

Rumblings from Hawaii

Floyd W. McCoy

The Volcano Letter. Reprint edition edited by Richard S. Fiske, Tom Simkin and Elizabeth A. Nielsen. *National Museum of Natural History/Smithsonian Institution Press*: 1987. 3kg. \$30.

SEVENTY-FIVE years ago, Thomas A. Jagger settled in Hawaii to study volcanoes; he had become interested in volcanic hazards after seeing the devastation of St Pierre, Martinique, following the 1902 eruption. The Hawaii Volcano Observatory (HVO) was thus in business. To raise funds, Jagger circulated a weekly newsletter to donors — *The Volcano Letter*. The newsletter described tilt measurements and eruptions on Kilauea and Mauna Loa, seismic activity throughout Hawaii and how to make a seismograph; it discussed all aspects of volcanism; it chronicled Jagger's travels; and it catalogued world-wide seismic and volcanic activity. *The Volcano Letter* was thus a curious mix of comment, data and observations.

The Volcano Letter lasted 31 years. It was published in various formats depending upon changing financial circumstances and publishers. Upon Jagger's retirement in 1940, Ruy Finch became editor. With Finch came more scholarly articles, less chatty and with references (an equation printed in 1941, in issue No. 473, signals writing directed to a new audience). Gordon Macdonald followed as editor until 1955 when the last issue was printed. *The Volcano Letter* was left to reside in libraries, increasingly forgotten except by those devoted to Hawaii and its volcanoes.

No more. The entire publication, 530 issues, has been reprinted in one bound volume, fully indexed, to coincide with the seventy-fifth anniversary of HVO. What delightful reading it is — here is a history, a genealogy of research on Hawaiian volcanism. Read Jagger's "Native Superstition" (No. 431) after the bombing of the 1935 Mauna Loa flow heading towards Hilo: the Hawaiians predicted that in "anger the goddess [Pele] would immediately vent her wrath upon [Hilo] and cause widespread destruction. [But] an aged native . . . stopped the flow by direct supplication to the goddess. This gentleman claims direct descent from the goddess herself . . .".

Here are Jagger's predictions of doom for Hilo by either lava flow or tsunami, or both, that culminated in the 1946 tsunami disaster. He pleaded for a Pacific warning

* Orders to E. Nielsen, NHB Mail Stop 119, Smithsonian Institution, Washington, DC 20560, USA.

system, and for lava barriers above Hilo, insisting that "The shadow of the lava menace is just as removable as the shadow of malaria, tuberculosis or yellow fever, the noxious mosquitoes . . ." (No. 443).

The Volcano Letter also contained narratives of eruptions. For instance, the 1880–1881 Mauna Loa flow (No. 520): "We cooked every meal on the lava . . . Occasionally our frying pan floated down with the lava . . . the flow crossed [a] stream, forming a natural . . . bath, from cold to scalding hot". Or this account from Kilauea in 1936 (No. 441): "A thousand people at the active crater . . . are standing . . . on the edge of a vast circular pit . . . motionless . . . a concourse of fire worshippers. All are looking down, over a ring of precipice 800 feet high" — some things never change.

Equally fascinating are Jagger's comments on continental drift; or on the need

to explore the seafloor: "Why go to remote lands when the greatest discoveries in the history of science and invention are within . . . a sampan sail of thirty knots from Hawaii" (this comment was made in 1925, in No. 49).

Wonderful stuff. Here are Jagger, Finch, Powers, Stearns, Wentworth, Stone, Palmer, Macdonald and others talking about their science as much as they are reporting it. But primarily here is a chronicle of one man, Jagger, and his times — a scientist and his interests, an observatory and its development. At \$30, a copy of the book should be in all libraries serving geologists and geophysicists concerned with volcanism or the history of science. □

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Sensitive science

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Biosensors: Fundamentals and Applications. Edited by Anthony P. Turner, Isao Karube and George S. Wilson. *Oxford University Press*: 1987. Pp.770. £60, \$110.

BIOSENSING is a new field of science which pulls together an enormous range of disciplines, and which is likely to have a considerable effect on clinical testing, environmental monitoring, industrial process control and battlefield early-warning systems. The breadth of the subject and the diversity of the basic science training of existing and prospective practitioners mean that there is the danger of the wheel being re-invented and that constraints on the performance of actual biosensing devices are not appreciated. In addition there is the need to move outside the laboratory and develop sensors that can be manufactured and can live up to the rigours of the proposed operating environment. This is the backdrop to the scene into which *Biosensors: Fundamentals and Applications* makes its entry.

The aim of the editors of this international multi-author text is "to provide the first advanced and comprehensive treatise on the subject of biosensors". In seeking to achieve this aim, the range of subjects covered includes all those that can even loosely be described as biosensing, and there are also chapters on related technology areas such as DNA probes and genetic engineering. All of the contributions are by respected specialists and are well written, and in each area both the fundamental science and the most recent attempts at practical realization are presented. No attempt is made to make

judgements as to which areas of technology are most likely to succeed, which is a realistic approach in view of the embryonic nature of much of the work. However, the level of coverage is such that the skilled reader is well placed to reach his own conclusions.

The book leads naturally from a discussion of principles, through detailed chapters on the basic methods of biosensing (bioelectrochemical, acoustic, calorimetric and photometric), to accounts of instrumentation aspects and commercialization. As would be expected, over half the text is devoted to the many different electrical and electrochemical methods which have been investigated. In many cases the approach taken in expounding each technique is not new, but even the expert reader will find it helpful to have discussion of them brought together in a single tome. Although the coverage is academic and comprehensive, if read selectively the text is nonetheless suitable as a general introduction for the non-specialist reader.

No one can tell where biosensor technology will be in ten years time. The editors of this book make no predictions and neither would I. But it is highly likely that this work will still be a valuable foundation text whichever way the technology progresses. □

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• A Discussion on Biosensors, edited by M. Akhtar, C. R. Lowe and I. J. Higgins, is presented in *Phil. Trans. R. Soc. B316*, 1–181 (1987). This issue is also published as a cloth-bound book entitled *Biosensors*, available to subscribers to *Philosophical Transactions* at £19.80 (UK), £21 (elsewhere), and generally available at £33 (UK), £35 (elsewhere) from the Royal Society, 6 Carlton House Terrace, London SW1Y 5AG, UK.