Lean Your Loneliness Slowly Against Mine
Original title: *Lene din ensomhet langsomt mot min*
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The university's Abel building has twelve floors; two hundred and fourteen steps. Rakel has always been fascinated by stairs. L-shaped, U-shaped or S-shaped; helical, spiral or straight with a landing. Escalators. When she was small she would pretend that the steps were piano keys; take any stairs she encountered by playing songs with her feet. '*Nøtteliten*' on the way up. '*Kjerringa med staven*' on the way down. If the staircase was a long one she would have to play several verses to make it all the way to the bottom. She played '*Fløy en liten blåfugl*' too, but the last note was scary – she'd have to jump five full steps at the end.

The mathematicians are on the seventh floor. She sneaks down the corridor, studying the nameplates as she goes. Finds the door to his office straight away, but doesn't dare knock. Just stands there, reading the nameplate. Jakob Krogstad. She's tried to guess who he is whenever she walks past the first floor cafeteria where the mathematicians drink their morning coffee – she hasn't met him yet. Only encountered his voice through an article he wrote some years ago, about the Russian mathematician Sofia Kovalevskaya – the first woman to become a professor of mathematics. She completed her doctoral degree in August 1874, exactly one hundred years before Rakel was born. When Sofia was a child she read maths books in secret under her bedsheets at night, because her father didn't think girls should be studying such things. Later she became the favourite student of Karl Weierstrass, Europe's greatest mathematician. But she died young, at just forty-one years old.

Stairs are a good place to think – everyone should have a staircase for thinking. Twelve floors is perfect. Three minutes and twenty-six seconds up; two minutes and eighteen seconds down. The time it takes her to crack a moderately difficult problem. Whistle Beethoven's *Moonlight Sonata*. Or think about the town she's left behind.

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Rakel's first memory is of blue days with the voice of Joan Baez coming from the record player. Sitting on a stool by the window, looking out at the mountains as she listens to her mum sing along:

To the queen of hearts is the ace of sorrow.
He's here today, he's gone tomorrow.
Young men are plenty, but sweethearts few.
If my love leaves me, what shall I do?

The song plays over and over, in a round, as if her mum is trapped in a circle from which she can never break free, because every time the song nears the end it bites its own tail and starts from the beginning again. The melody is sad and beautiful, just like Mum. Her black hair; her golden skin. Rakel can draw her dad in lead pencil, but her mum always has to be drawn in coloured crayon.

When her mum sings, it's as if time holds its breath. As if it stops and waits. What is it waiting for? For Rakel to find something to do, so that it can come to its senses and start moving again. So it can *run and run, but never come to the door*, just like the riddle of the nursery rhyme.

She stares at the mountains until she recognises all their faces; they stand there in a long, long line, holding each other's hands. The mountains are her friends, and the two she likes best are *Blåstolen* and *Trollstolen*. They lean towards each other like twins. One white, the other blue.

She's friends with the letters of the alphabet, too. Not just from one side, but from all possible sides. She knows which of them are themselves through and through, like 'O', and who becomes someone else when turned slightly. The big 'M' that becomes 'W' when turned on its head. The capital 'N' that becomes 'Z' when it lies down on its side. Those who tend to stick together and those who are all alone. There are grown-up letters and baby letters, but the babies don't always look like the grown-ups. She's fond of the tiny 'o', how it looks exactly like its mother and is so round that it rolls along all by itself. But most of all she loves the little 'i'. It often spends time alone, but it never looks sad. The little 'i' is a letter after her own heart. It is itself, both forwards and backwards, but if you turn it on its head, it protests: !

Her favourite number is eight, because she was born in August. But mostly because the number eight can be written in so many different ways. Two circles, one atop the other, like a snowman. A mirrored number three first, and then a normal number three. Or in the difficult way her dad is trying to teach her, where she starts by drawing an S, before continuing upwards again in a reverse S from the bottom, and it all has to be done in a single continuous movement without lifting her pencil from the paper. She likes six and nine too, because they're twins, only one of them is standing on its head. Five and two are mirrored twins, whether standing on their heads or not – but only if you type them into a calculator.

The best thing about numbers is that you can put them together. When two numbers merge, they grow and become bigger than themselves. Three plus three is six. Six plus six is twelve. Twelve plus twelve is twenty-four. Twenty-four plus twenty-four is forty-eight. Forty-eight plus forty-eight is ninety-six. Ninety-six plus ninety-six is one-hundred-and-ninety-two. One-hundred-and-ninety-two plus one-hundred-and-ninety-two is three-hundred-and-eighty-four. Three-hundred-and-eighty-four plus three-hundred-and-eighty-four is seven-hundred-and-sixty-eight. Seven-hundred-and-sixty-eight plus seven-hundred-and-sixty-eight is one-thousand-five-hundred-and-thirty-six. They grow so fast that Rakel almost gets out of breath. And even if she stops there, it feels as if she's hurtling towards infinity at top speed.

Her mum is also heading for infinity. The song that never ends. Rakel has to look after her mum. Make sure that she doesn't get swallowed up by the song and disappear completely.

I love my father, I love my mother,
I love my sister, I love my brother.
I love my friends and my relatives too.
I forsake them all, and go with you.

One day Rakel will manage to draw a picture that makes her mum happy. A sun in all the colours of the rainbow; her mum dancing, with butterflies in her hair. Before Rakel was born, Mum lived in a country where it was never cold. Where she was friends with the language, and the alphabet had more than twice as many letters. It isn't so strange that Mum longs to go back.

'Nobody will ever love you as much as I do, Rakel,' Mum often says to her. 'Who else would have sacrificed everything for you?' And there's another thing that Mum tends to say: 'If you ever have to choose between a man who loves you and a man you love, chose the one who loves you. That's the mistake people make in life.'

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Extract, pp. 29–74

Not many people whistle as they take the stairs of the Abel building. Rakel wonders whether Jakob Krogstad is a whistler. And which key he walks in. When she was little, she had imagined that all people walk with a particular tonality – some in a major key, others in a minor one. She had mostly walked around in a minor key – like the violin sonata by César Franck. Only when she decided to play the piece herself did she discover that it was actually called the 'Sonata for violin and piano in A major'. Despite the fact that it was so sad. Just imagine misjudging your own key like that.

She's only heard two whistlers on the stairs so far. One of them whistled so faintly that she had to hurry to keep up so she could catch the melody. '*Vårsøg*' – somewhat out of tune. The other she heard from several floors away – a chorale prelude by Bach. '*Jesus bleibet meine Freude*' – one of the pieces her dad often played for her when she was small. If she'd had a friend who was good at whistling, they could have played the Moonlight Sonata in two-part harmony. It's a difficult piece to whistle alone, because the underlying chords are just as important as the melody – but it isn't impossible. She just has to cheat a little; whistle the broken chords while smuggling in the notes of the leading part. The extended echo of the stairwell helps her; camouflages the notes she has to leave out.

In the square outside stands a statue of Niels Henrik Abel – the greatest mathematician Norway has ever produced. One of world history's most exceptional talents. Abelian integrals are named after him, as are abelian functions. Like so many geniuses he died young – just twenty-six years old. Seven years older than Rakel is now. What will she have accomplished by the time she turns twenty-six?

The university's buildings are named after scientists. The maths lectures will be held in the Sophus Lie auditorium; the group sessions in the Vilhelm Bjerknes building. She's tested out how to walk there already. Has carefully studied the lecture list; created a number of alternative timetables. The mandatory philosophy lectures will be held in auditorium 2 in the chemistry department. On the tour they were given by the students in the year above, they'd been led down into the cellar of the physics department – a labyrinth of corridors wound their way to auditorium 2 in the chemistry building. Afterwards, she had tried to walk this same route alone but ended up getting lost – she only just made it out again, the same way she'd come in. She'll have to do what Hansel and Gretel did – sprinkle breadcrumbs after

herself along the corridors so that she can find her way out. And should she still get lost, she can think of something funny. Until the cleaning lady eventually finds her.

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Jakob Krogstad will deliver the lecture series on discrete mathematics. Rakel is rather discreet by nature, and so thinks she'll like this course better than the one on continuous functions in higher dimensions and multiple integrals. She has never liked integrating. Counting is much more fun.

She loves the course. To finally learn how to count all the combinations and permutations she's always enjoyed figuring out; to be able to calculate the total possibilities that exist in the world. How many different ways the letters in the word Jabberwocky can actually be arranged – nineteen-million-nine-hundred-and-fifty-eight-thousand-four-hundred. Or how many ways you can distribute coloured balls into various containers. Different balls in different containers. Different balls in identical containers. Identical balls in different containers. Rakel wants to systematise what she has learned, and creates an overview of the various problems for herself. In doing so she discovers that the only thing she doesn't know how to count is the number of possibilities for distributing identical balls into identical containers. No matter how she approaches the problem, she doesn't understand how it can be done. In the end she becomes so desperate that she forgets how shy she is, and pounces on Jakob when she sees him sitting in the cafeteria one day, scribbling down notes on some serviettes.

