

DOUGLAS  
RUSHKOFF

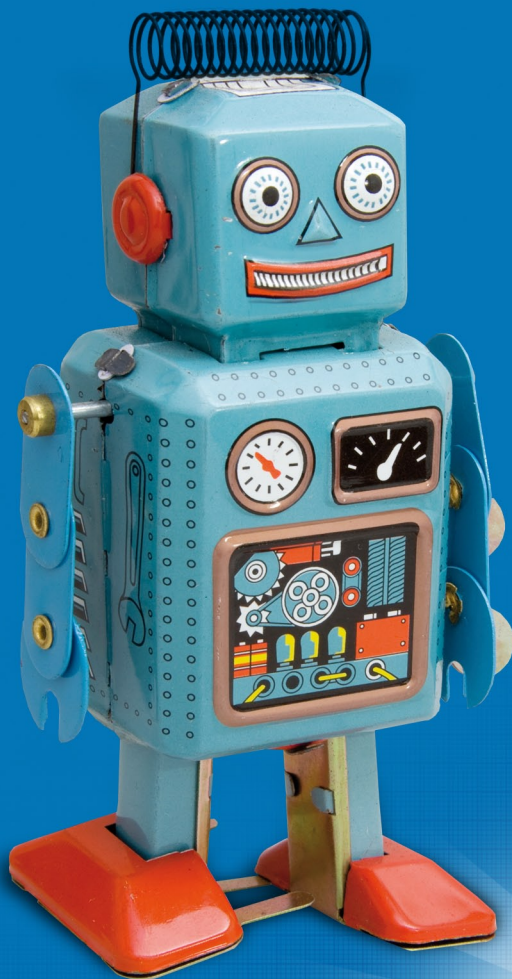
RAY  
HAMMOND

SCARLETT  
THOMAS

MARKUS  
HEITZ

# THE TOMORROW PROJECT

BESTSELLING AUTHORS DESCRIBE  
DAILY LIFE IN THE FUTURE.



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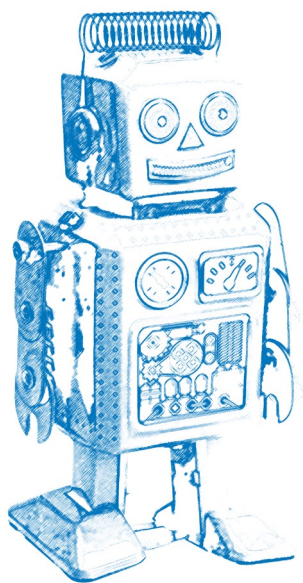
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# THE TOMORROW PROJECT

**BESTSELLING AUTHORS DESCRIBE  
DAILY LIFE IN THE FUTURE.**





*Editorial*  
*CONVERSATIONS ABOUT THE FUTURE*

*Ulm, Germany. September 24, 2007*

It was an unseasonably warm fall day in Ulm. The sky was a cloudless crystal blue and the Ulm Minster's towering Gothic steeple loomed over the city. Up the hill at the university I was attending the Intelligent Environments Conference. IE07 gathered together a wide collection of disciplines including information and computer science, architecture, material engineering, artificial intelligence, sociology and design. I had been invited to give a keynote on some work I'd been doing at the Intel Corporation. Standing in the middle of the crowded circular hall, I began my lecture titled: *Do Digital Homes Dream of Electric Families.*

In the lecture I proposed that we could use science fiction as a design tool for the development of technology and new products. The idea was that we could write science fiction stories based on science fact to explore the human and cultural implications of that science. I recognized that some of the greatest scientists of the twentieth century were been inspired by science fiction. Similarly, science fiction authors routinely use emerging science and research to inspire stories, movies and comic books. But the difference I explained was the intent. Here the relationship between science fiction and science fact was specific, they were being used together as a way to develop a deeper understanding, explore the opportunities and examine the hazards. The combination of the two created a kind of science fiction prototype and could not only speed the development of the technology described in the stories but it could actually produce better results and more successful products.

*Portland, OR, USA. November 07, 2010*

Over the last three years I have worked with scientists, researchers and students from all over the world who are applying these science fiction prototypes as

they became known to a number of different areas such as artificial intelligence, robotics, cyber-security and health care. These prototypes became not only a serious development tool but also a new way to get students and the general public interested in science and technology. I have written a text book on the subject called *Science Fiction Prototyping: A Framework for Design*, that is currently being taught in universities and will be available to the public early in 2011.

## **The Future is About People**

All four stories in this collection are based on technologies Intel is currently developing in our labs. What is striking about them is that even though they are all science fiction stories they are all first and foremost, stories about people. Each story is unique in its own vision and portrayal of life in the future, but each of them is extraordinarily good at capturing the human drama of the future. These stories are not about technology, they are about the complex and fascinating lives of their characters. Technology is simply a part of the drama.

Scarlett Thomas' *The Drop* gives us a portrait of a family in a world that is mundane and familiar yet ingenious in its technological connections. Markus Heitz's *Blink of an Eye* is a fascinating cautionary tale, pitting our human wants and desires against our ability to construct a future that we may not want to live in. Douglas Rushkoff's *Last Day of Work* tells us about Dr. Leon Spiegel's last day of work, literally the last human to work. With intelligence and foresight Rushkoff ultimately challenges what it means to be human. And finally Ray Hammond's *The Mercy Dash* gives us a couple's pulse-pounding break-neck race to save the life a loved one. It is a race that is both helped and hindered by a complex landscape of devices, sensors and connections. These stories ultimately show us that the stories of our future are not about technology, megatrends or predictions. They show us that the future is about people.

At Intel we use futuristic visions like the ones found in this collection to inform our technological development and experimentation. In our labs we spend a lot

of time listening to people and studying how technology touches and affects their lives, because we also believe that not only the future but also technology is ultimately about the people that will be using it.

The stories in this collection give you a chance to envision possible futures, the same way we do, when developing future technologies. Each story is a kind of conversation about the future, a way to develop a deeper understanding, explore the opportunities and examine the hazards of a future that is not quite set but does get closer and closer each day.



*Brian David Johnson*

*Futurist and Director, Future Casting, Interactions and Experience Research  
Intel Corporation*

*„Last Day of Work“*





## **LAST DAY OF WORK**

I'm finally doing it. Clocking out for the last time.

It's been twenty years since they began offering the package, close to a decade since the company's been down to just the skeletal observation crew, and over a year since it's been just me. Well, Curtis and me, but he wasn't every fully here, anyway, so when he left the office it was more like watching someone log off one network to join another.

And I'm looking forward to it, I really am. I just thought being the last one here would be a more notable achievement. At least more noted. An accomplishment as fame-worthy as something my father could have done. So while it is a significant human milestone, I'm sure of it, I just so happen to be doing it when nobody is around to care. I am the headline of every newspaper, the front page of every web site, and the message in everybody's inbox: Dr. Spiegel Turns Off the Lights.

I've been delaying the inevitable (and, from what I'm told, my own joy, my own release of ego, my membership in the next phase of human evolution) mostly because there's no one who knows or cares that I do. I'm collecting salary every day - I'm paying myself time-and-a-half, in fact, in consideration of my having to both work and monitor my own progress. It's not easy being the last guy.

Of course there's nowhere left to spend the money I'm earning. The last few businesses stopped accepting credits early last year, and even before that most financial transactions were done purely for show. Once the Date of Dissolution had been agreed to by the banks, there wasn't much point in hoarding currency of any kind. It's as if we just needed the credit for credit's sake - to prove to ourselves and our friends we had really done something of value. Kind of made everyone think about

the stuff they used to buy with money, and if most of it was for the same, empty purpose.

Just because you know something to be true doesn't make you any better at accepting it, or acting any differently because of it. That was the main message of my dad's work, I suppose. Not that he was any messiah himself; just the messenger. But in a land of no egos or authority, that's pretty much the best anyone's going to get. As for me, well, I'm a messenger, too - but in a world with no recipients. Except maybe you, if you happen to find this missive. And if you do, I guess it means we were wrong about the whole thing.

But that possibility has been enough to keep me going at this chronicle, written in the same work hours that I used to spend monitoring the systems, making sure the nano, robo, digital, and genetic algorithms were all working within predicted parameters. Ready to pull the plug right up until the moment there was no longer any plug to pull.

I mean, everyone - at least everyone who was anyone - went over. Someone had to watch from the other side. Someone had to be the last one to leave. Work the last day of the last job. Close the door, turn out the lights.

It's fitting that I'm the one - and not just because I'm a Spiegel. As a kid I had always been obsessed with Michael Collins - the Apollo 11 command module pilot - not Neil Armstrong or Buzz Aldrin, the guys who actually landed on the moon's surface. Collins circled around, alone, over to the dark side while the other two made the historic lunar landing for the TV audience. He just sat there in the capsule, beyond the range of our communications, when everybody else celebrated our first truly unifying planetary achievement. He was completely responsible and utterly by himself.

So yeah, I've been relishing my "last-remaining-human" experience, and dragging it out far longer than I have any excuse to. I wander through the abandoned shopping malls, try on clothes I would never have been able to afford, watch movies the old-fashioned way, stack paper cash in big piles, and shoot machine guns at cars. It's fun. As long as there's only one of me, I can afford to live in exactly the way my father's work showed us not to.

On the off-chance you have no idea what I'm talking about (Wouldn't that be a hoot? Me having to tell people about his existence?), here's how it came to pass:

I've got my own theories on the moment it all shifted - but so does everyone else. There's no way to know exactly which technology or policy or pop star or combination of these led to the great unwinding. There's not much consensus on this, but I still think it was the TP, or telepathic podster. It wasn't a truly telepathic uni device, of course. That took another decade. The TP was just a biofeedback circuit. It observed the neural output of enough people thinking "right" or "left" and then use that data to predict when someone else is trying to move the cursor in that direction. It was the first smart phone / gamepad that seemed to know what we meant without our telling it anything.

While that might not seem like so very much, it changed the whole way technology developed from then on. Instead of it being our job to figure out how to make some new thing and then figure out what the heck to use it for, now it was technology's job to figure out what we wanted and then just go do it for us.

This turned out to be a big problem, because what we all wanted was more of everything we already had. Consumer technologies learned to think of people the way we already thought of ourselves: as absolute consumers. Technologies from net agents to nano-bots competed through the networks to bring their owners as much stuff as cheaply as possible. Meanwhile, technologies in the service of corporations and governments mirrored the profit-minded or bureaucratic ideals of their own users. They created trading algorithms, intelligent currencies, and self-referential legal axioms that brought capital into their coffers at alarmingly rapid rates.

This was all good for the economy - at least in the short run, as measured by the GNP. The faster the economy grew, the faster it could accelerate. As long as there were new thresholds for acceleration, the sky was the limit.

The only drag on the system proved to be human intervention. The amount of time it took human beings to make decisions for themselves paled in comparison to the rate at which these same choices could be accurately predicted and carried out by

assumption routines. Our impulses at that stage of evolution, after all, were really quite simple. They all pointed towards more of one thing or another, the sooner the better.

Once outside direct human command and control, technologies from the TP to the nano probe were capable of reflecting and meeting the aggregate human demand well in advance of our conscious requests. At least until the economic systems on which all this was occurring began to break down.

It seems that leaving technology to meet human demand, unchecked, wasn't the best idea after all. Resources ran scarce, especially when distributed to individuals. And capital tended to pool at the center, leaving companies with no one left to sell goods to. We painted ourselves into a corner, and lacked the ingenuity to change in time to get out of the mess. Our programs gave us exactly what we asked them for, and we didn't know how to ask any differently. Environmental forecasts indicated that even if we reversed course somehow, it was already too late. Resource depletion and wealth disparity had passed the point of no return.

