

Elements of disaster

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Volcanic Hazards: A Sourcebook on the Effects of Eruptions. By R.J. Blong. Academic, 1984. Pp.424. \$66, £49.50.

IN A period when such environmental disasters as drought in Ethiopia and flood in Bangladesh make headline news, it has now been generally acknowledged that many Third World communities have become so "marginalized" that the slightest aberration in their local atmospheric or geophysical systems may trigger a disaster. Records suggest that there has been no increase in either the magnitude or the periodicity of hazardous events, but death tolls continue to rise.

Bare statistics disguise a significant trend, however, for while the loss of life from natural disasters has increased in the developing world, deaths in the developed world have fallen. Most observers claim that the dichotomy results from the "technological cushion" enjoyed by developed nations, where scientific knowledge, organized planning and advanced warning systems have combined to alleviate the threat and ease the impact of natural hazards. Critics highlight the distinction between those societies which can choose from a long list of structural and non-structural adjustments and those which have no choice. The latter have limited expertise and local infrastructure, little or no opportunity to insure against disaster, and even if warnings could be disseminated the lack of mobility inhibits evacuation: they must bear the loss of life and property.

Any new publication dealing with natural hazards must be viewed in this light. Increasingly, the value of such books is judged by the degree to which they offer to help reduce the vulnerability of threatened populations, whatever their economic or social status; it is no longer enough simply to catalogue and explain the physical phenomena of natural hazards. One is encouraged, therefore, to discover that *Volcanic Hazards* has this humanitarian concern as one of its three aims. Its other objectives, of chronicling and analysing the effects of the hazard, follow the traditional approaches adopted by the plethora of books on the subject which have appeared over the past decade.

Volcanic hazard research has progressed far beyond such pioneering works as Symons and Lacroix who, respectively, described the famous eruptions of Krakatau and Mont Pelée almost a century ago. Even the modern global syntheses of Bullard¹ and Francis² have rapidly

been overtaken as earth scientists have become more concerned with effects than with causes. Following the valuable work of Walker³ on volcanic prediction, and of Sheets and Grayson⁴, who examined the relationship between volcanoes and human ecology, there has been an urgent need for a single volume that would bring together the mass of literature on volcanic eruptions in a clear and concise form. R.J. Blong has provided such a volume. Here is a well-written "sourcebook" (the author's own subtitle) which not only examines all of the well-chronicled volcanic events from Santorini (1500 BC) to Mount St Helens (AD 1980), but also provides, at the end of each chapter, an appraisal of the impact of volcanic activity on various aspects of the environment.

In Blong's assessment of deaths and injuries caused by volcanic eruptions, several points emerge. For instance,

activity have resulted from starvation and disease. It is a pity, therefore, that while the devastating effects of tephra falls, pyroclastic flows etc. on crops and livestock are critically discussed at local scales, Blong says virtually nothing about the influence of volcanic dust veils on world climates and thus on harvests. Unfortunately, he believes the topic to be beyond the scope of his book.

There are no such omissions in the sections dealing with the impact of volcanic eruptions on buildings, public utilities, communications and economic activity. When it comes to property losses we discover, not surprisingly, that it is the developed world that has borne the brunt. Almost half of the book is devoted to an analysis of the effects on the built environment, and although worldwide case studies are included Blong relies heavily on the Mount St Helens disaster.

This is a welcome synthesis of information on the 1980 eruption, and one which puts the economic effects in their true perspective. We learn, for example, that local employment actually increased and that the economic impact was less than that of the Boeing recession. One suspects that were it not for the mass of volcanic perception studies generated by Mount St Helens, the valuable chapter on social aspects of eruptions would never have appeared. Like other hazard perception studies, it illustrates the impossibility of producing a regional disaster plan without knowing something of the likely behavioural responses of decision makers as

well as of those at risk. Without such knowledge disaster relief funding, evacuation plans and survival rates are difficult to assess.

Because it offers broad outlines for risk assessment, *Volcanic Hazards* will be invaluable to administrators, engineers and planners in developing and developed societies, as well as appealing to all earth scientists concerned with volcano monitoring and hazard delineation. A careful balance has been maintained in the treatment of man-environment relationships, the examples are well-researched, clearly explained and superbly referenced, and the whole is supported by many high-quality photographs, maps, diagrams and tables. This is an elegant volume which satisfies a longstanding need in the literature of natural hazards.

1. Bullard, F. M. *Volcanoes of the Earth* (University of Texas Press, Austin, 1976).
2. Francis, P. *Volcanoes* (Penguin, Harmondsworth, 1976).
3. Walker, G. P. L. *Geol. Soc. Lond. Misc. Publ.* 3, 23-41 (1974).
4. Sheets, P. D. & Grayson, D. K. (eds) *Volcanic Activity and Human Ecology* (Academic, New York, 1979).

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IMAGE
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REASONS

Destruction by volcano — *The Last Days of Pompeii*, by Brüllow.

deaths due to volcanic activity are contrasted with those resulting from other natural hazards and it is shown, for example, that the victims of earthquakes outnumber volcanic fatalities by a ratio of 12:1. Of even greater note are the figures indicating that Indonesia suffers no less than 67.3 per cent of the world's volcanic casualties, compared to a combined total for New Zealand and the Mediterranean countries of 2 per cent, despite the fact that all three regions are together regarded as the most volcanically active in the world. The statistics can, of course, be explained in part by the respective population densities of the three areas. But when a developed country such as Japan (just as over-crowded as Indonesia) is taken into account, one has to conclude that Japan's 8 per cent of the total casualties must be explained by its "technological cushion" and its reduced vulnerability to hazard-induced crop losses and subsequent famine. Indeed, in the context of food shortages in the Third World, the chapter dealing with volcanic effects on agriculture is of great importance, in particular because, as Blong shows, since 1600 some 40 per cent of deaths from volcanic

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