'Excuse me, could you please explain to me how you distribute identical balls into identical containers?' asks Rakel.

Jakob glances up, his face taking on the same expression as that of the bus driver when she'd insisted on her adult ticket earlier that morning. But he gestures to indicate that she can take a seat in the chair beside him.

'Yes, of course, that's no problem,' he says, tugging on his earlobe. 'We just go like this…'

She watches as he scribbles away on her notepad.

'It seems it isn't so easy after all,' he says, starting on a new sheet.

Rakel gets excited.

'I think I tried that already, but I didn't get anywhere with it,' she says.

She feels suddenly alarmed at how this might sound – what if he's offended? He casts a glance at her, but she only stares intently at the sheet of paper.

'Then we'll have to try something else,' he says. 'Do you have any suggestions?'

'I only know what I've tried, and why it doesn't work,' says Rakel.

'That's a good start,' says Jakob.

Rakel shows him what she's thought of, and he scribbles away on the notepad. But no matter what they try, they don't get anywhere.

'I think I'll have to take a closer look at this when I have a bit of peace and quiet,' Jakob says finally. He hands her the serviette he was scribbling on when she turned up. 'If you write down your name and address, I can send you an answer when I've had a little more time to think about it.'

There's something scribbled on the serviette already, but Rakel can't make out what it is. It almost looks like some hats.

'What's *that*?' she asks.

'Just a puzzle I'm thinking of giving to some students,' says Jakob. 'A real tough nut to crack.'

'Oh, I *love* puzzles,' says Rakel, the words slipping out of her before she can stop herself.

Jakob asks whether she'd like to hear the problem. She nods.

'A wizard has three apprentices. One day, the wizard has five hats with him – three blue and two red. He asks his apprentices to close their eyes, and then sets a hat on each of their heads. Then he hides the last two hats, and asks his apprentices to open their eyes again. The apprentices are sitting behind one another in a line, and can only see the hats of the apprentices sitting in front of them. The wizard asks the apprentice at the back of the line whether – based on what she can see – she can work out what colour hat she's wearing. She can't. So the wizard asks the apprentice in the middle, but he too is unable to say what colour hat he's wearing. Then the apprentice at the front of the line says: 'Now I know the colour of my hat!' What colour is the hat she's wearing?'

Rakel breathes out, relieved.

'It's blue,' she says.

‘And you’re sure about that after just three seconds?’ says Jakob, seemingly wondering whether she’s just guessed.

‘Yes. Because the apprentice at the back doesn’t know the colour of her hat, both apprentices sitting in front of her can’t be wearing red hats, because then she’d know that her hat was blue. And since the apprentice in the middle doesn’t know the colour of his hat either, the apprentice at the front can’t be wearing a red hat, because then the one in the middle would know that his was blue.’

Jakob looks astonished. He asks whether she’s heard the problem before. She shakes her head.

‘But I enjoyed solving those kinds of problems in high school,’ she says. ‘I used to listen to “Good to Know” on the radio, and they’d offer up a different puzzle to solve every Saturday.’

‘Now I know who I can test out my mathematical puzzles on in future,’ says Jakob. ‘If you manage to solve them in twenty seconds, I’ll know they’re reasonable weekly tasks to assign.’

Rakel realises that the cafeteria is almost empty – she’s wasted a lot of his time. She hurries to write her address on the serviette, thanks him for his help and pretends she has an appointment to get to. Jakob calls after her that he’ll send her an answer as quickly as he can.

The letter arrives in her mailbox the very next day.

Blindern, 28 March 1994

Dear Rakel – you have excellent taste in problems! Your question centres around a famous classic problem to which there is no simple solution, but I’ve enclosed an article for you to read. If you drop by my office one day I’ll find some more reading material for you.

Best wishes,
Jakob

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A problem rarely arrives alone. Jakob gives her several exercises to chew on. She becomes a regular guest at his office, and because he believes so absolutely and completely that she'll solve the problems he gives her, she has to work harder, not stopping until she figures out the answers. There is no other option. And he answers all her questions as though they're the most sensible questions he's heard in a long time. As if she has a special sense for asking the right questions – as if the ability to ask the right questions is actually more important than being able to answer them. *You have excellent taste in problems*. He's the first person to make her feel that her name is Rakel because she's actually a *mi-rakel* – a miracle – no matter how small.

Jakob lends her books, too – and not just books about mathematics. He seems just as interested in literature as he is in maths. She starts to dream that one day she'll be able to visit him at home; see which books fill his bookshelves. Tell me what you read, and I'll tell you who you are, she thinks.

One of his favourite poems is by Thomas Hardy, and he quotes from it for her: *I, an old woman now, / raking up leaves*. Rakel has never heard of Thomas Hardy. She tries out the lines: *I, an old woman now, / raking up leaves*. The words feel curiously familiar, although she in no way feels old just yet.

'That's how I feel,' says Jakob.

'With the emphasis on *old* and not on *woman*, presumably?' teases Rakel. He laughs.

When she was small, she had wondered whether her name was written incorrectly – whether it should actually be written 'Rake L', where the 'L' stood for 'Leaves'. She loved raking leaves in the autumn; gathering them into a huge pile on the grass before they lost their colour. And then: running through the pile of leaves at top speed, making them whirl up into the air to form a dancing, multi-coloured symphony all around her. Like being at the centre of a rainbow composed of red, orange and yellow. Watching the leaves settle on the ground again, as if in a candescent painting. If she couldn't be a violinist when she grew up, she'd be a raker of leaves.

She refrains from telling Jakob this. Instead, she tells him about a rhyme she read on the cubicle wall in the girls' toilets down in the cellar of the Vilhelm Bjerknes building. It's so grotesque that they have to laugh:

Mary held her little daughter twenty minutes underwater.

Not to save her life from troubles, but to see the funny bubbles.

It reminds her of when the boys in her class cut an earthworm into several pieces, just to see whether the pieces would survive. Or when they pulled the legs off a daddy-long-legs, to see how many legs it could live without. No. It reminds her of cutting an earthworm into so many pieces you're certain none of them will survive. Of pulling *all* the legs off a daddy-long-legs.

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Rakel has found an exercise she doesn't understand in the English maths book Jakob has lent her. It seems meaningless. She doesn't understand what she's supposed to differentiate. So far, she's only differentiated functions. To study how steep the graph is – how quickly it grows and where its peaks and troughs are. She's good at differentiating twice, also. Finding out which way the graph curves; whether it's convex or concave. But in this exercise, it seems she has to differentiate something else. She just doesn't understand what, or how.

'The English word *derive* doesn't mean *to differentiate*, like the Norwegian verb *å derivere*,' says Jakob. 'It means *to deduce*.' Rakel blushes. She's always had a talent for misunderstandings. They're possibly one of her greatest talents.

She has a talent for slips of the tongue, too – especially when she gets excited. Then the letters and words come out helter-skelter, all at sixes and sevens. When she was small, she called the *Nutcracker Suite* the *Nutsnacker Cruite*. Or the *Nutquacker Sheet*. *Twin primes* become *prim twines*. She could write Jabberwocky poetry as if on a production line. But Jakob takes it all in good humour.

'I found out which graph the way curves,' says Rakel. 'No, I mean – which way the graph curves.'

'Did you find the exercise to the other answer as well?' asks Jakob.

'Yes, I found the answer to the other exercise,' laughs Rakel.

Some of the best things in life are a result of misunderstandings. When she was little, she misunderstood the song about the fox that hurried over the ice. She had thought that it hurried over the *rice*. And had been happy that she wasn't alone in eating rice for dinner. All the other children ate potatoes. But the fox gobbled down rice – just like her.

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Rakel stands in the lower ground floor of the student bookshop. She's just tried to stack the twelve volumes of *In Search of Lost Time* in such a way that she'll be able to carry them up the stairs to the cashier and pay for them, and she's just discovered it's impossible – she can't carry all the books at once. They're on sale, the hardback editions, at 49 kroner per book. It's a bargain, and there's a risk the books will be sold out if she returns to buy the rest of the series later. She starts to count how many copies remain of each volume, so she can buy the volumes there's fewest left of first and ensure the greatest chance they'll still have the ones she needs when she comes back. In the middle of her calculations she gets the feeling that someone is looking at her, amused. She glances up to catch sight of Jakob standing there, watching her. 'Shall I help you carry them, so you can buy all the volumes at once?' he says. But then he adds: 'These books are absolutely wonderful.' His eyes well up as he says it. She's always thought the word 'wonderful' too big to be used. She'd felt queasy when Ibsen's Nora told Helmer everything was 'wonderful' in Norwegian class in high school.