A few great ideas - master plans - were attempted. A Chinese firm developed a technology through which biological forms could be reduced to one-tenth their normal size. The thinking behind this scenario was that human beings would only take up a tenth the space this way, and thus utilize only one-tenth the resources. But even tiny humans would have a hard time surviving the radiation that was to come, so the idea was scrapped.

Trapped in the scenario from which there seemed to be no escape, my father came up with the last resort idea for saving the species: interstellar migration. No, we didn't have the technology to fly humans from earth to some save haven, but we had the means to seed another planet with our DNA. And so scientists began on the great project to send robots, nanotech, and genetic material across the galaxies in search of a planet suitable for life to begin again.

To avoid merely repeating the evolutionary process that brought us into our sorry state, however, our government came up with the idea of nesting a message into the DNA strand: our little fortune cookie for the next round of humanity. In this message, we could explain where we went wrong, as best as it could be articulated.

Then, once the next civilization was approaching our level of development, they would presumably find the message in their DNA strand, read it, and avert our fate. While the United Nations argued about exactly what the message should say, my father was tasked with finding an unused, or generally unnecessary codon on which to embed it. He spent a long time considering which animal and human qualities were necessary or not for our development, and scanned over the sections of the genome like an engineer looking for unused tunnels in the New York subway system.

Then, he figured, why not go to the source of the trouble? The human drive for self and tribal interest so necessary at early stages of development, yet so dangerous when allowed to run human affairs in the later stages of evolution when drives can be so easily amplified by technology. He used his virtual quark microscope to zoom in on his target zone of the genome, exploring the fractal-like model on the sub-atomic level, when he noticed something strange: there was a small, extra bundle of mesons and single baryon hanging onto the edge of one of the neutrinos in an atom of the cytosine nucleotide. Now what was that doing there?

He guessed it as quickly as you just did. It was a message. Similar in spirit to what humanity was now attempting to tell its own evolutionary progeny. Incapable of being translated into words, but conveying the essential and seemingly frightening truth: technology is not a mirror, it is a partner.

The location of the message provided the clue for its implementation, which proved a whole lot easier than trying to embed it in some future seed-spawning project. We would simply release our technology from simply amplifying the existing social order, and set it free to deliver us a new one.

It took some time for people to accept that the biases of our technology were not foreign to humanity at all, but its greatest and most deliberate expressions. Through our networked intelligences, we had developed a fully decentralized modality for matter to achieve greater complexity in the face of entropy. We could hunt and gather no more, conquer and collect no further. The Industrial Age reversed itself, as bigger was no longer better, and centralized authority worked against the power of networks. Our drive to monopolize was no longer a valid means of increasing our knowledge and capability. We would have to learn, instead, to let go.

And so the process began through which we saved humanity and, more importantly, continued the evolution of matter toward greater levels of self awareness. It just meant including our technologies in the great game, instead of requiring they submit to reality as we previously understood it. They were only as responsible for reading our minds as we were responsible for reading theirs.

We moved from the scarcity model - the zero-sum game through which species compete for resources - to an abundance model where anything that is necessary can be found or synthesized and then shared by all.

The manufacturing of energy (long limited by the faux economics of resource depletion) was as simple as a yawn. The only thing that had been standing in the way was an energy industry whose profits depended on fixed supplies and non-renewability. Medicine, agriculture, air and education all proved as plentiful as our willingness to adopt technologies that created value from the periphery, and replicated effortlessly as they spread. From shape shifting to mems to transformation of matter. Everything became free.

While our prior social system would have been challenged by the extreme unemployment that came with the collapse of corporate capitalism, we no longer saw the need to distribute wealth according to one's contribution. There was enough for all, and barely enough "work" for anyone. Once the synthesis of appropriate matter forms was left to technologies unencumbered by the necessities of an artificially scarce marketplace, people started lining up to do the one day of work per month per person required to keep everything going.

Then, the work itself became ritual. Over the past ten years or so, those of us who visited a workplace regularly did so purely out of habit, or as a form of historical re-enactment. A few of the robots, like my friend Curtis, remained to perform the last few clerical functions - keeping the lights on, maintaining the few ancient servers left that provided no functionality other than maintaining the illusion of working companies. And then even the robots left, fully convinced of their superfluosity, and ready to join the party. There out there, too.

I've spent time there, don't get me wrong. Matter, energy, consciousness, all in the

same dance. The technology - the balls, the light, the information - isn't taking commands from any server. There's no middle, anymore. No top. Everything is just taking commands from everything else. The network is the server, the genes are the organism, the nanos are the medium. What we tried to teach technology in the industrial age turned out to be the opposite of what technology finally taught us in Great Unwinding.

I don't know if anyone but me gets this on anything but an intuitive level, or why they'd feel the need to. Once you see the dancing, you can't help but join in. And it's everything they say it is: the ecstasy of connection - of everybody knowing everything about everyone else, and being perfectly okay with it. Overjoyed, even. Still unique and individual, yet also part of a greater mind - a collective awareness that has finally grown ready to reach out and finally find the other ones out there.

I have held back for a long time, now. But no longer. I just wanted to - I don't know - to do something as significant as my father did. Make a mark. Get recognized, lauded, and even rewarded for something I did, me alone.

That's something I could only do back here. And like everyone else's personal success, the only thing it can do for me in the long run is keep me more alone.

So I'm going to stop now. Years later than I had to, I suppose. But all in my own good time. And this time I'm really doing it. This is my last day of work. I'm going to turn off the terminal, switch off the lights, and walk out that door. This time, I know I will.



More information on  
robotics and telematics

<http://personalrobotics.intel-research.net/videos.php>

<http://www.youtube.com/watch?v=bbifmRBBN6Q>

<http://www.youtube.com/watch?v=s27Yd5mwZKM>

<http://www.youtube.com/watch?v=Vq08egobDCI>

„*The Mercy Dash*“



## **THE MERCY DASH**

‘I’ll only have four runs, darling,’ promised H       as she pushed herself up from the sunbed. She leaned in under the shade of the beach parasol and quickly kissed her new husband on his cheek.

‘Be safe,’ he told her, glancing up with a smile.

At the jetty the speedboat was waiting, its old-fashioned diesel engine ticking over with a low rumble. The newly-weds were at one of France’s most fashionable beach clubs – Club 55, at Pampelonne Beach, just outside St. Tropez – a venue that had managed to retain its super-exclusive cachet for over 75 years. Princess Grace and Brigitte Bardot had partied here in the club’s early years. And now, in the high summer of the year 2025, Europe’s beautiful people were still gracing its white sands and paying hyper-inflated prices for its drinks.

Few of the guests were as beautiful, or as fashionable, as Parisienne H       Guenier. Despite her 56 years, the tall and slender H       still drew admiring glances from the men, and from many of the women as, bikini clad, she tiptoed carefully across the hot sand to the boating jetty. Roger Guenier leaned up on his elbows to watch as his wife of only five days told the speedboat driver what she wanted. Even at a distance of a few hundred metres he could see the smile on the man’s face as H      ’s natural charm worked its effect. Then she was out of sight briefly on the other side of the old wooden jetty as she slipped into the warm water to attach her skis. A beach club employee jumped into the sea to make sure the guest’s water skis were fastened tightly enough for safety. With a subdued roar, the speedboat captain revved his engine, moved away from the jetty and slowly pulled out to sea to take up his skier’s slack line.

Roger knew that his wife was an expert water skier – she had skied every day so far on their honeymoon – and he smiled as H  l  ne rose effortlessly to the surface, straightened her long, shapely legs and leaned back as the speedboat picked up speed. He could almost feel his wife’s pleasure as a plume of spray rose up behind her skis. Her large dark glasses glinted in the morning sunlight and her highlighted-blond   hair streamed behind her in the ocean breeze. In the distance, nearer to the horizon, was a line of moored megayachts which would soon be disgorging billionaire owners and their guests, keen to lunch and be seen at Club Cinq en Cinq. Others along the beach were watching admiringly as H  l  ne began her favourite figure-of-eight manoeuvre, jumping over the speedboat’s wake as she crossed its path. The July sky was cerulean blue, the only disturbance two white jet contrails slicing eagerly southwards in almost parallel formation. At the far end of the beach the speedboat executed a wide turn and H  l  ne leaned low into the curve as the centrifugal force skimmed her at increased speed across the gentle waves. Roger picked up his book reader again, but he couldn’t help but watch as H  l  ne began her return run. A jet ski revved noisily from nearby, momentarily distracting him. When he looked back H  l  ne was clear of the water, effortlessly leaping the speedboat’s wake.

A moment later the water skier was pulling out in a wide arc from the boat’s plume, when suddenly she seemed to halt abruptly, then fly up into the air before disappearing into a huge cloud of spray. Roger was on his feet, as were others on the beach, and they were running towards the water when the jet ski drove at high speed into the spreading cloud of spray.

There was a scream, the high-pitched snarl of a jet-ski engine and then silence.

\* \* \*

There was no doubt that the new diamond stud in his left ear looked cool – not too big, not too bling, just a tasteful statement about urban fashion and modern networking. And very retro – very Millennial. But to Billy Becker it felt strange

hearing Sophie's voice deep inside his left ear, rather than hearing her voice from his headphones or from the loudspeaker in his mobile. And his virtual assistant's voice was different now, smoother. Billy thought his VA sounded sexier.

'So what now?' asked Sophie, as Billy left the tech-care surgery.

The procedure had taken fifteen minutes and had involved fitting a micro in-ear amplifier and speaker and the multi-function diamond ear stud which replaced his old smart mobile device. The ear stud now provided all personal data processing and network management services that Billy needed and, what was really cool was that the device was powered entirely by Billy's own body movement. To complete the system Billy wore new light-sensitive, motion-powered wireless glasses that doubled as a heads-up visual data display. It helped that they had stainless steel frames and were definitely über-cool. The new system had been fitted with the latest software upgrade and his VA now seemed even more human as she whispered her question in his ear.

'Back to the studio,' Billy told her. 'I've got to finish the boardroom designs.'

'It seems strange to be this close to you,' said Sophie softly in his ear-drum. Billy nodded, his large mass of dark curls moving a fraction of a second later than his head. It also felt strange to him – and a little unsettling. Billy had programmed his virtual assistant's speech using samples of his own girlfriend's voice and, with the system's improved natural language interface, the virtual Sophie sounded almost exactly like the real Sophie; Billy joked with his friends that naming his virtual assistant after his live-in partner avoided any misunderstandings if he were to talk in his sleep. As he approached his car Sophie spoke again. 'Is it OK for Speedy to talk to you?'

'Now?' asked Billy, surprised. 'On my...' He had been about to say 'mobile but he realised he no longer owned a mobile.

'It's a new feature,' Sophie told him. 'And Speedy's been wanting access to your personal network for some time.' Billy felt in his pocket for his car remote.

'Well?' asked Sophie, almost impatiently.

'OK,' said Billy, smiling at the improved simulation of emotions his upgraded VA was exhibiting.

'There's been a traffic incident on the ring road,' said Speedy, the car's built-in ro-

bot chauffeur and journey management system. 'Southbound, right by the power station. The delays are expected to last into this afternoon. I suggest taking the thirty-six, but you'll have to drive manually.'

The driver's door swung open and Billy slithered in and gasped the wheel of the fast saloon.

'You have control,' said Speedy and the robot chauffeur threw a transparent image of a map of the surrounding area onto the inside of the windshield. A route was marked in white.

'Just tell me where to go as we drive,' instructed Billy. He was anxious to get back to his studio. He was a very successful furniture designer and his work was in demand all across Germany and beyond. At the moment, the 31-year-old was finishing designs for a boardroom table and chairs for a plastics company based near Vienna. Naturally, he was working in that most pliable of materials. Billy touched the 'engine start' button on the steering wheel and, as the hydrogen-powered Audi began to move, Speedy faded the map away. Although all traffic on Europe's highways and major roads was now robot-driven under networked computer control, back street traffic was still driven and managed by humans. As a result accidents and jams were still frequent in the side streets.

