Geoscience Canada

Book Reviews / Critiques

Volume 21, numéro 1, march 1994

URI : https://id.erudit.org/iderudit/geocan21_1br01

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Éditeur(s)

The Geological Association of Canada

ISSN

0315-0941 (imprimé)
1911-4850 (numérique)

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Citer ce compte rendu

(1994). Compte rendu de [Book Reviews / Critiques]. *Geoscience Canada*, *21*(1), 37–43.

Book Reviews / Critique

Book Reviews

Functional Geomorphology: Landform Analysis and Models

Edited by K.-H. Schmidt and J. de Ploey
Catena Verlag
Cremlingen-Destedt
Catena Supplement n. 23
ix + 212 p., 93 fig., 10 tabl., 1992, US $99

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The papers presented in this collected work highlight the retirement of Frank Ahnert (1927-) of the Rheinisch Westfälische Technische Hochschule (Technical University). The major achievements of the German geomorphologist relate to functional geomorphology, which is the analysis of the process-response network of geomorphological forms and processes.

The book contains papers authored by colleagues or collaborators of Ahnert, especially in the framework of the Commission on Measurement, Theory and Application in Geomorphology of the International Geographical Union. (One of the co-editors of this work, Jan de Ploey, died during preparation of the book.)

In addition to the preface by Karl-Heinz Schmidt, who briefly presents the scientific aspects of Ahnert's life, as well as a list of his principal publications, the book contains 11 papers, is hard cover, well bound, and very well edited. The papers are an average of 19 pages, 8 figures, and 1 table, but the reader is at times uncomfortable because of the great disparity existing from one paper to another. Most of the papers follow the scientific method, and contain an abstract and references. The papers are produced by authors from seven countries: Germany, Britain, Belgium, Canada, the United States, Israel and the Netherlands. References do not reflect this diversity since, other than those in English, only a few references can be found in German and French, generally cited by Europeans.

The papers can be divided into two parts, the contents of which are well described in the foreword.

The first part, composed of six papers, concerns the research subject matter of Ahnert, namely landform analysis and modelling. R.B. Bryan and D. Oostwoud-Wijdenes (U. of Toronto) present the short-term evolution of gully microsteps and scour channels, and J. de Ploey presents the long-term formation of badlands using a well-established erosional susceptibility model. A. Yair studies the effects of climatic change at the desert fringe and shows that, depending on internal system conditions, a wetter climate does not necessarily cause a more humid local environment. P.D. Junderius and D. Schoonbeek present a methodological study on blowout development in coastal dunes. J. de Lugt and I.A. Campbell (U. of Alberta) study the role of mass movement processes in slope development in the badlands areas of Dinosaur Provincial Park in Alberta. Lastly, M.A. Seidl and W.E. Dietrich present a little-known field in fluvial geomorphology: the processes of channel incision into bedrock.

The second part, composed of five papers, concerns various subjects related to Ahnert's work. O. Slaymaker (U. of British Columbia) attempts to reconcile Ahnert's process/response models with a sediment storage approach; as a matter of fact, Ahnert never used his models to model fluvial systems with a disequilibrium state caused by a glacial or other non-fluvial heritage. K.-H. Schmidt tries to demonstrate that, using Ahnert's work on landform change, no "eksystemic" variations of climate or tectonism are needed to effect changes in system conditions; ensystemic attributes alone can control changing equilibrium states. It is shown that Gilbert's dynamic equilibrium concept helps to explain complex evolutionary aspects in geomorphological evolution. P. Ergenzinger and J. Schmidt experiment with one of Ahnert's ideas, namely the use of a soil erosion model, originally designed to determine soil erosion budgets in response to short-term events, for simulating long-term slope evolution, since, according to Ahnert, this type of model should provide good results independently of the time-scale. M.J. Kirby, for his part, presents an erosion-limited hillslope evolution model as a generalization for both transport and supply limited conditions. Lastly, N.J. Cox deals with Ahnert's magnitude/frequency morphoclimatic concept. He questions whether gamma distributions, recently much applied to hydrogeomorphological problems, may not be more suitable for describing the distributions of empirical precipitation data.

Based on the high price of the book, purchase is recommended primarily for university libraries and research centres.