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Jakob says that he's working on a novel about Sofia Kovalevskaya. He's started to study the correspondence between Sofia and her mentor in Berlin, Karl Weierstrass. It's all in German and mainly consists of the letters from Weierstrass to Sofia, since most of the letters written by Sofia were burned. But Jakob can give Rakel a copy, if she'd like. The greatest mystery he's hoping to solve is why Sofia gave up mathematics for six years – why she moved home to Russia, cut all contact with Weierstrass, and started to write fiction instead. Jakob doesn't understand how Sofia, who had always had such a passionate interest in mathematics, could have suddenly lost all enthusiasm for the subject. Rakel thinks she'll help Jakob with this. She'll find out why Sofia stopped practising mathematics. It's the least she can do for him, seeing as he's already done so much for her.

'It's clear from the letters that Weierstrass was very fond of Sofia,' says Jakob. 'She had a special place in his heart. He admired her beauty, intellect, ingenuity and wit – he paid special attention to her. But there's nothing to indicate that there was any romantic relationship between them; at least, if there was, it's a well-kept secret. They've left no trace

of it in any of their letters. He probably saw her as an intellectual daughter.' An *intellectual daughter*. It sounds like the loveliest relationship Rakel can possibly imagine.

But after a time Rakel finds out that Jakob has misled her, whether consciously or unconsciously. Perhaps he simply hasn't read the letters in which it's clear that Weierstrass has romantic feelings for Sofia, and is taken by surprise when he finds out she's already married. A pro forma marriage she entered into so she could travel abroad, and study without her parents' consent.

Nevertheless, Weierstrass continued to dream about Sofia. In her he found a kindred spirit, someone with whom he could share his deepest interests and visions. At the end of one of his letters to her, dated 20 August 1873, he writes:

'*Hiermit, Liebe Sonia, schliesse ich meinen Brief über mich. Hoffentlich bist Du jetzt auch der Züricher Atmosphäre entronnen, und athmest die freie Luft der Berge. Ich habe während meines hiesigen Aufenhalts, sehr oft an Dich gedacht und mir ausgemalt, wie schön es sein würde, wenn ich einmal mit Dir, meiner Herzenfreundin, ein paar Wochen in einer so herrlichen Natur verleben könnte. Wie schön würden wir hier – Du mit Deiner phantasievollen Seele und ich angeregt und erfrischt durch Deinen Enthusiasmus – träumen und schwärmen, über so viele Rätzel, die uns zu lösen bleiben, über endliche und unendliche Räume, über Stabilität des Weltsystems, und all die anderen grossen Aufgaben der Mathematik und Physik der Zukunft. Aber ich habe schon lange gelernt, mich zu bescheiden, wenn nicht jeder schöne Traum sich verwirklicht.*'

It takes Rakel some time to translate the text into Norwegian – it's been a while since her high school German classes.

'*Herewith, dear Sofia, I end my letter about myself. You have by now hopefully escaped the city smog of Zurich and are breathing the fresh mountain air. During my stay here I have thought of you very often, and imagined how wonderful it would be to spend a few weeks in these beautiful natural surroundings with you some time, my heart's dear friend. How beautifully we could dream and fantasise, you with your fanciful disposition, and I encouraged and refreshed by your enthusiasm. So many mysteries remain for us to solve – about finite and infinite space, about stability within the world system – and all the other great future problems of physics and mathematics. But I have long since learned to temper my excitement, for not all beautiful dreams become reality.*'

There is a sincerity in Weierstrass's letters. Although they're mostly about mathematics, it is the few lines in which he addresses Sofia directly that contain the most beautiful poetry. He calls her *Meine Schwäche* – my weakness. He can't help but worry about her and long for letters from her when she's not close by – he repeatedly asks her to write to him as quickly as possible. In a letter dated 25 April 1873, he writes:

'*My dearest, most precious Sofia, be assured that I will never forget that it is thanks to you, my student, that I have gained – not only my greatest, but my only true friend.*'

And it is in a letter to Sofia, dated 27 August 1883, that Weierstrass compares mathematicians with poets:

'*A mathematician who is not also a poet will never be a complete mathematician.*'

Although the letters from Sofia have not survived, it is clear that the affection was mutual. Weierstrass was the most faithful and supportive friend Sofia could ever have wished for. In her memoirs, Sofia described how important this correspondence with Weierstrass had been to her:

'*These studies had the deepest possible influence on my entire career in mathematics. They determined, ultimately and irrevocably, the direction I would follow in my scientific endeavours. All my life's work has been carefully undertaken in Weierstrass's spirit.*'

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Rakel sits at the back of the large auditorium named for Sophus Lie, the second greatest Norwegian mathematician after Niels Henrik Abel. The auditorium has space for over 600 students, but most still seek out someone familiar to sit next to. If everyone took a seat randomly, there would be little probability of ending up next to someone you know. She tries to define the problem more precisely for herself: 'A student has spoken with three of her 600 fellow students. Assuming that all the students sit in a random seat in the lecture hall, how many lectures must the student attend on average before she ends up sitting next to one of the three people she has spoken to?'

Jakob is just completing a long proof on the board. Several of the students look as if they've fallen asleep, but Rakel loves mathematical proofs. Anything you can be sure of in the world is safe – and in mathematics you can be sure of everything that is proven. Her favourite proofs are those by contradiction, where you start by assuming the opposite of what you want to prove and show how this leads to a self-contradiction; that is, that the assumption

you made must be wrong, and therefore the opposite must be true. And it was, after all, actually the opposite you wished to prove.

The real number system consists of both rational and irrational numbers; the rational numbers can be written as fractions, but no irrational number can be written as a fraction. It's easy to prove that the sum of a rational and an irrational number will be irrational – using a proof by contradiction. Because if the sum was rational, it could be written as a fraction. But then the irrational number you started with could be expressed as the difference between two fractions, and therefore be a fraction itself. And that is a self-contradiction. It's therefore impossible for the sum to be rational.

The irrational always wins out over the rational in this world. She knows she'll have to speak to people to make friends. But still she doesn't speak to anyone.

Maths lectures can be the most boring thing in the world if the lecturer isn't able to communicate the poetry of it all and simply reads out the symbols as he writes them on the board. But Jakob has a unique ability to explain mathematics. She tries to put her finger on exactly what it is he does. The first thing she notices is that he animates the terms. 'Poor little epsilon, he's just so small,' says Jakob. 'But at least he rules over delta, who's even smaller.' This makes it easy to remember that epsilon and delta stand for small quantities, and that epsilon is the boss, setting requirements that delta has to fulfil. Jakob is like an actor performing in a play, using both voice and body language to impart what he wants to say.

But most of all he's like a spider. It's as if he's weaving a web for them, where the points of intersection are the theory and the threads the connections he draws between the various parts of the material. The maths teachers she had at school focused on stuffing as much theory as possible into the heads of their students – that is, as many points of intersection as possible. But Jakob shows her that it's not the number of intersection points that's important – the secret lies in the number of threads that bind them all together. It's these connecting lines that show her the links, that enable her to recreate the theory herself later, using only a few points of intersection.

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'It's been a while since I last saw you,' says Jakob.

‘Well, I borrowed so many books from you last time I’m still not done with all of them,’ says Rakel.

She glances at her watch. Five past four. The underground train leaves in seven minutes. She presses the button to call the lifts and stares impatiently at the signs that indicate where they are. If only they wouldn’t stop at so many floors today, since she has a dentist appointment to get to.

‘One of them is out of order,’ says Jakob. ‘But at least it looks like the other two are on their way.’

‘Do you think it would be quicker to take the lift that comes last?’ says Rakel.

‘It’s surely most natural to take the first one to arrive,’ says Jakob.

‘I just thought that might not be a given, because it’s less probable that the last lift will have to stop on the way down,’ says Rakel.

They step into the first lift to arrive. Jakob’s eyes have a thoughtful cast.

‘It’s definitely not quicker on the first floor,’ he says, ‘because then the lift doesn’t have anywhere else to stop.’

Rakel thinks for a moment.

‘That means it might be worthwhile on the second floor then,’ she says. ‘If there’s more than a fifty per cent chance of the first lift having to stop on the first floor, then of course in most cases the second lift will win.’

‘This is starting to get interesting,’ says Jakob. ‘What about the third floor? That isn’t so easy, because then the lifts can stop on both the first and second floors.’

Rakel pushes aside the hair that has fallen across her forehead.

‘No, that isn’t so easy…’

‘But it should be possible to work it out,’ says Jakob. ‘If, to keep things simple, we assume that the lift that arrives at a floor first stops with probability p, and the other one then passes by… That should actually provide us with a fairly clear expression.’

Rakel becomes excited. ‘Yes – because it would be better to take the second lift if there are people waiting to take the lift on an odd number of floors, but not if there are people waiting on an even number of floors. So that’s what we have to calculate the probability for.’

She thinks a little while longer.

‘Do you think it would be worth taking the last lift if there’s an odd number of floors between us and the exit?’