'Turn left two hundred metres ahead,' said Speedy. 'There's some road works coming up that I suggest we avoid.'

'Sophie's calling,' said VA Sophie in his ear. Out of habit Billy reached for the switch on the steering wheel that would have patched his girlfriend's voice to the in-car sound system. Then he remembered. He nodded and the motion sensor in his ear stud delivered the call via his new system.

'Hey...' said Billy.

'My mother's been injured,' shouted real Sophie in a rush, right into his inner ear. 'She was waterskiing and...'

'And what?' shouted Billy back. He saw the right turn coming up.

'She hit something in the water – and then a jet ski hit her. Her back's been injured.'

'How badly?' asked Billy as he made the turn.

'She's in the hospital – they'll have to operate,' Sophie said. 'And you know about

her blood. I have to get down to Nice as fast as I can.'

Options raced through Billy's mind. He and Sophie had been at the wedding in Paris the weekend before and he knew that H       and her new husband were honeymooning in the South of France. And he also remembered what Sophie had told him about her mother's strange blood type; H       carried a rare antibody which made normal blood transfusions dangerous for her.

'I'm on my way home,' said Billy. 'One moment.'

He gave instructions to Speedy to check for jams and traffic conditions. Then he told the robot chauffeur to plot the fastest course back to the apartment he and his partner Sophie shared just outside his hometown of Mannheim.

'I'll be there in...'

'Twelve minutes,' said Speedy, completing the sentence.

\* \* \*

'For God's sake, Paul, give it to me!'

Sophie snatched the sweater from the robot's arms and folded it herself. She knew her bad temper was caused by her worry over her mother, but the slow and careful way Paul the butler-bot was trying to pack incensed her. All domestic robots were programmed to move slowly and handle things gently for reasons of humans' safety, but there were certain times when such behaviour was inappropriate – and now was one of them. Paul understood the tone of his owner's voice and he switched himself to safety mode. Sophie Ducasse was a medical student – in her fourth year – at the Universit      medizin in Mannheim and she had learned enough medicine to be desperately worried about her mother. She'd been thrilled when her mother told her she was remarrying and although Roger was ten years younger than his bride, Sophie thought her mother's new relationship had an excellent chance of lasting – and of making her happy. The wedding had been wonderful and, until a few moments ago, Sophie had still been enjoying the afterglow of the pleasurable event. It had been Roger who had called Sophie with the news of her mother's accident, but it was clear that the



doctors at Hôpital Saint-Roch in Nice had either had told him very little about their patient's injuries or that they knew very few details themselves. Sophie understood that any damage to the spine could result in damage to the spinal column which, in turn, could leave her mother partly or wholly paralysed. Roger hadn't even known which vertebrae had been damaged in his wife's back. His new stepdaughter had quickly told him to find out – and she had also told him to relay the important information about her mother's rare blood antibody. Sophie stood before a mirror and scraped her long, blonde hair back into a utilitarian ponytail. Then she grabbed some toiletries for herself and Billy as she finished packing – Paul standing back, watchful but completely stationary as he always was when switched to safety mode.

It was shortly before noon and Sophie guessed that if they could drive down through France as rapidly as possible they could be in Nice by the early evening. Having grown up in Paris she had frequently spent holidays in the south of France and she was familiar with the air and rail links. She was certain that driving offered the fastest way to get there. But what if the surgeons decided to operate before Sophie arrived? The medical student knew that speed was important in treating back injuries, but she also knew what could happen if her mother was given ordinary blood. Sophie herself also carried the rare blood antibody and, some years ago, she had provided blood for transfusion when her mother had undergone gall-bladder surgery. Ordinary blood transfusions could cause her mother to develop a high fever and could even induce a coma. Mother and daughter often joked that it was good that Mannheim was so close to Paris – 'We can always give blood to each other if we need it,' Hélène would say from time to time, when questions of health arose. Now her mother really did need her daughter's blood, but they were separated by 650 kilometres.

Sophie heard Billy's ID open the front door lock and she snatched up the large overnight bag she had packed and ran through to the living room.

\* \* \*

‘The scan suggests that three of Madame Guenier’s vertebrae have been damaged,’ said the doctor, as he pointed to an image on a wall screen. ‘Here, here and here.’

‘Do these vertebrae have particular names?’ asked Roger Guenier, remembering his step-daughter’s demand for more precise information.

‘They have letters and numbers,’ explained the doctor. ‘These are vertebrae L2, L3 and L4 – in the lumbar region.’

Roger made a note on his tablet.

We can repair the bones, of course,’ added the doctor. ‘The question is whether Madame Guenier’s spinal column has been damaged.’

‘You’ll have to operate?’ asked the anxious husband.

‘Yes, and as soon as possible,’ confirmed the emergency room medic. ‘Our senior orthopaedic surgeon is just finishing a procedure in the operating room. Then he’ll take look at these scans. I would guess Madame Guenier will be next in for surgery.’

Then Roger Guenier did his best to explain about his wife’s rare blood antibody, and the complications that could arise.

\* \* \*

‘What are the lane and speed options on the A35?’ asked Billy.

VA Sophie and Speedy answered almost together. ‘150 kilometres and 120 kilometres.’

Now that all autoroute traffic was computer managed, speeds could be a lot faster than in the old days when erratic humans controlled the vehicles.

‘How’s the traffic south of Strasbourg?’ Billy asked.

He was driving manually, his worried girlfriend beside him. He was also breaking local speed limits on the back roads and he knew the networks would be detecting him and automatically issuing fines. But it was clear that this was an

emergency. Speedy had estimated that if they could maintain an average speed of 70 kilometres per hour they could be in Nice by early evening.

‘Moving well for the first twenty kilometres,’ Speedy said, but there’s some major road works around Dijon.’

‘Route me round them,’ instructed Billy.

Sophie’s ancient *le portable rang* – she rarely upgraded her mobile and she still stuck to the old-fashioned French description of such devices. Billy listened as she listened, unable to hear the other side of the conversation.

‘OK, I understand,’ said Sophie into her handset. She glanced sideways at Billy and mouthed ‘Roger.’

‘Yes, yes,’ continued Sophie, talking to her new stepfather. ‘We hope to be there around seven.’

Sophie finished the call, then turned to her partner. He was intent on the road, driving as rapidly as he could through the patchy midday traffic.

‘There’s a recording of Maman’s accident – from the web cams at Pampelonne Beach,’ said Sophie. ‘Roger’s pasted it to our private album.’

Billy nodded, concentrating on weaving through the traffic. He knew that such driving would make him an easy target for the *Gendarmerie Nationale*, the French traffic police, who loved nothing better than to extract on-the-spot cash fines from foreign motorists.

‘Put it up for us,’ Billy told his VA Sophie. ‘Heads up for me.’

Almost as soon as he finished speaking, his VA pasted two separate displays of high-definition video footage to the windshield – the modern photonic networks threw petabytes of data around the world as effortlessly as if they were old-fashioned text messages. In front of the driver the video images were transparent; on the passenger side they were solid. Sophie and her partner watched as the images from the web cams were replayed. They saw *Hélène* start her ski run, watched as she turned at the end of the beach and then began her return. Suddenly she seemed to halt in the water, and then fly upwards, into the air. Then the jet ski roared into the cloud of spray.

‘She hit something,’ said Billy, squinting alternately at the video and the road

ahead. 'Something in the water. Replay from just before she hit it.'

VA Sophie started a reply of the video.

'Freeze,' ordered Billy. Even while he watched he was still weaving through traffic at almost 100 kph. 'Zoom in.'

As they gazed at the video frame they could see the outline of something dark in the water ahead of the skier.

'Zoom in more,' said Billy.

The dark object appeared to be just below the surface.

'Looks like a submerged log,' said VA Sophie.

Billy shook his head and, without taking his eyes off of the road, he reached across and squeezed his girlfriend's hand.

\* \* \*

'Of course,' said Roger Gurnier as the anaesthetist went through the interminable questions on her pre-surgery form. 'We cross-compared our DNA profiles before we married.'

'Planning a family?' asked the doctor with a smile.

The recent bridegroom wondered whether the medic had checked her patient's age; then he remembered that these days many women in their fifties and sixties were still having children with medical help.

Roger shook his head. 'No. We both have children from previous marriages.'

'And Madame's genome profile is where...?' asked the anaesthetist.

'Here,' said Roger, and he touched a thin gold bracelet on his left wrist and then moved his hand to the wall screen. The data moved with his fingertips.

'Right. I'll just run a drug compatibility trial on her profile,' said the doctor, touching his screen. 'Apart from the blood antibody, is there anything else you know to be unusual in your wife's DNA?'

\* \* \*

'OK, I have control,' said Billy as he took back vehicle management from Speedy.

He steered onto the on-ramp of the A6, waited at the smart traffic signal and, when the signal changed, quickly moved into the high speed lane. 'All yours,' he told the robot chauffeur as he took his hands from the wheel. The car clicked into the high speed stream of network-controlled traffic. Billy glanced to his right at the drivers who had selected the slower lanes. Most of them, he guessed, were watching the news, talking to someone, gambling, scanning emails, watching videos or simply going over their work. Many of them were 'attending' meetings in different time zones, different climates, different seasons: some of them would be involved in more than one. And some would simply be asleep.

When the first fully-automated traffic-flow system had been introduced to European highways, there was much public outcry and intense political debate. Drivers felt uncomfortable handing over control of their vehicles' movement to computer systems, even if the European Union was providing them with generous tax incentives to assist with the cost of installing the necessary automatic driving systems. It was only when non-automated traffic was completely banned from the fast lanes in peak periods that drivers seriously began adopting Auto-Ride technology. The EU fuelled the experiment by providing an 80 per cent cash subsidy for these in-car control systems and, during the first few years of the experiment, the flow of vehicles was managed by roadside locators and broadcasting systems. Now they were managed by a combination of GPS nodes and satellites, cellular network sensors and roadside beacons and, despite carrying double the number of vehicles per hour than had been possible when vehicles were still driven manually, lane speeds had increased by forty per cent. The public now loved network traffic management and robot-driven cars

'What's your best estimate of our ETA Sophie?' asked Billy.

'About seven-thirty,' said VA Sophie in his ear, just as the real Sophie answered, 'Around eight.'

'No, I was talking to Sophie,' said Billy, touching his ear. He swung his seat round so that he was facing his girlfriend. The Audi continued its journey southwards, at 150 kilometres per hour.

'You seem very friendly with your virtual assistant,' said the real Sophie, with something like an accusation in her voice. 'What's the new system like?'

'She understands almost everything I say now,' said Billy. 'She gets the semantic context of my words in real time from the networks.'

Then Billy smiled and added, 'And she seems very real herself, now that she's in my ear,'

'Let me hear?' asked his girlfriend.

'Patch to speakers,' said Billy. 'Now Sophie, tell Sophie about the weather on the way down to Nice.'

'It's clear and fine all the way down,' said the VA over the car's sound system. 'Set fine for the next four days.'

'That's exactly my voice!' exclaimed real Sophie. 'That's spooky! I don't think I like it.'

'I've always had your voice,' said the VA. 'But my software has been upgraded – for greater naturalism.'

'But she's never spoken like that before!' exclaimed Sophie. She punched Billy on the shoulder, hard enough to make him wince. 'Aren't I enough for you?' she demanded of her boyfriend.

Then Sophie's old mobile device beeped. Roger's name and face appeared on the screen.

'What news?' asked the worried daughter into her phone as the car raced southwards.

'OK, let's see them,' she said. She turned to Billy. 'The doctors are allowing me to look at the scans. Can you put them up?'

