAUFFEUR (V.1)

* MELNIKOV, commandant of Khrushchev's first security detail in his retirement (V.1)

Khrushchev's COOK (V.1)

* Khrushchev's SON, Sergei Khrushchev, a rocket designer (V.1)

At the government dacha

* Alexei Nikolaevich KOSYGIN, Chairman of the State Planning Committee (Gosplan) (V.2)

In Galina's flat, and the labour ward

FYODOR'S MOTHER, an annoyingly slim woman in her forties (V.3)

IVANOV, her lover (V.3)

A tired DOCTOR (V.3)

INNA OLEGOVNA, a midwife (V.3)

In the Kremlin corridor

FRENCHIE, a secretary (VI.1)

At Akademgorodok in 1968

MAX, Zoya's ten-year-old son (VI.2)

TYOMA (short for Artemy), a doorkeeper in the Institute of Cytology and Genetics (VI.2)

The DIRECTOR of the Institute of Cytology and Genetics
(VI.2)

A note on the characters

Although the list above divides the people in this book into two categories, real and imaginary, there are a couple of characters who, while fictional, exist in a relationship to real historical individuals: they occupy similar historical positions, they play similar professional roles, they share to a limited degree in the life-histories and life-events of the real people who prompted their invention. Yet they *are* inventions. They are fictional people standing roughly where real people stood: Zoya Vaynshteyn displacing the real fruit-fly biologist Raissa Berg, and Emil Shaidullin rudely elbowing aside the eminent economist Abel Aganbegyan. It is important to understand that Zoya and Emil, as represented here, came straight out of my head. Their characterisations were not the result of any process of interview or research or investigation on my part, and are not intended to reflect any judgement of mine on the character of the real scientists whose places they have taken. No characteristic, trait, action, thought, intention, utterance or opinion of these characters should be taken as an indication of any corresponding characteristic, trait, action, thought, intention, utterance or opinion belonging to the real individuals.

PART I

In a certain kingdom, in a certain land, namely, the very land in which we live . . .

I.

The Prodigy, 1938

A tram was coming, squealing metal against metal, throwing blue-white sparks into the winter dark. Without thinking about it, Leonid Vitalevich lent his increment of shove to the jostling crowd, and was lifted with the rest of the collectivity over the rear step and into the cram of human flesh behind the concertina door. 'C'mon citizens, push up!' said a short woman next to him, as if they had a choice about it, as if they could decide to move or not, when everyone inside a Leningrad tram was locked in the struggle to get from the entry door at the back to the exit at the front by the time their stop came around. Yet the social miracle took place: somewhere at the far end a small mob of passengers burped out onto the roadway, and a squeezing ripple travelled down the car, a tram-peristalsis propelled by shoulders and elbows, creating just enough space to press into before the door closed. The yellow bulbs overhead flickered, and the tram rocked away with a rising hum. Leonid Vitalevich was wedged against a metal post on one side, on the other against the short woman. She was wedged against a tall fellow with a big chin and blond hair standing on end. Beyond him was a clerk with a glazed eye, like a herring on ice, and three young soldiers who had already started their evening spree judging by their breath. But the smell of vodka merged with the sweaty sourness of the workers a little further forward, whose factory had plainly lodged them in a barracks without a bathroom, and the fierce rosewater scent the short woman had on, into one, hot, composite human smell, just as all the corners and pieces of sleeve and collar he could see fused into one tight kaleidoscope of darned hand-me-downs, and worn leather, and too-big khaki.

He was wearing what he thought of as his ‘professor outfit’, the old suit cobbled together by his mother and sister which had been supposed to make him look like a plausible Professor L. V. Kantorovich when he first started teaching at the university six years ago, aged twenty. He’d been standing at the blackboard in the lecture theatre, taking a deep breath, chalk in hand, about to launch into the basics of set theory, when a helpful voice from the front row said, ‘I’d stop messing about if I was you. They take things seriously here. You’ll only get in trouble when the professor arrives.’ He’d had to learn to be sharp, to make his presence felt. Even now, when the world was filling up with surprisingly young scientists and army officers and plant managers – the older ones having taken to disappearing by night, leaving silence behind them, and gaps in every hierarchy to be plugged by anxious twentysomethings working all hours to learn their new jobs – even now, pinched and tired as he was, dull-skinned like everyone else on the tram, he still had the occasional difficulty with someone misled by his big adam’s apple, and his big eyes, and his sticking-out ears. This was the problem with being what people called a prodigy. You always had to be saying something or doing something to persuade people that you weren’t what they thought they saw. He couldn’t remember it ever being any different, though he presumed that before he learned to talk, and then almost immediately to count, and to do algebra, and to play chess, there’d been a milky time when he was only Dr and Mrs Kantorovich’s ordinary baby. But at seven, when he worked out from his big brother’s radiology textbook that you ought to be able to tell how old a rock was from the amount of undecayed carbon in it, he’d had to get past Nikolai’s indulgent medical-student smile before he would pay attention, and start talking about the idea seriously, the way he needed. ‘You must have read this somewhere. You *must* have done. Or been talking to someone . . .’ At fourteen, he had to persuade the other students at the Physico-Mathematical Institute that he