Their lift has reached the ground floor without having stopped even once.

‘In all likelihood, that would depend on how great the probability p is – but you could work it out, of course,’ says Jakob in a playful tone.

‘That was a nice exercise,’ says Rakel. ‘I’ll stop by your office when I’ve figured out the answer.’

As usual, Jakob lets her exit the lift first. She wishes she didn’t have to run to catch her train.

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Rakel is taking a course in project work for second year students. She has to give a presentation about the golden ratio, the magical division ratio that recurs everywhere in nature – in sunflowers, pine cones and seashells – as if it is written into the musical score of the universe itself that this is the most harmonious way of dividing a line segment into two parts: the ratio between the longest and the shortest part shall be equal to the ratio between the entire line segment and the longest part. This is how the elbow divides the arm from the shoulder to the fingertips; how the navel divides the body from the crown of the head to the soles of the feet. Throughout history, visual artists have used the golden ratio in their artworks because the human eye associates beauty with precisely this ratio. She asks whether Jakob might like to hear her presentation in advance, like a sort of mini dress rehearsal. She trusts his gut feeling. If he thinks her presentation is good, she can be absolutely certain that it’s good. And by watching his facial expressions as she speaks she can tell that he thinks she’s made the right choices; that the focus of her material and the balance of the presentation are as he thinks they should be. ‘I should probably stop calling you *the girl with the golden eyes*,’ Jakob teases. ‘From now on, you’ll be known as *the girl with the golden ratio*.’

‘There must be a sort of mathematical musicality,’ says Jakob. ‘A kind of absolute, logical ear. I’ve long had my suspicions about it, but after meeting you, I’ve become almost certain. The way you do mathematics – it’s as if you immediately capture the fundamental tone of the material. While the rest of us are practicing our scales, you go straight to the music, right to the very core. I think it has to do with a sense for connections, a sense for underlying structures. The point isn’t to play all the notes perfectly. The point is to know how to unite them, to find the right phrasing; what’s significant, the accentuation of the various parts.’

Rakel starts to feel worried. She isn't a mathematical prodigy – Jakob has far too high an opinion of her. He'll soon discover that he's mistaken; that she isn't as talented as he supposed. What if he's disappointed?

If he only knew how stupid she is. How much time she spends trying to understand things.

***

When she was small, she loved rhymes consisting of long strings of numbers that grew so fast they gave her the feeling of speeding towards infinity. The aunties at kindergarten would write out sums in the sand to check whether her sequences were right. Luckily they'd stop long before they got to one-thousand-five-hundred-and-thirty-six.

Once, she was allowed to accompany her dad to the great mathematics conference in Helsinki, where she met the old mathematics professor – the man who was born on the same day she was, just fifty years earlier, so that when she turned four, he turned fifty-four. Papa told him about the rhymes made up of the strings of numbers that Rakel loved so much. But the mathematics professor didn't say 'what's three plus three?' like everybody else tended to. Instead, he said: 'what's one-and-a-half plus one-and-a-half?' Rakel was suddenly unsure. She didn't really know what 'one-and-a-half' was – only that it was more than one and less than two. Right in the middle, perhaps. But one plus one was two. And two plus two was four. So one-and-a-half plus one-and-a-half might be halfway between two and four. And halfway between two and four was three. If the answer was three, the next question would be 'three plus three', and she'd be back in the sequence of her rhyme. She took a chance and answered 'three', and the mathematics professor nodded, satisfied. As if he thought this was more impressive than the fact that she could rattle off the entire long sequence of her ditty by heart.

***

Jakob teaches her that there isn't just one kind of infinity. There are infinite infinities. And some infinities are more infinite than others. Mathematicians call this *cardinality*. The smallest kind of infinity is called aleph-null. This is the infinity you get when you take the set of all whole numbers. But it is possible to prove that there are more decimals than there are integers, so the infinity of the set of all decimals is of a greater type, called beth-one. And if

you start with the set of all decimals, and take the set of all subsets of this set, you get an even greater infinity known as beth-two. And you can continue to do this indefinitely.

'If I ever finish my novel about Sofia Kovalevskaya, I'll use the pen name Aleph Omega,' says Jakob.

'And should you want to pass for a female author, you can just swap Aleph for Beth,' teases Rakel. Jakob smiles.

'I have the opening sentence, at least,' he says. '*I sat on a bench in Bolanzo and waited for Weierstrass*.' Rakel has to laugh.

'I doubt many readers have heard of the Bolanzo-Weierstrass theorem, so I'm not sure they'll get your subtext,' she says. 'But it could very well become a cult book among mathematicians, so you still have the chance to reach a much wider audience than by publishing scientific articles.'

***

His office window is the first thing she seeks with her eyes as she arrives at the university each morning. If the window is lit, a light kindles inside her. As if the world is a better place simply because he exists. Then the window is dark for three weeks in a row. Might he have left to attend a conference? Just as long as he isn't ill. But one morning the window is lit again, making her so happy that she immediately takes the lift up to the seventh floor and knocks on the door of his office.

'I just wanted to return this,' she says, holding out the book she had borrowed.

'Did you like it?' he asks.

'Yes, but I'm not sure I understood the ending. Usually I like novels that have an open ending, but the author should have at least thought through some possible alternatives as to what might have happened. In this novel, it's as if the author has no idea about what might have happened.' And then they lose themselves in a conversation about whether an author has a moral responsibility to have thought through at least one possible solution when leaving a novel's ending open. It feels as if Jakob has never been away at all.

She starts to fantasise about him, too, as she walks down the green fields behind the student housing blocks on her way to the university. The sky is grey-black; dark threatening clouds above. She wishes that 'clouds' and 'threaten' rhymed, and wonders whether she prefers the sound of 'dark threatening clouds' or 'dark clouds threatening' – should she ever

have to choose between them. She plumps for the latter alternative. It's the ring of the last word that lingers, so most important is that the last word sounds right. Perhaps she could ask Jakob, too. He's the kind of person who doesn't find such questions meaningless.

It starts to rain. If it rains as heavily as it did when she was on her way home yesterday afternoon, she'll be soaked through before she gets there. The kind of torrential summer downpour that can only happen here in Eastern Norway. She imagines herself turning up at his office, drenched and laughing. And he'll see that she's the kind of girl who can stand to get her hair wet – the kind of girl who doesn't have to go straight home and change. Perhaps he'll be worried about her; say that they can postpone their meeting. But she'll simply shake her wet hair and say, no, it's absolutely fine – although I do apologise for standing here dripping water all over your office floor. And then maybe he'll notice how wildly her hair curls when wet; suddenly feel compelled to brush a tangled lock of hair from her face. And she'll see just how strong is his desire to do this – how his hand is almost moving of its own accord before he can stop it. And she continues to stand there in the middle of his office, trembling slightly from the cold, a little tired and dishevelled, until the tenderness that fills him is overwhelming and he blurts out: 'But you're soaking wet, my girl! Come here and let me feel your hands. Just as I thought – they're like ice! Let me warm them in mine.' And she lets him hold her hands and feels how the warmth spreads throughout her body, until she wishes she was a little girl who could crawl up into his lap and press her face into the hollow of his neck and have the smell of his hair envelop her, so close. But she is no longer a girl, and so must simply stand there, politely, where she is. 'You can't just stand there freezing in those soaking wet clothes, you know. Come on, take them off – you can borrow my shirt for now.' And before she can protest he's taken off his shirt and is standing there before her, stripped to the waist, and… and… and…

***

Once, long ago, when she was in lower secondary school, her dad took her along to a presentation about fractals – a kind of geometric object more complex than circles, triangles and rectangles. They're similar to shapes that can be found in nature, like fern leaves, trees and snow crystals. Fractals are made up of smaller copies of themselves, so if you enlarge a small piece of a fractal under a microscope, the piece will look similar to the entire fractal. It's as if each and every tiny part carries a copy of the whole fractal within it. Fractals are also

full of holes of varying sizes, and this means that they can have a dimension that isn't an integer.

A classic example of a fractal is the Sierpinski triangle. You start with an equilateral triangle and mark the central point on each of its sides. Then you connect these central points with straight lines. This divides the original triangle into four smaller triangles – one in each corner, and one upside down in the middle. Then you remove the triangle in the middle by shading it black, so that it becomes a black hole. Now you're left with three smaller copies of the original triangle. You then repeat the process on each of these copies: draw straight lines between the central points on each of the sides and remove the upside-down triangle in the middle. If you were to continue this process to infinity, you'd finally end up with the Sierpinski triangle, which contains smaller copies of itself at different levels and is full of holes of various sizes. This means that the Sierpinski triangle has a dimension that is not an integer. While a triangle is two-dimensional, and a pyramid is three-dimensional, the dimension of the Sierpinski triangle will be the logarithm of three divided by the logarithm of two – which is around 1.57.

