Blind Guy Travels
“Brick by Brick”

MATTHEW SHIFRIN: We all have people in our lives who have changed us, and for me, Lilya Finkel was one of those people.

Lilya met my parents in Russia, literally a few days before they immigrated to the U.S. in the ’80s. Lilya immigrated six months later and also settled in Boston, where she babysat for my older sister and then, years later, for me.

But it wasn't just babysitting. Lilya was like another member of our family: always around, and always in good spirits. She wore the tiniest bit of perfume — just enough so that I could tell that it was her when she entered the room.

When I was young, Lilya taught herself how to read and write Braille, just so she could teach me. She created Braille Mad Libs for me, and a Rubik's Cube with little Braille labels marking the colors of each square. She was always keen on helping me experience as much of the world as I could. Once, she even let me take the wheel while driving around the neighborhood. It was pretty terrifying for *me*; Lilya loved it.

[Jaunty piano music begins.]

MATTHEW (CONT'D): But the greatest gift of all arrived on my 13th birthday. On that day, Lilya came over lugging a big cardboard box and a big fat binder, as thick as a phone book. On the box was a Braille label: "LEGO Battle of Alamoot, 821 pieces."

I was intrigued. I'd read about this set online: "a fortress bristling with barrels of dripping oil, catapults, and castle guards." It even came with a LEGO camel! I never thought I'd actually get the Battle of Alamoot, though. After all, blind kids can't really build LEGO sets, because the instructions are all pictures. Despite that fact, I had always been a LEGO fan, and Lilya knew it. She'd actually introduced me to LEGO, when she found a crate of assorted pieces sitting at the end of someone's driveway on our way home from a piano lesson. And she knew I'd be excited about building this palace. But the real gift wasn't the LEGOs, it was the binder.

I'm Matthew Shifrin and this is Blind Guy Travels, from Radiotopia.

[Music ends.]

I opened up the binder from Lilya, and spread out before me were pages and pages of instructions, describing every step of the building process.

[Reading instructions.] Step 1: Take a camel and put the saddle on it. Step 2: Take a flat 8x2 and put it horizontally on the table. Put a flat 2x1… *[Instructions fade under.]*

Lilya had created a system for identifying each piece by its tactile qualities...

[Reading instructions.] Take a flat 2x2 with connectors, and put the wheels on the connectors. *[Instructions fade under.]*

… And describing exactly how they all fit together, so that the whole set could be built by touch.

[Reading instructions.] … to the left of the previous piece, wheels to the front and to the back… *[Instructions fade under.]*

[A person sifts through LEGO pieces.]

Then she pre-sorted the pieces for each step into separate bags, so I wouldn't mix up the colors.

MATTHEW (CONT'D): *[Reading instructions.]* Bag 1: make the person. Bag 2: make the people. Bag 3: make a camel. *[Instructions fade under.]*

Lilya typed these instructions by hand, in Braille.

[A person types on a typewriter. Sound mixes with instructions and fades under narration.]

Now, if you've never seen a Perkins Brailler, imagine an old typewriter, but way louder, that punches little sequences of dots into thick, rough paper. It only has six keys on it, one for each of the six dots that combine to form Braille letters and numbers.

[Typewriter dings.]

So instead of pushing one key at time, like on a typical keyboard, you're pressing up to six keys at a time, in many different combinations. And you have to really press them hard to get a good indentation. Point is that writing these instructions was a *lot* of work.

[Tapping on typewriter keys mixes with simple piano music, then ends.]

I remember in elementary school, my sighted friends were obsessed with LEGO. They'd come to class with tales of the Hogwarts Express or tow truck they'd just finished. I was in awe. It would take me hours to finish even a small set when building with my parents. They'd have to tell me what piece to look for, one by one, and I'd go scrounging around for it in the box. The whole process was exhausting.

[Reading Braille LEGO instructions, which fade in over top of each other.] Number 5: put the 3x2 part next to it. Number 6: put a 2x2 part on the joint between… Number 7: put… *[Instructions fade under.]*

Now, years later, with Braille instructions in hand, I spent my entire 13th birthday building… And by bedtime, a domed Middle Eastern palace loomed before me on the kitchen table. And that's how LEGO for the Blind began.

[Simple piano music ends.]

