"Where are you headed next, Alice? Down another rabbit hole?" was said to me as I was scuffling around the hotel, draped in mathematics and my petticoat swinging in step, looking for another puzzle to do. I do not often find myself at a conference surrounded by puzzles, geometries of various materials and scales, magic, juggling, and play, but that's precisely where I was at the Gathering for Gardner in Atlanta. I had quickly acquired something of a reputation at the gathering for my boundless excitement at just about everything; if I wasn't squealing, giggling, and jumping up and down at a remarkable solution of a twisty puzzle or mathematical magic trick, I was stood, mouth gaping wide open, treating breathing as an optional exercise, marvelling at juggling artistry or beautifully simple demonstrations of very complicated mathematical ideas. I was in Wonderland. I had crossed the Atlantic Ocean just to be there, and as a result, I had found a place with an atmosphere of pure magic.

The Gathering 4 Gardner (G4G) is a biennial celebration of all things recreational mathematics, magic, literature, art, puzzles, and everything in between. This is all in celebration of the gathering's namesake, Martin Gardner, who showed the world that mathematics invites play; for those who engage, it offers wonder, excitement, and a twinkle of magic. I really must note that the sentiments I am expressing are not exaggerations for the sake of a poetic narrative but rather my experience of a particular effect that Gardner had on those who encountered him: "He turned children into mathematicians and mathematicians into children".

Welcome to Wonderland

Getting to the hotel from the train station required what I can only describe as falling up a rabbit hole in the form of the tallest set of escalators I have ever seen. From this point, it was very clear I was not in London anymore (except for a curiously placed telephone box). Everything felt larger than life, and once I had reached street level, I had a mysterious feeling that I had perhaps shrunk, for how else could these buildings be so large.

Once I'd arrived, my next challenge was working out where to go next. There were doors that led to more doors, winding staircases and people rushing to and fro', but amid this chaos, I spotted what was undoubtedly a mathematical conversation and decided this was a promising place to start. With a new sense of purpose and a slightly improved sense of direction, I sorted myself out, put down my things and started exploring.

A Nonsensical Series of Events

What follows is a grouped retelling of the things I found most mind-blowing; I have abandoned all attempts to tell this in the correct order because, in such a magical place, chronology is a frivolous pursuit. In places like this, enthusiasm combined with an inclination towards effervescence has a magnetic appeal, and at G4G, this was to an overwhelming extent. The trouble with being openly excited about puzzles, magic and maths is that it means people *will* show you their puzzles, magic and maths, and this is a perfect storm for exhaustion because the more outwardly excited one gets, the more people show you their neat tricks and around we go; so, I made a conscious effort to pace myself.

So. Many. Puzzles.

Upon arriving at the registration desk and declaring my interest in puzzles, I was asked, "Do you make puzzles or solve them?" It did not occur to me that this was a question one could ask. When I was questioned further as to which kind of puzzles I liked to solve, I realised that I was about to learn a lot of new things in very, *very* quick succession.

In Particular, Twisty Puzzles.

Twisty Puzzles: an endearing name for a sophisticated and diverse set of puzzles. Most will have seen the 3x3 cube, commonly referred to as the Rubik's Cube, but if you thought that was all the puzzles one could twist to solve, you would be grossly mistaken. Starting with the basics, there are cubes and bigger cubes and cubes bigger still of curious colours or some with no colours at all, of sizes from absolutely enormous to very (very) small (I found a 1x1 cube someone showed rather amusing). But I bet when envisaging these cubes, you have in mind a cube whose faces were made up of square tiles all of equal size, but what is stopping the particularly puzzling from tiles of all sorts of sizes or shapes? While we're at it, why not have a twisty puzzle shaped like a tetrahedron? Or a sphere? Or your favourite polyhedron? But I get a bit ahead of myself; my skillset remains firmly in the realms of the 3x3, so I will pause this chatter here, grab a 3x3 cube and make my way to the next mathematical playroom.

Extreme Juggling.

When I was 10, I went to a Saturday circus club where I learned how to walk on stilts and a ball, as well as other creative methods of transportation. I also learned what became one of my favourite party tricks for the ten years that followed: juggling. Learning to juggle was a big deal for me as someone who struggles with coordination, so once I had grasped my new skill, I showed everyone who would watch. In the pursuit of more novelty, I graduated to performing the same juggling pattern with objects beyond the standard juggling balls, like TV remotes, much to the annoyance of my parents. The first time it occurred to me that I hadn't yet reached the peak of juggling possibilities was at a talk at the Royal Institution in London called "The Unexpected Maths of Juggling", given by my friend Colin. Now, I'm a big fan of finding algorithms to describe how to do (and, therefore, generalise) things and combining that with the novelty of maths in unexpected places, so to find out that it was possible to use maths to invent juggling patterns put me at serious risk of being nerd-sniped... What I learned at G4G, however, was that what I had seen at the Royal Institution was only the start. There was

juggling with all manner and quantity of objects; sometimes it was set to music, and other times it was choreographed into dance, but what left me in wide-eyed wonder was when movement, music, and careful weaving of a variety of objects, sometimes many, sometimes few into a narrative was used to tell a story with not a single word. It's an art that takes mathematics, physics, and coordination and creates a story more remarkable than the sum of their parts.

An Atmosphere of Pure Magic.

What was most striking about my time at G4G was the atmosphere itself; there was something so special about it, where people from all over the world, from all walks of life, could come together to *share* what they love with people who may be familiar, but especially with people who aren't. I felt so welcome from the moment I got there and felt like I belonged, which can be hard to find. I fell up a rabbit hole to this wonderful place, then ran through countless (not really) doors to find the most incredible and bizarre feats of mathematical ingenuity and creativity.

But, worth infinitely more than all the things I found on my adventures through Wonderland was meeting the most amazing, kind, intelligent, and inspiring people: my people. I had several moments where I paused to reflect on how grateful I felt to be there and how thankful I was to be part of this amazing community of people who were endlessly passionate about their niche thing and even more passionate about making sure other people could experience it. I want to thank everyone who worked so hard to make G4G happen, for creating this magical and wonderful space for maths and play, and for the scholarship I received that enabled me to attend! The Gathering 4 Gardner 15 was the most amazing and magical experience, and I cannot wait for the next one!