

# Toxic Legacy:

## How the Weedkiller Glyphosate is Destroying our Health and the Environment

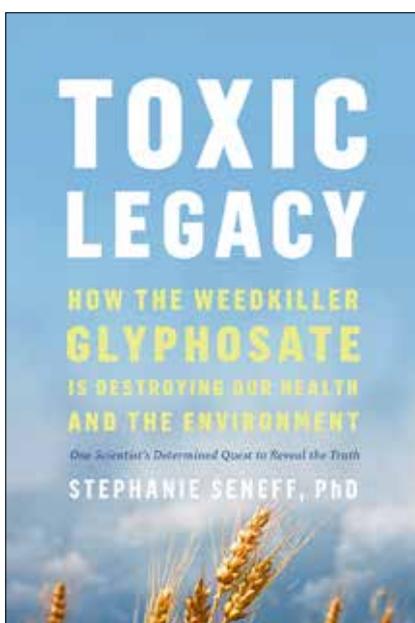
By Stephanie Seneff

Chelsea Green Publishing, Vermont, 2021, Hardback, 262 pp, £19.99 (Amazon £14.92) ISBN 978-1-60358-929-1

I confess that I had not heard about glyphosate until ten months ago. Most of the people that I have spoken to subsequently had not heard of it either. A friend of mine, who is passionate about health and fitness, recommended I read *Toxic Legacy*, and I am very glad that I have. On one level, this is an account of a brave scientist's determination to uncover the truth about a dangerous chemical, involving a battle with a powerful corporate adversary, a David pitted against a Goliath. On another level, it illuminates the advances in scientific understanding of human biochemistry, the microbiome, and the natural environment since glyphosate was first approved for general use as a weedkiller in America in 1968. At a third level, it poses deep philosophical and theological questions about our readiness to interfere in the complex and interdependent systems that permeate the natural world.

As a professional economist with a background in finance and investment, you might well wonder why I should choose to read, let alone review, a book so far removed from my field of study and experience. Yet there are many parallels between interventions in the realms of medicine and pharmacology and interventions in economics and finance. A certain John Maynard Keynes, reflecting on the Wall Street Crash in his book *The Great Slump of 1930*, concluded: "But to-day we have involved ourselves in a colossal muddle, having blundered in the control of a delicate machine, the working of which we do not understand. The result is that our possibilities of

wealth may run to waste for a time — perhaps for a long time." For "wealth", read "health".



Glyphosate was first patented by the Stauffer Chemical Company in 1961 as a chelating agent to strip mineral deposits off pipes and boilers in commercial hot water systems. A few years later, Monsanto patented glyphosate as a herbicide for use in agriculture – the replacement of choice for banned DDT – and finally, in the early 2000s it was patented a third time (again by Monsanto) as an oral antibiotic. Dr Seneff maintains that "all of these applications, as a chelator, a herbicide and an antibiotic, play a role in the chemical's unique and diabolical impact on human health."

The first three chapters of this book set out the catalogue of harms that the author attributes, in part or in full, to the widespread and near-global use of

glyphosate. It is estimated that about 8.6 billion kilos of glyphosate have been applied worldwide since 1974. By genetically modifying a range of agricultural crops to be resistant to glyphosate, indiscriminate spraying of the fields destroys the weeds without appearing to harm the plants. A final spray, just before harvest, is used to ripen the crops and it has been found that synchronising plants to go to seed improves crop yield.

Far from the harmless weedkiller that its promoters claim is swiftly expelled by humans, animals, birds and amphibians, and metabolised by soil bacteria within a couple of weeks, Seneff quotes an array of peer-reviewed scientific studies that reveal the long-term presence of glyphosate in the lungs, kidneys, muscles, and intestines of various mammals, causing severe metabolic disruption. The herbicide interferes with the uptake of minerals and other nutrients by plants and kills the bacteria, fungi and other organisms that have symbiotic relationships with plants for mutual health.

In humans, glyphosate damages the gut microbiome preventing the synthesis of essential amino acids that build body proteins. This affects liver and kidney function, fertility, and autoimmunity. Glyphosate acts to raise the pH of the gut (tilting to alkaline), favouring the growth of some bacteria over others, giving rise to inflammatory bowel diseases. Seneff claims that glyphosate is inducing an epidemic of pathogenic fungal infections, as its antibiotic properties kill off beneficial bacteria in the human gut. Chronic exposure to

glyphosate in our food and water is like taking low doses of antibiotic all the time. Worse, Seneff describes how glyphosate can cross the blood-brain barrier via amino acid transporters.