Billy nodded and VA Sophie displayed the incoming images on the windshield.

'Yes, I understand,' Sophie told Roger. 'The lumbar region.'

She glanced up at the scans. 'Can we zoom in?' she asked.

Billy nodded and his VA enlarged the central area of the image.

Sophie stared at the main scan for some time. 'Three vertebrae are badly crushed,' she said quietly. 'Can I see the 3-D?'

The image on the windshield changed and they were looking at a multidimen-

sional scan that seemed to stretch from the windshield back into the interior of the car. Sophie reached forward and turned the images over slowly with her fingertips.

'I still can't see the spinal column itself,' she complained.

'I'll grab my modeller,' said Billy as he swung his seat further round. Leaning backwards, he pulled a large, thick, white tablet from the rear seat.

'Transfer the data to this,' Billy told his VA.

As if by magic, tiny nodes rose from the flat bed of the Dynamic Physical Rendering device and a solid, half-life-size, 3-D model of a human spine appeared to rise up from the bed. Despite the seriousness of the situation, Billy smiled to himself. He loved using the DPR modeller in presentations. He could show his clients physical 3-D renderings of his furniture designs. It was a cool and very useful technology. Sophie took the modelling tablet from Billy's hands and closely examined the e-sculpture of her mother's damaged back.

'They'll have to fuse these vertebrae, I would think,' she said half to Billy and half to herself as she ran her fingers over the model of the spine. 'But I still can't see if there are any bone fragments in the spinal canal. I don't suppose they'll know for sure until they go in.'

'Péage coming up,' said VA Sophie as the Audi began to slow for the toll booth.

'I have control,' said Billy as he turned his seat forward and took the steering wheel again.

\* \* \*

'Can't you wait just a while?' asked Roger Guenier as the orthopaedic surgeon completed his pre-surgery checks on his patient. 'Her daughter's a medical student – she understands these things. She says it will be very dangerous for Hélène to have a blood transfusion.'

'The longer we wait the greater the chance that your wife could suffer some paralysis, Monsieur,' said the doctor. 'I understand about the blood antibody and we'll do our best to restrict your wife's blood loss. But we must operate now.'

Roger glanced at his watch. It was just after 4 pm. 'Sophie will be here in a few hours. Then you can use her blood – she has the same antibody.'  
The surgeon looked at the worried husband and shook his head.  
'I'm sorry. We must proceed now.'

\* \* \*

'I don't like her sounding like me!' snapped real-life Sophie. 'Where's it going to end?'

They had been arguing for almost half an hour. Billy understood that his partner was very worried about her mother, but it was his newly upgraded VA that was the target of her anger.

'You've started to talk to her as if she were real – and that's the way she talks back. Do you think that's healthy? Sometimes I hardly see you from one day to the next, but now you can talk to her all day long, can't you? You won't need me.'

'I only got the upgrade this morning,' protested Billy. 'I'll give her another voice if you like.'

They were on the A7, speeding south to Aix-en-Provence.

'I suppose you'll give her Julie's voice,' fumed Sophie.

That was a low blow. Julie had been Billy's previous girlfriend. She had dumped him for a rapidly rising tennis player a few months before he had met Sophie – and his current partner always accused him of still being in love with his ex.

'Road works coming up,' announced Speedy. 'It's manual control for the next ten kilometres.'

Reading the emotions of the humans in the car, VA Sophie said nothing.

\* \* \*

'Sophie's on her way,' Roger told his wife. 'Billy's driving her down. She'll be here soon.'

Hélène had been brought gently back to consciousness so the anaesthetist could judge the correct level of sedation to administer for the operation. Hélène blinked



her understanding to Roger. She couldn't move her head or say anything; she was encased in a rigid skeletal protection suit that prevented all movement.

'We'll take her in now,' said the anaesthetist, and she nodded for a hospital porter to move the bed.

Roger reached into the cage and touched his wife's hand.

'I love you,' he told her. 'I'll see you later.'

\* \* \*

'I DON'T CARE WHAT YOU DO!' screamed Sophie. 'Once we make sure Maman's OK you can just disappear into the sunset with your damned VA!'

Billy was driving much too fast through the road works, but he was constantly being held up by cars that were slow to pull over, despite his frantically flashing headlights. And Sophie's anger was now boiling over. He knew that she was worried about her mother, but this row was spiralling out of control. Suddenly Billy saw flashing blue lights in his rear view mirror and his heart sank. He had been so engaged with driving – and with arguing – that he hadn't kept an eye on the road behind him. He slowed and pulled over, turned the car engine off and watched as two gendarmes climbed out of their vehicles.

'I'll handle this,' said Billy.

'No let me,' insisted Sophie. 'It's my mother.'

\* \* \*

Although promoted and harmonized across national borders by the Department of the Road Traffic Commissioner of the European Union, the day-to-day operation of the road management networks in member states remained under national control. The two officers of the Gendarmerie Nationale – technically a division of the French military rather than the police – had listened sceptically as Sophie, and then Billy, had explained their reasons for speeding. The officers not only had recordings of speeding offences stretching over a distance of 12

kilometres, they also had images of six other traffic violations Billy had committed as he had weaved his way through the traffic .

‘We should confiscate your licence immediately,’ the older gendarme had warned him.

Then Sophie showed them the DPR model of her mother’s spine, pointing out the crushed vertebrae and emphasizing again why only she could provide blood for her mother’s transfusions. The reality of the three-dimensional model seemed to change something in both of the officers. The senior gendarme told Billy and Sophie to wait in their vehicle and the pair watched anxiously in the rear view mirror as the policemen discussed the case.

Then Billy saw both officers talking on the networks.

\* \* \*

‘Her blood pressure is eighty over thirty. She needs blood,’ said the anaesthetist. The orthopaedic surgeon raised his head, flipped back the electronic magnifying lenses from his eyes and glanced at the monitors at the head of the operating table. There was still a lot of work to do before he could reveal the spinal column itself. Each fragment of bone had to be carefully removed and accounted for, and there were many small fragments. The jet ski must have been travelling very fast when it cut across his patient’s back.

‘OK. Give her a half litre,’ the surgeon instructed, aware as he did so that he was creating a new problem, one that could seriously damage his patient’s prospects for recovery.

\* \* \*

In the holiday season, progress along the coastal A8 autoroute that runs west to east, parallel to the Mediterranean seashore, is exceptionally slow. There are only a few sections on which traffic is guided by networked computer systems and

much of the route runs through busy seaside resorts. While making their estimates of the travelling time, VA Sophie and Speedy had allowed for this being the slowest part of the journey – all of the historical traffic data suggested that this stretch of road might take two hours on its own. But now they were speeding along the A8 at over 100 kilometres an hour! They were following the police vehicle that had stopped them outside Aix-en-Provence – and following them with their Audi being driven under computer control.

The gendarmes had checked their story with the accident room at the Hôpital Saint-Roch and, having gained confirmation of Sophie's explanation, and clearance from their own police control room, they had told the anxious pair that they would escort them all of the way down to the hospital in Nice. On the computer-managed sections of the autoroutes, the gendarmes used their police traffic-management over-ride codes to navigate clear sections of road at up to 180 kph. But here the traffic was dense. Up ahead the flashing blue lights and the klaxons of the police vehicle cleared slower traffic out of the way like a farmer scattering turkeys, and Speedy was locked onto the police vehicle's control system to make sure that Billy's Audi remained precisely two metres behind the police vehicle at all times – as instructed. Here and there the traffic was so bad that the police vehicle and Billy's Audi had to cross into the oncoming lane to steer around stationary traffic. As they approached Antibes, normally the busiest stretch of the A8, Billy pointed to a traffic junction. A local gendarme was holding traffic up until they passed! Then they started to see police holding up traffic at every junction they passed. They were being given the equivalent of a presidential escort to their destination.

'Sixteen kilometres to Nice,' announced VA Sophie, as Speedy concentrated on staying precisely two metres behind the rear bumper of the police car.

\* \* \*

'Her temperature's rising,' said the anaesthetist. 'It's almost forty.'

'How's the BP?' asked the surgeon, without raising his head from his patient's back.

'It's improved a little. Eighty-five over forty-two.'

The surgeon straightened up from his patient and a nurse stepped in to wipe his brow. Despite the airconditioning in the operating room, surgeons always seemed to perspire freely as they worked. It was a symptom of their intense concentration.

'I don't want to give her any more blood,' he instructed the head surgery nurse. 'We'll try and complete without. Continue with the saline.'

The operating room telephone rang. The senior nurse lifted the sterile-wrapped handset.

'Her daughter's arrived,' the nurse told her colleagues. 'They're taking blood from her now. But they'll have to process it.'

The surgeon shook his head. He knew that scanning a blood sample for infections and then sterilising it would take half-an-hour.

'Tell them not to bother,' he ordered. 'I want it in here now.'

\* \* \*

Billy had been shown into a bare waiting room with four chairs, a table and an old vending machine. As he sat at the table he munched on a chocolate bar he had bought from the battered machine. Neither he nor Sophie had had any lunch, and the only time they had stopped during their high-speed dash southwards had been when they had both needed a toilet break. Like all of the new generation of hydrogen-powered vehicles, Billy's Audi didn't need to recharge its hydrogen tanks more than once every 2,000 kilometres.

'We were lucky with those gendarmes,' said VA Sophie in his ear. 'Their escort must have saved us over an hour.'

Billy nodded, then he allowed himself a wry smile; he was getting used to having VA Sophie as his intimate companion.

'I shouldn't worry too much about Sophie's jealousy,' said VA Sophie, as if she had read his mind. 'I think it was just that she was worried about her mother.'

Billy nodded again. Then he glanced at an old clock on the wall. It was nearly 10 pm. They had arrived at the hospital three hours before and he hadn't seen his girlfriend since they had rushed her away to give blood. The nurse who had shown him into this waiting room had explained that the doctors would probably keep Sophie in a bed on stand-by to give more blood for as long as the surgery took.

'What time did they take Sophie's mother in for surgery?' Billy asked.

'About four,' said VA Sophie. 'It can't be much longer.'

Billy rose and opened a door which led onto a white-painted corridor just as his girlfriend walked around the corner.

'She's out of surgery,' said Sophie in a rush as Billy stepped forward and put his arms around her. 'She's OK, but they won't know for a while if there's any...'

Billy held his girlfriend away from him by her arms and gazed enquiringly into her face.

'If there's any paralysis,' said Sophie, completing the difficult sentence. Suddenly she put her hand to her forehead and he felt her stagger.

Billy led her gently back into the waiting room and helped her into a chair.

'They took more than a litre of blood,' explained Sophie. 'They wanted me to rest for another hour, but I didn't have my portable to let you know what was happening. I think I left it in the car.'

Billy knew she didn't have her old phone with her – he had tried calling her on the device several times.

'I'll get you something to eat,' said Billy as he crossed the room. 'The café's shut, so there's only crisps or chocolate bars.'

\* \* \*

Billy Becker touched his ID to the front door lock of his apartment and pushed the door open. It was Friday evening and the end of a long week. Fourteen days had passed since he and Sophie had undertaken their frantic drive southwards – and he had just received a warm and grateful call of thanks from Hélène. The

patient was out of hospital – and had taken her first few unaided steps.

‘Sophie?’ called out Billy as he gave his backpack to Paul the butler-bot. ‘Where are you?’

‘She knows you’re coming,’ said the other Sophie in his inner ear. Billy had called ahead when he left the studio.

At that moment the biological Sophie appeared in the kitchen doorway. Her long blonde hair was pinned up, she was dressed in the pink tracksuit she liked to wear around the flat and she was carrying two glasses of champagne. Billy noticed that she too was now wearing some very stylish network spectacles.