Although she didn't understand much of the mathematics back then, she was fascinated by a figure known as the Mandelbrot set. It looked a little boring at first – like a lumpy man with a head that was far too small and a body that was far too big. The lecturer explained that the set was named after the man who had introduced the term 'fractal', Benoit B. Mandelbrot, and that spiteful tongues had said that the set actually rather looked like the man himself: Mandelbrot – *the gingerbread man*. But at the end of the presentation they were shown a film, which zoomed in on details of the Mandelbrot set, as if they were being taken on an endless journey into it. And that was when the miracle revealed itself. It turned out that the Mandelbrot set contained an entire universe of exotic shapes, like a landscape full of seahorses and spiralling tentacles. Not only that, but ever-increasing copies of the Mandelbrot set popped up, only slightly distorted, as if shown from a new point of view. As she walked home from the presentation that evening, she thought: maybe this is something I can fill my life with. If I can't be a violinist, this might just be something I can do.

***

Maybe being loved is like being zoomed in on. Like someone undertaking an endless journey into you, enabling you to see all the beauty you contain. That you are an entire universe of

exotic shapes, with ever-increasing copies of yourself – only with a slight twist. Like fanciful variations on a known theme, from viewpoints you never even knew existed. Everyone deserves to experience such a journey at least once in their life. It's the most beautiful thing she's ever known. Not only have new spaces opened up in her, but it's as if she's been drawn in an entirely new dimension. And perhaps one day she'll discover that this dimension is not an integer.

***

Before she can make a start on her master's degree she has to get through the course in topology, which is notorious for being so abstract that over half the students fail the exam. But Rakel is rather abstract by nature, and so suspects that she'll like this course better than the one on Fourier analysis and partial differential equations. As it turns out, she loves the course. To finally understand why mathematicians view a coffee cup and a doughnut as equivalent objects. To discover that something can be both open and closed at the same time. The only thing that irritates her is that the lecturer turns up to the sessions unprepared, probably prioritising his research over his teaching as many professors do. He therefore stands and stares at the board for ten minutes whenever he encounters an unexpected problem. Rakel feels for him, even though it's his own fault. Had he thought through the material beforehand, he would have easily seen how each problem could be solved.

'Could you not just take a set that looks like a cog with infinite teeth, on which the teeth get closer and closer together, and then remove all of the furthest tooth, apart from the outermost point on the tip?' she says finally. 'The set will be topologically continuous, even though it isn't path connected.' The professor nods and turns back towards the board. Several of the students turn and look at her.

'Imagine correcting the professor of topology,' whispers a boy in the back row.

***

'Are you still going around with the letters to Weierstrass in your bag?' says Jakob, glancing over the edge of the desk. 'It must be at least three years since I gave you those photocopies.'

'I've just started to look at them again,' says Rakel. 'And I've had an idea for your novel. You can turn it into a love story.'

Jakob leans back in his office chair and puts his feet up on the desk.

‘I don’t think one can freely make up stories about historical figures,’ he says.

‘But it’s a novel,’ says Rakel.

‘It doesn’t matter,’ says Jakob. ‘And anyway, I’d end up with the entire feminist movement breathing down my neck.’

‘Why?’ asks Rakel.

‘For a long time, rumours circulated that it was actually Weierstrass who was behind Sofia’s results,’ says Jakob. ‘A lot of people didn’t want to believe that a woman could achieve such things on her own.’

‘But it was her work, wasn’t it?’ says Rakel.

‘There’s no reason to believe otherwise,’ says Jakob. ‘Much of what she did fell outside Weierstrass’s areas of interest.’

‘I’m sure they were more than just friends,’ says Rakel.

‘If you had hard evidence, it would be quite the sensation,’ says Jakob. ‘But you have to take into account that the tone of the time was a different one – the language was much more florid. It probably wasn’t unusual to write *Liebste, theurste Freundin*.

Rakel leafs through the sheaf of paper.

‘There’s a change in letter number eight,’ she says. ‘Earlier on, he uses polite phrases such as *Verehrte Frau*… but then the tone suddenly turns intimate. He calls her *Meine Schwäche,* and the letters ooze with romantic dreams about her.’

She pulls a sheet from the pile and holds it out to Jakob. He leans over the desk, wrinkling his brow.

‘Weierstrass wrote this letter when Sofia was at home in Russia,’ she explains. ‘He thanks her for the photograph she sent him, but isn’t satisfied with the image. He prefers the previous photograph he has of her, and asks for a new one in another pose, in which her nose doesn’t look quite so big. You don’t comment on someone’s nose like that unless you’re very close to them.’

‘It’s not surprising that Weierstrass had eyes for Sofia,’ says Jakob. ‘But I wonder whether she was interested in a bachelor thirty-five years her senior.’

‘But she couldn’t help but love someone who understood and supported her like that,’ says Rakel.

‘It’s a shame we’ll never know what Sofia felt for Weierstrass,’ says Jakob. ‘He burned all the letters she sent him.’

‘That suggests they had something to hide,’ says Rakel.

Jakob smiles and shakes his head.

‘Now I think your imagination’s running away with you. She was already married, remember?’

‘That’s true,’ says Rakel with a sigh.

Jakob stares into space, seemingly thoughtful.

‘But since the marriage was only a formality, her husband lived in another town,’ he says.

‘But she wouldn’t have had the conscience to betray him,’ says Rakel.

‘Although it’s possible they had an agreement that permitted it,’ says Jakob.

‘I doubt it,’ says Rakel. Then she quickly gathers up the sheets of paper, stuffs them back into her bag, and gets up to leave.

***

Rakel sneaks into a presentation that isn’t actually intended for students. Jakob is going to speak about the correspondence between Sofia Kovalevskaya and Weierstrass. She stands at the very back of the auditorium and hopes that nobody will notice her. Jakob’s presentation is already well underway. She already knows most of what he’s talking about, and so is just as interested in studying how he presents the material in this kind of setting; how he once again becomes an actor rendering his audience spellbound. His charisma. How he maintains eye contact with his spectators. But then he catches sight of her. His eyes meet hers and turn helpless, as if to say: ‘You see through me – can see how bad this is. It’s just an act.’ And he’s right in that this isn’t even close to what he can do at his best – but it isn’t terrible, either. It’s miles and miles above what others could ever do. She feels a kind of affection for him as he stands there, holding her gaze. She wants to smooth down his hair. Comfort him, like a small child.

She remembers the first time their eyes met like this – before he knew who she was, before she had spoken to him in the cafeteria. It was during a break between two lectures – instead of going outside to get some fresh air as she usually did she stayed seated, leafing through the pages of her textbook. A girl comes along, roaming randomly back and forth between the lecture hall’s benches, occasionally bending down to peer beneath a bench before shaking her head and moving on. She seems to be looking for something.

‘Is this the Arne Næss auditorium?’ asks the girl.

‘No, Sophus Lie,’ answers Rakel. ‘Arne Næss is down in the Georg Morgenstierne building.’

‘Have you seen the textbook I left behind this morning?’ says the girl. Rakel realises that Jakob has entered the lecture hall and is standing there, leafing through the notes he’ll go through in the next period. He glances up at the girl and says: ‘What’s the title of the book?’

‘*The Art of Critical Thinking*,’ answers the girl. Rakel glances across at Jakob, who meets her gaze. He seems to be struggling to keep a straight face just as much as she is. ‘No,’ the two of them chorus, simultaneously shaking their heads. And Rakel marvels at how Jakob’s eyes reflect her, so that for a moment she sees a glimpse of herself from outside, as he sees her.

***

It’s as if she started a new chronology when she met Jakob. As if their first meeting in the cafeteria is the new zero from which she measures time. Perhaps she should start using the designation ‘AJ’ – *Anno Jakob* – instead of AD.

In the first year after encountering Jakob Krogstad, she met him in the student bookshop.

In the year AJ 2 she gave a presentation about the golden ratio.

In the year AJ 3 she took a course in topology.

In the year AJ 4 she started to study fractals in earnest, making a start on her master’s degree.

What will happen in year five? *The year AJ 5*.

The best thing about this chronology is that she was born in the year 19 BJ – *Before Jakob*. And nineteen is her lucky number.

***

‘Can you time it for me?’ asks Rakel.

‘You want to do it now? Without having prepared?’ says Jakob.

‘But I know how to do it,’ says Rakel.

Jakob shakes his head.

‘For most people, there’s a huge difference between knowing something and being able to present it in a clear, understandable way,’ he says. ‘And the snake lemma is so complex that it’s almost impossible not to end up getting yourself in a muddle at some point or other.’

‘I’d like to try anyway,’ says Rakel.

Jakob shakes his head again.

‘Okay, fifteen minutes then?’ he says. ‘As a kind of record attempt?’

Rakel nods.

‘Ready, steady, go!’ he says.

Rakel bends down and takes off her shoes.

