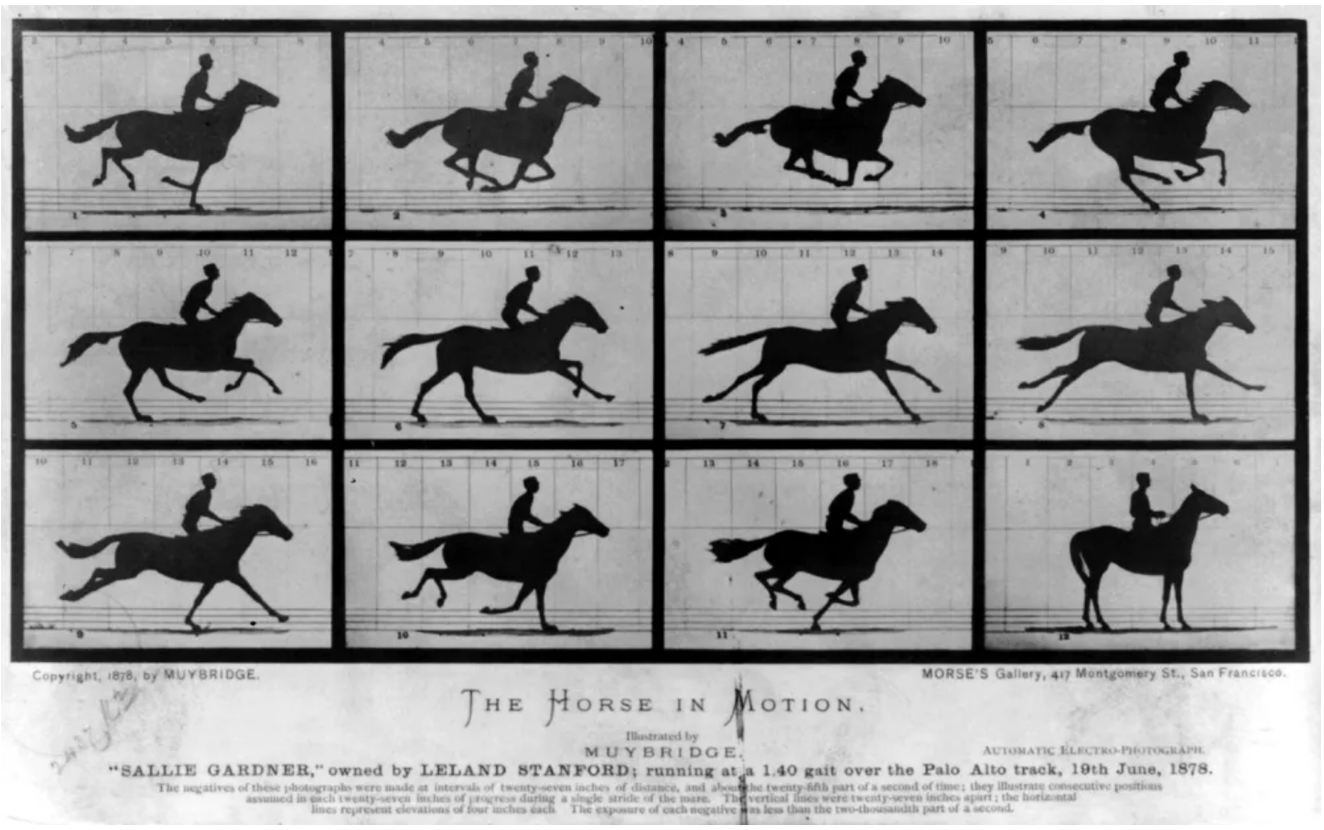

Emily Wheater // Earlier this year, the Wellcome Trust in the UK announced their new Photography Prize. They call on photographers to share, uncover, and disseminate new insights into medicine and healthcare at several levels of resolution: the global and social, technological, and biological. The Awards are a celebration of photography intersecting with science to communicate complex ideas and realities through the medium of vision. In the scientific tradition since Muybridge's galloping horses, photography has become crucial for the recording and dissemination of science. Its influence can be observed in any scientific journal and thousands of biomedical images showing our bodies' organs, cells, and molecules; the principles of exposure, resolution and magnification capturing experimental data and (hopefully) reflecting scientific truth. In science, Emile Zola's pronouncement that "You cannot claim to have really seen something until you have photographed it" acquires a stark literality.

