

the term moraine should be restricted to the material in glacial transport". P. H. Banham, with particular reference to Norfolk, discusses glaciotectionic structures and the models of glaciotectionic deformation. He also points out that some of the structures which have been interpreted as glaciotectionic, may have resulted from polygenetic multiple causes.

Four authors deal with the Pleistocene climate from various points of view - H. H. Lamb's paper begins with the recent meteorological and climatological data, followed up by the past climatic regimes, and concludes with drawing attention to the short-time periods of rapid climatic change. R. B. G. Williams discusses "the British climate during the Last Glaciation: an interpretation based on periglacial phenomena", while G. R. Coope attacks the same problem by studying fossil assemblages of Coleoptera which appear to be more sensitive climatic indicators than plants. Therefore "the pattern of climatic changes indicated by Coleoptera deviates considerably at times from the traditional picture". W. H. Zagwijn follows the more traditional way and discusses the "variations in climate as shown by pollen analysis, especially in the Lower Pleistocene of Europe", and points out that the translation of vegetational changes into terms of climatic changes also offers many problems.

R. F. Flint's paper on "Features other than diamicts as evidence of ancient glaciation", though placed among the papers dealing with climate, actually ties together the criteria used for deciphering the Quaternary glaciations with those of the more ancient ones.

The pre-Quaternary glaciations are dealt with by five papers - W. B. Harland and K. N. Herod present a general review for the time span ranging from Precambrian to Late Cenozoic, also pointing out the different opinions of various authors and the possible varieties of the causes of ice ages. A. M. Spencer discusses the "Late Precambrian glaciation of the North Atlantic region". P. Allen, the "Ordovician glacials of the central Sahara" where even some landforms have survived the hundreds of millions of years and are exposed in the desert terrain. R. J. Adie deals with the "long-known Permo-Carboniferous deposits

throughout the Southern Hemisphere", reviewing also the different opinions on their sequence and paleogeography. L. J. G. Schermerhorn reviews quite critically the supposed Precambrian glacials in a setting of tectonic framework and concludes that "the great majority of Late Precambrian mixtites are essentially the product of crustal instability".

The concluding paper, by both editors, is a summary of inter-disciplinary discussions on all topics and several related problems.

The book is a valuable contribution to a better understanding of glacial sediments and structures, and the climates which have been favourable for their wide-spread formation.

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Beach and Nearshore Sedimentation

Édité par Richard A. Davis, Jr. et R. L. Ethington
SEPM. Publication speciale No. 24.
 187 pages, 1976.
 CSPG membres \$11.00, autres \$13.00

Critique par Bernard F. Long
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Cet ouvrage constitue une synthèse des différents sujets abordés au cours du colloque de DALLAS, organisé par la SEPM en 1975 sur le thème: Sedimentation des plages et infralittorales (Aspects physiques et biologiques). Il résume les tendances actuelles de la recherche en sédimentologie marine qui furent préconisées lors du colloque de Toronto, en 1964, sur les relations entre les structures morphosédimentaires et les paramètres hydrodynamiques et biologiques.

Ce livre contient 10 articles, neuf sur les aspects physiques du problème et un seul sur l'influence de la biologie sur la sédimentation. Il démontre, d'une part le haut degré de symbiose existant actuellement entre la sédimentologie classique et l'océanographie physique

et d'autre part les relations modestes liant la biologie marine aux sciences de la terre.

Le premier article, "Weather Patterns and Coastal Processes" de W. T. Fox et R. A. Davis présente les relations entre les conditions météorologiques et l'évolution littorale en divers points du continent Nord-Américain en insistant sur l'influence de la pression atmosphérique sur la stabilité du littoral.

L'article de V. Goldsmith ("Wave Climate Models for the Continental Shelf: Critical Links between Shelf Hydrolic and Shoreline Processes") propose un modèle mathématique très poussé de la propagation des houles de différentes périodes dans la mer de Virginie. Il en détermine leurs orientations, leurs énergies et leurs actions à la côte ainsi que les relations entre cette action et la nature granulométrique des sédiments. Cet article complète l'approche théorique de J. I. Collin ("Approches to wave modeling") qui constitue une synthèse des travaux sur la dynamique des houles.

Quatre auteurs: P. D. Komar ("Evaluation of Longshore Current Velocities and Sand Transport Rates on Beaches"), B. N. Benninkmeyer ("Sand Fountain in the Surf Zone"), R. L. Miller ("Roles of Vortices in Surf Zone Prediction: Sedimentation and Wave Forces") et E. Waddell ("Swash-Groundwater-Beach Profile Interactions") précisent de manière théorique et expérimentale l'influence des différents paramètres hydrodynamiques sur les mouvements sédimentaires au niveau des estrans. Komar insiste sur l'importance de l'angle d'attaque des houles par rapport à la côte et sur le rôle majeur des brisants dans le transport littoral; ce dernier point fait l'objet d'une excellente étude "in situ" de la part de Benninkmeyer à l'aide de systèmes optiques. Miller démontre le rôle des vortex dans l'érosion des figures sédimentaires durant la période des brisants et du déferlement. Les interactions de phénomènes hydrodynamiques au niveau de jet de rive sont définies par Waddell. Ainsi, toutes les étapes des actions mécaniques des houles sur les littoraux sont analysées.

