Matthew Reinhart: Pop-up Art and Paper Engineering

A conversation with Anna-Sophie JÃ¼rgens | Section: *Visual Science Storytelling, Sequential Art & Illustrated Science Communication: Introducing a New Series*

Abstract: This article spotlights acclaimed American author, illustrator and paper engineer and artist Matthew Reinhart, whose extensive body of pop-up book work bridges storytelling, design and scientific imagination. Reinhart has crafted dozens of unique, immersive, three-dimensional reading experiences that range from pop culture icons to science-rich explorations of the natural world. In this article, Reinhart discusses how his tactile and dynamic books ignite curiosity, invite questions and transport readers â both young and old â into captivating science realms. The conversation delves into the encyclopaedic pop-up format, exploring its potential as a compelling tool for science communication and creative exploration. It elucidates Reinhartâ s artistic concept but also how Reinhart pop-up books merge meticulous craftsmanship with immersive storytelling to make science accessible and, ultimately, exciting.

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Matthew Reinhart, what a pleasure to welcome you to the online journal w/k! You are an American writer and illustrator of childrenâ s and picture books, with a background in Industrial Design (Pratt Institute in Brooklyn) and an interest in biology. More so, you are a paper artist and paper engineer â and the breadth of your pop-up book publications is mind-blowing! Your pop culture-themed work ranges from titles like *Cinderella: A Pop-up Fairy Tale* (2005), *Star Wars: The Pop-Up Guide to the Galaxy* (2007) to *Lego Pop-up: A Journey Through the Lego Universe* (2016) and *Frozen: A Pop-up Adventure* (2016). Themes of science â especially biology and palaeontology â and the natural world feature prominently in your work. For example, together with pop-up book artist and paper engineer Robert Sabuda, you are the co-creator of the *New York Times* best-selling three-volume pop-up series *Encyclopedia Prehistorica*, which explores dinosaurs and â mega-beastsâ . Your first solo pop-up book became *The Pop Up Book of Phobias* (1999). Since then, you have created books focused on beetles and butterflies, as well as a pop-up *Insect-lo-pedia* (2003) (among many other projects). All of this is very interesting for our w/k series on â Illustrated Science Communicationâ ! We would like to invite you to share your thoughts on the science communication power of your science-themed (broadly defined) three-dimensional pop-up art and publications. The aim is to better understand the artistic concept behind your nature- and science-themed pop-up books and how the pop-up medium itself (including the paper engineering) can excite our imagination about science.

Matthew Reinhart: Thank you for such a beautiful description of my work! I always feel like Iâ m anticipating my next deadline, so I rarely get the opportunity to stop and look back at my work. ð

By way of introduction, could you tell our readers what your definition of a pop-up book is and how you first became fascinated by them? Not every three-dimensional â movingâ book â such as a flip book â is a pop-up bookâ ¦

Technically, a pop-up book usually incorporates movable, dimensional paper structures that are powered

by the readerâ□□ s manipulation of the pages, pull-tabs or liftable. That said, my definition of a pop-up book is fluid, because pop-up books keep evolving. Iâ□□ ll be honest with you â□□ I only had one or two pop-up books as a kid and I really didnâ□□ t think about them until I got older. When I was young, I got a Random House *Dinosaurs* pop-up book by Dot and Sy Barlowe after a medical procedure. I remember being so excited to get the book but that didnâ□□ t last long. A day later while I was at school, my little sister got her hands on the book, and I discovered all of the pop-up dinosaurs were ripped free of the book. It wasnâ□□ t until I started freelancing as an assistant to Robert Sabuda that I really got back into pop-ups.

Pop-up books have an impressive history and are sometimes called *interactive* books. In your opinion, what is it that has been so attractive about interactive and pop-up books over the centuries?
I think itâ□□ s the idea that the reader has the power to make pop-ups happen! Open the pages of a pop-up book and the magic happens â□□ and the reader is key. A pop-up book seems like an everyday book from the outside, but when a reader opens it up, so much more magically appears.

