

Preface: why?

The word 'textbook' is a bit pompous. Yet many come from the passions of authors wanting to pass on their worldview and enthusiasms, reflected in the facts. But the relative importance of individual facts changes as understanding grows, and the amount of information increases. A huge volume appears in articles, books and websites on almost everything, and although there is a lot of repetition, the amount is nonetheless daunting. In the five years between 2010, when the last edition of this book appeared, and 2015, 26 596 papers with 'freshwater' appearing in the title or keywords were published in peer-reviewed journals. The complete literature on freshwaters for the five years will amount to several times this, perhaps as many as a quarter of a million articles.

Textbooks have to change to reflect this. Once they could be nearly comprehensive but remain of modest size; increasingly they have become near encyclopaedias, off-putting in bulk. I have come to the view with so much information, including most formal journal publications, available on the net, that a textbook should become a guide book, with the advantage that guide books can be much more attractive to read than encyclopaedias, and still give the fundamentals necessary for understanding. This is the fifth edition of this textbook. The previous editions have grown bigger and bigger so I decided to write a shorter fifth. Faced with so much information, however, this proved smaller than I had thought, but at least I have more or less held the line. I have had to be ruthless in avoiding giving several examples

of everything, so as not to offend anyone, and I have had to discard some topics and many references that were dear to my heart and survived several previous editions. But a book is to be read. I have tried to make this one as accessible as I can. The web can be used for further reference.

Photographs taken from the first space missions in the late 1960s are said to have jolted our perceptions of our planet and ourselves. They showed a distant, delicately blue planet with wispy clouds. It was Planet Ocean rather than Planet Earth and the images inspired the environmental movement with the fragility that Earth appeared to have. That message of fragility is both right, when it comes to the conditions that make for a comfortable human existence, and wrong when a study of Earth's geological history reveals the vicissitudes that the biosphere, albeit occupied only by microorganisms for most of the time, has survived. The fragility message, though, has been forgotten. A plethora of beautiful satellite photographs that are too distant to reveal the details of destruction has diluted it. Many human activities continue to exploit the Earth's resources because of a roughly 200-year-old flawed economic model that assumes that lunches are free if the bill is not tendered immediately.

Environmental scientists and some economists have repeatedly pointed out that our present economic system can only be temporary, but the message has been ignored. We are ruled by those who know little outside the parochial worlds of finance and politics. Winston Churchill wrote that scientists

should be on tap but not on top. Most would not wish to be on top, but the tap seems to have been screwed shut; and we must seek droplets of compromise from political plumbers determined to keep it that way.

Science, an account of the workings of energy and matter, and politics, that of the workings of human societies, are intertwined and it would be foolish to pretend otherwise. There has been no sentence, in any scientific book, ever written, that has not been immediately charged

with the subjectivity of its author. But the self-critical, peer-policed world of academic investigation and experimentation, which I offer you here, gives the closest we have to objectivity, and is far superior to the nebulous and often self-serving dogmas of political theory, not least when it comes to the environment in which we must live. Our problem is to change the politics to reflect the science.

Brian Moss