Eustasy: The Historical Ups and Downs of a Major Geological Concept

Edited by Robert H. Dott, Jr.
Geological Society of America Memoir 180
Geological Society of America Publications
Boulder, Colorado, United States
120 p., 1993, US $45

Reviewed by William A.S. Sarjeant
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On all of Canada's coasts, we may see the effects of rising and falling sea levels. Raised beaches, fjords, rias and the stranding of tree trunks along western Canadian shorelines all give witness to such changes. Most of us nowadays have decisively rejected such once-imagined causes as burstings-forth of contained waters from within the earth, the soaring of the moon upward from the cavity of the Pacific Ocean, and the malign influence of comets and supernovae. Although science fiction nightmares concerning dinosaur decimation continue to haunt some of us (no, not usually the paleontologists) the concepts of Hutton and Lyell have prevailed. We are, instead, examining continuing causes — what one might term "intraterrestrial" causes — to explain the surficial features of our planet in present and past times.

As editor Dott states in beginning a useful introduction to this thought-provoking volume,

> Sea level is our most fundamental datum, being the boundary between land [and] the sea as well as the ultimate reference for all elevations. Although on a day-to-day basis, sea level seems permanent, in reality it is constantly changing. (p. 1)

It was Eduard Suess who first coined the term "eustatic" for such changes, in his *Der Antlitz der Erde* (1881), but, as Dott's introduction shows and Carozzi's account of the work of Benoît de Maillet stresses, the concept is much more venerable. The very idea of a universal deluge, termed by Jews and Christians "the Noachian deluge," but predating even the writing of the Old Testament, has its part in this story. Moreover, throughout centuries of seafaring, submergences and emergences of land have been affecting the use of harbours and rivers, causing the decline of formerly flourishing ports and generating lawsuits concerning the ownership of newly emergent lands. However, serious scientific discussions of this question did not begin until the 18th century, the century when geology — or was it to be called "geognosy," as Werner urged? — was at last taking shape.

Within the context set for them by Dott's introduction, the successive papers in this volume show how geologists' concepts of eustasy have evolved. After being reminded by Carozzi of *Telliamed*, we have Tony Hallam's lively discourse on Suess and his ideas; Dott's own recounting of T.C. Chamberlin's hypothesis of a diastrophic control of eustasy; Markes Johnson's exposition of Amadeus Grabau's pulsation theory; and the intriguing demonstration by Rex Buchanan and Christopher Maples of how a great stratigrapher, Raymond C. Moore, could long close his mind to the effects of glacial advances and retreats upon sea level. Ralph Langenheim and John Nelson discuss how the concept of cyclothems has (in properly eustatic fashion!) risen, fallen and risen again, specifically in its application to the Illinois Basin. Peter Vail's spirited defence of the virtues of seismic stratigraphy usefully incorporates an account of the origins of that particular approach, currently so fashionable. In a final chapter, a group of authors wonder whether the effects of eustasy can be disentangled from the web of other events revealed, albeit only partially, by the stratigraphic record.

The concept of this volume was good; its production has been excellently done. Will there be sibling volumes from the Geological Society of America, examining the fluctuating fortunes of other geological concepts? I hope so.

Terrestrial Ecosystems Through Time. Evolutionary Paleoecology of Terrestrial Plants and Animals

Edited by Anna K. Behrensmeyer, John D. Damuth, William A. DiMichele, Richard Potts, Hans-Dieter Sues and Scott L. Wing
University of Chicago Press
Chicago and London
xix + 568 p., 1992, US $75, $29.95 (paper)

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This volume embodies a synthesis of the research and reflective products of working groups of the Evolution of Terrestrial Ecosystems conference, which was held " near Washington D.C." (p. xiii) in mid-1987. As the Preface reports (*idem*):

> The contents of this book reflect the dual goals of coordinating a large body of scattered data and demonstrating the potential use of these data in testing hypotheses of general interest to paleontolgists, anthropologists, evolutionists, and ecologists.