Matthew Reinhart: Encyclopedia Prehistorica: Sharks and Other Sea Monsters. Screenshot from the artistâ
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Art and engineering going pop

Reviewers have described your books as â□□ breathtaking work[s] of artâ□□ , highlighting your â□□ characteristically spectacular paper engineeringâ□□ . Sometimes the visual art and the paper engineering are not created by the same person, sometimes they are. Could you share with us how your pop-up books are created?
Whether or not I am illustrating the colour artwork for the pop-ups in a book, I am a part of the visual art process from conception. Every book starts with a concept, audience and a price point (especially if itâ□□ s going to be sold in stores). Once the publisher and I have an idea about that, we begin conceptualising the book, spread by spread, and whatâ□□ s going to happen on each page. Sometimes, Iâ□□ ll just write out an outline while other times, I might sketch out a rough idea of what might happen on the page to help illustrate my thoughts to the publishing team. Once everyone agrees about the bookâ□□ s direction, I begin the actual pop-up design, which is just me in my studio cutting and folding paper into the design Iâ□□ ve imagined. Sometimes I can come to a design in a few hours; sometimes it might take days or weeks! Once I have a rough sketch design that we all like, I carefully deconstruct my handmade sketch prototype, scan all those separate pieces and trace them using Adobe Illustrator. I can then use these templates to recreate the pop-up and work out all the kinks, because there are always issues that need fixing. No pop-up design comes out perfect after just one rebuild â□□ ever. Iâ□□ ve rebuilt pop-ups up to 20 times to find solutions to issues that come up and there are times when I have to re-engineer the pop if I canâ□□ t get the engineering to work properly.

Once the pop-up design is set and working well, we start creating the colour artwork that accompanies it. There are times when I make that artwork myself, which all has to be made in pieces and flat, and there are times when I collaborate with other artists. Paper engineers donâ□ t typically illustrate their own books like I do, so I have more say when I collaborate. I often sketch out exactly what the collaborators need to make their artwork, so they donâ□ t have to waste time figuring out how the pop-up pieces fit together. I want them to feel comfortable about what they need to make, so I do the hard part of figuring out all the separate pieces for them. When they finish, I take their finished colour artwork and digitally â□ chopâ□ it up to fit onto the pop-up pieces.

I prepare digital art files for the printer and manufacturer and create one finalised perfect book prototype so the manufacturer can remake the pop-up book thousands of times over. The whole process takes about 6-8 months, which seems like a long time, but Iâ□ m usually working on several projects at once, so Iâ□ m NEVER bored.

On your YouTube channel, where you share insights into your work and tips and tricks around paper engineering and pop-up books, you use the term *paper craft*. In the process of creating a pop-up book, where does technology become craft and art, and vice versa?
Interesting question and a hard one to answer! I think technology is an art in its way â□ creatively crafting new solutions for problems by using existing knowledge and finding new pathways to progress. In creating a pop-up, Iâ□ m taking what I know, whatâ□ s been created before, to use in my design explorations, and hopefully, at least once in every book, finding new techniques along the way.

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Matthew Reinhart: *Encyclopedia Prehistorica: Sharks and Other Sea Monsters*. Screenshot from the artistâ□ s website.

On your website you say that many of your nature-themed pop-up books are full of â□ fascinating facts and lighthearted good humorâ□ . This certainly makes sense as you specialise in books for younger readers. But pop-up books can, and do, appeal to readers of all ages. What role does the paper technology/engineering play in this?
I think the paper engineer needs to think about what makes the subject interesting for a particular subject and amp it up to the max! What about a subject is visually appealing? What movements can a subject make? What part of that subject might be best illustrated in dimensional structures or in movement? In addition, I think itâ□ s essential to have a strong connection to your inner child so you can just make something thatâ□ s really cool!

To what extent does the content of a pop-up project inspire the complexity or intricacy of paper engineering? How do you decide how complex the paper engineering should be?
Content can determine complexity of paper engineering, certainly. Complexity is also determined by publisher directives, costing and marketing. It depends really â□ I wouldnâ□ t make a super complex board book for pre-kindergarten readers because theyâ□ d probably want to rip out all the pops!

Pop-up books and science communication

What can the pop-up book format bring to the exploration of science and nature that other formats (such as â normalâ books) cannot?
The pop-ups can demonstrate scientific facts, theories or behaviours in fun interactive ways, like a pull-tab that reveals in the inner workings of a machine. Pop-ups can bring to life creatures that are no longer on Earth, like giant chomping therapods! Pop-ups can indirectly also inspire an enthusiast to explore paper mechanics themselves, recreating pop-ups in new directions â like Iâ ve done my entire career! We all inspire each other with the work we do.