A few months after my 13th birthday, Lilya was diagnosed with stage 4 cancer. No one knew how long she had to live; the doctors said a year at most. I was devastated, but I couldn't just crumble into a depressed mess. Lilya certainly wasn't crumbling; she was taking it day by day, one task at a time. So I did the same.

MATTHEW (CONT'D): *[A clip of Matthew building with LEGOs.]* OK, here we are… Uh, I'll just read the instructions out loud. It says: Insert two sticks into the two holes on both sides of the large, rectangular… *[Clip fades under.]*

When I'd call her after chemo, she'd be too exhausted to talk. And yet, she was still typing up LEGO instructions and sorting pieces into Ziploc bags with Braille labels so I could build faster. After we finished building the palace, we moved onto Hogwarts castle...

[Matthew building.] Oh yeah, yeah, yeah, the ship is going to be hard to build. *[Clip fades under.]*

… a pirate ship, the Sydney Opera House, and London's Tower Bridge. As the sets got more complicated, we realized that there was an easier way for Lilya to translate instructions: She could just type them into a Word document, which I could then read on my Braille computer. This streamlined our whole process. As Lilya wrote instructions, I would build the sets, checking for errors as I went.

[Matthew building.] Oh, never mind. I was hoping it would make a clicking noise, but… it didn't. And now I have to put two more... *[Clip fades under.]*

Around this time, I reached out to LEGO to see if they'd be interested in making their own text-based instructions for the blind. I mean, if Lilya and I could make instructions from our living room, LEGO could make every set accessible, no problem. Right? Trouble was, I didn't quite know who to talk to. And neither did the customer service rep I got on the phone. So Lilya and I decided to launch our own website: legofortheblind.com. And it kind of took off.

[Clip from the PBS documentary, "How LEGO Helps Blind People See"]
VANESSA HILL, INTERVIEWER: So Matthew and his family friend Lilya developed a system to enable blind or visually impaired people to build commercially available LEGO sets…
[Clip fades under.]

MATTHEW: Popular Science interviewed us, TIME for Kids got in touch…

[Montage.]
VANESSA: … Matthew calls it LEGO for the Blind…

NEWS ANCHOR: … Now he's doing the same for kids everywhere. Voice and Braille instructions for four different LEGO sets…
[Montage fades under.]

MATTHEW: The emails started pouring in. A lot of them came from blind children or their sighted parents, requesting we make instructions for their favorite sets. Blind *parents* with sighted children also wrote to me, saying that they finally understood why their kids were so obsessed with LEGO, and telling me how great it felt that they could finally check their kids' work to make sure that all the bricks were in the right spots. I even got emails from sighted kids who wrote, "Hey, I'm not blind, but this is really cool! Keep it up!"

[A waltz on piano begins.]

I've often thought that creating text-based instructions kept Lilya going. They gave her purpose. When things got really bad, I'd come over to her house and sit by her side, building LEGO sets as the oxygen concentrator whirred and hummed.

The doctors had given her a year to live, but she lived for five. And they weren't five years of pain and suffering; she was energetic as always. She mentored autistic children, translated books from Russian to English, and still made it to church almost every week. The cancer and chemo almost seemed to fade into the background. And in that time, she created instructions for over 40 LEGO sets.

[A recording, taken outside.]

MATTHEW: Lilya, what inspired you to take on a project of such magnitude?

LILYA FINKEL: [Laughs.] I didn't know it was of any magnitude when I started it…

MATTHEW (as narrator): This is the only conversation I recorded with Lilya, a few years before she died.

LILYA: It was interesting to realize that the most explainable and adaptable thing is words. You cannot build a model to copy it; it's too cumbersome. But you can explain it with words.

MATTHEW: Is there anything that you would like people to know about the process of adaptation?

LILYA: It's exciting. It's very rewarding for both of us. After I started it, I noticed that my whole thinking process changed a little bit. I was always a word person and never a construction person. And after I've done quite a lot of these directions, I found out that I could fix a broken air conditioner or a toilet bowl or something. And it was amazing, because it inspired me with confidence that I could do something like that. And it really expanded my mind.

MATTHEW: I would agree. I would say that it's just been really interesting for me, as a blind person, to really be able to — to feel on par with sighted people. And Lilya, thank you so much for your time.

