Structure and Classification of Paleocommunities

Edited by Robert W. Scott and Ronald W West
Dowden, Hutchinson and Ross, Inc. (Halsted Press) 291 p., 1976.
$25.00

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This volume contains 11 papers which originally formed part of a Paleontological Society symposium on "Structure and Classification of Ancient Communities" held in Miami in 1974. These papers, in one way or another, all review the problems of applying the community concept to fossil suites and attempt to demonstrate that communities *can* be interpreted and predicted from preserved paleobiological and paleoecological data.

The editors have arranged the papers in logical sequence, beginning with broad theoretical discussions and progressing to case histories. The first paper is by E. G. Kauffman and R. W. Scott, who discuss basic concepts of community ecology and paleoecology, define terms precisely and advocate the use of the dynamic holistic concept of the community, wherever possible. While the paper forms an excellent background to the ones that follow, it is slightly marred by over-use of such terms as "conceptual", "interface", "interaction", etc. Scott then proposes a trophic classification of benthic communities using well-documented examples from the Cretaceous of southwestern USA. R. H. Parker, on the other hand, favours a geomorphologic classification of communities, recognizing also the important role of radiant, kinetic and chemical energy input and utilization in the ecosystem. K. B. Macdonald addresses himself to the problem of "confidence limits" on the accuracy of paleocommunity reconstructions by citing studies on comparisons of living and dead shell assemblages from present-day environments. He concludes that protected, low-energy, shallow-water environments show a strong correlation, in terms of structural community characteristics, of living shelled communities with nearby shelly thanatocoenoses, whereas postmortem faunal mixing prevails in higher energy areas. The papers by J. E. Warme *et al.* and R. J. Stanton are in similar vein. Warme and his co-authors maintain that close correlation of living and dead molluscs and foraminifera in modern environments indicates minimal postmortem transportation. Stanton would agree, in terms of distribution patterns, but demonstrates from his studies on modern macrofaunal shelf communities off southern California that the oft-held paleoecologic assumption that the original biocoenotic trophic structure is preserved in the fossil community is, in fact, invalid: a most important conclusion.

The last five papers are more or less case histories. R. R. West compares seven lingulid communities from Ordovician to Holocene in age. M.D. Brondos and R. L. Kaesler measure and analyze diversity of late Paleozoic ostracode assemblages, while K. H. Lister does the same for Pleistocene lacustrine ostracodes. Finally, J. H. Hanley and T. W. Broadhead offer detailed community studies on Tertiary non-marine molluscs and Carboniferous marine benthic communities, respectively.

This book is not for the "old-fashioned" paleontologist, but should be required reading for the new breed of graduate paleoecologists with a strong background in theoretical, experimental and observational ecology. The editors hope the book will help answer the question "Whither goest paleoecology?" I think this volume goes a long way towards doing so.

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Terre—Lune—Planète

A. Cailleux
Masson - Fides, 1975, 346 p.

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A. Cailleux nous présente une introduction à la géologie trés bien documentée et simple, sans jamais être simpliste. De 346 pages ce livre est divisé en 13 chapitres couvrant tous les aspects de la géologie, y compris celle de la lune et des planètes. L'illustration est abondante et le format très pratique. Seule remarque négative, certains schémas auraient gagné en clarté s'ils avaient eu une échelle.

Le premier chapitre se consacre à la revue des méthodes des sciences de la terre brossant à grand trait une introduction aux méthodes de datation, de travail de terrain, de géochimie et de télédétection. Vient ensuite le chapitre sur le globe terrestre en général. L'auteur sort des descriptions habituelles des traités de géologie, telles la composition chimique, la topographie, la structure interne et l'isostasie, pour aborder les problèmes des ressources non renouvelables et le bilan énergétique. Le troisième chapitre constitue une introduction trés complète à la minéralogie et aux méthodes d'études des minéraux. Les chapitres 4, 5, 6 et 7 sont consacrés à la pétrographie. Les nombreux exemples du Québec rendent ce livre encore plus utile à l'enseignant canadien. Le chapitre sur les roches sédimentaires est le plus long, et particulièrement intéressant. L'auteur s'éloigne de la classification trop simple - biotique versus abiotique - pour présenter des roches d'origine mixte déjà connues et des hypothèses de recherches très intéressantes. Le chapitre 8 est consacré aux fossiles et à leur évolution. Le problème est exposé de façon très nouvelle: les grands biômes actuels, l'origine de la vie sur terre, les grands traits de l'étude quantitative et qualitative de l'évolution. Le chapitre 9 serait aussi bien à sa place dans un traité de géomorphologie. Il parle des

