

and material discoveries that have led to the cures that now support us. The book is presented in a standard history format as it traces the development of 'cures' since the Greeks, stressing particularly those advances that had bearing on matters pharmaceutical. Topics are covered in historical order with each chapter dealing with a different theme ('The Chemistry of Medicines', 'Replacement Therapy', and so on). As developments quickened, themes have necessarily overlapped and Weatherall gives helpful reminders with cross-referencing.

*In Search of a Cure* is by no means a complete account and in selecting his particular landmarks Weatherall essentially overlooks, for instance, Boyle, Descartes and Morgagni and developments in the Chinese or Indian subcontinents. But the subjects he does cover are complete in themselves, are well referenced, are described with clarity and insight and are skilfully woven into the context of their times. Friedrich Wöhler's discovery in 1828 that organic compounds synthesized in the laboratory could be structurally identical to those produced by the body was met with resistance, not least from his mentor, Jons Jakob Berzelius, for it questioned the dogma of vitalism. But the relief felt by the more analytical of the time must have been enormous, and this sense of relief is transmitted to the reader.

But what makes this book so entertaining is that in addition to the science, time and again the reader is trusted with the author's asides. How the great Robert Koch argued that there was virtually no danger of humans catching tuberculosis for cattle, how throughout its history the pragmatic business approach rather than the academic has dominated the pharmaceutical industry, how a merchant banker was the father of epidemiology, and how, according to Weatherall, much of Alexander Fleming's fame has been the product of the media in which Fleming's ease with the press contrasted with Howard Florey's media phobia.

This is a good read. It leaves one in no doubt that the scientific process has been a dominant feature in the evolution of drug discovery but luck has played a major part. Time and again ideas moved between minds, disciplines, countries and up and down false paths till chance was given the oppor-

tunity to "favour the prepared mind".

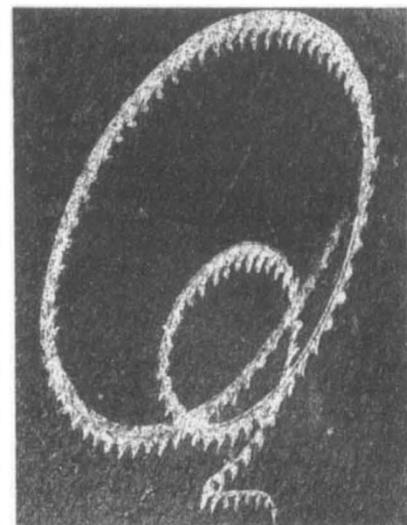
As much as Weatherall is absorbing, I found Maxwell and Eckhardt annoying. *Drug Discovery: A Casebook and Analysis* is a hotchpotch of concepts which ultimately provides little intellectual advance. "Leading North American clinician-scientists" (selection criteria unstated) were asked by an "informal written poll" (questions not stipulated) about innovative therapeutic agents introduced since the Second World War. All drugs (with the exception of those used for the chemotherapy of infection or cancer) appearing in more than 50 per cent of a minimum number of ten returns (rather arbitrary) were then submitted to an analysis designed to check whether they were indeed innovative, whether or not the discovery was the product of chance or design (assessed from analysis of the original publications and contemporary literature), where they originated (country, type of institution) and which was the primary academic discipline involved (for example, pharmacology, chemistry). Each chapter relates to a different drug (32 in all), and is presented in one of seven sections depending on its broad therapeutic category (for example, 'Rheumatology', 'Gastrointestinal', 'Neurology'). An eighth section deals with analysis and interpretation.

The bulk of the text consists of rather heavy descriptions of the drugs themselves, first 'defending' their inclusion in the study as innovative, then describing how their use had altered clinical practice. The remainder deals with the study proper, analysing the pedigree both of the drug and its inventor(s).

The findings are perhaps much as to be expected. We learn that most of the ideas crucial to recent drug development have emanated from the United States; that 60 per cent of the drugs were developed solely in one country, the remainder involving contributions from two or three; that the predominant intellectual drive behind each discovery was shared roughly equally between industry and university; that drug research never seemed to follow plans designed at the outset; and finally that there was a general and 'respected' role for a widespread contribution of serendipity.

It is tempting to accept these findings but there are aspects which undermine confidence; the essentially bogus distinction between good luck and serendipity, the belief that data taken from published material can provide a full picture of the process and the reticence of the authors to approach the inventors themselves for fear of getting unreliable or partisan information, are all worrying. In their next book, and others are promised, perhaps Maxwell and Eckhardt might start with a section validating their own survey methods. □

Joe Collier is in the Department of Pharmacology and Clinical Pharmacology, University of London, St George's Hospital Medical School, Cranmer Terrace, London SW17 0RE, UK.



GRAPTOLITES are the perfect fossils. Beautiful as objects and relatively common, they have long been prized by collectors. But totally extinct and unlike any living creatures, their biology and phylogenetic relationships have been a puzzle for professionals. Enough is known, though, to allow the production of *Graptolites*, edited by Douglas Palmer and Barrie Rickards, a concise yet lavishly illustrated guide to the group. Published by Boydell and Brewer (price £39.50, \$79), it is a pilot in what promises to be an excellent series of users' guides to all fossils.

Graptolites were marine, colonial animals that lived between about 550 and 300 million years ago. The individuals, or zooids, were linked together with common soft tissue and housed in a tough, collagenous communal exoskeleton. The distinctive shapes of the exoskeleton, as well as being visually appealing (the fossil in the picture, which is taken from the book, is *Monograptus proteus*) are essential for identification. Benthic, epibenthic and planktonic forms existed, and the animals reproduced either asexually (by budding) or sexually. Opinions vary about their affinities: some researchers align them with colonial coelenterates, but a relationship with colonial hemichordates is the majority view.

*Graptolites* tells you what the animals were made of, how they lived, where to collect the best ones, which museums hold the best collections, addresses of graptolite experts and concludes with 138 full-page, black-and-white plates. The chapters are short and written in a crystal-clear style that falls exactly midway between basic introduction and professional guide, with the best bits of both and the bad bits of neither. The editors have conducted this collaborative venture with considerable aplomb, including nothing superfluous and yet leaving nothing out. A perfect book, then, for the perfect fossils.

Henry Gee

**New in paperback**

■ Of interest to students, researchers and technicians in the biological and biomedical sciences is *An Introduction to Centrifugation* by T. C. Ford and J. M. Graham. The book is published by Bios Scientific at £12.95, \$25.

■ The fourth edition of *Lipid Biochemistry: An Introduction* by M. I. Gurr and J. L. Harwood has just been published by Chapman and Hall. Price is £19.95, \$39.95.

■ *Peptide Hormone Action: A Practical Approach* edited by K. Siddle and J. C. Hutton provides a useful summary of laboratory methods and experimental ideas. Published by Oxford University Press/IRL Press at £22.50, \$50. □