

## The **NO-NONSENSE GUIDE** to

# SCIENCE

Jerome Ravetz

### About the author

**Jerome Ravetz** is author of the classic study *Scientific Knowledge and its Social Problems* (1974, 1996). Formerly Reader in History and Philosophy of Science at Leeds, he also helped found the Council for Science and Society and is a pioneer in the area of science and safety. He is now an independent scholar and self-employed consultant working mainly on the problems of management of uncertainty in risks and environmental issues. His selected essays were published as *The Merger of Knowledge with Power* (1991) and with Silvio Funtowicz he co-authored *Uncertainty and Quality in Science for Policy* (1990). He is currently a Visiting Fellow at the James Martin Institute for Science and Civilization at the University of Oxford.

### Acknowledgements

Thanks to my longstanding colleagues Silvio Funtowicz and Zia Sarda.

### Other titles in the series

*The No-Nonsense Guide to Globalization*  
*The No-Nonsense Guide to Fair Trade*  
*The No-Nonsense Guide to Climate Change*  
*The No-Nonsense Guide to World History*  
*The No-Nonsense Guide to Conflict and Peace*  
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They are useful as introductions but they do not penetrate into the core of the problem, the conduct of science itself. This second set are more personal. Their primary focus is students, for they know enough about science to feel confident in questioning it, but are not yet so committed to a career that they are inhibited from criticism. Of course, anyone, not only students, can engage with these questions as a way of increasing their own awareness and understanding.

Before stating the questions, I want to remind us of the sort of conceptual box in which we have been placed by generations of propaganda for science. This is described by a list of assumptions about science, which until recently were sheer unquestionable common sense. For anyone living inside that set of assumptions, questions like the ones in the subsequent lists are perverse. But for those for whom these old assumptions are obsolete, the new questions are an urgent necessity.

### The old assumptions

- Science is coherent, objective, unproblematic and well-bounded.
- Science is central to decisions about practical action in everyday life.
- Science is unencumbered by social and institutional commitments.
- Uptake of science is determined by intellectual ability.
- Ignorance on the part of the public has to be remedied.
- Unscientific behavior results from the failure to apply scientific knowledge.
- Scientific thought is the yardstick with which to measure the validity of everyday thinking

These assumptions might be thought of as a sort of

catechism, articles of faith which both define a belief system and also guide practice. We notice that they are all *about* science, not scientific statements themselves. Yet those who subscribed to them believed that they are as obviously true as the atomic weights of the chemical elements.<sup>2</sup>

By contrast we now move to:

### The political questions

- Who decides on the priorities and resources, whereby we have the possibility of knowledge in some domains and remain in enforced ignorance in others?
- Who decides on the ethics of research, including the creation of possibilities for harmful technologies, and the infliction of pain on sentient beings of all sorts?
- Who should decide – and by what sorts of arguments – on those applications of science that can alter our constitutions as human beings?
- Who assesses the consequences, intended and unintended, of scientific and technical advance; and how is democratic accountability in science to be achieved?

And then on to:

### The personal questions

- How can I engage with science to make a better world?
- How can we best deploy science to prevent further harm to the biosphere, that we see in climate change and species loss?
- How can we stop the use of science in biopiracy and other forms of exploitation of Majority-World people?



- How can official scientists regain trust for the next occasion that they reassure the public that something is 'safe'?
- How can science prove that something is impossible, like acupuncture or homeopathy?
- How can we rescue textbook science from its implicit message that for every problem there is just one correct answer?
- How could education in science help us to teach ourselves and to criticize what we are taught?
- How can citizens become skilled in the assessment of the quality of policy-related scientific information?
- How can science be taken out of the lab into the community, solving people's real problems in rich and poor countries alike?
- What can science students do to make science education more relevant to the real world?
- If I get a job as a scientist, who will direct my research and who will own what I discover?
- How can science help me to build my life?

These questions come at the end of this book, not at the beginning. This book is not a textbook, providing answers. Rather, its purpose is to be an introduction to the questions. The reader is invited to take them as invitation to explore science for themselves.

Over to you!

- 1 David Bollier, *Leveraging Scientific Commons to Foster Innovation*, The Networker Vol. 11 #1, <http://www.sehn.org>. See also his website <http://www.bollier.org>
- 2 D Layton *et al*, *Inarticulate Science? Perspectives on the Public Understanding of Science and Some Implications for Science Education* Driffield, E Yorks, Studies in Science Education, 1993.

## Contacts

The issues raised in this book are being discussed increasingly in all the national and international forums for science. Here are some organizations that have special concerns.

### Appropriate Technology

website: [www.changemakers.net](http://www.changemakers.net)  
email: [embcbi@ashoka.org](mailto:embcbi@ashoka.org)  
tel: +91 33 2483 8031 (India);  
+1 703 527 8300 (US)  
Promotes ingenious, simple techniques along with traditional medicines and social reform.

### Center for Health, Environment and Justice

website: [www.chej.org](http://www.chej.org)  
tel: +1 703 237 2249  
Leads grassroots campaigns in the US against pollution and environmental hazards.

### ETC (Action Group on Erosion, Technology and Concentration)

website: [www.etcgroup.org](http://www.etcgroup.org)  
tel: +1 613 241 2267  
Formerly RAFI, based in Canada, operates worldwide. Currently leading the campaign on nanotechnology.

### Friends of the Earth

website: [www.foei.org](http://www.foei.org)  
tel: +31 20 622 1369 (International)

### Greenpeace

website: [www.greenpeace.org](http://www.greenpeace.org)  
tel: +31 20 5148 150 (International)  
Both the above engage with science-related issues.

### RIVM (Dutch Environmental Agency)

website: [www.nusap.net](http://www.nusap.net)  
Web-based, for guidance on uncertainty management.

### Intermediate Technology Development Group

website: [www.itdg.org](http://www.itdg.org)  
tel: +44 1926 634400  
Follows the vision of EF Schumacher, promoting practical measures for self-help and development.

### Worldwide Virtual Network of Young Practitioners Working on Science and Society Issues

website: <http://alba.jrc.it/science-society/>  
Web-based, post-normal science network sponsored by the European Community's Joint Research Centre.

### Science Shops

website: [www.scienceshops.org](http://www.scienceshops.org)  
tel: +31 30 253 7363  
Netherlands-based science shops movement, linking to similar groups internationally.

### Community Based Research

website: [www.loka.org](http://www.loka.org)  
tel: +1 301 583 9398  
Allied US movement.