wasn't just an annoying shrimp who'd wandered in by mistake; that he *belonged* in their company, even though he was a head shorter than any of them, and had to bounce as he walked along the corridor with them to keep his face in the general domain of the conversation. At eighteen, presenting original work at the All-Union Mathematical Congress, he measured his success by his ability to get the yellow-fingered, chain-smoking geniuses to stop being kind. When they gave up being encouraging, when they made their first sarcastic remark, when they started to sneer and to try to shred his theorems, he knew they had ceased seeing a kid and started to see a mathematician.

Automatically, Leonid Vitalevich gripped his wallet tight in his trouser pocket, against pickpockets. Gangs worked the trams, and you couldn't tell which of these faces, these polite faces, aggressive faces, drunken faces, was really a pokerface, a front for a hand down below extracting surplus value. He couldn't see anything beneath chest level, so it was best to be careful; couldn't see his feet, though he could certainly feel them, now that the fuggy warmth of the tram had thawed the crust over the annoying hole that'd appeared today on the sole of his left shoe. He had a small wad of newspaper in there, and it was turning soggy. This was the third time this winter the shoes had sprung a leak. He would have to go back to the retired cobbler Denisov this Sunday, take him another present, listen to more self-contradictory reminiscences about the old man's adventures with women. Of course it would be much better to get a new pair of shoes altogether, or maybe boots. Who could he ask? Who would know somebody who knew somebody? He would have to think about it. He gazed through the sliver of window visible between heads, and fragments of city slid by: a patrol car parked on a corner, grand facades streaked with damage from leaking gutters, red neon flashing FIVE – IN – FOUR, FIVE – IN – FOUR, the word *more* on the bottom corner of a poster, which he knew at once would read in full *Life has become*

better, more cheerful! Those posters were all over the place. The slogan advertised Soviet Champagne. Or the existence of Soviet Champagne advertised the slogan, he wasn't sure which. But now he was looking without seeing. His thoughts had dived into his satchel, clutched tight with his other hand. Halfway down a lefthand page in his notebook, the blue ink scribble of equations broke off, and now his mind was racing on from that point, seeing a possible next move, seeing the thread of an idea elongate. Today, something had happened.

He had been doing a bit of consultancy. It went with being attached to the Institute of Industrial Construction; you had to sing for your supper every so often. And he didn't really mind. It was a pleasure to put the lucid order in his head to use. More than a pleasure, a relief almost, because every time the pure pattern of mathematics turned out to have a purchase on the way the world worked, turned out to provide the secret thread controlling something loud and various and apparently arbitrary, it provided one more quantum of confirmation for what Leonid Vitalevich wanted to believe, needed to believe, did believe when he was happy: that all of this, this swirl of phenomena lurching on through time, this mess of interlocked systems, some filigree-fine, some huge and simple, this tram full of strangers and smoky air, this city of Peter built on human bones, all ultimately made sense, were all intricately generated by some intelligible principle or set of principles working themselves out on many levels at once, even if the expressions didn't exist yet which could capture much of the process.

No, he didn't mind. Besides, there was a duty involved. If he could solve the problems people brought to the institute, it made the world a fraction better. The world was lifting itself up out of darkness and beginning to shine, and mathematics was how he could help. It was his contribution. It was what he could give, according to his abilities. He was lucky enough to live in the only country on the planet where human beings had