Considering how important images and imaging are to the modern scientist, one could reasonably assume that learning how to read, interpret and construct images was a crucial element of scientific education. Indeed, as this is a visual world with arguably the majority of our culture communicated through watching, glimpsing, and looking, one could reasonably assume that this was an important skill for anyone. Ramon y Cajal, a Nobel prize-winning neuroscientist of the 19th-20thC (as well as an artist and photographer) said: "A graphic representation of the object guarantees the exactness of the observation itself". All that is well and good, providing you know how to handle the graphic representation.

And so, it was troubling when, in 2016, the UK's History of Art A-level was threatened with being axed. It was, after much uproar, saved. But the episode reflected a wider pattern: of the arts and humanities being regarded as 'soft' subjects. But in my own experience at school and degree level, science education involved – in essence – rote-learning and not much else besides. In university lectures you received material and learnt it. When it came to exams, you put everything relevant

that you'd learnt into your answer, and so onwards. I began to suspect that this was not an education to hone my scientific thinking, or any kind of thinking for that matter. Certainly, my memory was tested – but that was pretty much it. As my degree progressed, I became increasingly uneasy: where might I find the skills I needed to investigate the world scientifically?

It was in a journal club that I realised the answer. It was my masters degree, and the first time that I really had to critique a scientific figure and present it to peers and lecturers.

I looked at it and I panicked. Where should I start? The figure legend? Yes, I thought, I'll read the legend. That should help. I read it. I was not enlightened. Perhaps the main text would tell me? I read the main text. There I found an interpretation of what the image said. Helpful, but I would only be taking the authors' word for it – and that was not the point at all.

It was shocking to realise that I had never done this before – not in a scientific setting. For so long, I had had to demonstrate scientific acumen through what I knew, not through what I *saw*, nor my ability to say what I saw. I felt a powerful sense of unease, almost of blindness, such was my lack of faith in my own eyes.

I forced myself to question what this image was showing me. As I found myself dividing it into sections, describing this corner to myself, that colour, asking what shape is this, I realised that the task was similar to an exercise that I had done in English classes, describing a painting as accurately and precisely as I could. In art and in history, I'd had to consider the materials of a source or work of art, and decide how that influenced our interpretation and judgment of veracity. I'd looked at images used for propaganda in both Nazi Germany and World War 2 Britain, and questioned their provenance in time and geography, their purpose, their effect. Skills that I'd learned in myriads of tasks set by English, Art and History teachers, I was using here, on this image, in this scientific paper: separating it into constituent parts, interrogating each of them, and putting them together again to decide what the image could, and did, say. As I did so, I realised that now I could understand the image. And then – only then – was I able to assess its value as evidence regarding the hypothesis being tested.

I am not an expert in how to read science papers, nor on how to read images. But as a scientist in training, I am worried about scientific disregard for 'soft' disciplines such as History of Art, Art, and English literature in the UK.

This disregard shows up at the heart of scientific education. When I was halfway through a Biochemistry degree, at a university dedicated to STEM subjects, my peers and I had to take a humanities option. It was to 'broaden our horizons'. Some groaned. They were here to do science: like, proper, *hardcore*, science. They'd come here to do this science-y degree in this science-y place because they didn't want stupid humanities. For some, it became light relief 'doss' time. Unimportant. Others' resentment solidified when it turned out they weren't very good at it. But there were many of us who found it a wonderful spring-clean for rusty intellectual cogs. You had to

think, engage, memorise perhaps, but also have thoughts and ideas of your own. There was interpretation and creation to be done.

And yet: the over-riding sense was that this humanities module was intended to make us more well-rounded individuals, not that it might actually teach us something that would be useful *in science*. Some scientists, I am sure, are made in their school science lessons. But many, if not most, must learn skills and procedures of thinking from other disciplines.

Organisations like the Wellcome Trust realise the importance of images – their power to inform and to deceive. Establishing photography prizes is important, but perhaps it's time for scientists to promote the means by which the greatest number can learn to handle the resulting images on display. And that means defending the humanities in education.

Image: "The Horse in Motion", by Eadweard Muybridge, 1878. *Wikimedia Commons*