illustrating complex information

Amber Griffiths, Dec 2025

INTRODUCTION

While I see incredible beauty in our world, it is full of wicked problems (Peters, 2017) that transcend disciplinary boundaries [e.g. climate breakdown (IPCC 2023), the related genocide in Palestine (Funes 2023), or our increasing pandemic risks (Lawler et al. 2021)]. We can not usually address these types of complex problems from within any single specialism, it requires broader modes of enquiry (Anon 2014). To our hindrance, most of the academic world remains divided into two cultures (Snow 1959, Anderson-Tempini 2018), treating artistic and scientific approaches as though they are separate (with rare exceptions e.g. the London Interdisciplinary School).

Coming from my first working decade in applied scientific research and policy (related to environmental change and wildlife conservation genetics), through my next decade of studio work helping to get research used and understood more widely - I now wonder how illustration might help when we're faced with complex situations that we need to change.

The use of illustration as a mode of understanding or as a problem solving tool is not a new idea, and many have written eloquently on this (e.g. Grandin 1996, Anderson-Tempini 2018, Nolan 2025) - indeed drawing was a considerable component of my Biology degree at UCL. I want pull together disparate disciplines and be expansive in my definition of illustration in order to look at the question from the perspective of my own practice, blending modes of enquiry from the sciences and arts.

Firstly, to determine whether illustration is 'helpful' in the context of complex problems requires a definition of what I mean by helpful:

1. Our ability to get out of a problem and move on to something better first depends on whether we notice the problem, and the subsequent understanding we form of it.
2. Then, we might need to be able to dream of something better, or simply be shown something better that we can identify with.
3. Finally, we may need to find the motivation and energy to enact a change.

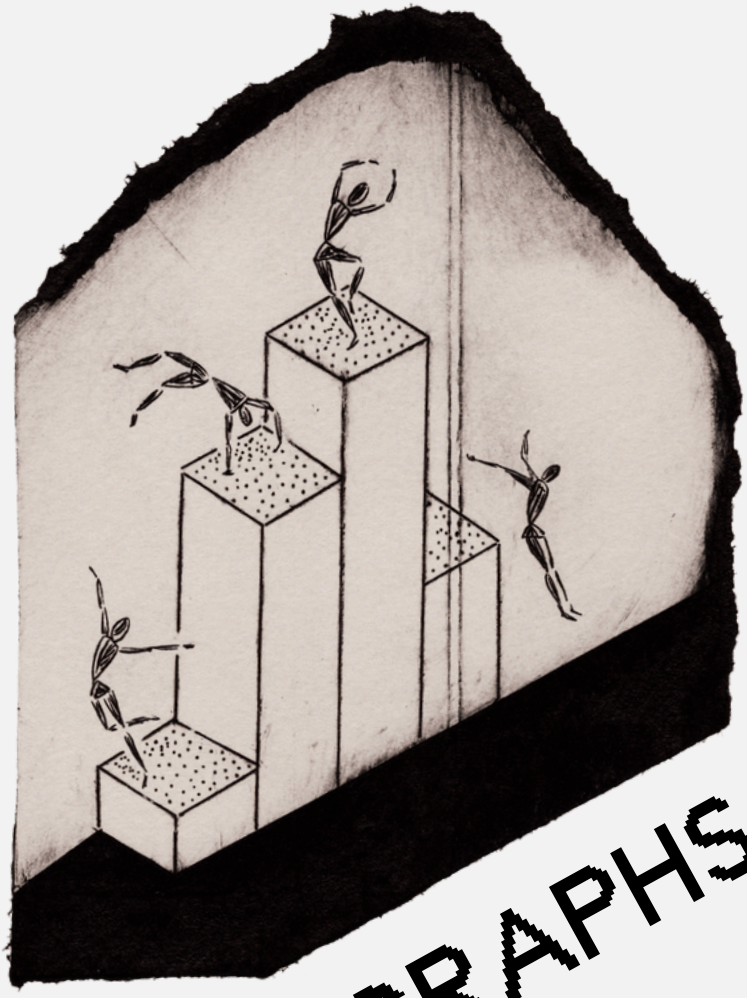
For the purposes of this essay, I will use these as three tests to evaluate the extent to which different visual approaches might be 'helpful'.