While the author accepts that the deterioration of our ecosystems – evidenced by the dramatic reduction in insect and bird populations and demonstrable loss of biodiversity – has many causes, she reckons that glyphosate is among them. The abundance of blue-green algae and the blooms of cyanobacteria in bodies of water adjacent to sprayed fields, the over-abundance of nutrients and minerals in the water, the sluggishness of fish and insects exposed to high levels of glyphosate, all point towards a deleterious impact on our ecosystems. Dolphins drifting out to sea have been discovered to have Alzheimer's disease.

The reader is drawn deeper and deeper into a nightmare scenario of human and environmental destruction, yet on awakening the world is still using glyphosate in phenomenal quantities. If Dr Seneff's case is so compelling, if the body of scientific evidence is so strong, why isn't there a worldwide ban? After all, the World Health Organisation's cancer agency said in 2015 that glyphosate was "probably carcinogenic" and chemicals giant Bayer (which bought Monsanto in 2018) has settled billions of dollars of lawsuits against its products without admission of fault. About 30 countries have banned or restricted its use, including Bayer's home country of Germany (from 2024), 8 out of 10 Canadian provinces, Australia and Netherlands. Vietnam is the only country in Asia to have fully banned glyphosate.

Without doubt, Dr Seneff is on a crusade, inspired perhaps by Rachel Carson's *Silent Spring* in the 1960s. She has courted controversy by the strength of her assertions and the

breadth of her thesis. The response of the giant chemical companies has been dismissive and derogatory towards her. There have been repeated attempts to discredit her work and destroy her professional reputation. A recent Pesticides Peer Review for the European Food Safety Authority concluded that "in the area of mammalian toxicology and non-dietary exposure, no critical areas of concern were identified" and "based on the available evidence, glyphosate does not meet the criteria for endocrine disruption" as laid down in EU regulations. Glyphosate has been debated in the EU for years but not banned. The European Commission has authorised its use for another ten years from December 2023 to December 2033 on the grounds that is insufficient reason to block it, or unanimity about doing so. Dr Seneff remains a voice crying in the wilderness – perhaps prophetically so.

Reading this book through the prism of the Christian faith, what can we learn? It is a typical consequence of a worldview that places humankind at the centre of everything, that blight, mildew and pests are regarded as enemies of human progress which must therefore be eradicated using human ingenuity. Yet again, it appears that a chemical/pharmaceutical intervention has had unforeseen, unintended and harmful consequences to humans, to other living organisms and to the ecosystems that sustain the natural environment. Our growing awareness and understanding of the interconnectedness of the natural world – illuminated by Merlin Sheldrake's *This Entangled Life*, among others – casts the process of regulatory approval for new pesticides and genetic mutations in a very different light. How many of the chemicals in common use would have gained their approvals if they were being sought for the first time today, knowing of their wider implications?

By contrast, scriptures in Deuteronomy 28:22, I Kings 8:37, Amos 4:9 and Haggai 2:17 consider that the unfruitfulness of the land has a divine context, a divine prompt to "return to the Lord". The delineation of blessings for obedience and curses for disobedience set out in Deuteronomy 28 makes for salutary reading in the modern age. The catalogue of woes to befall the disobedient includes diseases, fever and inflammation, scorching heat and drought, blight and mildew, madness, blindness and confusion of mind. Amos laments over Israel, that despite her hunger, drought, blight, plagues and military defeats, "yet you have not returned unto me." There is much heart-searching in America, where life expectancy has begun to fall – from nearly 79 years in 2019 to just over 76 in 2021 – and the incidence of diseases such as diabetes, autism and Alzheimer's shows an alarming increase. Maybe it's down to the Covid pandemic or better diagnostics; but maybe toxic chemicals are playing a much bigger role than we have imagined.

After ten chapters of gritty investigation into the evils of glyphosate, focusing on liver disease, reproduction and early development, neurological disorders and autoimmunity, there is light at the end of the tunnel! In the closing chapter, Dr Seneff rescues us from the weeds of despair: "the biochemistry of our bodies is marvellous and miraculous (shades of Psalm 139:14). Much of the damage caused by glyphosate and other chemicals is reversible." She endorses a diet rich in fresh vegetables, fruits, wild fish and grass-fed organic meats, herbs and spices. She recommends animal-based proteins to address a widespread deficiency in dietary sulphur, eating foods that are high in prebiotics at every meal, antioxidants, sea salt and vitamin D supplements. But the key message of this book is that no detectable amount of glyphosate is safe: that it should be banned. 



*Peter Warburton is director of Economic Perspectives, an international macroeconomics and financial consultancy based in Luton, Bedfordshire. He is also the chair of the FIBQ Steering Group.*