‘Well, I suppose this isn’t a lemma one approaches with one’s shoes on,’ says Jakob, surprised. Rakel pulls out a chair from under the desk and turns it towards the board.

‘I need all the space I can get,’ she says, climbing up onto the chair and starting to write, all the way up in the top left-hand corner. She starts to explain the concepts as she writes out the enormous diagram that winds across the board like a snake. When she’s completed the top line she jumps down from the chair to continue. She casts the occasional glance at Jakob, to see whether he’s still following. Every now and again she takes a turn he doesn’t expect. She sees that this forces him to reconsider – but that every time he agrees that’s how it should be done.

After a while his gaze has changed. It’s as if he’s stopped following the arguments – rather, it’s as if he’s enjoying a ballet or a piece of music. It’s as if his eyes draw her to him; following her hands as they dash across the board while she highlights, connects and emphasises the things she’s talking about. Even facing the blackboard she can feel his eyes glide attentively across her body.

‘Done!’ she says, turning to face Jakob.

‘Eleven minutes and forty-two seconds,’ he says.

‘I did it!’

She smiles.

‘By a good margin,’ he says.

‘I cheated a little bit,’ she says, ‘but the two arguments are equal.’

‘It was absolutely perfect,’ he says. ‘Really. Absolutely perfect.’

‘Not quite,’ she says. ‘I should have…’

He only laughs; waves away her words.

‘You were right. It really isn’t a proof you can approach with your shoes on.’

***

Then comes the fever. It starts with the flu – it’s her dad who gives it to her. He comes to visit from the blue city and must have picked up the virus somewhere along his train journey. They’re soon both laid up with a body temperature of 40 degrees. Her dad is well again after a week, but Rakel’s fever simply won’t relinquish its grasp. She tells herself that she has to be patient; must try to keep working on her mathematics as she lies there in bed. She can’t make it to the shops. Runs out of toilet paper. Wonders who she might ask for help. Her dad has returned to the blue city; her mum will be worried if she finds out Rakel is sick. Maybe she can ask Jakob? But not until she really needs it. It’s better to be afraid than to be a burden.

After six weeks, Jakob gets in touch. Asks whether she’s gone away somewhere, as it’s such a long time since he’s seen her. Asks her to stop by his office when she gets back. He’s found a mathematical article about juggling that he thinks she’ll like. The juggling patterns are described using number sequences, which can be used to find new patterns to juggle. ‘But you have to promise me you won’t get so fascinated that you decide to become a juggler instead of a mathematician,’ he jokes.

When he finds out that she’s ill, he asks whether there’s anything she needs. Whether he can go buy some groceries for her. He arrives with two carrier bags full of food – and toilet roll. She’s so happy to see him that she wants to throw her arms around his neck – she hasn’t seen another human being in six weeks. He says she has to go see a doctor; that she must promise him she’ll make an appointment for the very next day. But Rakel doesn’t know how she’ll make it to the doctor. She almost faints just going to the loo.

She tries to make it to the doctor’s office – but while she’s waiting for the train she can feel it’s all about to go terribly wrong. She faints. When she comes to, she can’t get up. A woman gives her a fizzy drink and some chocolate; a man calls an ambulance for her. He’s told that Rakel should take a taxi to the emergency clinic, but she still can’t get up. So once again the man calls for an ambulance. Finally, they bring a stretcher and come and get her.

‘We’ll drive you home, but we just need to run a few tests first,’ says the ambulance driver. Rakel wonders how she’ll manage to unlock the door to her apartment; she can no longer feel her fingers. The man’s voice is far away. ‘You have a blood sugar of 1.6 and a high fever, so I think we’ll take you to the hospital to get you checked out after all,’ he says.

At A&E they stick needles in her once an hour. The doctors can’t figure out what’s wrong, but it’s something to do with her blood – she has dropping blood values and a declining platelet count. She can feel that she needs to pee, but gets dizzy from just lifting her head. A nurse with black hair – and who reminds her of her mum – brings her a bedpan. But Rakel is afraid that she’s going to miss. ‘Is it in the right position? Can I just start to pee?’ she asks. The nurse nods. But Rakel misses anyway; her clothes and the sheet get wet. She can see that the nurse is angry – Rakel has created extra work for her, as if she didn’t have enough to do already. The nurse tears the sheet from the bed, pulls the curtain aside and leaves the door to the corridor open when she leaves. Rakel lies there naked on the bed, unable to protect herself from the gazes of the people walking past. She turns over. Better that they can only see her backside.

She manages to restrain her bladder for nineteen hours, but then she has to pee again. It’s a blonde-haired nurse this time. ‘I don’t know whether I can pee right – it ended up all over last time,’ says Rakel. ‘But didn’t they lift the head end of the bed so you could sit up?’ asks the nurse. ‘No wonder it went everywhere if you were lying completely flat – you have no control like that.’ And this time it’s okay. Rakel wants to give the blonde-haired nurse a hug.

Jakob comes to visit her. She’s so happy to see him that a doctor sticks his head around the door a few minutes later, wondering what’s going on. Rakel has electrodes attached to her chest to monitor her heart’s rhythm, and abnormal activity is now registering on the screen. The doctor asks her to relax as much as possible so that the values will return to normal. Perhaps medical students don’t get taught what love looks like on a cardiogram.

***

She’s in the hospital for a week. Her enlarged lymph nodes prompt the doctors to take a bone marrow sample, but they still don’t understand what’s wrong with her. ‘High fever upon admission. Ketones in urine. Declining platelet count and neutropenia. Some enlarged lymph nodes detected upon palpation. Awaiting results of bone marrow sample. Collapse possibly

due to insufficient fluid intake combined with viral infection,' they write in her discharge summary.

Her condition continues to fluctuate. It's as if Rakel's body has become a sine wave, only the fluctuations are completely unpredictable. She might feel almost well for a week, only to hit rock bottom for the next three. She has to make the most of the good weeks, resting only when she absolutely has to.

She gets a first on her dissertation. Jakob says she has to apply for PhD funding – with that kind of grade her application is bound to be granted. She's upset when she's awarded a scholarship – feels guilty accepting the money when she knows someone else would have been given the chance had she said no. She tries to hide how exhausted she is from everyone around her. Sneaks into the broom cupboard in the ladies' toilets in the Vilhelm Bjerknes building between lectures, because there's a sofa there. She locks the door to the lovely office she's been given so that nobody will catch her lying on her desk, resting. Pops into the cafeteria during her lunch break, so the head of department will see that she's at work – although she arrives late and leaves early. She doesn't understand what's wrong with her. The doctors don't understand what's wrong with her. The sole point of light is Jakob. He brings a packed lunch and eats in her office when she's incapable of making it down to the cafeteria. Only he sees how she's really doing; understands this isn't something she's feigning, making up.

***

The kiss in December – on Saint Lucy's Day itself. She walks home through the snow like a luminous Santa Lucia. He'd asked for permission to kiss her; when she had nodded, he put his lips to hers. It was as if something opened, as if he was completely open to her. It wasn't unpleasant. Now she knows what it's like. It's about time – she's twenty-five years old.

'What are we going to do about this, Rakel?' he'd asked afterwards. 'Shall I come over to your place tomorrow, so we can talk about it?' She had nodded.

It's snowing. Big, dancing flakes in the air. She sticks out her tongue and catches some of them. Lets them melt in her mouth, so she can experience what it tastes like to kiss the snow.

The next day he comes over. She hopes that he'll say that he loves her – but that it's impossible for there to be anything between them. It would be enough to hear that he loves her. Then she could die happy.

Instead, he takes off her top, and she feels the warmth of his belly against hers – feels that from now on she will always long to lie belly to belly with him.

'But don't you love your wife?' she asks.

'Yes,' he answers.

'But then how can you do this?' she asks.

'I'm a lout,' he says. She can't believe her own ears. Really – who is he?

'Do you love me?' she asks finally.

'I don't know. I don't really know what it means to love,' he answers. He tries to undress her lower half, but she manages to twist away. Then he gets up, and she can see there's a wet stain on his trousers.

'It's a good thing I'm going away for a few days – it wouldn't have been advisable to go home like this,' he says. 'And it's a *very* good thing that I put on a long sweater today.' She no longer recognises him. He's become so repulsive. After he's gone, she thinks she doesn't ever want to see him again.

But this feeling only lasts for a few days, and then she misses him. It's so strange to return to his office. They both act as if nothing has happened. Then she feels sad, although she doesn't know why – he sees this and moves across to her. Puts his arms around her.

'Oh, Rakel,' he says. 'My dear girl.'