Illustration is an extraordinarily broad field, so I need to place some boundaries. I will look in turn at the following spectrum of visual methods that are used for illustrating complexity: Graphs, data visualisations, data illustrations, explorable explanations, and non-fiction graphic novels. This list roughly follows the trajectory of specialisms throughout my career, helping me to place them in a broader context and understand how they could form a cohesive practice.

All these approaches have visual storytelling at their core - the cultural activity of sharing information, ideas or emotions. To me, there is no solid line that can be drawn between the different approaches. There are clearly strengths and

weaknesses along this spectrum, so I will look in turn at how each approach performs against the three points above. If I consider this list of visual methods as a toolkit for my work, when and how are they useful, or not? Can parts be cherry picked or recombined and applied to my own practice in new ways?

"Every plant, every person, every interaction we take part in can be mapped, counted and measured, and these measurements are what we call data" - Lupi & Posavec 2018



GRAPHS

Graphs are visual representations of quantitative information, with their use dating back to at least 1750-1800 (Tufte 2001). They are typically used with the aim of presenting factual information clearly, or creating an illusion of doing so.

Graphs were my starting point in the visual representation of information. I have published over 40 scientific journal articles, all containing graphs depicting various types of large numerical datasets - yet I rarely find them useful since leaving academic science, and I never turned to them when working in scientific policy advice. Used ethically and with skill, they can portray large amounts of otherwise impenetrable data succinctly, however people with high graph literacy usually overestimate their accessibility (Gaissmaier et al. 2012). Many people tend to think graphs are inherently trustworthy, but at the same time don't know how to read them - which is perhaps why they are so useful for those aiming to mislead (Quadri et al. 2024, Galesic & Garcia-Retamero 2010). Albeit as Tufte (2001) says: "...data graphics are no different from words in this regard, for any means of communication can be used to deceive".

Exacerbating the difficulties of graph literacy, there is the related issue that we humans aren't particularly good at spacial perception. Pie charts are notoriously bad because we perceive bigger circles as having a smaller area, and smaller circles as having a bigger area than reality - even our perception of the length of a line depends on the context (Tufte 2001).

We also interpret graphs (as with many other things) differently depending on our expectations and familiarity with the topic (Carpenter & Shah 1998, Blair et al. 2024).

The three tests:

It seems graphs falter at the first hurdle - helping us to see and understand a problem - despite this being their main strength. They are an effective approach for communication between experts within specific fields, but less so for broader audiences. In terms of inviting us to dream of something better, or motivating change - my mind turns to political campaigns aimed at attracting voters (Lamble 2024, and Fig. 1), or graphs of declining solar energy costs which might encourage a switch in energy use. These examples do not promote open ended dreaming with numerous options for change, they guide a viewer towards a particular outcome.