‘Great news about Maman,’ she said with a huge smile as she padded across the wooden floor towards Billy. ‘She’s walking!’

Still holding the two glasses, she raised her face up for a kiss. Billy took her face in both hands and kissed her slowly and with increasing diligence. Sophie pulled away with a smile to catch her breath. Then she handed him one of the glasses. ‘Here’s to Maman – and she’s going to call you. To thank you for everything you did.’

‘She already did,’ said Billy, chinking glasses with his girlfriend. ‘She looks and sounds just like her old self.’

They sipped their wine, then Sophie put her head on one side and gazed up at her cool partner. His light-sensitive glasses were also very fashionable.

‘I want you to meet someone, Billy,’ she said, adjusting her new spectacles. ‘I popped into the tech-centre today. I’ve upgraded my system – and my new VA is so much more helpful and intimate than my old system.’

Sophie turned her beautiful face to one side to reveal a small diamond in her ear.

‘Very nice,’ said Billy as he gazed at her ear and the soft skin of her neck. ‘But I can’t see any difference from your old earrings.’

‘You’re not supposed to,’ said virtual Sophie in his inner ear with a tut of annoyance at Billy’s stupidity. ‘Kiss her there.’

Billy did as he was told and biological Sophie’s free arm stole round his neck for another kiss on the lips. He felt her soft body warm against his and he felt a sudden surge of desire.

‘I’ve called my new VA Billy,’ said Sophie stepping back with a smile. ‘Would you like to say hello to him?’

Billy considered for a moment and then smiled. With a nod he instructed VA Sophie to enable inter-VA communication.

‘This is Billy, Billy,’ said real Sophie, speaking via the magic of personal nets, as if she too were now in his head, alongside virtual Sophie.

‘Good to meet you, man,’ said Sophie’s virtual Billy. ‘She’s really been looking forward to you getting home.’

The real Billy burst out laughing. Sophie had not only given her VA the same name as him, she had turned the tables on him by giving the software personality a precise copy of Billy’s own voice.

‘That’s my voice exactly,’ said Billy gazing at Sophie.

‘We sampled a lot of recordings to get that,’ said real Sophie with a laugh, ‘but I think Billy’s already got it down.’

‘I hope you approve?’ asked virtual Billy in real Billy’s inner ear.

Suddenly a petulant voice broke in. ‘Excuse me,’ said virtual Sophie. ‘Aren’t you going to introduce me to Billy?’

With a glance of amusement the two humans simultaneously muted their virtual assistants. Billy stepped forward, took the glass from Sophie’s hand and set it down with his own on a low side table. Then he picked her up in his arms and without saying a word strode purposefully towards their bedroom.

Sensing that the room was now empty of humans, Paul began to carefully clear away the champagne glasses.

More information on  
robotics and intelligent sensors

<http://www.youtube.com/watch?v=Vq08egobDCI>

<http://personalrobotics.intel-research.net/videos.php>

<http://www.youtube.com/watch?v=c2sro8CrB0g>

<http://www.seattle.intel-research.net/robotics/>





„*The Drop*“



## **THE DROP**

This morning my metabolic age was 28.

It's gone five and I'm running along the seafront. To my left the amusement arcades are flickering into life. On my right, the sea, with swirls of pink and grey sky above it. I'm keeping a steady nine minute/mile pace and my GSRcx says I am not emotionally stressed at all, which is a miracle given the fact that earlier today I walked out of my job because of a salad. My heart rate is probably around 70bpm, but I wouldn't know; I never look at it. My heart rate gives me the heebie-jeebies. What I like knowing is my pace, my stress level, and the distance I've covered. I don't like looking at the air quality screen. It's bound to be good by the sea, and with all the improvements to the network, but I wouldn't want to freak out if it wasn't. I'm listening to Portishead.

The English Channel is like a bathtub with water that slops around as if a whole family was constantly taking turns in it. My GSRcx tells me that a 32mph wind is coming from the SSE and I can feel it pushing me along, faster than a nine minute/mile pace now. Cars pass by on the road running along the embankment. All cars are on the network now. People seem to like it. This means that most of the cars in the town are blue at the moment. There is one red car and two grey cars, obviously driving out of town. I wonder where they are going. My brother Danny loves watching the sped-up satellite view of the cars on the network, and the kaleidoscopic patterns they make. He'd do it all the time if he didn't also have to practice on the Mindflex III. He says you can see special things in the network, but he won't say what they are. It is oddly beautiful, although I've never watched it for very long.

I reach the end of the embankment and turn. My pace drops immediately. A strong headwind has the same effect on my speed as a hill, although to be hon-

est I'd rather have the wind. Maybe it's just what I'm used to, living at sea-level. I'm not the only one struggling. On the sea, there are four guys in a racing boat, their backs to the wind, rowing hard. Two of them seem to be doing all the work. I don't know why the other two don't join in. I've never understood the rules of rowing. The tide is up, and so they are close enough that I can just about see their expressions. I don't know whether or not to smile, so I look away. I smile at other runners, usually. I keep going. So does the boat. The two men are still struggling. I see one of them glance at me again. He's got curly dark hair and a green top. I keep running.

After about a quarter of a mile, I notice something. I'm going at roughly the same pace as the boat. It's still alongside me. The dark-haired guy glances at me, and I glance back at him. We glance again, and again, and without anyone saying or doing anything I realise we are now in a race. Is it fair? I don't know. One against two isn't fair. Then again, they're going against the current and the wind. All I have against me is the wind. I increase my pace. I've got a battered old iPod Shuffle that has been customised to choose songs according to my stride length. Now it chooses Blur. My stress level increases slightly, and I can feel my heart-rate pick up. It really is absurd for me to try to race a boat being rowed by two men. But maybe it's not a race at all. Perhaps I misunderstood the glances. Could it just be that there is one runner and one boat out in the greying evening and one will reach the pier first and that's all there is to it?

But I want to reach the pier first.

The way to do this is not to kick too early. If they realise I'm racing them, like really racing them, and that I've taken the lead, they may gain too much momentum. Better for them to think I'm struggling to keep up for now. Also, this is supposed to be an easy run and I'd be mad to race. The seafront five-miler is now less than a week away and I am tapering, like my new book told me to. But I keep glancing over, and they keep glancing over, and then they speed up, and then I speed up to match them, and then the guy with the curly hair smiles and says something to his friend and points at me. They increase their pace again. I match them. When the pier is about 200 metres away I drop them and sprint to a finish. I can see that I've left them a long way behind. I guess they weren't racing

after all. I slow to an easy pace and keep going, pretending that I was just doing a fartlek or something. Then my GSRcx beeps. Not another mile already? No. A message. You won. Fancy a rematch sometime? Theo.

When I get home everything looks almost normal but not quite. Mum's on the bike as usual, eating butteries. Gab is on her dance pad and Danny's trying to make his foam ball go through a maze I haven't seen before. Dad is virtualy-touring somewhere that looks like another mountain on the back wall. But something isn't right. For one thing, no one has changed the wallpaper today. It's the same Mediterranean Afternoon scheme it was yesterday. And the other screens are all off. The Takahashi family aren't even on anyone's Box, as far as I can make out. That's pretty weird. Even I want to know whether Aki will get off with Bunko, and whether Mrs. Takahashi has lost another pound.

'Hello, dear,' says my mother. 'Where have you been.'

She knows where I've been. She never calls me 'dear'. She has given every word in her sentences exactly the same stress, like an ancient satellite navigation system. Gab looks up into the corner of the room and says: 'My sister, Agnes, returning from her daily run, which generates literally like NO energy for the household.' I look at Danny. His ball stops floating and falls behind a red foam wall.

'We got a hit,' he says. 'At about two o'clock. Since then we've had twenty-five. About twenty of them are still watching.'

'Seriously? Watching us now?'

I get my towel and start rubbing my face with it.

Gab says to the corner, 'My sister Agnes is 32 but she still lives at home. It is truly tragic, ladies and gentlemen. She has had ONE boyfriend in her whole ENTIRE life and when he dumped her she decided she would never love again and so she spends all her free time ALONE, pounding the pavement, building OFFPUTTING muscles...'

'Gabriele,' says my mother, slowly and loudly. 'You know that is not true. Agnes is a very hard working and brave young woman with a master's in philosophy who is saving up all her hard-earned money to start her own restaurant. Perhaps Agnes will show us a recipe later. We could all learn how to make these delicious

butteries.' She picks up the plate like someone off a shopping channel but carries on pedalling the bike. Butteries are made of lard, flour and water. They are the secret to making a profit from generating electricity, Mum says. I do make them for her, but I don't like doing it. Lard freaks me out.

'They think it'll pay for the holiday,' Danny says to me.

'Jesus.'

'Dad is trying to be boring so they'll all go away.'

I look at Dad; his eyes are following a trail that looks exactly the same as it did two minutes ago. He wears hiking boots most of the time.

'Does he even know?'

Danny shakes his head and smiles. 'There's bath water, by the way,' he says.

'Who's had it?'

'Gab, then me.'

'Did you pee in it?'

'No.'

After my bath I go to my room and upload my stats for today's run. I hit just under a six minute/mile pace on my sprint finish. That's slower than an elite athlete's marathon pace. But it's good for me, and was enough to beat Theo and his friends. Emotionally, things were pretty good while I was running: I was on about a 1.5 until the race. But my stats for the rest of the day aren't so good. I'm still waiting for my phone to ring and for Ursula, the owner of the Marshall Hotel, to offer me my job back. I'm waiting for her to ring and tell me that Paul has been sacked, or walked out, and that the head chef job is all mine.

That afternoon I was peeling eggs, which is one of the worst jobs in the kitchen, because the top layer of skin on your fingers gets sliced by the shells and you end up looking like you've got a weird dermatological condition. It's odd that it happened today, because I'd decided to really try to make things easier in the kitchen. Paul and I both knew that the other staff didn't like the arguments, because they were always leaving. Last week Ty left, and now we have a new girl: Rachel. Even though it was obvious to anyone that I was always right (wanting to give smaller portions because so much got sent back; wanting to use butter instead of mar-

garine; wanting to make real stock for soups) and Paul was always wrong (not throwing away wilted lettuce; putting sugar on tomatoes; using packet gravy; always watching real time amateur car races on the big screen behind the stove) somewhere along the line this had stopped mattering and we had become 'those two who are always at each other's throats'. Anyway, there I was peeling the eggs when he came over and slammed an aluminium bowl of salad down in front of me.

'What the fuck is this?'

'Er, salad?'

'Don't start.'

'I'm not. I really don't know what you mean.'

'Why have you put dressing on after I explicitly told you not to?'

'Excuse me? Explicitly? Told me? You're not my boss.'

'Just tell me why.'

'Oh my God. You are so infuriating. I didn't dress it. I know you think the customers want bland food. Why would I do something so normal as make salad dressing?'

Rachel came over from the washing up. 'I did it,' she said. 'We always dressed the salads in the Blue Moon.'

'See,' I said. At this point, my stress levels were peaking like well-whipped cream. We never whip cream in the hotel kitchen, though. We get it out of a spray can. Rachel sighed. 'I had to go out and get some balsamic, though, because I couldn't find any here. I kept the receipt.' She started pressing buttons on her Box to bring it up.

Paul rubbed his eyes. 'You kept the receipt.'

Rachel looked at me and I frowned.

'You kept the fucking receipt,' Paul said again.

'Paul,' I said.

'First of all,' he said to Rachel, 'it will come out of your wages. But second of all, you're sacked. Go and get your things.'

'This is ridiculous,' I said. 'You can't sack someone for buying balsamic vinegar.'

'We. Are. On. A. Budget.'



Rachel was already getting her coat.

'If she goes, I go,' I said.

She went, and so did I. It took a lot of running before I felt OK.