actions géologiques externes sans se perdre dans les détails mais par contre sans généralisation trop poussée et en gardant une optique plus ouverte que la plupart des traités de géologie. Le chapitre sur les actions géologiques internes comprend une bonne discussion de la dérive des continents et de la tectonique des plaques, ce qui n'est pas si fréquent qu'on pourrait l'espérer. Le chapitre (11) sur la géologie des planètes est inhabituel dans un livre de ce genre et y ajoute une nouvelle dimension. Il ne traite pas uniquement de l'aspect géologique, il inclus l'atmosphère, le relief et les possibilités de vie sur les différentes planètes. Le chapitre 12 porte sur l'origine et l'histoire de la terre. En parlant d'un exemple québécois, il traite des généralités planétaires sur l'origine des océans, des terres émergées et des variations climatiques. Le dernier chapitre qui précède et introduit la conclusion est consacré à l'arrivée de l'homme. L'auteur parle de l'homme fossile (méthode d'étude-évolution) mais aussi de l'homme actuel et de son influence. Le livre se termine sur une page de réflections nécessaires... mais si rares dans ce genre d'ouvrage.

Partout, dans ce livre, on perçoit la forte personnalité et la très grande culture de son auteur, entre autre dans la diversité et le nombre des exemples et aussi par certaines phrases de conclusions partielles qui ouvrent aux lecteurs de nouveaux horizons. En cela le livre est très loin du "text book" habituel et est beaucoup plus enrichissant. Ce livre devrait sûrement être un des éléments de base de la bibliothèque d'une personne intéressée aux sciences de la terre. Il sera aussi utile au professeur et à l'étudiant par la clarté de la présentation et le nombre impressionnant de figures, qu'au traducteur par la précision du vocabulaire et les références fréquentes à la terminologie anglaise.

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Geologic Time (Second Edition)

By Don L. Eicher
Foundations of the Earth Science Series, Prentice-Hall, 150 p., 1976.
$7.95

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Geological time is implicit in historical geology, and most geologists, directly or indirectly, seek to explain the history of some part of the Earth's crust. Time, therefore, should be as central to the thinking of the student, teacher, and practitioner of geology today as it was to that of the founding fathers of the science one to two centuries ago. But it is far from so. With an apparent indifference to the wealth of information now available to them, many modern geologists think about time only casually and imprecisely, almost intuitively; they continue to have only vague notions of the concepts of absolute and relative time, of how time is measured and time-scales constructed, of the relationship between material stratigraphic sequences and abstract geochronologic sequences, and of the distinctive nomenclatures for these sequences now advocated by national and international commissions. By preparing a second edition of his slim but informative book on *Geologic Time*, Eicher has refocused attention on the place and on the unifying role of time in the many and varied fields of the geological sciences, and he has revamped a much-needed contribution to a woefully thin, generalized literature specifically on this topic.

Considering its length, *Geologic Time* is remarkable in its scope. It achieves both breadth and depth, because Eicher has chosen wisely to summarize not *what* is known about geological history but *how* it has come to be known. He begins logically by recounting some important historical events, such as the conclusions of Hutton and Lyell on the vastness of geological time, shattering the pre-eighteenth century, quasi-Biblical belief that the Earth was only a few thousand years old; the central role accorded geological time in the formulation of Darwin's theory of organic evolution by natural selection; the fallacious methods followed and spurious results obtained in the early attempts to make quantitative assessments of geological time; and Becquerel's discovery of radio-activity and the birth of radiometry. Eicher then proceeds to discuss the rock record and discontinuities within it, thereby setting the stage for bringing rock and time together in an account of the chronostratigraphic record. In perhaps the longest section in the book, he discusses the place of time in a number of stratigraphical concepts and principles: correlation, facies recognition, transgressive and regressive sequences, paleogeographic reconstruction, and continental and polar movements. An ensuing section on biostratigraphy initially discusses organic change in space and time, which provides a basis for a detailed account of different kinds of zones, how these zones are established, and what their relative usefulness is likely to be. Appropriate in the context of Eicher's general discourse, this portion doubles as a useful adjunct to the biostratigraphic portion of the American *Code of Stratigraphic Nomenclature* in that it provides just the kind of explanatory exposition that, conveniently, now has been included in the new (1976) *International Stratigraphic Guide*. *Geologic Time* concludes with sections on the methods (both biological and physical) of making quantitative measurements of time. Considering the desirability of integrating as closely as possible the absolute and relative time-scales, the inclusion of a review of the radiometric methods and their limitations as comparably detailed, yet as succinct, as the summary of the biostratigraphic methods is appropriate.

As a contribution to the general geological literature, *Geologic Time* stands alone, and it fills a niche long left vacant. Compared to Shaw's (1964) *Time in Stratigraphy*, Eicher's book offers a shallower but wider treatment of the topic, and it is as clearly directed to the student as Shaw's work is directed to the professional. In more than one respect, therefore, these books complement one another. Harbaugh's (1968) *Stratigraphy and Geologic Time* perhaps comes closest to Eicher's