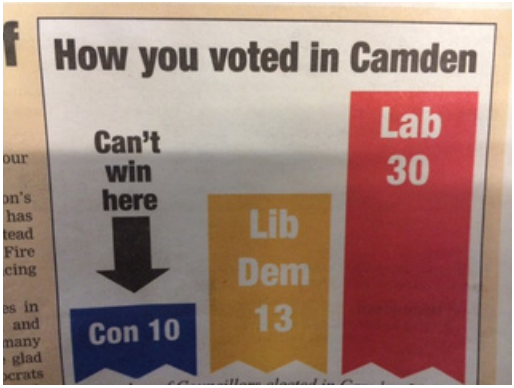
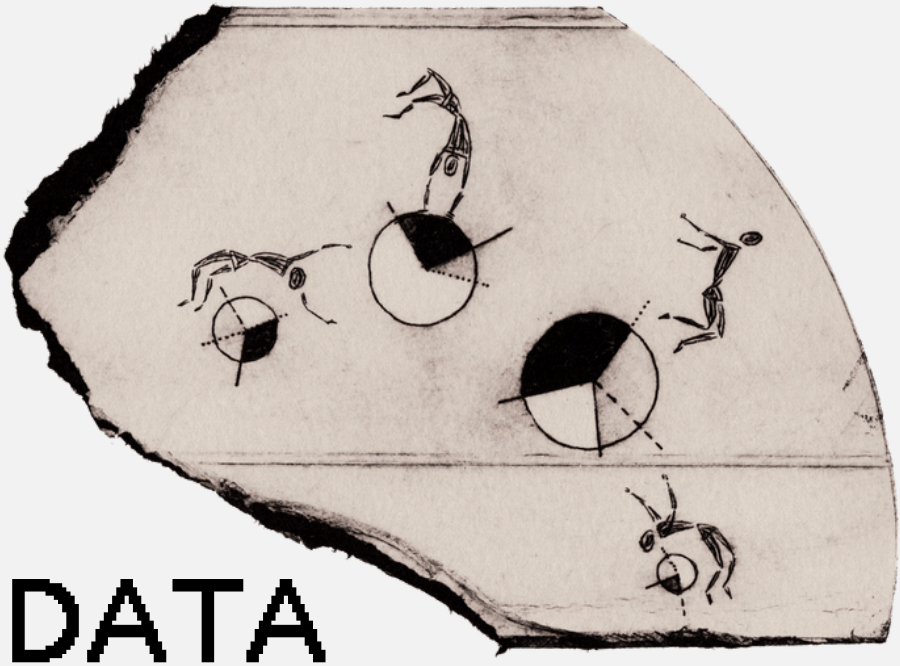


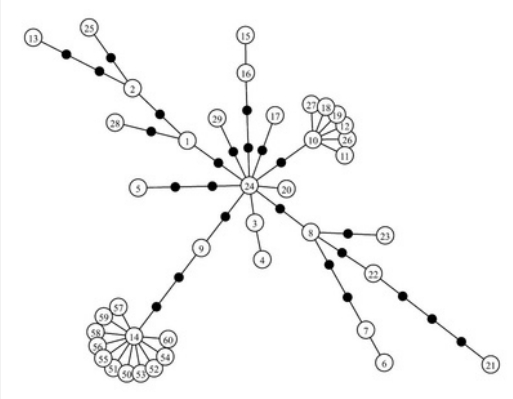
Fig. 1 - An graph being used for manipulation for a different future, from a Liberal Democrat leaflet (2013). Note the 3 point gap between Con/Lib Dem, shown as a similar size to the 17 point gap between Lib Dem/Lab.



DATA VISUALISATION

Data visualisation includes traditional graphs but is more about experimentation with new ways to convey quantitative information visually. This field, based on visual shorthand, has been around for a long time (e.g. Otto Neurath's 1930s International System of Typographic Picture Education, a representational icon-based language; Heller & Landers, 2014).

As amounts and types of data increase alongside our computational capabilities, the demand for visualising information in new ways has grown. One of my earliest papers was the development of software (HapStar, Fig. 2) to visualise genetic information at a scale that wasn't possible with existing software, simply because the field of genome sequencing was advancing so fast (Teacher & Griffiths 2011). While data visualisation can require bespoke software, it can also be as simple as hastily sketched notations on postcards, as exemplified by Lupi and Posavec's Dear Data project (2016).



Simple data visualisation from Hapstar (Teacher & Griffiths 2011) for automated layouts of genetic data, this is quite close to a graph in its format.