In my bedroom now I try to bring up Theo's message on my GSRcx but I can't find it. I didn't know you could get messages on it, and I've got no way of sending one back. It's just a small watch with no character keys, only buttons for 'stop', 'start' and 'menu'. I try 'menu' to see if there's some option I didn't know about, but there isn't. I'd assumed that the curly-haired guy had sent the message, but he was rowing. It could have been any of them. Maybe I imagined it: after all, it's not there now.

In the olden days, the arcades on the seafront looked as if they were made from melted jelly babies: bright yellow, pink, blue and red. Now they are the colours of the dusty, organic sweets I eat during my long runs: lavender, teal, eggshell, algae. It's all about the lightbulbs: they're not neon anymore, but unlike neon they will last for a thousand years before they have to be changed. It's pretty optimistic of this place to have chosen them. It has always looked as if it might not be here next month, let alone next millennium. It has no wallpaper, and no discernible layout, either. There's the table for the MD&D games in one corner, with an old carousel horse propped up next to it, and then a truly random selection of machines from every period in the entire history of arcade games vaguely lining the walls. The owner, George, stands in a little booth all evening making piles of change and watching the Takahashi family. Everyone watches the Takahashi family. They have something like fifty million hits every day. A few years ago they became so rich from this that they had a castle built just outside Tokyo. People like their life in the castle even more than the one in the apartment, because they are always having arguments over who spilled the champagne, and they keep buying expensive puppies.

As far as I can make out, the only people who come to this arcade are Danny and his friends, and some older kids who very occasionally abandon the air hockey on the pier and bring their girlfriends to play on the dancing simulations. Then there's the Pumpkin Man. The Pumpkin Man carries a pumpkin with him all

year round. No one knows why. By August it's really shrivelled, and then when the season starts again he gets a new one. He only ever goes on the skiing simulation. He's there almost all the time, with his pumpkin on top of the machine while his legs go backwards and forwards. George lets him do it for free, I think, because he's got the machine wired up to a generator. While the girls are between dances they sometimes go over and try to make conversation with the Pumpkin Man. One time they stole his pumpkin but Jerry from the pier made them bring it back.

Danny is only allowed to go to the seafront if I go with him, but his friends must not know this, and the older kids especially must not know this, so I have to feign an addiction to the cheapest game and play it, without making eye-contact with Danny, for an hour or more each night. Manic Mechanic is a ZX Spectrum game from the 1980s. George picked up an arcade version in a boot sale in the early 2000s. You get five games for ten cents, which works for me, just about. I keep ten cent pieces in a jar in my room for this purpose, although I'm aware that soon Danny will be old enough to go out on his own and I'll never play Manic Mechanic again.

Danny and his friends never touch any of the arcade machines. They play MD&D games: it is their purpose in life, although I think that Danny actually prefers watching cars on the network in peace at home. The MD&D table is a bit like old AD&D tables, except that it has a screen in the centre of it. Instead of battling using dice, you have to battle using your mind. The graphics are a bit old-school, but that's not the point. When it's time for a battle to take place, the characters appear on screen and take it in turns to choose what to do: cast a spell, use a potion, make an attack. According to Danny, it's very hard to transmit these choices with your mind, but with all the practice on Mindflex III he's getting pretty good at it. The games firm across the bay, Factors, makes mind-control games, and sometimes there are beta versions of things to try out, because George knows someone who knows someone. One of the founders of Factors worked on the original programme of mind-control with coma patients. In those days there were no simple headsets: the patients would be put into an MRI scanner and asked questions. They were told to think of playing tennis if the answer

was yes, and to not think of playing tennis if the answer was no. When asked if they wanted to carry on living, everyone thought of playing tennis.

Lately Ash has been getting killed a lot in the MD&D game. When he gets killed he comes over to talk to me while whoever is on his team tries to find a Phoenix Down to revive him. He doesn't seem to care that much. Although he is only 12, he has a little moustache growing, and he always asks how my day went, as if we were married. It's quite good, because when he comes over to chat I can plausibly stop playing Manic Mechanic and therefore save some money.

'How was your day?' he asks.

'Not so good. How was yours?'

'I built a mind-controlled car in electronics and it worked. Sort of.'

'That's amazing. Well done.'

Ash is in the middle of a long explanation of how he did this when my GSRcx bleeps.

'What was that?' he says. In a world where everything bleeps, and in a room within that world where everything bleeps all the time, it's odd that he's noticed it. Maybe it was my reaction. The GSRcx only bleeps when I complete a new lap when I'm running. You can set it to bleep when your stress levels go too high, or if the air pollution gets too bad, but I never did that. So why is it bleeping now?

'It's this,' I say to Ash, waving my wrist at him.

'Yeah, what is that thing?'

'It's for when I run. It tells me my pace and stuff.'

'Like how fast you're going?'

'Yeah.'

'Doesn't your Box do that? Mine does.'

'Yeah, I guess so. But mine's like 300 grams and I'd have to strap it to my arm. I prefer having this.' I don't tell him about the galvanic skin response detector that tells me how relaxed I am when I run. 'Anyway, I like having a few different devices that do different things. It reminds me of my childhood.'

'Yeah, but like the whole point of the Box is so you can have everything in one. You're not supposed to need anything else. Mine's got an analogue volume control on it. And a tuner. I like the way you can rebuild them the way you want. I'm

sure you could make it do everything your watch does.'

'Maybe. I actually still have an iPod Shuffle as well,' I say, smiling.

Ash shakes his head. 'You're beyond help.'

'Well, talking of help... Do you have any idea how you'd send a message with this?' I wave my wrist at him again.

'With a watch?'

'Yeah.'

'Er, you don't even try, and send it with your Box instead, like a normal person?' I sigh. 'What if you had no Box, or...' I search for something more likely. 'What if you'd dropped your Box in the sea? Could you in theory send a message from something like this?'

Ash frowns. 'I don't know. Let's have a look.'

He spends the next 30 seconds pressing all the buttons in different orders.

'It says that someone called Theo is in range. That's what the bleep was telling you. What's he? Like a training partner or something? This does that, right? Hooks you up with other runners in range?'

I can feel my stress-level go up to about 3.8.

'I think so. I've never known what "in range" actually means.'

Ash shrugs. 'Like probably within a hundred metres or something.'

He presses some more buttons, mumbling to himself. 'Oh, I see. So he must have transferred this to you and then – oh, right – a patch and wow this is kind of wacky. I've never seen... Oh where's it gone? Oh. Aha. Now it all makes sense.'

While he does this, I wander over to the window and look out. Is Theo out there somewhere? Which of the rowers will he be? I want him to be the curly-haired one and I want this not to be a joke. Is that so much to ask? But no one is out on the seafront. I go back to Ash.

He gives my GSRcx back to me. 'How good are you at mind control?'

'What do you mean?'

'He's sent you some software. I've got it on my Box but I can't do it. It's really hard.'

'What kind of software?'

'Give me your Box.'

‘OK.’ I give it to him.

‘There. I’ve sent you the software, the manual, and the Wiki. Good luck.’

The way it works is this: there’s a mind-control alphabet. I wonder what my philosophy lecturers would make of it. A is apple. B is ball. C is cat. D is dog. X is xylophone. Z is zebra (apparently ‘zoo’ is too nebulous). It’s just like when you’re a kid learning to read. Each letter has a concrete noun to go with it. Apparently these concrete nouns are so fundamental and archetypal that everyone thinks them the same way. Each has a definite shape. When I think ‘apple’ and when you think ‘apple’, our brains do almost exactly the same thing. So, if you can summon up a picture of the noun in your mind, and therefore make your brainwaves into a recognisable shape, a compatible device will type the letter that goes with it. The principle is a bit like the phonetic alphabet – Alpha, Bravo, Charlie, Delta etc. – but with words that are easy to think, rather than say. I put down my Box. Even I agree with Ash on this one. Why not just use a keyboard? The Wiki included hard-to-believe stories of people who have become so fast at this that they prefer it to typing. It seems pretty weird to me. I can’t find anything about punctuation, except that you can get a full-stop by thinking of a hole. I go downstairs to find Danny.

Things are back to normal, which is something, although this means that everyone except Dad and Danny is watching the Takahashi family. Mum is still pedalling, but Gab is now curled up in her blanket, eating a huge bar of milk chocolate. Grandma has come down too, it seems just to make sucking noises at Aki when she decides to wear a super-short shirt to meet Bunko. Dad is virtual-fell-running on the treadmill, with a plate of butteries beside him. Danny is in the kitchen, where he has tuned the back wall into the UK car network. I watch for a few seconds. There is definitely something magical about it. It still slightly chokes me up that every car owner in the country (give or take) lets the network choose the colour of their car at any given moment, especially when it must be so tempting to just choose it yourself. It means that you do see beautiful patterns, as what begins as several multicolour jumbles in the big cities and towns gradually begins to make sense. Although the colour-scheme changes every day, it could

be that light blue cars are going to Aberdeen and dark blue cars to Edinburgh. Yellow cars might be going to Thanet, and white ones to Brighton. Cars are programmed to take the most efficient route, based on the traffic situation at any given time. But eventually, all the red cars end up together, and all the blue ones, and all the black ones, however impossible the jumble looks at the beginning. Network theorists are always glued to the images, along with autistic children, teething babies, Alzheimic old people, stoned students and fortune tellers.

'I heard,' says Danny, 'that sometimes the network sends people to the wrong place, not because the system has malfunctioned, but simply because it wants symmetry and beauty.'

'Don't people get pissed off?'

'No. Not at all. Apparently when it happens to people they can see it, or feel it – or something. It's like being part of a big dance, and people realise they are creating a unique pattern with the other dancers. That's one theory. Another says that there are patterns in everything – like in the I-Ching – and no one goes to the wrong place at all. They say it's completely unpredictable, like the game of Life, and evolution, but when you speed it up you see things that seem like they were meant to be there all along.'

'By 'game of Life', do you just mean living?'

'No you dummy. The game of Life. John Horton Conway. Look it up.'

I watch the network. Somewhere in the Midlands there is something like a 'T' shape. Then a love-heart surges behind it. How is that possible? I shiver.

'Have you got a spare headset?' I ask him.

'Hmm?'

'Like a mind control thingy?'

'What are you up to?'

'Nothing. But have you got one?'

'Sure. In the basket in my room. What are you using it for? Is it a secret?'

'No. But it's too complicated to explain. By the way, what happened to all those hits from before?'

'All gone. No one's watching us now. I think Gab and Mum put them off.'

'Good. I was worried we'd become a cult phenomenon or something.'

‘No danger of that. We’re too normal.’

‘God. If this is normal...’

‘Don’t think about it. Oh – my room smells, apparently. Gab was moaning.’

‘That’s OK.’

When? In order to send this message to Theo I have to think the images wheel, house, egg and nut. There’s no question mark, though. I’ve practiced on my Box and have successfully sent this message to myself several times. It takes ages, though, because nut is harder to think than you might assume. I have more luck imagining a huge peanut than I do with, say a hazelnut. But what is an archetypal nut? Anyway, I’m actually amazed that it works at all. But I have to wait until Theo is in range before I can send it to him. And then I’ll have to be quick. The headset is smaller than any I have used before. It slips behind your ear like half a hearing-aid. It’s so comfortable I almost fall asleep with it on.

The next day I’m in the cafe on the pier when Ursula rings. I’m waiting for Theo to come within range, my theory being that everyone walks past the pier at some point. But there have been no bleeps so far. Still, I’ve been having fun learning how to operate my GSRcx with my mind. From the main screen you only have to think ‘moon’ and the menu pops up. From there you think ‘star’ and you get your stats. I find it very bizarre that an archetypal star has several points, and is silver. Real stars... Well, who knows?

