

The Poison Paradox: Chemicals as Friends and Foes

By John Timbrell

Reviewed by Angelika Börsch-Haubold, Germany

“All substances are poisons; there is none that is not a poison. The right dose differentiates a poison from a remedy.” Thus wrote the physician and scientist Paracelsus 500 years ago, and this is also the point of view of the English toxicologist John Timbrell. For him, all chemicals have both good (wanted) and bad (unwanted) effects, which he calls the “paradoxical” nature of poisons. As the subtitle of *The Poison Paradox: Chemicals as Friends and Foes* states, chemicals are our friends as drugs, pesticides and cleaning agents, and our foes as environmental pollutants, natural poisons and harmful food additives.

After a short historical outline of the concept of poisons, Timbrell introduces the reader to the physiological mechanisms of the uptake of a substance into our body, of its fate there (metabolism) and of individual differences in these mechanisms due to genetic factors and lifestyle. He continues with a survey of pharmacological concepts such as the dose-response relationship and receptors, explains mutagenesis, teratogenesis, and carcinogenesis, and describes tissue degeneration and cell death. He then contrasts the benefits of common medicines such as aspirin, paracetamol and penicillin with their adverse effects. The mechanisms of drugs of abuse (cocaine, morphine/heroin, and ecstasy) are also explained. As virtually all of us will take some form of medication in our lifetime, and almost nobody is in a position to second guess the doctor’s prescription, this alone makes these two chapters on medicines worth reading.

Throughout his account, Timbrell is anxious to display the positive aspects of chemicals. One prominent example is DDT, successfully used as an anti-louse powder during World War II and also to combat malaria. The extensive spraying of forests against bark beetles, however, had detrimental effects on wildlife which were triggered by an accumulation of DDT in the food chain. Timbrell blames this overuse for our loss of a chemical that was relatively safe for humans.

One does not need to agree with this point of view to learn a lot from the book. Timbrell moves methodically from the small scale – household poison cabinets with cleaning agents, gardeners’ tools, and “our favourite drug: alcohol” – to the large scale – the deliberate release of industrial waste products into the environment, as well as industrial accidents in which cities or whole populations are exposed to toxins. But it is not always humans who damage nature with synthetic chemicals: it works both ways. We all teach our children to eat only berries that are known as “safe”, because plant toxins are among the most deadly compounds in the world.

Timbrell aims to teach the lay reader about poisons. He avoids complicated scientific terminology, places detailed information for advanced readers in separate boxes, and defines toxicological jargon in a glossary at the end of the book. What is more, he knows how to entertain. Headlines such as “Ricin: a molecular Trojan horse from the castor bean” or “Lucy in the sky with diamonds: hallucinogenic compounds” catch the reader’s attention. Case notes

in the style of newspaper clippings vividly describe the action of a poison, and the accounts of serial killers and political murder juxtapose historical anecdotes (“Was Napoleon poisoned?”) with toxicological facts. Figures such as the photograph of an alcoholic’s liver say more than a thousand words.

There are a few unfortunate errors, however. The repeated misspelling of Nobel laureate Paul Ehrlich’s name and inconsistencies in the botanic names of plants and families should have caught a careful editor’s eye. In addition, a number of pharmacological details are irritatingly mistaken; for example, the former use of atropine-containing plants for the treatment of Parkinson’s disease (and not epilepsy), or the case note on herbal-tea poisoning in which the pyrrolizidine alkaloid-containing plant coltsfoot is more likely to be the culprit in the liver disease than alpendost. A number of repetitive phrases should also have been cut before publication.

Nevertheless, *The Poison Paradox* is a good source for teachers in search of examples to enliven chemistry, biology or ecology lessons. I also recommend it to older school students with an interest in chemistry and the life sciences. The manifold involvement of poisons in our daily life and Paracelsus’ principle of the right dose is bound to be an eye-opener for them.

Details

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