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When Rakel was at school, she didn't know about any number systems other than whole numbers, rational numbers and real numbers. But in her first year at the university she learned about complex numbers, which were given their geometric interpretation by mathematician Caspar Wessel, brother of the poet Johan Herman Wessel. While the real numbers sit neat and proper along the x-axis, the complex numbers fill the entire plane. Some of the numbers are purely imaginary – they sit along the y-axis – but most numbers have both a real part and an imaginary part. Rakel feels most kinship with those that have a greater imaginary part than real part. She's always been fond of the little 'i' because it's alone so much – and is itself both forwards and backwards. But the best thing about the 'i' is that it's the imaginary unit. The square root of minus one. It's happier in unreality than it is in reality.

Every complex number has a complex conjugated twin, which is inverted – a mirror image – along the x-axis, and has the same real part. Only the imaginary part is different: the equal-sized opposite. If you multiply a complex number by itself, you get a new complex number. But if you multiply a complex number by its complex conjugate, you get a real number.

So it's important to find your complex conjugated twin – and to multiply yourself by him. Then the product will be real. Although you might find yourself waiting eight years to do so.

***

Although Rakel has no children of her own, it's almost as if she has a little boy – the little boy from her neighbourhood. She meets him one day when she's sitting on a bench outside the apartment block, reading *The Brothers Karamazov*.

When he's five months' old, he twists himself away from his mother's breast because he'd rather look at Rakel.

When he's one year old, he pulls up her sweater and crawls in under it.

When he's two years old, he looks at her roguishly and says: 'You're a girl. I'm a boy.'

When he's three years old, he sits in the sandbox and says: 'You don't have a house.' Then he goes back to building his sandcastle and smiles: 'But that doesn't matter. Because you can live with me.'

When he's three-and-a-half, he makes pink hearts out of Perler beads for her, even though blue is his favourite colour. 'Do you promise to take care of them?' he asks. She nods. 'Forever?' he says. 'Forever,' she answers.

When he's four years old, he clambers up onto her lap and plays with her hair. 'How come your hair is so dark?' he says, gently combing his fingers through it.

When he's four-and-a-half, he presses his cheek against hers and asks whether she can teach him to count to one thousand – both forwards and backwards.

When he's five years old, he moves to a place far away. And she thinks that this must be how a mother feels when she has to let go of her son. She will always be rooting for him; will cheer him on forever. One day, little man, you're going to make a girl very, very happy.

The most painful thing about not having children is not having ever tried. The fact that she only has herself to blame. She could have coped – have lived with – fate not wanting to give her children. But can she live with never having tried? She pops into the maternity department of the clothing store and buys a pair of maternity trousers, which she wears at home, just to see how it feels. At least she manages to steer clear of the toy store this time. In her mind's eye she sees a young woman buying a birthday present for the neighbourhood boy, and feels so sad that she doesn't have a child of her own that she buys an extra birthday gift – for the child she hasn't had. She does the same the following year. And so her non-existent child grows parallel to the boy from the neighbourhood. When he turns five, she finds a motorised carousel made of Lego. It's far too difficult for a five-year-old to build by himself, but with an adult to help out she's sure it'll be great fun. So she buys the merry-go-round for her non-existent five-year-old and is so fascinated with the building techniques that she orders several more Lego sets. In the end she has quite the large collection.

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'What's the nicest girl's name you can think of?' asks Rakel.

'Dunno,' says Jakob.

'You don't know?' she says.

‘Rakel,’ says Jakob.

‘Be serious,’ she says. ‘You didn’t call either of your daughters Rakel.’

‘But I don’t know! I’ve never thought about it,’ says Jakob.

‘So how did your children get their names, then?’

‘Well, I…’

‘So what’s the nicest girl’s name you can think of?’ she says.

‘Ane, maybe. Or Ina.’

‘More!’ she says.

‘Irene…?’ says Jakob.

‘Irene is old-fashioned,’ she says.

‘What about you – don’t you have any names?’ asks Jakob.

‘Ada and Iris,’ she says.

‘Any others?’ asks Jakob.

‘Siri, perhaps. But that’s not quite as nice, even though it’s Iris backwards.’

‘And Ada is herself backwards,’ says Jakob.

‘Smarty pants,’ she says. ‘But now we have to decide which ones we like best of all!’

She gets up and goes across to the drawer to get some paper and a couple of pens. Then she writes Ane, Ina, Irene, Ada and Iris on a sheet, which she gives to Jakob.

‘You have a hundred points to divide between these names. And I have the same.’

She takes a piece of paper for herself, too.

Jakob bends over his sheet of paper and concentrates on distributing the points.

‘Done?’ she asks.

‘Yep,’ says Jakob, handing her his sheet. He’s given the most points to his own suggestions, but he’s given quite a few to hers, too. She starts to add up the points, and Jakob leans back on the sofa.

‘We have a winner!’ she says.

‘So who is it?’ says Jakob.

‘Ada, then Iris.’

‘Let me see!’ he says, snatching her piece of paper from her.

She’s given fifty points to Ada, and fifty to Iris.

‘That’s cheating!’ says Jakob. ‘You’ve only given points to the names you came up with.’

‘I said nothing about having to give points to all the names. And it isn’t my fault that you didn’t do your best to win.’

‘Okay, fine,’ says Jakob. ‘It doesn’t really matter one way or the other, and so if you want to win this game so badly, I can gladly surrender.’

What about boys’ names, then?’ says Rakel.

Jakob looks like he’s starting to get tired of the game.

‘Arild,’ he says. ‘And Stian. What about you?’

‘Sinus,’ she says.

‘That’s not a name!’ says Jakob.

‘Yes it is.’

‘Don’t be silly.’

‘I can prove it,’ she says, moving over to the bookcase. She takes down the thick book of names she bought during the annual book sale and eagerly flicks through the pages.

‘Look, right here!’

‘Sinus,’ reads Jakob. ‘Friendship, love, deep down, the heart.’

‘Isn’t it lovely?’ she says.

‘Well yes, but you can’t call a child Sinus,’ says Jakob.

‘Why not?’

‘There’s nobody who is *actually* called Sinus.’

‘Yes there is – there’s six of them! I’ve checked with the Office of National Statistics.

‘Poor buggers,’ says Jakob.

‘Let’s vote!’ she says.

He’s seen though her strategy this time, and so gives all his points to his favourite name. It’s a tie between Sinus and Arild.

‘You can’t call a child Sinus,’ Jakob repeats. ‘Especially if you’re a mathematician.’

‘We can call him Sindre Magnus and just use Sinus as a nickname, then’ she suggests.

‘Him?’ says Jakob. ‘Him who?’

‘Our son,’ she says. ‘If it’s a boy.’

He sighs. ‘You don’t have the strength to look after a child – you can hardly take care of yourself.’

She turns away. ‘You think I’m never going to get better?’

‘Of course you’re going to get better.’

‘Don’t you want to have children with me?’

‘Actually, I feel that I’ve had all the children I’m going to have.’

‘So what about me?’ she says. ‘Will I never get to have a child?’

‘I didn’t say that. We’ll see when you’re well enough to take care of one.’

If she gets well enough, he’ll give her children. If it’s a girl, she’ll be called Ada. And if it’s a boy – Sindre Magnus. And then they can call him Sinus for short. Ada and Sinus.

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Rakel has always regarded her dad as the best thing in her life – the single great joy that enables her to endure all pain. The only person she can’t live without. Papa, who played tickling games with her at the piano. Papa, who recorded her Aurora books onto tapes so she could listen to them over and over again. Papa, who sat on the edge of her bed and sang to her when it was time to sleep:

Rakel, my darling little one,
Come and put your hand in mine,
There’s no-one in the world who will love you like I do.
Joy of life and bright sunshine –
If only I could give you all things so fine,
To always light your future path in time,
My darling little love.

Rakel thought the song was so sad. And what was so sad about it were the words ‘if only I could give you all things so fine, to always light your future path in time’. Because ‘if only’ denoted that this was a wish – that it wasn’t possible in reality. He wouldn’t always be there. And the thought was so unbearably sad. So she had to ask him to stop singing the song. She had to ask him for other things, too: ‘*Remember to turn off the stove and the oven and to lock the door, and don’t go anywhere this evening or in the night or early in the morning. And take Oskar away once I’ve fallen asleep.*’ This last request was actually unnecessary, but Papa thought that Oskar took up too much space in the bed, and that cuddly toys should sleep up on the shelf. So she said it so that Oskar would be able to stay in the bed with her, right up until she fell asleep. ‘Do you have to give me so much homework every night?’ asked Papa. Rakel couldn’t sleep without first ensuring she’d reminded him of everything, but after the time he said this she’d just say: ‘Remember to do your homework!’

She once got so scared that he was going to die that he ended up having to promise her that he’d live until he was seventy – just so that she could sleep at night. She’d worked out that she could then live safe and sound until she was thirty-seven years old. Inspired by a children’s book she’d read about the life of Albert Schweizer, she’d decided to divide her life into two parts. Up until the age of thirty-seven, she could be selfish and enjoy spending time on frivolities – like playing violin, or doing mathematics. But then, when she lost her dad, she would either have to find a worthy cause to die for or a worthy cause to live for. She envisioned becoming an organ donor, because she thought that all she had to do was simply march into the hospital and say she wanted to donate all her organs. Then they’d help her to pass away in her sleep, and help themselves to her organs. The alternative was to be a mother in an SOS Children’s Village in a poor country, far away.