Ursula sounds tired. ‘Agnes,’ she says. ‘Why now? We’ve got all the Halloween bookings next week, and then it’s going to be Christmas.’

‘I don’t know. I think I’ve just had enough.’

I should be pleased that she’s phoned me. But instead, as I speak, I’m thinking iceberg, volcano, egg, house, apple, dog, egg, nut, orange, unicorn, girl, house. When I was a student and I’d been overworking I sometimes used to lie in bed imagining my fingers typing my thoughts. This is similar. Once you start thinking of words as a collection of pictures it becomes sort of addictive. In some languages this must come very naturally, because words are made up of pictures anyway. I imagine Aki Takahashi sending Bunko a secret message with her mind,

full of symbols of trees.

'Are you going to come back?' Ursula asks.

'I don't know. I need the money, but...'

'Look, I know that you and Paul don't get along.'

'It's not as simple as that.'

She sighs. 'Yes, he says that too.'

'We just don't really share the same vision. I'm always having ideas for new menus and he won't even listen to them. I've costed them, and they're not more expensive than the current menu. And, for example, having linen tablecloths and napkins would eventually be more cost-effective than the paper ones, and...'

'And how do you think Jack would react to linen napkins?'

Jack is an ex-fisherman who comes in the Marshall every evening at exactly six o'clock. He orders pie and chips (frozen pastry; oven chips) and a bottle of cheap house red and sits there watching sport with his Box propped up against the ketchup bottle. At exactly half-past six he finishes his bottle of wine and orders another one. Half an hour later he's asleep. One of the first jobs you're likely to get at the Marshall is to wake Jack at the end of the evening. When you wake him, he always says, 'I swear it's the truth,' in an agonised voice, and then slowly drifts home to his cottage on the seafront.

'What do you mean?' I say.

'The Marshall is all about customers like Jack,' Ursula says. 'You may not like it. I may not like it. I'm not even sure Paul likes it. But the fact is that Paul caters for Jack and you don't want to. I'm beginning to wonder whether you think you're above him.'

'Maybe Jack would prefer linen napkins. Has anyone ever asked him?'

For some reason I imagine him lying there asleep with one of them over his head. And I also think nut, apple, penguin, key, iceberg, nut.

'Look,' says Ursula. 'I can probably hold off advertising your job until next week. If you want to come back you'll need to have a proper conversation with Paul. I know he's keen to start afresh. I'm just not so sure you are.'

My GSRcx beeps.

'OK. Well, thanks. I'll think about it.'



‘Let me know what you decide.’

I put down my Box and look at my GSRcx. Theo is in range, it says. I bring up the new software and start transmitting my message. Wheel, house, egg, nut. I still don’t know how to do a question mark.

Then I go and buy another coffee, thinking that by the time I’ve done that he will have replied. After ten minutes I decide he’s not interested. Then I start imagining him coming in here, tousled and breathless and pleased to have found me. Then I check my GSRcx to see if the message definitely went through. Then I consider sending it again. Then I decide I’m bonkers. I’m not in the mood for the Takahashi family just now, but I manage to find a marathon taking place in Scotland and watch the leading elite women struggling to finish in under 2 hours 10. Then I download a new running book that claims to teach you how to run with your core rather than your legs. But it’s hard to read when you’re constantly watching the door, and glancing at your GSRcx. I wonder if Theo’s having trouble sending a message. I should have given him the number of my Box. Perhaps he’s sending me his. Another fifteen minutes passes. I read about the importance of relaxing your ankles.

Just over an hour later there’s a bleep. It’s Theo. He’s sent a message.

Are you doing the seafront run on Sunday?

I send back: Yacht, egg, star.

Great. Last one to finish buys the drinks?

Orange, Key.

At home, Gab is still wrapped up in her blanket, still eating milk chocolate.

‘Why isn’t she dancing?’ I ask Danny.

‘Biggest loser competition coming up.’

‘Oh. I see.’

Every year the town has a competition for the person who can lose the most weight in two weeks. Gab came second last year. Her strategy is to pile on the weight before the competition starts, drink three litres of water before the weigh-in and then live on dry bread and dance for the duration. I can’t imagine that this has been approved by Mum. But...

'If she wins, I guess the holiday will be in the bag?'

'Yep.' Danny frowns. 'The prize is like a grand.'

'What's wrong?'

'I don't want to go.'

'Why?'

'Flying. It can't be natural.'

'You know, when I was growing up, people flew all the time. You flew, as well, although you probably don't remember. People flew to Scotland. Imagine that.'

'Really?'

'Yeah. Of course there was no virtual travel then. Literally everybody who went on holiday flew somewhere. Well, almost everybody. And there was no network, and cars could still crash. It was safer to fly. I mean, it's still safe to fly. You'll be OK.'

'I don't know...'

'Imagine the view of the network you'll get from a plane.'

'I suppose.'

'And think of the amazing virtual travel experiences people will be able to have when you get back, all because you were brave and actually went and did it.'

'Yeah.' He frowns. 'And all that money we'll make.'

Before bed I whip up a batch of butteries for Mum and Dad. I try to do them in the shape of houses, oranges, penguins and eggs, but in the end some just look square and the others look a bit oblong.

The next day my metabolic age is 27.

It's crisp and bright on the seafront and my GSRcx says the temperature is 9 degrees Celsius. The wind is coming from the NE but it's only 7mph today: almost nothing. I'm wearing running tights and an old cotton t-shirt. Of course, I have several intelligent-fabric tops that would in many ways be a lot better than cotton. They'd keep me cool and dry, for one thing. But what it comes down to is this: I look better in cotton, and it doesn't smell as much. Going on a date after a run isn't ideal anyway, but what can you do? If it was raining I'd think again, but it isn't.

It's five minutes before the race starts and Theo still isn't in range. I've done my warm-up and gone for a pee. My stress level is 3.7: in the normal range for 'nervous' or 'excited'. Now I've just got to pretend that Theo doesn't exist and run my normal race. Not that I'm an expert. This is only the fifth race I've ever done in my life. I position myself towards the back of the pack and start stretching, even though stretching before running isn't meant to be a good idea. My stress level hits 3.8. Three minutes to go. My GSRcx bleeps. Theo is in range. I look around but I can't see him.

Good luck, he sends.

You too, I send back, almost quicker than I can think the words.

Then we're off. This is a flat race, so I have to make sure I don't start too slowly. But at the same time I must remember to run the first 2.5 miles conservatively so I can complete the second half of the race faster. My previous PB for five miles is 42:02. Not too bad for a relative beginner, but I think I can do better than that today. Once I'm away from the jumble of bodies in the pack and in my own space on the side of the path I automatically look at my pace. It's 09.17 at the moment. I need to speed up a bit, but I also can't afford to get tired early. My GSRcx bleeps.

What did you have for breakfast?

I smile, and then send: Porridge. You.

Sounds nice.

Oh dear. How do I do a question mark.

It's a hammer.

And apostrophes?

Ears.

So what did you have for breakfast?

Same as you. With blueberries. Where are you?

Towards the back. You?

Towards the front! You never told me your name.

It's Agnes.

Apple, girl, nut, egg, star. Sounds about right. The front is a long way away. But it doesn't really matter. Racing like this is completely different from racing a

boat going against the current. I'm never going to beat Theo if he's already at the front. I'm never going to win. But that's OK. All I really want is a new PB and, if I'm honest, a chance to see who Theo is. I also just love this: being in a group of people all going to the same place, as if we were all blue cars on the network. Everyone wants different things, and likes different books and music – but for now, we're all moving as one. We're all doing the same thing. My old iPod is playing me Elliott Smith, then the Pixies, Pavement and Bob Dylan. I go into a kind of running trance, until my GSRcx bleeps again.

What do you think is the most important thing in life?

I wasn't sure I knew the answer to this question, but I send back: Patterns. What about you?

Love.

I complete the race in 39:45. I'm exhausted when I finish, and I just manage to take my medal and drink the water that someone gives me before I collapse onto the grass. I close my eyes and slowly my breathing goes back to normal. I've resigned myself to the fact that he is going to be there when I open my eyes, and that I'm going to look terrible. I imagine his curly hair damp with sweat and his green top sticking to him in places. Mud on his ankles, perhaps. I imagine him passing me a beer, even though really I'm the one who should be buying the drinks. I lie there for a few minutes, and nothing happens. I open my eyes. There's no sign of Theo. Instead, there's a man of about my father's age, wearing jeans and an Intel-blue shirt. He's holding something that looks like a business card.

'Excuse me,' he says. 'I don't want to disturb you.'

'No, that's OK,' I say, sitting up.

'Are you Agnes?'

'Yes.'

He hands me the business card. It says Richard Mars. Head of R&D. Factors.

'There's a job for you if you want it. Mind Control games. You've got quite a talent, I hear.'

'Sorry? I don't understand...'

'The salary is pretty good, but we can negotiate that. There's some travel. Interested?'

Of course I am. But I find myself saying, 'I don't know.'  
He smiles. 'I'm sure you have lots of offers.'  
'It's not that. When do you need to know?'  
'Tomorrow by noon. You can start on Tuesday, if that suits you.'  
'And...' I sigh.  
'You'll be working with Theo. I believe you've met?'  
'Sort of.'

Now that I've got the proper software on my GSRcx I can upload the conversation I had with Theo during the race. I can't work out why he didn't hang around. Eventually, I stop looking at it and examine my stats instead. I should be really pleased with my race, but I feel a bit hollow. Why haven't I heard from Theo again? I said the most important thing in life is patterns. Maybe that put him off. Or maybe his job was over when I met Richard Mars.

I put my GSRcx back on and do some yoga breathing to get my stress level down to just over 1. Then I do an experiment: I think of the Marshall, then I think of Factors. They both take me up beyond 4. I do it again. Then I just let my mind drift over various other possibilities. If I could do anything, what would it be? I dream myself to sleep.

The next morning I look at my bank account. I add up everything I've got, for the first time taking into account my emergency fund and my backup emergency fund along with my savings. I do a few calculations. I look at estate agents. I look again. Then I go downstairs and find my mother. She's on the exercise bike as usual, half way through one of the butteries I made yesterday.

'You look whacked,' she says to me.

'Yeah. But in a good way, I think.'

'39:45,' she says. 'That's pretty good. I've told everyone.'

'It's not amazing, but I was pleased. I didn't say, but I got offered a job, as well.'

'Where?'

'Factors.'

'Seriously?'

'Yeah. But... I'm not going to take it. I think I've found a place on the seafront

for my restaurant. I'm going to do it, otherwise I never will. I don't know if that makes sense...'

My father looks over from his virtual fell-running.

'Pound the downhill,' he says, nodding. 'Then you can walk the uphill if you have to.'

'Are you sure this is the right decision?' Mum says.

'I've always wanted to do it so I think I should. Does that sound stupid?'

She smiles. 'Well, if we can help in any way...'

'Yeah, actually. I'm going to need to generate some electricity. So can you maybe go through your system again with me?'

Two months later I'm sitting in my restaurant on the seafront. I've called it The Drop. It's quite small – with a front section and a back section that together seat about 50 people. There's a lot of space upstairs, so as well as an office and a bedroom I've got a little sitting room and a big room that looks out over the sea. Eventually I'm going to make the big room into another dining space and host parties. But for now it's empty. I've done all my menus, and all my linen tablecloths and napkins are in the cupboard. The restaurant opens the day after tomorrow.

I'm just back from a run, breathing deeply and enjoying the stillness. Gab's coming later to help me choose the wallpaper and to have her last session learning how to send orders to the kitchen using the mind control system that Ash built. They all had a great time in Italy. Dad climbed some real mountains, and Danny has decided he wants to be a pilot. I pour myself a glass of wine and watch the sea. My GSRcx bleeps. Theo is in range, again. This happens several times a day. I can't make it stop, and I can't afford to get a new GSRcx. I haven't heard from Theo since the day of the race and I don't really want to think about him at all. And suddenly I don't even want to see that message any more. I want to move on.