seized the power to shape events according to reason, instead of letting things happen as they happened to happen, or allowing the old forces of superstition and greed to push people around. Here, and nowhere else, reason was in charge. He might have been born in Germany, and then this tram ride tonight would have been full of fear. On his professor suit would have been a cotton star, and dark things would have looked out of people's faces at him, just because his grandfather had worn earlocks, had subscribed to a slightly different unverifiable fairytale about the world. He would have been hated there, for no reason at all. Or he might have been born in America, and then who could say if he would even have had the two kopecks for the tram at all? Would a twenty-six-year-old Jew be a professor there? He might be a beggar, he might be playing a violin on the street in the rain, the thoughts in his head of no concern to anyone because nobody could make money out of them. Cruelty, waste, fictions allowed to buffet real men and women to and fro: only here had people escaped this black nonsense, and made themselves reality's deliberate designers rather than its playthings. True, reason was a difficult tool. You laboured with it to see a little more, and at best you got glimpses, partial truths; but the glimpses were always worth having. True, the new consciously-chosen world still had rough edges and very obvious imperfections, but those things would change. This was only the beginning, the day after reason's reign began.

Anyway. Today he had had a request from the Plywood Trust of Leningrad. 'Would the comrade professor, etc. etc., grateful for any insight, etc. etc., assurance of cordial greetings, etc. etc.' It was a work-assignment problem. The Plywood Trust produced umpteen different types of plywood using umpteen different machines, and they wanted to know how to direct their limited stock of raw materials to the different machines so as to get the best use out of it. Leonid Vitalevich had never been to the plywood factory, but he could picture it. It would be like all

the other enterprises which had sprung up around the city over the last few years, multiplying like mushrooms after rain, putting chimneys at the end of streets, filling the air with smuts and the river with eddies of chemical dye. All the investment that hadn't gone into new clothes and everyday comforts had gone into the factories: they were what the tired people on the tram had got instead. At the plywood factory, he supposed, there would be a raw brick barn, cold enough inside at this time of year to turn the workers' breaths to puffs of steam. He guessed that the machinery would be the usual wild mixture. Aged pre-revolutionary presses and stampers would be running alongside homegrown products of the Soviet machine-tool industry, with here and there a silky import, efficient but hard to maintain. Together, under the exposed girders of the roof, this mismatched orchestra of devices would be pouring out a discordant symphony of hisses, treadlings, clunks and saw-edged whines. The management wanted help tuning the orchestra up. To be honest, he couldn't quite see what the machines were doing. He had only a vague idea of how plywood was actually manufactured. It somehow involved glue and sawdust, that was all he knew. It didn't matter: for his purposes, he only needed to think of the machines as abstract propositions, each one effectively an equation in solid form, and immediately he read the letter he understood that the Plywood Trust, in its mathematical innocence, had sent him a classic example of a system of equations that was impossible to solve. There was a reason why factories around the world, capitalist or socialist, didn't have a handy formula for these situations. It wasn't just an oversight, something people hadn't got around to yet. The quick way to deal with the Plywood Trust's enquiry would have been to write a polite note explaining that the management had just requested the mathematical equivalent of a flying carpet or a genie in a bottle.

But he hadn't written that note. Instead, casually at first, and then with sudden excitement, with the certainty that the

hard light of genesis was shining in his head, brief, inexplicable, not to be resisted or questioned while it lasted, he had started to think. He had thought about ways to distinguish between better answers and worse answers to questions which had no right answer. He had seen a method which could do what the detective work of conventional algebra could not, in situations like the one the Plywood Trust described, and would trick impossibility into disclosing useful knowledge. The method depended on measuring each machine's output of one plywood in terms of all the other plywoods it could have made. But again, he had no sense of plywood as a scratchy concrete stuff. That had faded into nothing, leaving only the pure pattern of the situation, of all situations in which you had to choose one action over another action. Time passed. The genesis light blinked off. It seemed to be night outside his office window. The grey blur of the winter daylight had vanished. The family would be worrying about him, starting to wonder if he had vanished too. He should go home. But he groped for his pen and began to write, fixing in extended, patient form – as patient as he could manage – what'd come to him first unseparated into stages, still fused into one intricate understanding, as if all its necessary component pieces were faces and angles of one complex polyhedron he'd been permitted to gaze at, while the light lasted; the amazing, ungentle light. He got down the basics, surprised to find as he drove the blue ink onward how rough and incomplete they seemed to be, spelt out, and what a lot of work remained.

