

No place to hide

John Massey Stewart

Environmental and Health Atlas of Russia. Editor-in-chief Murray Feshbach. *PAIMS: 1995. Distributed by the Center for Post-Soviet Studies, 2 Wisconsin Circle, Suite 410, Chevy Chase, Maryland 20815, USA. Pp. 448. \$95 (pbk).*

Ecological Disaster: Cleaning up the Hidden Legacy of the Soviet Regime. By Murray Feshbach. *Twentieth Century Fund: 1995. Pp. 157. \$9.95 (pbk). Distributed by the Brookings Institution.*

'ECOCIDE' is the word coined by Murray Feshbach, ex-Sovietologist and research professor of demography at Georgetown University, Washington DC, in the seminal book he wrote with Alfred Friendly, *Ecocide in the USSR* (BasicBooks/Aurum, 1992). It refers to the self-inflicted twin disasters of environment and health facing the Soviet Union at the end of the Communist era. Feshbach has now produced a detailed atlas of post-Soviet Russia's environment and health, and an updated survey of Russia's environmental problems and threats, with concrete suggestions for Western collaboration.

The atlas has been compiled by a large team of Russian experts with US support. In his foreword Aleksei Yablokov, chairman of the Russian Security Council's Interdepartmental Commission on Environmental Security, suggests, surely correctly, that the atlas is unique in being the most advanced attempt to compare data on health and environment in such an enormous territory. He points out that whereas ecological information was confidential before *perestroika*, a 1993 law on state secrets now calls for full publication of all environmental and health data.

The 304 maps, coloured by province and supported by the text, portray demographic changes from 1989 to 1992, environment-cum-geography and finally public health. They show regional comparisons between all 76 provinces (including constituent republics) and cover a huge range of subjects, from atmospheric pollution emissions and surface-water quality to the incidence of rare plants and forest fires, pesticide storage to be destroyed or buried — a new and urgent problem — and on to radioactive pollution sites in the Moscow *oblast* (administrative region) and radioactive accidents and incidents in 1993. In that year, 200 operational violations were recorded at Russia's nuclear power stations.

The hundred or so health maps, far more abundant than their environmental counterparts, cover infant mortality and respiratory illness, the incidence of many individual diseases, life expectancy and

potential years of working activity lost because of premature mortality from illness and disease — although regrettably there is nothing on congenital abnormalities which could show priority areas for environmental improvement. According to the text, life expectancy in Russia has dropped steadily to 71.9 years for women and to 58.5 for men, two out of three fetuses are artificially aborted and abor-

IMAGE UNAVAILABLE FOR COPYRIGHT REASONS

Losing ground: storage point for contaminated trucks in the Chernobyl exclusion zone.

tion causes up to 25 per cent of all maternal deaths. Only 40 per cent of children are born healthy, and infectious diseases have increased alarmingly: between 1992 and 1993, the incidence of child diphtheria and measles increased by around 300 per cent.

The maps give a remarkably instant picture of comparisons across Russia, but such huge provinces as Krasnoyarsk with their marked north-south differences may give only a misleading average. Perhaps a new edition — and in a less cumbersome shape — could add some examples at the lower regional (*rayon*) level, synchronize the text and maps better and provide more interpretation of the maps. One hates to cavil in view of the effort and undoubtedly major achievement — the work will be of great use to many planners and scholars — but analysis, particularly of the correlation between health and the environment, is disappointingly absent. Surprisingly, very few regional patterns stand out from the maps (or text) except the effects of the lack of infrastructure, mostly, it seems, in remote indigenous

republics such as Yakutia and Tuva. And oddly, Moscow and St Petersburg often come out badly; for instance, in those cities, and in five other regions, at least 41 per cent of children were not vaccinated against diphtheria in 1993.

The atlas gives no cause for complacency. The total of all radioactive waste products, for example, is estimated at about 2.8 billion curies and 610 million cubic metres. According to both Russian and World Health Organization standards, the maximum allowable concentration of many substances is exceeded fivefold in more than 150 cities and tenfold in 86 cities, thus affecting 95 million people. Almost all reservoirs close to cities are contaminated and 75 per cent of all surface water is polluted, with only half of all water safe for drinking even after treatment. Interestingly, Chechnya has the lowest number per head of population of doctors, paediatricians, X-ray examinations and hospital beds.

Clive Shirley/EPL

Feshbach's purpose in writing *Ecological Disaster* is to go beyond description and analysis of the environmental and health crisis in the former Soviet Union and to highlight the principal issues that must be addressed and confronted by Russia and the West in consort. He draws valuable attention to the global environmental threats — the Soviet regime's "hidden legacy" — generally unappreciated in the West except for the question of the safety of nuclear power stations: nuclear dumping and decommissioning; radioactivity; the massive chemical and biological warfare facilities built up during the Cold War; the potential 'poisoning' of seas by radioactive and chemical dumping; and the accelerated and unsustainable felling of the great Russian forest with its potentially dangerous contribution to global warming. Ominously, Feshbach points out that the former Soviet Union's nuclear, chemical and biological facilities are not only threatening to the world but are also themselves under threat as potential targets for mafia or terrorist activity.