How do I get rid of this software? I send to him.

You still have it. That's nice.

But how do I delete it?

You have to link it with your Box. I'll send instructions.

Thanks.

There's a pause for about five minutes. Then my GSRcx bleeps again.

Why didn't you hang around? he asks.

When?

After the race.

I did. You never showed. Then your boss offered me a job.

I was still running.

How is that possible?

I'm not a runner. I set off too fast and then everyone passed me. It took me an hour and ten minutes to finish.

I smile. I thought you'd headhunted me and then left when your job was done.

I thought you thought I was a loser.

I'm sorry.

Where are you?

In my restaurant. It's on the seafront, opposite where we raced. It's called The Drop.

Can I come and meet you now?

I think about this for almost too long.

Then I send: Sure.

About five minutes later, a tall guy with curly dark hair walks through the door, wearing a green t-shirt. We look at each other as if we are old friends who've bumped into one another by accident. Then I pour him some wine.

## Appendix

### The Mind Control Alphabet

A	apple
B	ball
C	cat
D	dog
E	egg
F	foot
G	girl
H	house
I	iceberg
J	jukebox
K	key
L	lobster
M	moon
N	nut
O	orange
P	penguin
Q	quilt
R	robot
S	star
T	table
U	unicorn
V	volcano
W	wheel
X	xylophone
Y	yacht
Z	zebra
Space	longboat
Full stop	hole
Question mark	hammer
Apostrophe	ear
Exclamation mark	clown



More information on  
fotonics

<http://newsroom.intel.com/docs/DOC-1132>

<http://www.youtube.com/watch?v=0U4Af2qmgFA>

<http://www.youtube.com/watch?v=U5HhRB2W-DA>

*„Augenblick“*  
*Translated by Howard Fine*



## **THE BLINK OF AN EYE**

Alexin leafed through the brochure. “In the beginning was the skin,” the cover proclaimed.

This was the maxim of Professor Wilhelm Zarger, for whom Zarger Industries were named. The group of companies had adopted his adage and added a catchy slogan: “In the beginning was the skin. Now there’s AI and Zarger Sensor Technology.”

Skin: one of the most natural sensors imaginable. It detects warmth, pressure, moisture, wind and quite a bit more of whatever the environment can let a human being encounter.

Alexin began to lean forward in his armchair, and the tiny built-in sensors reacted: his seat tipped slightly forward to make it easier for him to get up; then he walked into the living room.

The heat and motions of his body were detected, and although it was nighttime, lights went on and off so Alexin didn’t have to grope his way through a dark house. Doors automatically swung open, and when he entered the bathroom and stopped by the toilet, the cover hinged open almost silently; the height of the toilet seat adjusted automatically. Alexin didn’t waste time pushing buttons, flipping switches, opening drawers, etc.

The sensors that made life easier were already installed in his yard.

The moment Alexin came onto his property, he scarcely needed to lift a finger, except for preparing meals, at least as far as the cutting and stirring were concerned. Or changing his clothes. Or sitting on the toilet. Trivial details.

He had learned to control the house’s computer with his gaze and to give commands silently. Invisible cameras observed Alexin, every single motion, and the AI interpreted whether or not this human’s movement was meant as a command.

Even his eyes were monitored.

Especially his eyes....

One day, just for the fun of it, Alexin had calculated how many precious minutes he wasted on mundane minutiae, and he experienced an alarming realization: more than an hour each day was spent with switches, buttons, knobs, handles and the like.

He didn't want to continue wasting his time, so he began a career at Zarger and devoted himself to simplifying daily life. Adding up all the time he had saved over the past twenty years, he had gained almost a full year for additional potential activities. All thanks to the sensors.

But Alexin still felt inexpressibly tired.

He sat on the toilet and closed his eyelids for a moment.

"Error," the computer's female voice rasped. "A potential command can no longer be detected. Please open your eyes, Mr. Karanev, or go to bed immediately so I can switch the system to standby mode."

"I'm not tired enough." He no longer knew how often he'd spoken those words. As it had insisted so often in the past, the voice again replied: "I cannot verify that statement. The last measurement of pupil reflexes detected a reduction in your reaction speed. Your heart rate and blood pressure show all the symptoms of tiredness. Please open your eyes or go directly to bed."

Alexin hated the voice that forced him to lift his lids. And indeed, he lifted them. He had so often intended to reprogram the system so the AI would behave less like a prison guard. But he always forgot to do it.

"Thank you, Mr. Karanev," a friendlier and rewarding voice said.

Alexin stood, pulled up his trousers, washed his hands and shuffled through the house. His little show of resistance. He didn't want to lie down just because that was the AI's opinion. Sure enough, she was right. He WAS tired.

But he didn't want to obey.

The combination of sensor technology and AI had made him a consenting dependent of caretaking technology. *One half of mankind suffers from scarcity, the other from its own laziness. Tomorrow I'll finally have the computer readjusted*, he thought.

Alexin's bright idea had made him a wealthy man. He had presented his time calculations to Zarger's CEO, who began marketing readymade houses studded with sensors. Together with an unprecedented advertising campaign, home-improvement sets were thrown onto the market too. A thinking house, new or old. Anticipatory obedience within your own four walls: "You've just begun to think it – your house is already doing it!"

What started as a habit had become a dependency. Day after day, Alexin was living proof of how tough it is for a human being to escape from a dependency.

Sure: He could simply switch off the AI sensors this very moment and stay awake.

Obviously: He could go back to living the way he used to.

Of course: He could make do without technical conveniences.

He could.

Without credit cards, TV, email...

He could.

Unconsciously, he had walked into the bedroom. He stood beside the bed.

The light was already dimmed, an aromatic spray upheld the illusion of fresh sea air, and loudspeakers filled the room with artificial surf.

The quotation of the day glowed in a digital picture frame above the bed. Today's adage had been randomly selected from a gigantic collection of aphorisms:

*"Enlightenment is man's escape from self-imposed custody."* – Immanuel Kant

Alexin shuddered and rubbed his hands over his arms. Goose bumps. He crawled wearily into bed and thought about when he wanted to switch off the AI and have only mute sensor-friendliness in his house. His escape from self-imposed custody.

He fell asleep without having come to a conclusion.

More information on  
intelligent sensors

<http://www.youtube.com/watch?v=ofpLeysWqgs>

<http://www.youtube.com/watch?v=-upPgMr-FIs>

<http://www.intel.com/technology/atom/>



**The American author and media theoretician Douglas Rushkoff** has published eight books thus far, including his debut volume “Cyberia,” which quickly became a cyberpunk classic. As part of the cyberpunk movement, Rushkoff cultivates close contacts with Robert Anton Wilson, the inventor of “Illuminatus!” Rushkoff, who studied theater directing, has written numerous short stories and documentations about the themes of technology and subculture since the early 1990s. Among his other activities, he has also served as a consultant for the United Nations. Douglas Rushkoff is currently working on a dissertation about new media insights for the New Media Program of Utrecht University.



**The British author and futurist Ray Hammond** has already written sixteen books about the future which have been published in Europe and North America since 1980. “The Modern Frankenstein,” which appeared in 1986, was the first book to predict the importance of genetic technology, cloning, and the mass dissemination of super-intelligent machines in the twenty-first century. In 2007, Hammond was accepted as a member of the renowned World Innovation Foundation, which includes ninety-one Nobel Prize winners in its membership. Hammond currently teaches at Oxford University and at Cass Business School of City University, London.





**The English author Scarlett Thomas** has written eight novels thus far. Her most successful novels, “PopCo” and “Troposphere,” explore the boundaries between natural science and philosophy. She majored in cultural studies and now also works as a book reviewer for *Literary Review*, *The Independent* and *Scotland on Sunday*.

Scarlett Thomas teaches English literature at the University of Kent.



**The German fantasy and science-fiction author Markus Heitz** has already written more than twenty-five books, including the extremely successful fantasy series “The Dark Time” and “The Dwarves,” as well as numerous “Shadowrun” novels. Heitz, who majored in German studies and history, won the German Fantasy Prize in 2003 for his debut novel, “The Dark Time: Shadows Over Ulldart.” This was followed by other

awards, including “Best German-Language Novel” in 2009 and 2010 for “Das Schicksal der Zwerge” (“The Fate of the Dwarves”) and “Die Legenden der Albäe 1 – Gerechter Zorn” (“The Legends of the Albäe 1 – Rightful Wrath”).

Markus Heitz presently lives in Zweibrücken, where he devotes himself to literature and his Irish pub.



## *RESEARCH AT INTEL*

Intel was founded by Gordon Moore, Robert Noyce and Andy Grove in Santa Clara, California in 1968. For more than 35 years, Intel has played a leading role in the field of highly developed silicon technology for the computer and communications industry. The business began marketing its first microprocessor, the Intel 4004 (US patent no. 3,821,715), in 1971. This trailblazing developmental step revolutionized the computer industry and has decisively shaped our daily lives ever since. Intel has established research facilities around the world and annually invests billions of dollars in the expansion of a research ecosystem consisting of industry, policymakers and scientists in order to do justice to new technical challenges and to develop technologies from which we reap daily benefits.

But Intel doesn't only work on developing innovative computer technologies: automobiles that drive themselves, helpful robots for household use, electronic devices that think and feel have already become realities in Intel's futuristic laboratories – and they'll soon make our lives easier at home and on the job.

This chip manufacturer's engineers work globally on various levels, e.g. at Intel's developmental centers (e.g. in Braunschweig and Ulm), as well as in collaborative research projects with the industry and universities, including Munich Technical University or Berlin Technical University. These research projects are especially fascinating because of the potentials for applying their results to daily life and as examples of technical options that will simplify everyone's life. "The Tomorrow-Project" focuses on the following fields of research:

### *Robotics*

The goal of Intel Research's Personal Robotics project is to develop helpful robot assistants for interior spaces where people live or work. Robots will move from structured assembly-line scenarios into natural unstructured environments: Herb, the Home Exploring Robotic Butler.

### *Telematics*

The objective of this area of research is to apply information technology to the task of making road transportation more intelligent. In the future, cars, trucks, buses, street signs, etc. will be equipped with IT systems so that they can communicate with one another, thus reducing congestion and improving safety on tomorrow's roadways: Openmatics from Intel and ZF.

### *Photonics*

It will soon be possible to transfer thousands of songs, hundreds of high-definition movies and other data in mere seconds. Intel uses light to revolutionize the exchange of data and makes it possible to transfer all items of information at the speed of light.

### *Dynamic Physical Rendering*

Scientists are researching an innovative, intelligent material that will consist of thousands of tiny robots which will collectively facilitate telepresence, teleoperation, handling and manipulating of materials, locomotion and distributed sensing. Motor-vehicle design is a conceivable field of application for this research.

### *Intelligent Devices*

Researchers at Intel are working to develop intelligent devices equipped with sensors that will be able to analyze parameters such as environmental pollution,

the status of a person's health, and even an individual's emotions. These devices will be able to adapt their look and feel to suit each user. For the input, people and devices will interact in a natural way via gestures and even via thoughts.

*Weiterführender Link*

<http://newsroom.intel.com/docs/DOC-1490>

**“The Tomorrow-Project” – Bestselling authors  
describe daily life in the future.**

Douglas Rushkoff, Ray Hammond, Scarlett Thomas and Markus Heitz are science-fiction authors and futurists. Intel presented them with the results of contemporary research in the fields of photonics, robotics, telematics, dynamic physical rendering and intelligent sensors.

The authors responded by creating four short stories that paint humorous, thought-provoking and hopeful pictures of our future, when these “futuristic technologies” have long since become familiar features of our daily lives.