these data had already been sent to two journals but were not yet publicly known. By the time the preprints became public on 30 March, Pons had altered the numbers in the figure with the result that the data now appeared to be bona fide evidence for fusion. The world then received this 'evidence' unaware of its true origins.

Had the real data been made public at the time of the original announcement, then the cold fusion 'fiasco' would probably never have been. So these dates are important in determining what was known to whom during the critical week after the press conference and leading up to publication of the first supporting paper. In this regard, historians may be intrigued by the claim in the chronology (Appendix 3) that Edward Teller was sent a preprint on 24 March. Huizenga documents the subsequent machinations about these particular data and comments (page 139) that "further investigation of Fleischmann and Pons' handling of the mobile gamma-ray signal peak is merited".

Huizenga draws morals about how scientific scientists should handle their publications and, if errors are found, withdrawals. He pleads that at a time where "carelessness and fraud in research are getting more public attention, experiments . . . and results [must be] honestly reported". Surely nobody would disagree, but how well prepared is the scientific community at large to respond when more than just mistakes are made? Is it really satisfactory that the policing of ethics seems to be of more concern to *The New York Times*, the National Institutes of Health and editorial columns than to scientific institutions?

Huizenga unequivocally states his opinions: the final chapter, entitled "Lessons", should be compulsory reading for anyone concerned about the conduct of science. Commenting on the hundreds of millions of dollars of research time and resources that were taken up in showing that there is no convincing evidence for cold fusion as a source of nuclear power, he notes that "much of this would not have been necessary had normal scientific procedures been followed". This should be taken on board by all scientific institutions.

And in future, how can the media, industry and general public make an informed judgement? Huizenga's cogent advice: "whenever the inability of qualified scientists to repeat an experiment is met by an onslaught of ad hoc excuses: Beware". □

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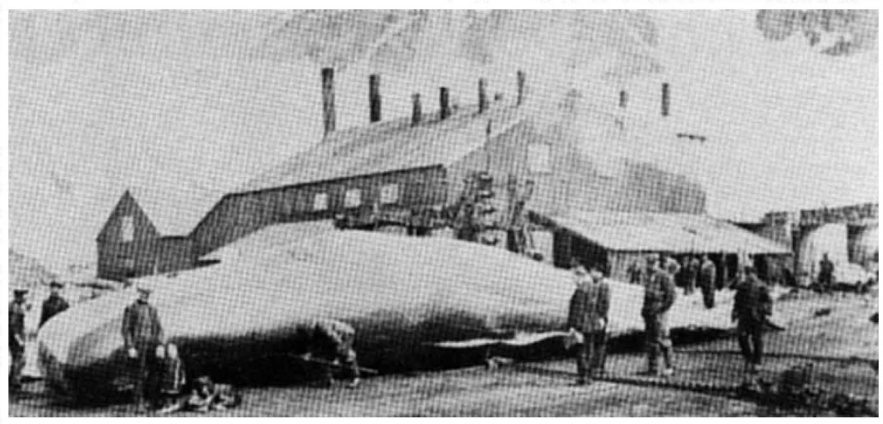

A sperm whale on the flensing plan at Grytviken (1916). Permanent settlement of South Georgia began in 1904 with the foundation of this whaling station. Photograph from *The Island of South Georgia* by R. Headland (Cambridge University Press, £19.95, $39.95 (pbk)).

Being prepared

J. G. Shepherd

Climate Variability, Climate Change and Fisheries. Edited by Michael H. Glantz. *Cambridge University Press: 1992. Pp. 450. £45, $69.95.*

THERE can be little doubt that fish stocks respond to climate change, and that the biological and economic consequences of global warming for fisheries are likely to be considerable. Whether or not science can say anything useful about these changes before they happen is another question. With a few exceptions, we cannot even be sure of the direction of the likely changes, let alone their magnitudes. The problems are difficult because of the great complexity and volatility of marine ecosystems. Trophic status in the sea is heavily dependent on size: individuals of a species may progress from being eggs through to herbivores and several varieties of carnivore in a single season, and become cannibals by the next. Also, the continued viability of a population may depend on a specific configuration of currents to prevent the dispersal of the young or to bring them safe to suitable nursery grounds. In few cases have these mechanisms been fully described, and our ability to predict from an understanding of the processes is thus limited.

One must therefore fall back on less satisfactory methods of prediction. This book is the product of a workshop held a few years ago to explore the possibility of "forecasting by analogy" — using the effects of recent natural and man-made changes as a guide to those that will occur in the future. It contains 15 case studies of varying relevance: they range from the rise and fall of the Californian sardine empire, already familiar to readers of John Steinbeck, through the fluctuating fortunes of the lobster fishery in Maine, to the 'cod wars' between Britain and Iceland in the 1960s and 1970s. The problem with forecasting by analogy is that its utility depends on the aptness of the analogy, and the relevance of some of these cases, such as the last-mentioned, lies somewhere between arguable and dubious.

Nevertheless, there is much here of general historical interest, even if there are few solutions on offer, and the assiduous reader may find among the references, particularly in the introductory chapter by the editor, entry points to reasonably up-to-date literature on the subject. One surprising omission is any account of an attempt to apply empirical but quantitative biogeographical techniques to the problem. Given the difficulty of understanding the mechanisms at work, this may offer the best hope of practical predictions in the foreseeable future — once, that is, meteorological and oceanographic researchers can provide reasonably reliable predictions of sea-surface temperature and wind strength and direction on a regional scale.

In a final summary chapter, Michael Glantz and Lucy Feingold attempt to summarize the lessons to be learned from the case studies. Disappointingly, most of these are common sense, or restate the sanctity of motherhood and the palatability of apple pie. In the end, one finishes the book not much further forward than one started. I fear the truth is that there is little to offer policy-makers beyond the Boy Scout's advice "Be Prepared", and the scientific problems are such that this will be slow to change. □

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