And now, on the tram, he was following his thought into implications, into what he was suspecting might be a world of implications. Clearly, the world had got by quite well until now without this idea. In the era before half past two this afternoon, the people arranging the flow of work in factories had been able to do so with a fair degree of efficiency by using rules of thumb and educated intuition, or else the modern age would not be as industrialised as it was: would not have trams and

neon, would not have airships and autogyros thronging the sky, would not have skyscrapers in Manhattan and the promise of more in Moscow. But a fair degree of efficiency was very far removed from a maximum degree of efficiency. If he was right – and he was sure he was, in essentials – then anyone applying the new method to any production situation in the huge family of situations resembling the one at the Plywood Trust should be able to count on a measurable percentage improvement in the quantity of product they got from a given amount of raw materials. Or you could put that the other way around: they would make a measurable percentage saving on the raw materials they needed to make a given amount of product.

He didn't know yet what sort of percentage he was talking about, but just suppose it was 3%. It might not sound like much, only a marginal gain, an abstemious eking out of a little bit more from the production process, at a time when all the newspapers showed miners ripping into fat mountains of solid metal, and the output of plants booming 50%, 75%, 150%. But it was predictable. You could count on the extra 3% year after year. Above all it was free. It would come merely by organising a little differently the tasks people were doing already. It was 3% of extra order snatched out of the grasp of entropy. In the face of the patched and mended cosmos, always crumbling of its own accord, always trying to fall down, it built; it gained 3% more of what humanity wanted, free and clear, just as a reward for thought. Moreover, he thought, its applications did not stop with individual factories, with getting 3% more plywood, or 3% more gun barrels, or 3% more wardrobes. If you could maximise, minimise, optimise the collection of machines at the Plywood Trust, why couldn't you optimise a collection of factories, treating each of them, one level further up, as an equation? You could tune a factory, then tune a group of factories, till they hummed, till they purred. And that meant –

‘Watch what you’re doing!’ cried the short woman. ‘Take your head out of your arse and watch what you’re doing, why don’t you?’ The big man had seized the chance, the last time they all shuffled up the tram, to free his hand and light a cigarette. But as it hung at the corner of his mouth, cardboard holder pinched in two dimensions to act as a filter, a jolt from the track had knocked the whole burning load of tobacco out of the paper tube at the end, and it had fallen, smouldering, onto her shoulder. Her arms were pinned.

‘Sorry, sister,’ said Big Chin, trying to flap the embers off her and down.

‘What good is sorry, you big lummox? Get it off me. Oh, look at my coat. There’s a hole right through –’

– and that meant that you could surely apply the method to the entire Soviet economy, he thought. He could see that this would not be possible under capitalism, where all the factories had separate owners, locked in wasteful competition with one another. There, nobody was in a position to think systematically. The capitalists would not be willing to share information about their operations; what would be in it for them? That was why capitalism was blind, why it groped and blundered. It was like an organism without a brain. But here it was possible to plan for the whole system at once. The economy was a clean sheet of paper on which reason was writing. So why not optimise it? All he would have to do was to persuade the appropriate authorities to listen.

Suppose that the Soviet economy could be made to grow by an extra 3% a year – an extra 3% year after year, compounded. It would mount up fast. After only a decade, the country would be half as rich again as it would have been otherwise. Quicker than anyone imagined yet could come the golden age whose promise was implicit in the rhythm of every production line, but which had still to free the world from scarcity; the golden age the Party promised, but said it could not deliver till the heavy

work of construction was done, except in the symbolic form of Soviet Champagne. Seen from that future time, when every commodity the human mind could imagine would flow from the industrial horn of plenty in dizzy abundance, this would seem a scanty, shoddy, cramped moment indeed, choked with shadows, redeemed only by what it caused to be created. Seen from plenty, now would be hard to imagine. It would seem not quite real, an absurd time when, for no apparent reason, human beings went without things easily within the power of humanity to supply, and lives did not flower as it was obvious they could. Now would look like only a faint, dirty, unconvincing edition of the real world, which had not yet been born. And he could hasten the hour, he thought, intoxicated. He gazed up the tram, and saw everything and everybody in it touched by the transformation to come, rippling into new and more generous forms, the number 34 rattlebox to Krestovsky Island becoming a sleek silent ellipse filled with golden light, the women's clothes all turning to quilted silk, the military uniforms melting into tailored grey and silver: and faces, faces the length of the car, relaxing, losing the worry lines and the hungry looks and all the assorted toothmarks of necessity. He could help to do that. He could help to make it happen, three extra percent at a time, though he already understood that it would take a huge quantity of work to compose the necessary dynamic models. It might be a lifetime's work. But he could do it. He could tune up the whole Soviet orchestra, if they'd let him.

His left foot dripped. He really must find a way to get new shoes.