Les aspects morphosédimentaires font l'objet de deux articles: "Wave Formed Sedimentary Structures"

(H. E. Clifton) et "Facies Relationships on a Barred Coast, Kouchibouguac Bay" (R. Davidson-Arnott et B. Greenwood). Le premier insiste sur les relations entre les courants et les figures sédimentaires de surface, le second applique cette méthode à l'étude d'un environnement particulier et à son évolution.

G. W. Hill et R. E. Hunter recherchent les actions du biotope sur la sédimentation et sur l'importance sur le remaniement des matériaux meubles.

En résumé, ce livre apporte une contribution importante à l'étude de la frange côtière et il laisse présager de nombreuses interactions futures entre les diverses disciplines scientifiques s'intéressant au problème de l'océanographie littorale, tout en insistant sur le haut degré des techniques d'investigation actuelles.

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Remote Sensing for Environmental Sciences

Edited by Erwin Schanda
Springer-Verlag
Chapman and Hall Limited, London,
 367 p. 1976
 \$29.80

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This book, the 18th in the series of Ecological Studies Analysis and Synthesis, discusses the various spectro-optical techniques that are currently employed in multidisciplinary studies of environmental parameters. Eight separate chapters, written by eight independent authors, cover the topics Aerospace Photography, Infra-Red Sensing, Lasers, Radar, Microwave Sensing, Gamma Radiation, Sonar, and Digital Image Processing, and each chapter unfolds in an identical manner. After an initial discussion of the physical principles involved, the sensing devices are described, and examples are presented of attempts to apply the

technology to specific problems. The book is competently written (despite some rather peculiar grammatical phrasing and very noticeable typesetting errors) with an excellent balance of European and North American reference material. As such, it gives an accurate, albeit abbreviated, narrative on the state-of-the-art of remote sensing. This is the most alarming aspect of the book, since it dramatically underscores the need for rapid (and probably, agonizing) self-reappraisals of the directions and philosophies being taken by active workers in the field. All the contributing authors adopt an optimistic (perhaps unreasonably so?) attitude while describing the efforts with which remote sensing has been applied to environmental management and the potential for future applications. However, such optimism appears incongruent with much of the cited literature, and it becomes eminently obvious that much clever and creative scientific thought is urgently required if the field of remote sensing is to achieve the potential that is continually being ascribed to it. Certainly it has a long way to go before it can achieve scientific respectability, a goal which is perhaps unattainable in the light of many of the activities and approaches discussed in this book. More realistic, however, is the ultimate acceptance of remote-sensing as a research technology/methodology (the use of the word "tool" liberally scattered throughout the book should be prohibited, as should the use of the phrase "ground truth" which mercifully is used only twice in the text, once in p. 4, and not again until p. 337) in the scientific assessment of the physical processes which govern the multi-disciplinary behaviour of the real world. But even this will require a concerted effort by many dedicated workers.

As an example of how accurately the book reflects the activities of the remote sensing community, the first technology discussed is aerospace photography, and the chapter devoted to photographic processes is the largest in the book. By contrast, the digital processing techniques are discussed in the closing chapter of the book in only a little more than half the space devoted to photography. To further emphasize the lack of scientific interpretation characterizing the current state-of-the-art in remote sensing, the closing

chapter on digital techniques (a mandatory approach for most interpretations based on scientific principles) deals with image enhancement, geometric correction, registration, and transformation, image filtering and smoothing, and classification techniques. Very little, if any, emphasis is placed upon a scientific (as opposed to an arithmetic) approach to the data. It has always been the contention of this reviewer that aerial photography should play, at most, a minimal role in the assessment of natural environmental resources by means of remote-sensing technologies, and that such photography should be included within the realms of photogrammetry, a field which is more concerned with geometry than the physical sciences. The sustained tedium of Chapter 2 serves only to reinforce such a contention.

This book is intended as an introduction to remote sensing in the natural sciences at the graduate student level, and there is no doubt that profit is to be found in this text book at such a level, particularly since the scientific principles upon which the remote sensing devices have been designed are described in an accurate (although, in some cases, overly concise) and exceptionally readable manner. However, perhaps it would be more profitable as a form of conscience to more veteran workers in the environmental sciences who are planning to utilize remote sensing methodologies in their particular disciplines. One can only hope!

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