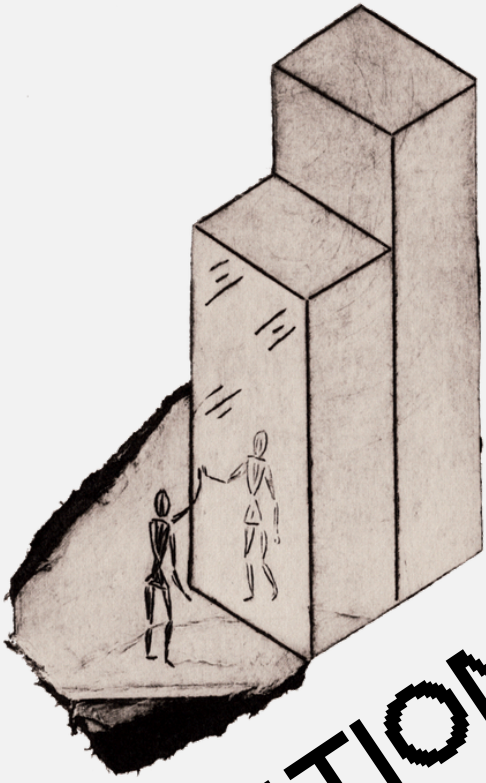
Fig. 3: Data visualisation from Dear Data (Lupi & Posavec 2016) - a postcard with hand drawn denotations of how Lupi spent her time one week.

Increasingly data visualisations are being made into something closer to artworks in their own right, for example the Climate Stripes, a visualisation where each coloured stripe represents the average global temperature of a year, starting from 1850 (attributed to Ed Hawkins in 2018, copied from a blanket made by Ellie Highwood; Rosch 2023). This visualisation was commercialised for clothing by Tannam (2025, Fig. 4), and commissioned by the Artichoke Trust to appear on billboards around the world (The Gallery, 2025). Research into whether this visualisation improves people's knowledge, perceptions, and behaviours concerning environmental issues has shown that it doesn't, and that it influences people to 'make inaccurately high estimates of future global temperatures' (Dawson & Zhang 2025).

Fig. 4: Climate stripes visualisation used commercially for clothing by Tannam (2025).

The three tests:

When it comes to understanding information, data visualisations sometimes add even more layers of obfuscation compared to simple graphs. Just as with non-data based imagery, people show strong preferences for the level of detail and the aesthetics, and emotional responses to colour and curviness of lines (Blair et al. 2024, Daron et al. 2015). We even trust beautifully made graphics more, regardless of their veracity (Lin & Thornton). As with graphs, data visualisations perhaps have little to offer in terms of dreaming up new ways of being, or energising us for change.



DATA ILLUSTRATION

The line between data visualisation and data illustration is particularly fuzzy - and Dear Data could represent the meeting point. I am most interested by the specific approach to data illustration that is exemplified by the work of Mona Chalabi (Fig. 5) - a data journalist and illustrator who won the 2023 Pulitzer Prize for Illustrated Reporting and Commentary. Her work includes clever illustrations of relatively trivial topics (like the average number of faeces in a US swimming pool - 6.23 in case you are interested), to exceptionally brave targets, notably the media bias regarding the genocide of Palestinians.

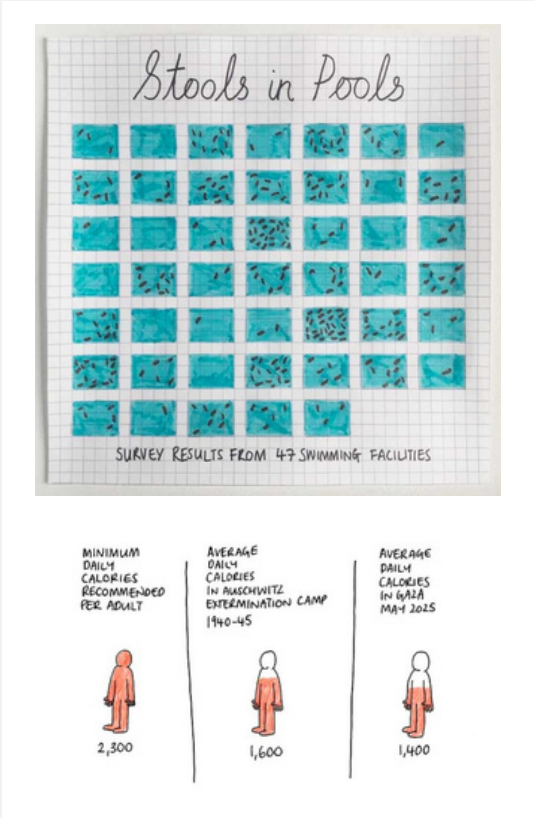


Fig. 5: Two examples of Chalabi's work, from 2018 and 2025.