Its first chapter discusses "Evolutional Paleoecology" in general; although one might find that title ambiguous, the particular meaning is adequately explained in text and diagrams. Chapter 2 discusses "Paleoenvironmental Contexts and Taphonomic Modes" at length, also providing a very useful bibliography. Chapter 3 is devoted to the "Ecological Characterization of Fossil Plants," while Chapter 4 attempts a "Taxon-Free Characterization of Animal Communities." That is a task which, in the opinion of this reviewer at least, simply cannot be done satisfactorily, so I did not find its conclusions convincing. Much more to my tast were the three concluding chapters, respectively on Paleozoic, Mesozoic and Early Cenozoic, and Late Cenozoic terrestrial ecosystems; these are a rich fruitcake of useful data.

Hitherto, the attention of paleoecologists has been concentrated on marine sediments; indeed, there are whole books devoted to paleoecology that devote no attention whatsoever to terrestrial environments, aqueous or non-aqueous. This substantial volume is to be

applauded as a long step along the road toward addressing this imbalance. It will make useful supplementary reading for any advanced-level courses on paleoecology and will surely be helpful to any vertebrate or invertebrate paleontologist whose research horizons range beyond the marine realm.

The Great Oil Age — The Petroleum Industry in Canada

Peter McKenzie-Brown,
Gordon Jaremko and David Finch
Detselig Enterprises Ltd.,
Calgary, Alberta
x + 181 p., 1993, $33 (inc. GST + shipping)

Reviewed by Walter O. Kupsch
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In 1930, Stephen Leacock wrote an essay in the *Imperial Oil Review* in which he used the expression "The Great Oil Age." It is an appropriate title for a book that deals with the Canadian petroleum industry. However, because it is such a vast subject, the aspects dealt with, of necessity, reflect the backgrounds and interests of the authors. McKenzie-Brown, a political scientist, now edits *Forestry, Oil & Gas Review* ; Jaremko holds an M.A. in history and is an editor for the *Calgary Herald* ; Finch, who has an M.A. in Canadian history, wrote a book on geophysics (*Traces Through Time*, 1985) and another (*Dealmakers*, 1989) on the role of the landman, both with respect to the petroleum industry.

So, what the reader gets is a disproportionally hefty 41% of the book devoted to the political and economic history of the petroleum industry, with the remaining 59% (or 90 pages out of 153 pages of text) concerned with the history of exploration and production of oil and gas.

Having thus alerted readers interested in the history of science and technology as to what they can expect to get out of this book, I should also raise questions regarding the targeted audience. If the intent was to write a book that would instill some enthusiasm in the general reader about an industry presently under siege by environmentalists as well as by its own customers, it disappoints on two accounts.

First, there is a dearth of human-interest stories, anecdotes, profiles and entertaining, attention-grabbing detail. Ted Link is mentioned as the geologist who selected the drill site on Bosworth Creek near Fort Norman, NWT by waving his arm and saying, "Drill anywhere around here" (p. 42). There is no indication that such an exclamation was much in character for a flamboyant personality. Reproducing the photograph of Ted Link on his head at the edge of a cliff and the mention of his attaching this picture to his *curriculum vitae* when applying for a job (whether or not true) would have given the reader a break and a chuckle. Also missed was the opportunity to mention the role individuals other than politicians played in the political games that were played in the 1970s and 1980s. The name of "Cam" Sproule, widely recognized as the father of Panarctic Oils Ltd., does not appear in the otherwise detailed and informative discussion of the role that company played in northern development.

Second, the absence of maps in the text is regrettable. The only map is the GSC's Geological Map of Canada on the books' cover. Colourful, but not helpful to the general reader who would be served much better by simple black and white maps in the text showing sedimentary basins, their petroleum occurrences, and geographic names used in the book that are unfamiliar to most Canadians (*e.g.*, the Bent Horn oil field on Cameron Island, p. 90). Besides some maps, a few diagrams would have helped, particularly where the conventional view on the origin of petroleum is presented. Anyone who has taken a Geology 101 course is familiar with it, but the general public may not be that well informed. As a matter of fact, they stand to become totally confused when they work their way through the text on pages 21 and 22. There they will find 11 lines devoted to the conventional view, but 49 lines to Thomas Gold's and Warren Hunt's advocacy of the inorganic theory of origin.

The book has few misspellings and most are easily spotted. An exception is the name of an early promoter of the Athabasca oil sands, Count Alfred von Hammerstein (p. 72, 192). Some statements are incorrect. The "world's first oilfield" was not Oil Springs in southern Ontario where production began in 1858 (p. ix and p. 11). That distinction belongs to the Bóbrka field in the Polish Carpathians, which started in 1853 and still produces today. Thus, this European oil field preceded Oil Springs by five years, and Titusville, Pennsylvania by six.