LILYA: But I wanted to add that it's not being on par. It's a much higher level of building. Because if you ask anyone to close their eyes and to read the written instructions, and then to build it without benefit of sight, I think it's a real feat. It's amazing that someone can do that. And it's not being on par. It's being much, much higher.

MATTHEW: Thank you Lilya.

LILYA: Thank you.

[Recording ends.]

MATTHEW: Lilya Finkel died on April 3, 2017. At that point, legofortheblind.com had been up for less than a year. There was no way I could continue writing instructions on my own, but it felt important to try — and not just to keep Lilya's memory alive, though that was a big part of it.

Building LEGO sets gave me insight into things that I'd always heard described, but never really understood. You can't wrap your hands around Big Ben, or scale the Statue of Liberty, but when you build these monuments by yourself, you can understand their shape and their form.

The same goes for fictional objects. No one I know has a life-sized Millennium Falcon or Batmobile lying around, so LEGOs were my way of touching the untouchable.

Soon after Lilya died, I was talking to a friend at MIT about the project, and it just so happened that *his* friend had recently moved to Denmark to work at LEGO. So my friend put me in touch with his friend, who, in turn, put me in touch with Olav Gjerlufsen, the head of LEGO's Creative Play Lab.

OLAV GJERLUFSEN: My name is Olav Gjerlufsen, and I've been working with LEGO for 40 years. The last few years with different kinds of digital experiences for children. Yeah.

MATTHEW: So what made you decide, I mean, when when we first met, I mean, I just wrote you this email and I kind of talked about the instructions that my friend and I had made. What made you decide to pursue this project?

OLAV: That was your good story.

MATTHEW: Mm-hmm (affirmative).

OLAV: At the very first point, how you as a blind, visually impaired, who had the opportunity to actually, to build with LEGO. And as I see it, LEGO should be for everyone.

MATTHEW: Oh, absolutely.

[Playful piano music begins.]

OLAV: And if we could help them in any way, then we should do so.

MATTHEW: Olav was inspired by Lilya's instructions, but realized that he needed a totally different approach.

OLAV: It was obvious that we couldn't do the same as Lilya, who did for Matthew, writing everything down manually.

MATTHEW: So Olav decided to go with a more high-tech process.

OLAV: We should do that in a more automated way.

MATTHEW: And what he realized was that LEGO already had text-based instructions for many of their sets… in a way.

OLAV: When we actually are doing building instructions, digital building instructions on the computer, there is a code, in behind, describing the individual elements, the individual components, and their position and their colors and everything. It’s all available in there, but it's in a coded computer language. So the idea was, if we could translate that into something that could be understood.

MATTHEW: But he didn't want to rely on someone manually translating these instructions from computer code. He wanted to automate the process. So, Olav came up with something much faster.

OLAV: That was kind of machine learning, artificial intelligence. That's what we used.

MATTHEW: An algorithm that could be trained to take LEGO designs straight off a computer, and spit out step-by-step, text-based building instructions.

OLAV: It has not been done before. We're learning a machine how to read the computer code.

MATTHEW: Mm-hmm (affirmative).

OLAV: That has never been done before.

[Clip from TODAY show story]
FENELLA CHARITY: … It just really brings so much purpose to what we're doing at LEGO.
KERRY SANDERS: The company developed four sets, using software to translate the visual…
[Clip fades under.]

MATTHEW: Two years after that first conversation, in 2019, LEGO released their first text-based instructions.

[Clip begins.]
COMPUTER VOICE (reading LEGO instructions): Find two bright yellow bricks, 1x2.
INTERVIEWER: What do you hope…
[Clip fades under.]

MATTHEW: At this point, word about the Braille instructions spread even faster.

[Clip from Reuters story "AI Brings LEGO to the Blind."]
[Sound of LEGOs being moved around.]
EMILY WITHER: That's Matthew Shifrin. He was born blind. But, at the age of 13, he built a LEGO model himself for the first time…
[Clip fades under.]

MATTHEW: And I started meeting more and more blind kids who, like me, were obsessed with LEGO.

[Clip from Reuters story.]
CHILD: … because now I might actually be able to build with my brothers. They're obsessed with LEGOs, and I…
[Clip fades under.]