Chalabi's work is always defensible with valid statistics. She has an awareness that complex presentations of data alienate people, believing there is an art to condensing a story and directing attention without making the viewer work too hard (Chalabi 2017). She hand draws her work as a reaction to how classic graphs and data visualisations give the impression of data being pure and precise, hiding the inevitable ambiguity that is always present in any dataset (Chalabi 2017).

Chalabi emphasises helping people see themselves within the data or empathise with those whose lives are represented. She connects the subject matter directly to the visualisation to make the result more memorable, unlike a typical graph where if you remove the labels it could be about anything. Berger (1972) talked of how "we never just look at one thing; we are always looking at the relation between things and ourselves" - Chalabi's approach aids this tendency.

In my work at my studio 'Then Try This', I have made numerous online games and citizen science projects that are hand drawn in traditional media, presenting the results to players through visualisations (e.g. Then Try This 2016 - Cricket Tales, Then Try This 2025 - Nergal). This approach is driven by anecdotal observations that people seem to find these topics less overwhelming when they are presented in an imprecise, hand-drawn way. Interestingly, it turns out that experimental research indicates that using a sketchy style to depict data really does improve engagement and positive attitudes (Wood et al. 2012).

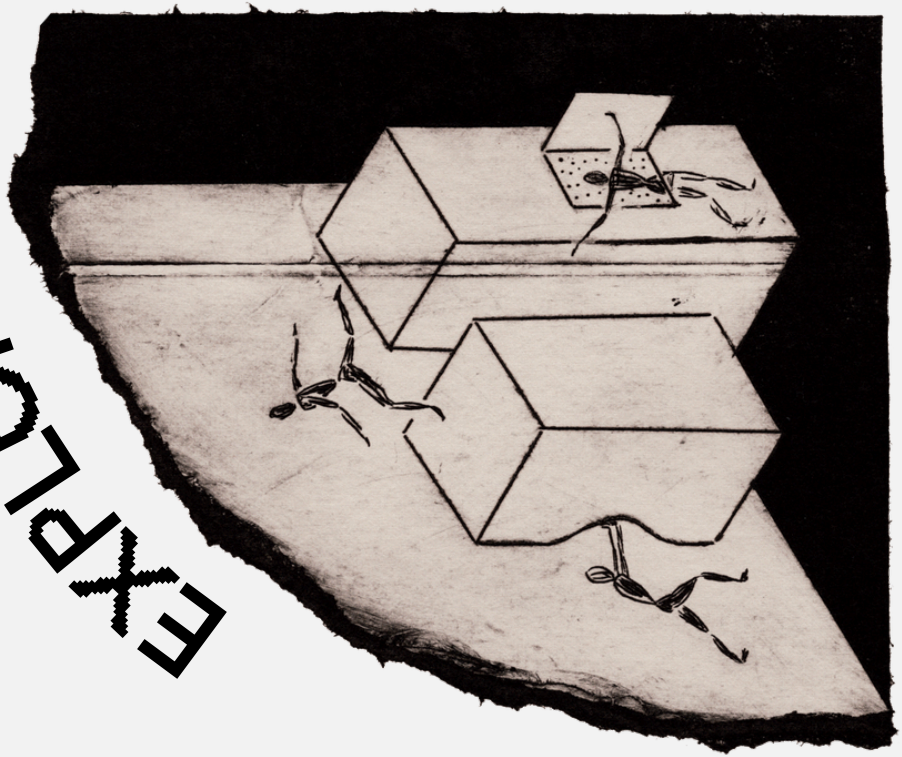
The three tests:

Data illustrations might arguably help a broader range of people understand a topic better than graphs or slick visualisations. Fiske (1994) talks of 'audiencing', where the audience reconfigures or rejects the meaning of a visual image - this is potentially problematic in the context of portraying factual information, and perhaps Chalabi's approach of embedding context in the image might reduce this when compared with a standard graph or data visualisation.

With the increased emphasis on seeing ourselves within the data, and empathising with others within the data, perhaps this approach goes some way towards helping us dream of, and be energised for different ways of being.