In spite of my criticisms, I enjoyed reading the book and learned a lot. The Notes, Bibliography and Timeline (a chronology) are informative and helpful. The Petroleum History Society, which sponsored the publication and to which all royalties will accrue, is to be commended for undertaking the project that led to this book. For those who should like to get more information about The Petroleum History Society, here is the address: 2100, 350 - 7th Avenue S.W., Calgary, Alberta T2P 3N9.

Simple Curiosity. Letters from George Gaylord Simpson to His Family, 1921–1970.

Edited by Léo F. Laporte
University of California Press
340 p., 1987

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Collections of letters (generally from scientists to scientists) and punctuating more or less detailed biographies, were staple fare of Victorian scientific biography; in this century, they are much rarer. As Simpson has already documented his own life with an autobiography and a travel book, why would a collection of letters written to non-scientific members of his family be deemed worthy of publication? *Simple Curiosity* offers abundant reasons, for the letters illuminate the fascinating life of a major 20th century figure, give some quite informal looks at fellow scientists and scientific politics, and make extremely entertaining reading.

Simpson took a lead in so many fields that probably few scientists know the full extent of his work. Born in 1902, he left to one side early ambitions to be a creative writer when he decided that "the highest possible scientific motive is simple curiosity," and turned to research. He was the first to specialize in Mesozoic mammals at a time when fossils were so rare that he could say "there is only one specimen in the world which I have not personally studied." Running out of Mesozoic mammals, he moved to later ones, which led his research in a number of directions. He collected the strange faunas of South America, which inspired his entertaining travel book *Attending Marvels*, still in print after more than half a century. Within the space of six years (1939-1945) his simple curiosity led him to publish what have become classic works on quantitative zoology, evolutionary theory, and mammalian classification, while fitting in important work on the history of vertebrate paleontology, and (in Spanish) an ethnographic study of a group of South American Indians. In later life, he published numerous other books on evolution and taxonomy: his best-selling *The Meaning of Evolution*, which elaborates what Laporte refers to as his "positivistic agnosticism"; textbooks on paleontology and biology; popular books on horses and penguins; a history of the discovery of South American mammals; and several books of essays (he later regretted only the one in which he argued against continental drift just before plate tectonics swept the field).

This remarkable record could easily seem like the work of a closet scientist peacefully plodding away at intellectual matters in an ivory tower, and indeed, his *curriculum vitae* of museum and non-teaching academic positions supports this. However, his somewhat eccentric 1978 autobiography *Concession to the Improbable* tells some of the real story, recollected in (relative) tranquility. The letters, addressed mainly to his sister Martha and to his parents, tell even more of the story, with the immediacy of the moment. Simpson's first marriage was traumatic, and ended in a difficult divorce, which at last gave him freedom to marry a childhood friend, psychologist Anne Roe, with whom he eventually achieved custody of the four children of the first marriage, and undertook successful professional collaboration. Many years at the American Museum led to increasing frustration when, (among other things) a prominent funder tried to get him fired. His letters discuss various attempts to move to a more congenial environment, eventually achieved when he became Agassiz Professor at Harvard. There he enjoyed his freedom to get on with research, but does not fail to lampoon the cumbersome protocols that had evolved around a long-established institution. He served in Africa and Europe in the intelligence services during World War II, often suffering from illness. In his extensive fieldwork, he was held at gunpoint in a South American revolution and (in his 50s) was crushed by a falling tree in the Amazon jungle, surviving an injury that would have killed most people.

The letters have clearly not been written with an eye to posterity. They are immensely varied, mixing zany humour, straightforward reportage of daily life in camp and in the office, and penetrating analyses of whatever was on his mind. They call back a lost era in science, when $15 per month was too much to pay for a car, and it was possible to "know personally nearly all the real vertebrate paleontologists in the world." As may be expected, letters covering nearly half a century show many glimpses of personal and social evolution: racial jokes in the earlier letters give way to active concern for desegragation in the 1960s, and his wife (living her own busy professional life) still made sure he had frozen dinners when she was away.