> Matthew Reinhart: Encyclopedia Prehistorica: Meta-Beasts. Screenshot from the artistâs website.
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Is there a particular kind of knowledge that emerges from science-themed pop-up books?
If done right, I think science-themed pops can demonstrate laws of science, instruct about the inner workings of a biological/astronomical/other scientific system or recreate creatures or objects that donâ t exist in a way we can observe with our eyes in situ.

Mesmerised by your dinosaur and phobia books, I would argue that pop-up books combine tactile engagement with dynamic visual storytelling, making complex scientific concepts accessible and captivating. They grab the readerâ s attention and draw them in with surprising and immersive illustrations that unfold as the story progresses. What are your thoughts on this â the power of pop-up books to â transformâ science into a visual adventure?
Indeed â when I am thinking about a pop to pull a reader in, I think about how best to represent the subject and what makes it exciting. Iâ m a life-long wildlife lover and love to recreate creatures â extant, extinct and mythical â in pop-up papercraft. We most often experience the world around us visually, and pop-ups are a perfect way to recreate that world in a three dimensional, easily-digestible way, coming to life inside the pages of a book.

In this w/k series, we are interested in different forms and facets of illustrated science communication, visual storytelling and sequential art and I was intrigued by your pop-up book on *DC Super Heroes*, which has been described as a â gorgeous, delicate masterpiece [â ¦] filled with carefully constructed pop-up artâ . This book, like many others of yours, has an encyclopaedic feel to it, although it is not called that. Is this a particular trend, or is the presentation of â encyclopaedicâ knowledge particularly suited to the medium of pop-up books?
A lot of times, making the pop-up a definitive pop-up guidebook just works best for readers and fans, while also pleasing the publisher so that the book is more evergreen and can sell for multiple years. Trying to introduce new stories can limit the range and life of a pop-up title. Plus, my mind automatically categorises information in an encyclopaedic manner, so itâ s easy for me!

> Matthew Reinhart: Encyclopedia Prehistorica: Dinosaurs. Screenshot from the artistâs website.
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As noted in the introduction, this series is particularly keen on exploring the artistic concept or vision behind your nature- and science-inspired pop-up books. Where would you suggest we begin to understand it?
My mantra begins with design: learn the rules â□□ then break them. Rule One: learn the rules. Rule Two: break the rules. Rule Three: make lots of mistakes along the way. Rule Four: repeat.

I hope to learn something new from every project I take on. Itâ□□ s not just about understanding subject matter, but about discovering something artistically new â□□ whether thatâ□□ s through paper-engineering or even writing. I take that *journey* very seriously. At its core, my work is about transporting the reader to a place beyond their current world â□□ transporting them somewhere new and unexpected in new and different ways. But as a creator, I also want to stay excited about, and inspired by, what I do. Doing the same thing over and over? That would just be incredibly boring.

I donâ□□ t really love looking back at my work â□□ because sometimes, once something is done, itâ□□ s over, and Iâ□□ ve already moved on. I tend to appreciate it later, but it takes time, as Iâ□□ m very, very critical of my own work. Some of the pop-ups Iâ□□ ve created in the past might not have been successfulâ□¦ or maybe they were. There are moments where I may have gone too far â□□ made things too complex. In some books, the paper engineering might not work as well as I hoped. Sometimes there are manufacturing issues, like a book not being assembled properly, or a design that ended up being a bit too finickyâ□¦ Ultimately, the concept behind my work, visually and in terms of paper-engineering, is to push myself, to explore new new places. I want to get someone excited about being in a book, maybe even have them pause and wonder: *How did he do that?* I love sparking curiosity in a readerâ□□ s mind, whether theyâ□□ re young or old.

What would you choose, and why, if you could choose a science topic for another major pop-up book project?
One of my current dream projects is a big, human body pop-up book. In my undergraduate years, I studied biology as I had prepared for medical school â□□ thankfully I didnâ□□ t follow that path! Anyhow, Iâ□□ ve always been fascinated by the complexity of the human body, its structure and the many systems within it that keeps us all alive and kicking! We take it for granted, I think, but itâ□□ s really astounding how everything in our bodies coordinates to allow us to live, learn and function.

Thanks for this beautiful article!
Thank you for the insightful questions! If any of your readers wants to learn more about pop-ups or the books I make, they can find my videos on my YouTube channel or check out my posts on Instagram, Facebook and my website.

Matthew Reinhart: *Encyclopedia Prehistorica: Dinosaurs*. Screenshot from the artistâ□□ s website.

Cover image

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