EXPLANATIONS

EXPLORABLE



Explorable explanations make data into something that can be explored, allowing people to follow their own interests and draw their own conclusions. They range from interactive news articles to games that allow players to act out different choices/behaviours and experience the varying results. This leans into the messiness and ambiguity of data - what you experience shifts depending on the choices you make.

Nicky Case has developed numerous 'explorables', including We Become What We Behold - "a game about news cycles, vicious cycles, infinite cycles" (Case 2016, Fig. 6). In the game we watch people mingling and snap photos of interesting things we see in the crowd, these photos appear on a TV and alter the behaviour of the crowd, which becomes increasingly polarised and stressed. Case's 2014 project 'Parable of the Polygons', "a story of how harmless choices can make a harmful world" is about how almost everyone makes decisions that lead to societal segregation. These topics are hard to understand or allow ourselves to believe without the experiential learning that helps our minds to be opened.

Fig. 6: Nicky Case's 'We Become What We Behold' (2016)

Case uses a more iconic illustrative style than Chalabi, making the games feel like something that you can tinker with rather than needing to 'win'. The abstraction of the characters might also help the viewer see themselves in the situations portrayed. McCloud (1993) talks of how when we look at a photo or realistic drawing of a person we see it as another person's face, but when we see a simplified or iconic character it is easier to imagine it as ourselves.

I took an 'explorables' approach when making the game WaspLove - commissioned to encourage people to empathise with wasps, and understand their valuable place in the world (Then Try This 2019, Fig. 6). I illustrated the animated wasps in watercolour and ink to soften the look, with the hope of also softening people's views towards wasps. Players play as a wasp colony, making decisions to try to survive despite what humans throw at them, with everything based firmly on wasp behaviour research. We used a solid scientific foundation to tell a story that people could empathise with - and were told numerous times of people's resulting behaviour changes.

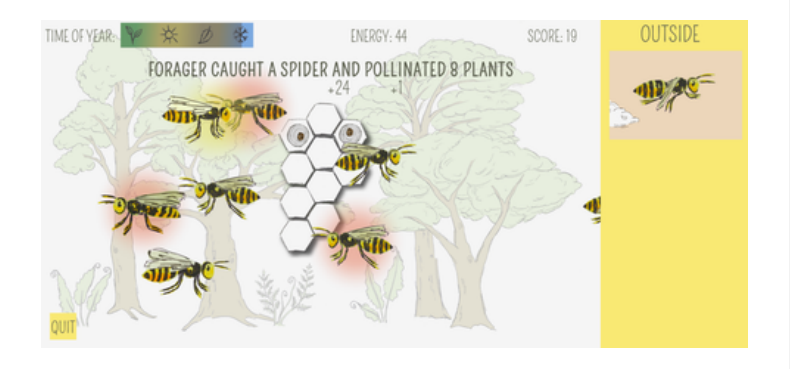
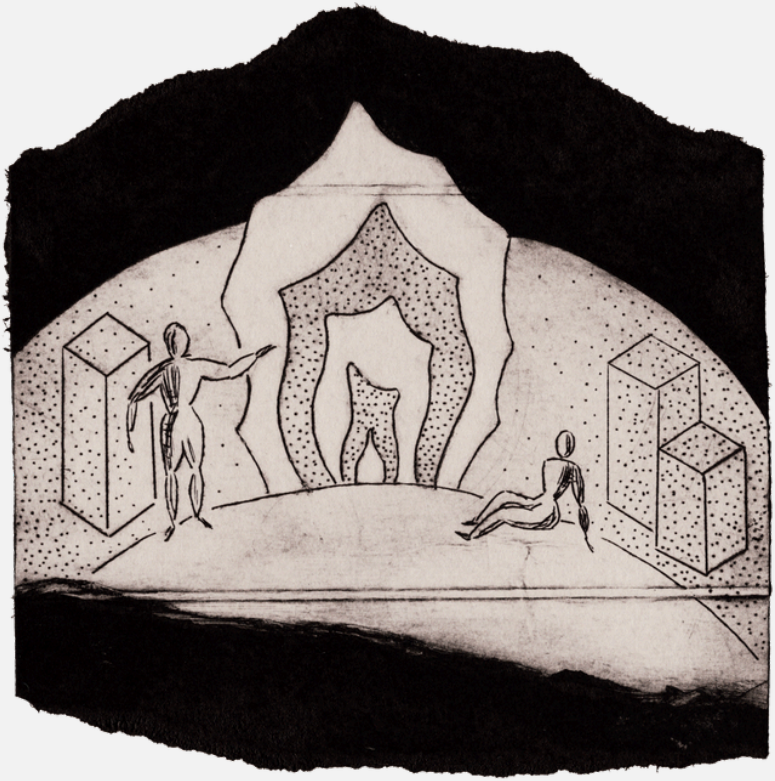


