who won an award for his coverage of the federal government's proposal to build a nuclear waste dump near his town, describes how under certain conditions the science journalist can be thrust into the role of providing crucial information to those who might otherwise be deprived of it — or who distrust other sources.

Sadly, but perhaps wisely, the editors have not attempted to pull together the wide variety of points of view represented in the book. If they had done, they would have found considerable evidence to support the argument that a closer relationship between working scientists and journalists would undoubtedly be more comfortable for science. But whether it would necessarily be equally beneficial to the non-scientific community is less clear. As William Bennett, editor of the *Harvard Medical School Health Letter*, points out, the journalist's role of "informed sceptic" is vital to the health of a science-based democracy. And this role is never a straightforward one; in science, even more than in politics or the arts, the definition of "informed" is often open to dispute.

Nevertheless scientists who are quick to attack critical reporting of their work, or that of their colleagues, should consider a thoughtful comment from David Crisp: "Good scientists and good journalists," says Crisp, "have a great deal in common: an ingrained skepticism toward established dogma, conventional wisdom and the tyranny of commonsense; an eye for accuracy and detail; the ability to deal impartially with facts that don't fit the theory; and contempt for the pernicious theory that all passionately held ideas are of equal value". □

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Dynamic insights

J.R.L. Allen

Coastal and Estuarine Sediment Dynamics. By Keith R. Dyer. *Wiley:1986. Pp.342. £36, $63.35.*

SEDIMENT transport dynamics is of great importance in several disciplines, each of which, in its traditional garb, approaches the subject from a special standpoint and with particular perceived needs. This is why it is so hard to write about it well. Sedimentologists and geomorphologists are best able to discuss the outcomes of sediment transport, namely what, in the form of sedimentary textures, structures and larger scale formations, has to be explained. From fluid dynamicists and rheologists come the necessary theoretical and experimental insights into the roles of fluid motion and particle mechanics in sediment transport. Engineers, with their emphasis on an empirical, pragmatic approach, are best equipped to provide from contemporary environments and from the laboratory many of the additional links necessary for the appreciation of sediment transport and its real effects in quantitative terms.

Writing about sediment dynamics as expressed in shallow-marine environments, Dr Dyer rightly attempts to blend these three traditional approaches — sadly, still a rare venture. The result is a lucidly written book which, if with limitations here and there on the descriptive and theoretical sides, and a singular lack of photographic illustrations, is up to date and largely a success.

The book begins with a brief survey of the subject and a sketch of sediment production and the geological context of modern shallow-marine sedimentation. Next come discussions of sediment particles as such and the fluid flow; more emphasis could usefully have been placed on the diversity and significance for transport of particle shapes, and on mass transport currents in waves. Chapter 3 covers sediment entrainment, one-way transport in suspension and as bedload, and bedforms (inadequately characterized). The following brief chapter examines sediment movement under waves, but the resulting bedforms are again ill-characterized and the origin of wave ripples is not explored. The further treatment of sediment suspension includes useful accounts of stratification by suspended particles and the suspension profile under waves.

In Chapter 7 Dyer compares sediment transport-rate formulae and sketches the important but under-researched topic of transport beneath waves and waves combined with currents. Not surprisingly, given the author's background, the treatment of cohesive sediments is excellent, except for the surprising omission of the by no means negligible mass-movement processes. Estuarine and coastal sedimentation are well summarized, as are beach processes, but the important role of storms in causing unusual sediment transport in these environments is ignored. An extensive bibliography (*c.* 1,000 items) and a short index conclude the book. Readers should beware equations 3.6 and 11.17, incorrectly set, and a mis-spelling of Bernoulli. Regrettably, SI units are eschewed.

This book has its faults. But it broadens our appreciation of sediment dynamics in shallow-marine environments, and deserves to be read and used. □

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Framework for twistors

Abhay Ashtekar

Spinors and Space-Time. Vol. 2 Spinor and Twistor Methods in Space-Time Geometry. By R. Penrose and W. Rindler. *Cambridge University Press:1986. Pp.501. £45, $89.50.*

TWISTORS were invented by Roger Penrose about 20 years ago. Since then he and his research group have worked on the subject steadily and have built it into a thriving branch of mathematical physics. The goal of the twistor programme is very ambitious — first to recast and then further develop all of known physics within a framework in which space-time itself is a derived, secondary object. Considering that relatively few individuals have been involved in the programme, the results to date are most impressive from a mathematical standpoint. Indeed, even if it should turn out that the ideas cannot be taken any further because of some intrinsic limitation, the fact that so much of the basic mathematical structure underlying relativistic physics can be constructed without a direct reference to space and time is, in itself, sufficient to make this endeavour fascinating. It is therefore regrettable that most mathematical physicists know virtually nothing about twistor theory. In part, this is because very little of the recent literature on the subject is accessible to non-specialists. The second volume of *Spinors and Space-Time* is intended to remedy this problem, and it does so very satisfactorily.

The authors first introduce the basic ideas of twistor theory, including some of the recent developments, and then go on to discuss a number of constructions of use in general relativity which are simplified and, in some cases, inspired by this theory. Since the relevant results and equations from Vol. 1 are recalled at the beginning of the book, readers familiar with 2-component spinors can go directly to Vol. 2.

The introduction to twistor theory is fairly detailed. Readers are first exposed to the non-local relation between the geometry of twistor space and of Minkowski space-time; they are then shown that the momentum angular-momentum structure of particles and fields can be coded in a natural way in the twistor picture; and, finally, they are presented with the description of the zero rest mass fields in terms of contour integrals and cohomology on the twistor space. It is remarkable that, although the relation between the twistor space and space-time is *non-local*, solutions to physically interesting *local* differential equations in space-

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