After an unnerving summary of the major problems, Feshbach focuses on how

Science Book Prizes

This year's Rhône-Poulenc Prizes for Science Books were announced yesterday at the Science Museum in London. The winner of the £10,000 general prize is Arno Karlen for *Plague's Progress: A Social History of Man and Disease* (Gollancz/Putnam). The junior prize goes to Chris Maynard's *The World of Weather* (Kingfisher; published in the United States by Scholastic as *Wind and Weather*).

the West can help and what policies and priorities it should adopt. I agree that the West has been painfully slow in delivering the goods, has raised expectations ill-advisedly and is seen not only as talking much and doing little but also as feathering its own nest in its aid programmes — all fuelling anti-Western feeling and instability. A huge political prize has been lost.

Feshbach pleads for an international mechanism to reach common decisions and to coordinate efforts for a comprehensive attack on the problems. "To date our efforts to aid Russia and the other states have been remarkably uncertain and uncoordinated", he laments. The problem, he rightly sees, is not simply the level of total Western assistance pledged but the slowness of implementing the aid, the duplication of effort and the absence of any overall strategy or set of priorities.

He urges an annual review of project performance for setting future priorities and pledging the next cycle of financial assistance, and advocates as a model the aid mechanism created for Indonesia in the late 1960s. He makes specific recommendations, albeit directed at the United States only, such as increased remote sensing and the environmental use of Russia's armed forces. And he rightly stresses how important it is that the former Soviet governments should feel they are playing an integral part in the planning process. The lesson is that health and environment problems are not peripheral but a serious national and international security issue. □

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Spectacular explosions

A. G. W. Cameron

Supernovae and Nucleosynthesis: An Investigation of the History of Matter, from the Big Bang to the Present. By David Arnett. Princeton University Press: 1996. Pp. 598. \$85, £66.50 (hbk); \$39.50, £27.50 (pbk).

THERE is a parallel between the design of thermonuclear weapons and the attempt to understand supernova explosions. The first challenges the theoretical physicist to make precise calculations that bring together the treatments of extreme conditions in plasma physics, thermodynamics, statistical mechanics and nuclear physics, all within the context of an elaborate hydrodynamic simulation of a device to be built in the workshop. The supernova explosion presents a similar challenge to the theoretical astrophysicist, except that the device is designed and built by nature, and the astrophysicist must deduce its construction as part of an attempt to understand its destruction. David Arnett gives a brief overview of the nuclear physics needed to understand some aspects of nucleosynthesis in the supernova explosion, but he does not attempt to summarize the rest of the relevant physics, and prospective readers should ideally be familiar with all of these topics. By way of compensation, he always emphasizes the physical understanding of the phenomena he discusses, and with appropriate preparation the

book is delightful reading.

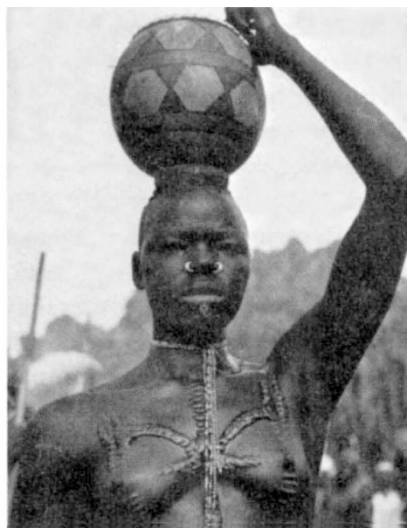
A more conventional treatment of supernova explosions would take a star of given mass and follow it through the various stages of its evolution and explosion, and then do the same for a star of different mass. Arnett prefers to consider different aspects of evolution separately, taking together all the different masses. This may bother some readers who would like to have all aspects of a given type of supernova dealt with in one place, rather than scattered among different topics, although there is also logic in Arnett's approach. Perhaps an electronic edition of this book could be set up with hypertext links, so everyone could be satisfied.

In his preface Arnett writes: "This book is not intended to be a scientific history, a textbook, or a review, although it has some of these elements and could serve these purposes. It is intended to be what was well described by Prof. S. Chandrasekhar in reference to his own goals for scientific books: '...a certain viewpoint of the field, written by one who has been an active participant in its development...'. Arnett has long been one of the leaders in the field of supernova explosions, starting with his PhD thesis a little over 30 years ago; the field has since developed into a small industry. His book emphasizes the areas in which he has worked, in accordance with his overall objective. But some important topics in nucleosynthesis are missing, in particular the formation of the very heavy elements by neutron capture on slow and rapid timescales (the s- and r-processes). Nor is the evolution of stars of medium mass (which do not produce supernovae) discussed in any detail, and it is in the asymptotic giant branch phase of such stars where the s-process takes place. Arnett's final chapter on Galactic evolution can therefore present only part of the general picture of the history of nucleosynthesis.

These omissions are not important in themselves, because Arnett's approach is intentionally selective. But to use the book as a textbook supplement for a course on stellar evolution, a teacher must be prepared to treat the missing topics by referring to other sources (and also to review some aspects of the more advanced physics). That said, the book is the best available source of material on supernova physics for the graduate student. □

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■ The third edition of *A Dictionary of Physics* edited by Alan Isaacs had just been published in paperback by Oxford University Press at £6.99.



Richard Lewontin's *Human Diversity* is now out in paperback in the Scientific American Library series. The author discusses the new techniques of DNA analysis and the results that have appeared since the book was first published in 1982. But his overall conclusion remains the same: that the very aspects of human diversity that fascinate us the most remain outside the domain of genetics. W. H. Freeman, \$19.95, £15.95.