Fig. 6: Wasplove game showing a colony forming and a forager heading out to find food.

The three tests:

Experiential or problem-based learning has long been known to be more effective than didactic fact-based learning (e.g. Capon & Kuhn 2010, Hmelo-Silver 2004, Wood 2004). This lends weight to explorables being particularly good at helping us understand a problem more deeply. They also perform well at helping us see or dream of alternative possibilities, as we can test different actions and experience the outcomes.

My experience making WaspLove showed me the possibilities of this approach for motivating and energising for change - people can draw their own conclusions and figure out their own ways of changing.



GRAPHIC NOVELS

There are numerous graphic novels that present complex factual information, usually as a story, memoir, diary, or conversation.

Comics are not widely used for science communication, so World Without End (Jancovic & Blain 2024, Fig. 7) is a useful case study. It is presented as a conversation between an engineer and the illustrator, with the former imparting extreme levels of detail onto the latter about our energy and commodity systems. Facts, figures and graphs all appear within the comic. Jancovici's personal interests in the nuclear energy industry dominate much of the book, clearly telling the reader the answers to our problems. From a pedagogical perspective the book takes a didactic approach, and leans on the deficit model which assumes people's 'ignorance' of scientific topics is because of their scepticism or hostility. This model has been widely debunked (e.g. Choi et al. 2023) yet stubbornly persists within science communication (Simis et al. 2016).

Diaries of War (Krug 2023, Fig. 8) takes a different tone. For this book, Krug interviewed two people, one Ukrainian and one Russian - placing people with direct lived experiences in the spotlight, as opposed to adding her own opinions. Week by week the two people's experiences are collated, starting immediately after the invasion of Ukraine in February 2022. Each person's diary is presented on opposite pages in a double spread, with the gutter acting as a geopolitical border between them. The side-by-side presentation of experiences, given identical physical space and only subtly different colour

schemes, equalises the two people, inviting the reader to listen to both sides. The illustrations have simple lines and textures, as though anyone could draw them. As with Chalabi and Case, this adds to the feeling that this could be any of our lives. The hand written text on yellow lined paper is reminiscent of school notebooks, I wonder if Krug is nodding to the fact that we have learned about similar events in history, and perhaps we could have stopped repeating these histories by now. Complexity is not shied away from, it is presented through the human experience - while this conflict could be visualised in data, here, facts and figures are obsolete.

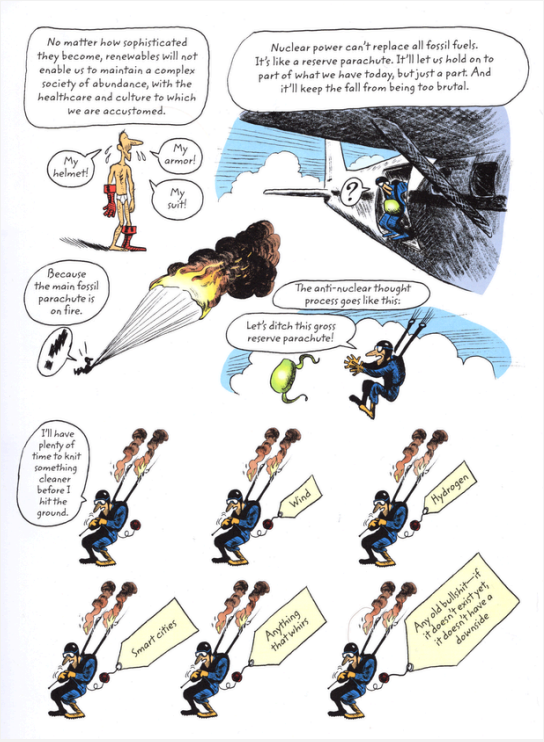


Fig. 7: World Without End, depicting nuclear energy as a green parachute to save humanity.