Simpson's letters cannot have been easy to edit. He calls his regular correspondents by different nicknames every time he writes, gives addresses in the field that are often delightfully vague ("camp, a long, long way from anywhere else"), dates letters in much the same way ("it must be November because the weather is beginning to get warm"), often uses several languages in the same letter, uses deliberate misspellings and malapropisms, and lapses into verse, sketches and ancient Egyptian hieroglyphics at the drop of a hat. In the face of these challenges, the editing is generally exemplary. Laporte introduces each section fluidly, balancing the partial story presented in the letters, and footnoting efficiently. Only occasionally does one regret the absence of an explanation (such as on p. 298, where we are told the name of one colleague who ended up in an asylum, but not which Director of the American Museum was mothballed by the board). Later work by Laporte (1990) makes it clear that there is still more material to mine in Simpson's fascinating letters and field notes, and we can hope that we will see some of his scientific correspondence, and perhaps a biography, in due course.

The only complaints are reserved for the uninspiring cover, which renders almost invisible some of Simpson's entertaining drawings, and the lack of a list of illustrations, or indeed, any annotation of most of the photographs that introduce the sections.

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Field Geology of High-Grade Gneiss Terrains

By C.W. Passchier, J.S. Myers and A. Kröner
Springer-Verlag, New York
150 p., 1990, US $45.00 (paper)

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To many geologists, mapping in gneiss terrains has always been treated with trepidation, in part due to the fact that most of us are trained in dealing with unmetamorphosed or weakly metamorphosed strata, the apparent complexity of many outcrops of gneissic rocks, and previously held views that little geologic information could be gained from these terrains. However, over the past decade, new approaches to mapping such terrains, particularly in areas of the Canadian Shield such as the Grenville Province, the New Quebec Orogen and the Nain Province, have led to increasing interest and study of high-grade gneiss terrains. Consequently, publication of *Field Geology of High-Grade Gneiss Terrains* might be expected to fill an important niche in helping geologists study such terrains. Unfortunately, the book is not the utilitarian reference volume that the mapping geologist might have hoped for.

The authors, in the preface, clearly state that the book is not a textbook, but that the purpose of the book is as follows:

> "We do not intend to give a foolproof field guide to high-grade gneisses, but rather to provide thought-provoking guidelines for solving structural problems."

For the most part, the authors succeed in their goals. To the geologist fresh out of school and starting work in a high-grade gneiss terrain, the book will point out many of the pitfalls that one can easily make in attempting to map and interpret such terrains (*e.g.*, effects of transposition, fold interference styles, *etc.*). To its credit, the book emphasizes mapping studies in such terrains, and takes the view that laboratory studies are only useful if undertaken after descriptive field studies.

Given the authorship, it is not surprising that the book emphasizes structural geology, and Chapters 3 and 4, which describe the structural features that can be observed in gneissic rocks, particularly gneissic tectonites, comprise more than 50% of the book. The judicious use of photographs and line-drawings illustrating the effects of progressive deformation are particularly helpful in this regard. There is considerable overlap between Chapters 3 (Fabric Development) and Chapter 4 (Interpretation of Structures and Fabrics), and I am not sure if the breakdown into two sections serves the reader well. These chapters assume a good background in structural geology, and therefore are most suitable for use at the university graduate, rather than undergraduate, level.

The emphasis on mapping in this book is a pleasant surprise, and a variety of geologic maps of gneiss terrains are illustrated in the book. In Chapter 2, the authors show how different types of maps (*e.g.*, conventional geologic map *versus* finite strain maps) for the same area effectively convey different types of information. This section is useful for any mapping geologist writing a report on a high-grade gneiss terrain.

Chapter 5 (Metamorphic History) and Chapter 6 (Geochemistry, Isotope Geochemistry and Geochronology) provide useful overviews of the types of information that can be gleaned from gneiss terrains. These sections are not comprehensive, but provide a reasonable starting place in the literature for the reader who is beginning work in such terrains.