MATTHEW: And one of those kids was Alex Rosario. He's twelve years old.

[A recorded call.]

ALEX ROSARIO: Hello?

MATTHEW: Alex!

ALEX: Hi!

MATTHEW: Can you hear me?

ALEX: I can.

MATTHEW: Hey, great— great to hear you.

MATTHEW (as narrator): We got back in touch recently, with some help from his mom…

ALEX'S MOM: We're making our way upstairs…

MATTHEW: And Alex told me about what he's been working on — a massive LEGO amusement park, about the size of a pool table.

ALEX: K, so… the idea is the table at the bottom is kind of like the entrance area, with all, like, the restaurants and stuff for the amusement park. There's a pizzeria, a bunch of ice cream carts, and cotton candy stuff. And then I have my roller coaster. And then inside my roller coaster, there's…
[Fades under.]

MATTHEW: Alex reminds me a lot of my younger self — his curiosity, the thrill he gets when building…

ALEX: … and then as they spin, they swing outward. So if you spin them really fast… *[Fades under.]*

MATTHEW: … and his love of LEGO not just as a toy, but as a way to learn about the world around him.

MATTHEW (as interviewer): What was it like when you found these text-based instructions and you were able to build with them?

ALEX: Oh, it was awesome. I felt — I felt like a whole new door had opened. Kind of like, OK, wow, this is how these parts go together.

MATTHEW: What do you think you've learned from building with LEGO? Has it taught you anything about… about the world?

ALEX: It's taught me pretty much how a lot of different things are made that I was never able to really realize because I can't see much.

MATTHEW: Oh, and the roller coaster is a great example.

ALEX: Yeah!

MATTHEW: We've all ridden roller coasters…

ALEX: But getting to really see and build the track design, and getting to watch it go up and around and back down, just really kind of let me think, like, “Wow, this is what it's like to see a roller coaster.”

[Simple piano music comes in.]

MATTHEW: If you're a sighted person, the world takes shape instantly, right in front of you. You can look at an object and take it in all at once. Touch is the opposite. It's sequential, meaning you can only take in parts of an object, and your brain fills in the gaps, trying to guesstimate what this object is and what it does.

For blind people, understanding the world is a step-by-step process. I might feel a side mirror and know it's part of a car, but I can't tell you anything else about the car itself unless I feel my way around the whole thing. Building a LEGO set is the same but in miniature, and there’s a special kind of surprise and delight you get when the pieces are all in place and you suddenly comprehend the whole.

MATTHEW (CONT'D): I remember when I went to Denmark to demonstrate the text-based instructions at LEGO's headquarters, they had a LEGO version of the Great Wall of China on display. In my mind, I had always pictured it as a regular wall, flat and straight, like the kind inside your house. No one had ever thought to tell me how uneven it was, how it rose and fell, punctuated by battlements and observation points, and how it, too, was built brick by brick by brick.

[Music ends; new, slow piano music begins to play.]

As of today, LEGO has adapted 25 sets for blind builders, and they plan to continue adapting, so that hopefully someday soon, every new LEGO set will come with downloadable, text-based instructions.

MATTHEW (as interviewer): Alex, is there anything you want to tell other blind kids. Let's say other blind kids want to get into LEGO and they don't really know what to do, what would you tell them?

ALEX: I guess, just do whatever you want. That's the whole point of LEGO.

[Piano music comes up to full volume, then fades under.]

MATTHEW: What's the most rewarding thing that you get out of spending hours upon hours of typing up these instructions?

LILYA: [Chuckles.] The wonderful thing was that when Matthew started building the first real LEGO model, he was kind of talking to himself. And I overheard him sing in a singsong voice, saying, "I'm a boy. I'm building LEGO." That was amazing.

[Piano music comes back up to full volume, then ends.]

MATTHEW: Blind Guy Travels from Radiotopia is written and performed by me, Matthew Shifrin.

[Jaunty, playful piano music begins.]

I also wrote and performed the music in this episode.

Our producer and sound designer is Ian Coss. Audrey Mardavich and Julie Shapiro are our executive producers.

If you'd like to build using text-based instructions, visit legofortheblind.com, or legoaudioinstructions.com.

Blind Guy Travels is a production of Radiotopia.

[Piano music ends.]

END OF EPISODE.