

Dear Theodore Gray,

Your every word, your personal anecdote in your book *The Elements: A Visual Exploration of Every Known Atom of the Universe* was an atom of solder that created for me a connection to my own life goals. My life is like an incomplete calculator: there is a battery with a copper wire connected to it, and a silicon circuit board. All I needed was some tin solder to connect that wire to the circuit board. The solder I needed was your book. As I was reading I gradually started to make connections. Your book brought back pieces of my past and connected them to the present. Soon after making these connections I would understand my life goal.

In our seventh grade yearly book fair, my science teacher came up to me and pointed at your book. I skimmed through some of the first few pages and then rashly bought the book. At home after I read your precaution to not drop the book on my foot, I became confused with the names of groups in the periodic table. Although too technical for me to understand quantum mechanics, it became something of a challenge and although I did not comprehend it the first few times, I kept at it. Unfortunately, I eventually had to give up and move on to the elements.

Needless to say I was happy once I got to hydrogen, since I actually understood some parts of it. My grandfather used to print off astronomy pictures of the day and he would show them to me. I was reminded of these pictures by your choice to use the Eagle Nebula in your representation of hydrogen. My first practical application occurred when I was able to find boron samples around my house – Silly Putty and a boron carbide lock. Now every page became a new discovery to me. With carbon you mentioned that diamonds could make your lip feel cold since it was such a good conductor of heat. When my mom got home that night I told her I wanted to make sure her ring had a real diamond in it. I later assured her that it was. With that success I decided to melt objects to get to their base components.

Farther into the book I started picking up on low melting point metals and how you had melted zinc down on the kitchen stove as a child from scarp zinc roof flashings. However, as you well know in e 21<sup>st</sup> Century, not as many roofing products are made of zinc, and unfortunately there are no scrapyards near my house. I began to look for expendable (or so I thought they were) objects that were in my house. The only way I would find out if they were zinc was if I melted them in a pot over the stove. My first choice was a monopoly character piece because they sure looked like zinc, but to my disappointment they would not melt despite my best efforts. I tried to do some level of research as to find distinct characteristics of zinc versus other similar metals, and fortunately I also discovered that zinc, when molten and in contact with water, explodes. My mom is not fond of explosions so I read further, searching for some other metal that I could melt.

I came across gallium, but its lack of applications in household items precluded further experimentation. Zinc and gallium were a depressing no but tin proved to be the experiment! I wanted to make a cast of something out of clay, similar to the tin soldier you made, so I used clay to make a rough cast of my finger. I placed solder in this basic cast, closed up the hole with some more clay so I could lay the cast on its side, waited for it to dry, and put it in a heated oven. It did not take long for the clay to start popping and shooting shrapnel all throughout the oven. I quickly turned off the oven, and was disappointed when the cast had cooled off only to find that none of the solder had melted. I used aluminum foil. I folded and shaped the aluminum around a pencil, and removed the pencil, then put a plastic funnel at the top. You probably know where this was headed. First the plastic funnel melted, and second, my completely exposed hand was right below the melting plastic. I immediately stopped, once I felt the really hot sensation in my hand. I was lucky that only molten plastic touched it, as the burn would have been far worse had metal touched it. My singed fingers and the mess in the oven dictated no more experiments.

With that I came to the conclusion you had the resources that I did not, so I decided to observe things. With consistency and dedication I began to notice everyday objects differently. Sometimes on occasion when there was a sample picture in your book similar to something I had seen in my life, questions would start popping up, “Is that samarium in it or not?” These questions satisfied my ever

growing curiosity. I began to love verbalizing these questions and was always intrigued to find the answers. In high school chemistry class I soon learned to love the experiments even more, and I realized how I could answer some of these questions by performing experiments safely.

Also in my chemistry class I started to reread your book. I started using your book for reference and answers to questions I had which developed skills to find the answers on my own. By my sophomore year I was asked the question what I wanted to be. In nothing short of an epiphany the skills I had developed, this mindset of asking questions, my constant longing for knowledge and affinity to chemistry, all came together and my “calculator” gave me my answer: chemist. The word resonates in my head. The idea of working with elements, and compounds, finding out what makes them do the things they do, makes me elated.

Now I could simply tell you that in the moment my brain released a good amount of dopamine and some oxytocin mixed in that made this feeling so amazing, but it probably has also a large amount of non-chemistry reasons too. I am a junior, I love chemistry, and I plan to go to college and major in chemistry, and then work towards a doctorate. This accomplishment would make me the first person in my family with the title doctor to be in the research field. The book that I had bought 4 years ago is no longer in my possession as it had become so worn down that there was no binding left and was just a pile of pages. I have since acquired two more copies of your book. Your book is iconic to me as it plays a constant role in my life. It consistently keeps me going and reminds me of what I want be every day. When I am a chemist your book will still be with me in my mind and in my hands, but not on my feet.

Sincerely,  
Matthew Heaney, Grade 11