Chapter 7 (Origin and Evolution of High-grade Gneiss Terrains) at five pages in length, hardly does the topic justice. The division of gneiss terrains into two types, tonalite-trondhjemite-granodiorite (TTG) and metasedimentary platforms intruded by S-type granitoids (Grenville Province is included in the later category although large parts of it clearly do not fit) is oversimplified. The crustal structure of such terrains, based on seismic studies, is briefly discussed, but not illustrated. In this regard, mention of the Kapuskasing structural zone is notably absent. According to the preface, the book arose from a workshop in Sri Lanka in 1987. Although the volume contains 1988 and 1989 references, much of the book, based on content, appears to date from 1986-87, rather than from 1989. This may be one reason why Chapter 7 is so limited in scope.

The book is well illustrated with crisp, clear, black and white photographs and numerous line-drawings. Typographical errors are few, although numerous hyphens were introduced throughout the text during typesetting and commonly prove to be a distraction. For the purpose the authors intended, the book is about the right length, and can be read in one sitting.

Particularly useful is Chapter 8, a problems section which, through a series of maps and photographs, allows readers to test their interpretative skills on a variety of gneissic rocks (answers are provided later in the book). It is, perhaps, this problems section that has caused the publisher to do a disservice to the authors and potential users by labelling, in advertisements and on the back cover, the book as the "first textbook on structural geology aimed primarily at the interpretation of high-grade gneiss terrains." This book is clearly not suitable as a textbook and should not be advertised as such.

Why isn't it suitable as a textbook? Well, it is not comprehensive enough. For example, in Chapter 4, it mentions and illustrates a variety of shear-sense indicators useful in determining motion along ductile shear zones, but unless you go to the original papers in the *Journal of Structural Geology*, or purchase a copy of *Shear-Sense Indicators: A Review* (Hanmer and Passchier, 1991), you will not be able to make use of these features in the field; the detail just isn't there. Migmatites are hardly discussed at all, and where noted, the restricted definition of migmatites as partial melts is used. This deficiency is not warranted, as many high-grade gneisses include migmatitic rocks (*sensu stricto* and *sensu lato*), as do gneissic tectonite zones such as those found in the Grenville Province in Ontario. Menhert's (1968) classic work is barely noted, despite the prevalence of his descriptive terminology within the literature; knowledge of terms such as paleosome and leucosome are assumed.

From the standpoint of mapping, few guidelines are given with respect to recognizing different gneissic units, and more importantly, how to describe such units adequately. Again, from a mapping perspective, the application of the stratigraphic nomenclature provisions

of the North American Stratigraphic Code (NACSN, 1983) — particularly terms such as lithodeme and structural complex — are not noted, despite some excellent examples of the application of such terminology in gneissic terrains for mapping purposes (*cf.*, Laajoki and Luukas, 1988; Hattin, 1990). Such units are most likely tectonostratigraphic in character and do not follow the law of superposition, but can be useful tools in map construction and description. Discussion of useful descriptive mapping terms for gneissic tectonites (*e.g.*, straight gneiss, porphyroclastic gneiss, *cf.*, Hanmer and Ciesielski, 1984), or useful visual aids to field mapping (*e.g.*, many granulite facies gneisses tend to have an olive colour) is absent. The use of geophysics (*e.g.*, gravity, aeromagnetic maps, *etc.*) in mapping is not noted. Reference is made to the mineral wealth of such terrains, but other than noting the existence of Mount Isa in Australia and the Thompson belt in Canada, such mineralization is not discussed, nor are mineral exploration techniques in such terrains. The fact that the mineral assemblages found in alteration zones of VMS deposits in high-grade gneiss terrains can mimic those of regional metamorphism (*e.g.*, Hodges and Manojlovic, 1993), makes this a significant oversight.

The section on metamorphism of high-grade terrains is limited, particularly with respect to recognizing polymetamorphic events, and does not take into account studies such as Percival (1989) with respect to granulite-facies metamorphic types and tectonic settings responsible for granulite-metamorphism. The use of Ar-Ar studies in determining the cooling history of high-grade gneiss terrains is barely noted, although Nd-Sm and U-Pb methods are discussed. As well, sampling methods are not well discussed, particularly with respect to dating deformational and metamorphic events. The Canadian scene is not well represented, despite many relevant studies of high-grade gneiss terrains in recent years, such as those in the Grenville Province, the Kapuskasing structural zone, and in the New Quebec orogen and the Nain Province.

From the standpoint of use as a textbook, an educator could use the layout of the book to design a course on the study of high-grade gneiss terrains, however, other texts and reprints from the literature, in addition to *Field Geology of High-Grade Gneiss Terrains*, would be needed in order to adequately cover the subject.

