Earth

In millions of years, what could a future civilisation learn about us?

Millions of years after humans vanish, fossil clues showing how we lived and dominated the planet may confuse future civilisations, says a new book by Sarah Gabbott and Jan Zalasiewicz

By Chris Simms

19 February 2025

Plastic litter on beaches is causing “plastiglomerate” rocks to form
Liz Barney/Guardian/eyevine

Discarded

Sarah Gabbott and Jan Zalasiewicz (Oxford University Press)

Humanity has fallen. The last people are long dead after our inadequate efforts to cut carbon emissions let global warming continue unchecked. Most animals and plants were wiped out in the sixth mass extinction to hit our planet.

Millions of years have passed and the few hardy species that survived have evolved to create a novel array of endless and beautiful forms. A new intelligent species has come to dominate Earth with the help of complex machines. They are curious, wondering whether any previous industrial civilisation was here before them.

Standard archaeology is likely to be of little use after so long – any traces of humans would have to be found in Earth’s rocks. Yet these could be tricky to discern: as climatologist Gavin Schmidt and astrophysicist Adam Frank argued in a thought experiment called the Silurian hypothesis in 2018, the traces humans leave in the ground may not differ greatly from those of other eras.

Enter palaeontologist Sarah Gabbott and Jan Zalasiewicz, a geologist and palaeontologist, both at the University of Leicester, UK. In *Discarded: How technofossils will be our ultimate legacy*, they

use what we know about the fossil record and how materials break down to argue that many distinctive clues to our existence could endure, even if some will be hard to interpret.

This advanced civilisation might, for example, come across some of the 150 billion or so tungsten carbide spheres we made, just 1 millimetre across. Even if these durable curiosities are found near shards of transparent polystyrene, it might not be obvious that they were the balls that let ink flow in ballpoint pens.

Exposed to air and light, the pens' plastic is likely to degrade eventually, but there are ways it could last. It is already creating new rocks, dubbed plastiglomerates, in which the plastic melts (sometimes in beach fires) around things like coral fragments and stones.

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Plastic may also survive in other forms. In the 48-million-year-old Messel Formation in central Germany, there are fossils of microscopic algae with cell walls containing a carbon-based molecule called kerogen. This strongly resembles polyethylene and polystyrene, so both materials may also endure that long if they are buried in sediment, embedded in the sea floor or fossilised in landfill.

This also promises a fossil future for some textiles. Leather and cotton are unlikely to survive more than a few thousand years. The real stayers will probably be clothing made from plastic-based fibres. We make 100 billion garments a year from such fibres, write Gabbott and Zalasiewicz, and a huge percentage of this fast fashion ends up in landfill.

Yet, when clothes are flattened and a two-dimensional imprint is left in rock, it will be hard to tell what they were. To help, *Discarded* contains a lovely diagram of six configurations into which Y-front briefs might fall and the silhouettes these would leave.

Concrete, too, could endure. Sinking cities on coastal plains, such as New Orleans, might be preserved under sediment, so the city buildings could be recognisable millions of years later as intentional constructions.

But chicken bones, often cited as an example of a permanent mark we will leave on Earth, may not generally stick around. This is because the 25 billion chickens alive at any time are mostly reared, used and processed in ways that remove lasting evidence.

The Anthropocene was officially spurned in 2024, but the idea lives on

Geologists surprisingly declined to formally declare a new epoch, but proponents of the Anthropocene will continue to highlight humanity's impact on the planet

Discarded is sobering, but engagingly written as it covers these and many other signs of our existence, such as crushed laptops. However, at times, the book gets lost in non-essential detail, such as a foray into the history of silicon production, rather than focusing on how long silicon chips endure.

That aside, if you fancy yourself as a writer of science fiction and want to create a realistic post-human world, this book could prove a terrific resource. And given we are told that printed books may outlive computer data, it might be wise to seal a copy of *Discarded* in a time capsule to help a future civilisation interpret the odd traces we will leave behind.

Chris Simms is a writer based in Somerset, UK. For Jan Zalasiewicz's take on when the Anthropocene began, see page 37