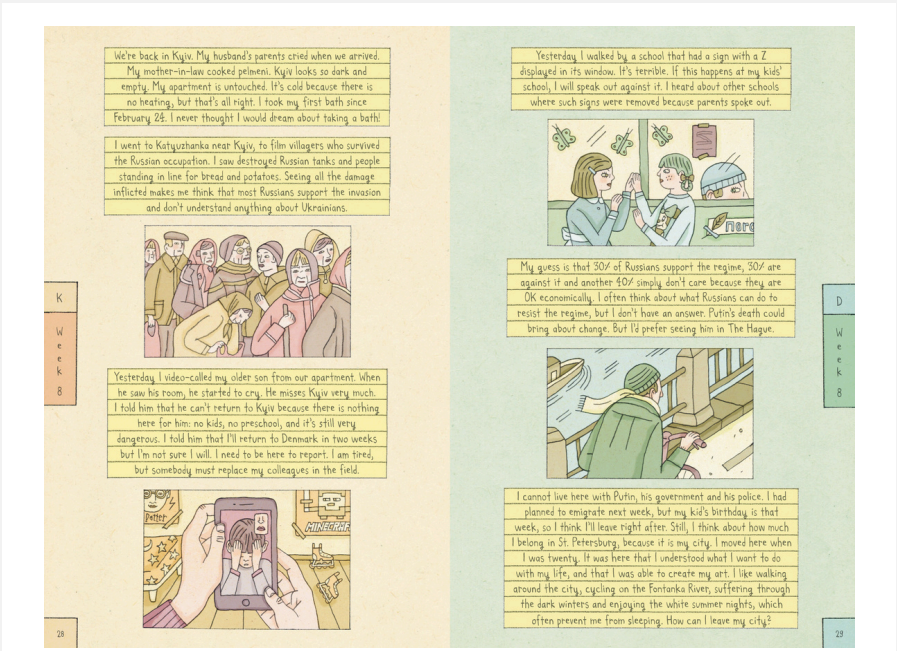


Fig. 8: Spread from Diaries of War.

The three tests:

Both examples help us understand a problem in more detail or from different perspectives. World Without End explicitly states the 'something better' that we should be dreaming of, and the changes we should be making, leaving little space for the reader to come up with their own interpretations or hopes. Diaries of War is more open ended, however might falter at my second and third tests as most readers will not be left feeling empowered.

Researcher Saffron O'Neill (2013) tests how images affect people's sense of saliency (belief that an issue is important)

and efficacy (belief that they can do anything about the issue). Climate-related images in the news tend to increase one of these feelings while decreasing the other, or they decrease both. In her upcoming book 'The Visual Life of Climate Change', O'Neill (in press) argues for the necessity of imagery that depicts imaginative, viable futures, and which people can see themselves and their familiar landscapes within.

TO CONCLUDE

Returning to my tests set out in the introduction, 'explorables explanations' perhaps show the most potential to fulfil all three criteria. There are many more variables at play of course, in particular the longer-form of explorables and graphic novels inherently allows more nuance, while the shorter-form of the other approaches are undoubtedly helpful for quicker snapshots or overviews.

Factual work seems to be my natural home. I believe firmly in not contributing to the mass of misinformation that exists in the world, and I will never knowingly state something as a truth unless I can provide the receipts - I feel a strong connection with Chalabi's ethos here. Finding some solid ground (or at least understanding the undulations), seeing a bigger picture and dreaming of different futures represents a personal struggle, as well as being a globally shared necessity.

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