But what she was most afraid of was that she’d end up in heaven, while Papa would end up in hell. At kindergarten she’d been told that people who don’t believe in God go to hell. And Papa didn’t believe in God. Which – of course – meant that he’d end up in hell.

But if Papa didn’t go to heaven, she didn’t want to go to heaven either. Because she wanted to be wherever Papa was. So she prayed a self-composed evening prayer:

‘*Dear God, I just want you to know that I don’t believe in you. Please don’t let Papa end up in hell. If you send Papa to hell, I want to go to hell too. But the fact that I’m praying to you for this doesn’t mean that I believe in you. Just so you know*.’

But she was unsure whether such a prayer would work in favour of its intended purpose or against it, and was afraid that God might conclude that she believed in him after all – since she was praying to him – and then perhaps he would send her to heaven instead of to hell with Papa.

Since Jakob came into her life, it feels – for the very first time – that she might be able to live past the age of thirty-seven.

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She fills the years with Eva Cassidy's voice. *Fields of Gold*. She fills them with R.E.M. *Everybody hurts*. She reads *To the Lighthouse* by Virginia Wolf, and thinks it might be the most beautiful book she's ever read. Then she finds out that the author filled her pockets with stones and drowned herself. This happened on 28 March, the very same date that Rakel first spoke to Jakob in the cafeteria, and in a flash she glimpses an image of a little girl collecting stones in Kringstadbukta bay. Like a little Virginia Woolf with her pockets full of stones, she will always think hereafter. She listens to Christian Ferras's interpretation of César Franck's violin sonata and thinks it might be the most beautiful interpretation of the piece she's ever heard. And then she learns that he, too, took his own life.

'The fact that you managed to complete your doctorate is quite simply a wonder, considering how ill you've been,' says Jakob. 'But you're able to do more running at just twenty per cent capacity than the rest of us are able to do at our maximum. It just shows what potential there is within you, if only we could get you well.' Rakel has no idea how to get well, how to cope with working life. She doesn't have the strength to teach. Gets so worn-out after two group sessions that she then spends the rest of the week getting back on her feet. She feels bad for having accepted the research position at the university – she would never have been offered it had they known just how unwell she is. How little she gets done. That she mainly just lies on her desk, resting. One day, they're going to find out.

She can't help herself – she asks Jakob whether he's still sure. 'It'll be eight years soon,' she says. 'Are you still sure you're going to choose me?'

‘Of course,’ he answers. ‘Why do you ask? Have you become a little uncertain yourself, perhaps?’ Always this technique of turning things on their head, so that it seems as if everything is about her and her problems.

‘But how can you bear to leave your family?’ she asks.

‘I’ll finally be able to be with you,’ he answers.

‘You’ll have to help me develop a good relationship with your kids,’ she says.

‘My son will be fine; it might be harder with the girls. But I’m sure we’ll cope with that, too,’ he says.

‘We can live close by, so that they can still pop in whenever they like,’ she suggests. He nods. She doesn’t understand how he can seem so unfazed. Is it because he isn’t taking the situation seriously? Because he hasn’t properly thought things through?

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The last summer – he’ll soon leave his family. Soon, they’ll be together forever. It’s about time – she’s almost thirty-three years old. The messages he sends her while she’s in the blue city: ‘I’m reading Stein Mehren’s love poems and thinking about you.’ She hears her favourite verse within her:

The light from a face that loves spreads endlessly
across the earth;
For the light in a face that loves
never ends, is on its way – always ongoing
in new people, in new lovers, timeless for all time.

Perhaps she should be hearing darker verses instead?

So shall we never leave one another entirely?
Yes – we will always be leaving each other.
Our ending never completely ends.
(...)
Oh, this must be the deepest kind of loneliness.
To see one’s loneliness in the depths of an unfamiliar face

and know: This face I have once loved and opened
and chased back to the darkness from which it came.

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She must try to be patient. Or try not to nag, at least. Even though there's something in his voice she doesn't quite understand. As if it's started to present itself in a slightly different key – but not enough that she can put a finger on exactly what it is. He's unable to call her as often as he used to. It's so confusing. Why is he no longer able to do everything he managed to do before? She's miserable, cries on the telephone; he says that he's just tired right now. He has a lot to do. 'It'll be good for both of us to have a talk when you get back,' he says.

***

He meets her on the platform – she's so happy to see him. Wants to lie with her body pressed to his – right now – belly to belly. Doesn't understand why he's so eager for them to go to the store so she can buy groceries – they can do that afterwards. He's so odd. But she lets him have his way.

'There's something I have to tell you,' he says, once they've entered her apartment and put down the bags of shopping. His voice is so serious that it frightens her. Has someone died? One of his parents? Or has someone fallen ill? Oh, no – please don't let it be one of his kids!

'Lea knows about us,' he says.

It takes a moment for her to understand who he's talking about, so rarely has she heard him say his wife's name. But that doesn't matter, she thinks, relieved – and is about to say that of course he can move in with her right away. It was going to happen anyway in a few months' time. In fact, maybe it's just as well that his wife has found out on her own – it might have been hard for him to make himself tell her.

'I have to end my relationship with you, Rakel,' she hears him say.

She looks at him in disbelief. Can't believe that he means it; cannot comprehend how he could pronounce these words. She stares at his lips to see whether they can possibly have said the things she's just heard him say. It's suddenly so silent. The music playing inside her

has stopped. But then she hears a faint sound after all – the sound of something rupturing. She realises that her skin has become too tight. That she's no longer human, but an animal about to shed him.

Who is he, really? And who is she? She hears her own voice blurt out a desperate *No!*; realises that her mouth is open and that she should probably close it. If only she could remember how.

'But you don't love her,' she says.

'I thought all my feelings were gone, but we've spoken so much lately I've realised they're still there.'

'But how can you suddenly love her again, just like that?'

'I've been reminded of all her good qualities.'

'Such as?'

'Her magnanimity, for one thing. Many of the problems we've had have been my fault. Because I got bored and lost interest. Now things between us are better than they have been for many years. And much of that is thanks to you, Rakel.'

'Is it because I'm so ill? Because I've been away so much lately?' she asks.

He shakes his head. She's sure that everything would have been different if only she'd been present; if she hadn't been away when he made his decision. It feels so unfair that he hasn't included her in the process; that he hasn't kept her in the loop about the slightest thing. That he has planned to tell her this and simply vanish from her life – even though he's all she has.

'How could you let me wait so long for you if you don't love me?' she hears herself say. 'We even chose names for our children.'

'I don't know,' he says quietly. 'I just wanted to lean your loneliness slowly against mine.'

Lean your loneliness slowly against mine. Almost as in the poem by Stein Mehren. But Jakob said *slowly* – not *quietly*. Was this a mere slip of the tongue? Or, by exchanging

these words, had he consciously captured the weight of their encounters – the weight that made time move more slowly, made moments fix themselves forever?

I just wanted to lean your loneliness slowly against mine. What kind of excuse was that? It was hardly a tenable explanation. He was obviously just as full of poetry and bullshit as usual. 'You say the strangest things when you're drunk,' she used to say to him. 'I haven't touched a drop of wine all day,' he'd said to her – a little insulted – the first time. 'You say the strangest things when you're drunk,' she'd repeated. 'Your soul inebriated, your eyes overcome – intoxicated by love.'

Can gold be turned to granite with nothing but words? Can happy moments turn unhappy when looking back on them from the future? He'd once asked her about this. 'After people get divorced, many of them seem to think that everything was shit all the time,' he said. Her response back then had been: 'Even though they see things that way from some point in the future doesn't change the fact that they felt happy there and then.'

But his words changed her from gold to granite in an instant, and now she can no longer imagine that she's made of precious metal; that she's suffered for the benefit of others. Now she is only granite. No – worse than that – she's nothing but the muck beneath the stone. A common mistress. Not the great love of his life, as he's led her to believe.

That night she goes out onto her eighth-floor balcony; sits there with her legs over the railing. Because right now, she doesn't give a damn about the poor wretch who'll have to find her. Right now, she cannot take any more. She looks out across the sleeping city. Grey and cloudy weather, but no rain. No tears, either. In the east, the sky has already started to brighten. When the city wakes, she'll no longer exist.

Then she catches sight of it – a rainbow over Nesoddtangen. In the exact same place she's so often fixed her gaze and thought about Jakob, at home with his family. A rainbow exactly when she needs it most. No sun in sight. No raindrops, either. So then how is it possible for a rainbow to appear? It stretches straight up towards the sky, like a deprecating hand. *You simply can't do this, Rakel. No-one will ever be able to forgive you for it.*

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