

We need some plastic surgery



Remember CFCs? That's chlorofluorocarbons, widely used in refrigeration, air conditioning and aerosols until the 1980s, when it was discovered they were damaging the ozone layer in the atmosphere, which absorbs much of the sun's ultraviolet radiation, a major cause of skin cancer and other problems. The Montreal Protocol of 1987 led to a near-total international ban and the introduction of replacement chemicals, and the ozone layer has gradually recovered. A success story!

We face as serious a challenge today with massive plastic pollution worldwide, and this time legislation won't solve the problem: plastics just aren't going to be banned outright and can't be so easily replaced, though there are recent proposals to ban plastic straws and cotton buds in England, and plastic bag use is already illegal in some African countries.

The problem with plastic is that most of it is chemically very stable and unreactive – one of the reasons for its widespread use – so it takes a long time to decompose. It's also not easy to recycle, especially when it is combined with other materials, such as in disposable coffee cups: billions of these are thrown away each year after a single use.

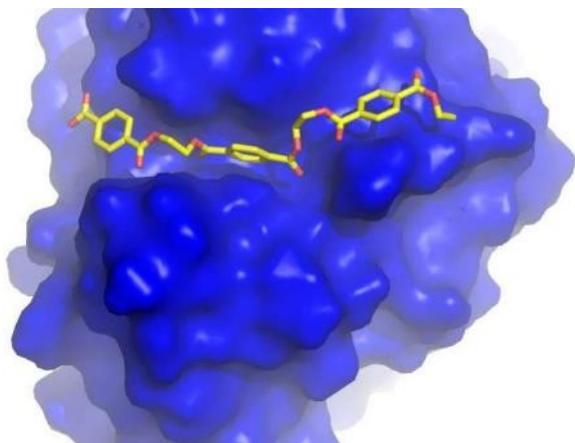


It has been estimated that well over 8 billion tonnes of plastic has been made so far, and over 6 billion tonnes has been discarded as waste. Less than 10% gets recycled, some gets incinerated, but nearly 80% ends up in landfill or in the oceans as a long-term hazard. A lot of plastic waste collects in one area of the Pacific because of the pattern of ocean currents, and this "Great Pacific garbage patch" between California and Hawaii is believed to be twice the size of France, about 80,000 tonnes in weight, with nearly 2 trillion items in it – nearly half being huge plastic fishing nets. The densest coastal collection of plastic waste is probably on the uninhabited World Heritage Henderson Island, with up to 670 items per square metre, brought ashore by the tides!



Of course, this is just what's visible. Even more alarming are the tiny particles of plastic, including especially the microbeads in many cosmetics, that are designed to be washed away as waste, and end up in the food chain of marine life (and so in ours too). And did you know that bottled water, a major use of plastic and generator of waste, often contains significant amounts of microscopic plastic, detracting from its supposed advantage over tap water?

With talk of partial bans, plans for deposit schemes on plastic bottles, surcharges for plastic bags and disposable cups, and demands for technological solutions in modified manufacture and more recycling, this has recently become a very hot topic, hitting the number one spot of BBC News and newspaper headlines.



There are some welcome and surprising bits of good news, including the enzyme that has evolved to digest PET, the plastic most widely used in bottles. Its molecular structure has been studied (using powerful X-rays at Diamond Light Source in Oxfordshire, a facility I've used a lot in my own research – just do a web search for it), enabling scientists to modify it to improve its performance, reducing PET's durability from hundreds of years to a few days. A glimmer of hope!

What the recent news items and features don't say, and they should, is that legislation and technology can only do part of the job of tackling this problem: a lot can also be contributed by ordinary people, just as with other environmental issues. We all need to play our part, starting with "the 3 Rs": reduce, reuse, recycle.

Reduce: avoid buying and using plastic where you can. Shun overpackaged goods at the shops, prefer glass bottles to plastic (they're making quite a comeback for milk), don't use a plastic bag at the checkout if you don't really need it, say no to plastic straws and cutlery.

Reuse: that includes shopping bags, coffee cups, lunch boxes. Carry a reusable water bottle; filling stations and drinking fountains are becoming popular, and bottled water isn't really better for you than tap water.

Recycle: plastic recycling facilities are hugely variable across our area and the country as a whole. If your local authority doesn't provide plastic recycling, join others in campaigning for it. And in the meantime see if you can reuse more and throw away less. I'm pleased to say that Newcastle University is one of the best in the UK for sustainability (including waste management) and well up in international league tables in this respect.



As a Christian, I note that this approach is in tune with the Biblical mandate to take good care of the world we've been given – it's the only one we have, and it's not ours to exploit selfishly and ruin but rather a resource to value and use wisely. The old-fashioned word for this is stewardship and it's been the responsibility of human beings since the very beginning. It's good that this moral imperative is recognised by many people whatever their religious beliefs or none; we just need to make sure we act on it consistently and don't wait for others to solve the problem for us – they won't, not without our contribution.

Bill Clegg

Modified version of the article in the Tyne Valley Express for May–June 2018