

Books & arts



CHARLIE MURPHY

Fired up: Anna Ploszajski gets to grips with the art of glass-making in her quest to fuse scientific theory and creative practice.

From spoons to semiconductors — we are what we make

Through a tour of ten materials, a scientist explores knowing through doing. **By Anna Novitzky**

When materials scientist Anna Ploszajski took up science communication, she found that the more she discussed her research with others, the less she could answer their questions. She knew all about the molecular interactions that give materials their strength, flexibility or hardness, but she couldn't tell her friends and family about

the best alternative to plastic, or why phone screens are made from glass even though it's prone to smashing. To address these gaps in her knowledge, she got hands-on, exploring how artisans interact with substances that she knew only in theory.

In *Handmade*, Ploszajski investigates ten materials. She starts with the classic categories of her field: glass, plastic, metals such as steel

and brass, and ceramics. She then moves on to materials common in making and crafts, and less often considered in the laboratory: sugar, wool, wood, paper and stone. She tries glass-blowing, pottery, steel casting, knitting and spoon carving; learns about plastic art, trumpet-making and stonemasonry; and gains a holistic perspective on objects to which she had never given a second thought.

The efforts bring an understanding of the properties and cultural impact of materials that helps her to communicate more clearly. As a chemist-turned-wordsmith, and a keen dabbler in crafts from knitting to origami, I related deeply to her search.

Ploszajski intersperses her experiences with the materials-science view of these media, from the amorphous molecular structure of glass to the chemical reactions between calcium minerals, moisture and carbon dioxide that give lime mortar its remarkable

“Scientists often forget that their experiences and culture affect every aspect of their work.”

self-healing properties. She describes the history of each material’s use, with snippets of tradition and archaeology from around the globe – ranging from 3,000-year-old ancient Egyptian knitted socks to wind-operated furnaces in Iron Age Sri Lanka. And she offers anecdotes about what the materials have meant to her: her immigrant grandfather’s plastics-manufacturing business; the sugary snacks that got her through a swim across the English Channel; how paper, relaying thoughts and stories written by lesbians of centuries past, helped her to grasp her own sexuality. The result is fascinating and affecting.

Real-world impact

Under ‘Steel’, Ploszajski describes how, as an undergraduate, she won a place on a team building a vehicle to tackle a land-speed record. She worked out that cogs in the car’s engine were breaking under stress owing to carbon atoms clumping inside the metal. But, lacking the confidence to share her ideas with the older, male mechanics, she was unable to apply the understanding in a practical way that could help the team to reach its goal.

This disconnect between doing good science and presenting it in the way that people need has become all too obvious during the COVID-19 pandemic. Researchers can understand the mechanisms of infection, produce effective vaccines and report compelling epidemiological data. Yet without an appreciation of why people cannot or will not take vaccines, the findings might not help people.

Ploszajski’s experiences also shine light on how people shape research. Scientists aim for objectivity, but often forget that their experiences and culture affect every aspect of



Spoons that Ploszajski carved as she explored the medium of wood.

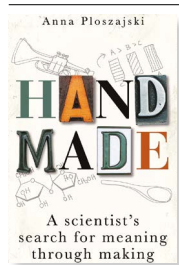
their work. Just as the grain of a piece of wood dictates the shape of the spoon that Ploszajski carves, the structure of a society dictates the research questions that scholars pursue. This isn’t necessarily a bad thing; trouble arrives when researchers forget that their approaches are shaped by their circumstances. Similarly, Ploszajski, a trumpet player since childhood, learns with surprise that the instruments are not always made of brass; some players prefer the sound produced by silver or copper. This put me in mind of how astronomy is usually considered a visual science – but some blind astronomers have pioneered investigating

the cosmos through sound.

I did wish for more from Ploszajski’s accounts. Directed mainly at lay readers, the book’s scientific explanations stopped just as I began to be intrigued. And she only scratches the surface of the history, cultural connotations and potential uses of each material. I almost wished for a volume based on each chapter, an encyclopedia of science and craft.

It’s enlightening to reflect on how our physical experience affects our thoughts. And, as Ploszajski points out, it’s unhealthy to compartmentalize: each can improve the other. As a crafter, I well understand the comfort Ploszajski finds in creation. There’s something magical about spinning disparate, fragile fibres into warm, strong yarn, or coaxing solid cheese curds out of liquid milk. After a day of thought and theory, it’s delightful to hold something real in my hand and say: I made this.

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Handmade: A Scientist’s Search for Meaning through Making
Anna Ploszajski
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