The ultimate question, perhaps, is whether one can really learn how to map high-grade gneiss terrains solely by reading a textbook, no matter how comprehensive. In my experience in such terrains, I have learned far more by attending field trips and working with many geologists with varied experience in a variety of geologic terrains and disciplines, than through reading. An eclectic educational background and varied mapping experience in a variety of geologic terrains also helped. *Field Geology of High-Grade Gneiss Terrains* does provide an interesting perspective on mapping such terrains, and some of the line-drawings and photographs make this a useful volume to take into the field as a quick reference guide. However, it is no substitute for personal interchange of ideas and methodologies. In summary, it is a useful volume for most geologic libraries and some field geologists to purchase, but it is not a textbook nor should it be in every geologist's library.

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Remote Sensing for Hazard Monitoring and Disaster Assessment: Marine and Coastal Applications in the Mediterranean Region.

Edited by E.C. Barrett,
K.A. Brown and A. Micallef
Gordon and Breach Science Publishers, Phildelphia
xii + 240 p., 68 Fig., 34 tables, 1991, US $45.00

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This volume is a collection of presentations given at an international training course held in Malta in 1989. The course was organized jointly by the Euro-Meditarranean Centre of Marine Contamination Hazards of Malta and the Remote Sensing Unit of the University of Bristol. The three co-editors belong to either of these organizations. Presentations from the first course, held in 1988 and also published, focussed on the same region, but covered different aspects (*i.e.*, hydrology and water-related management).

The book is intended as an introduction to the principles and practices in the field of remote sensing of environmental problems. It highlights the role of remote sensing in the evaluation and monitoring of natural hazards and natural or induced catastrophies in Mediterranean coastal and marine areas. It is designed for students enrolled in gradu-

ate studies, as well as scientists and technicians working in this field, and I believe that the book achieves its goal quite well.

The book is solidly bound with an attractive hard cover, and contains a preface, a thematic index including a glossary of acronyms, and 11 chapters. Although certain images often lack locality information and interpretation, the editors have found a clever way of using low-cost colour image reproduction: the 17 pages of the colour insert, placed in the centre of the book, are also reproduced in black and white in their rightful places in the text. In addition, each chapter is well written, with an introduction, theme development, and a conclusion, which is, oddly, not always the case in many of the books I have recently reviewed. However, the book does not have an introductory chapter for defining the context, unless the preface serves this purpose, nor a concluding chapter for opening other anenues of research, unless chapter 11 is intended for this purpose. Of the 17 authors, all but six are British and only five references involve publications in Spanish, German or French. (I might add that it seems odd to have only one French reference in a book that deals with an area that is, to a large extent, part of France.)

The first two chapters are general in scope, in the sense that they present the subject and the tool. Chapter 1 outlines the notions of hazard and catastrophy. These are loosely classified into five groups (*i.e.*, geological, hydrological, oceanographic, meteorological and those related to vegetation. Chapter 2 presents the fundamental principles of airborne and satellite remote sensing and the types of platform, sensors and data. Chapter 3 describes the overall use and importance of remote sensing in the study of hazards and catastrophies in the Mediterranean area.

Each of the remaining seven chapters deals with a different aspect of remote sensing: hazards related to humans (chapter 4), earthquakes and volcanism (chapter 5), soil erosion and desertification (chapter 6), vegetation and crops (chapter 7), meteorology (chapter 8), oceanography (chapter 9), and pollution (oil spills, water quality, algae blooms) (chapter 10). In chapters 4 and 5, complete or partial distribution maps of these phenomena can be found, although some are difficult to read (*i.e.*, p. 72). There are other problems with the book. In chapter 6, a case study in Spain is presented: is the example really representative of all the reference area? In chapter 9, concerning oceanography, wave monitoring using radar is referred to without providing any example related to the overall theme; the chapter becomes quite useless.

Chapter 11 deals with the usefulness of integrating remote sensing data within a geographic information system (GIS) to insure better data integration with multisource data. This is quite pertinent, especially at the end of such a publication. However, at least one application, showing its efficiency, should have been presented.

In conclusion, it is an interesting, although incomplete, and fairly priced book. It deserves to be purchase by libraries.