tion of critical exponents and a good summary of the experimental situation in fluids, as well as a number of pedagogical introductions to particular topics. It cannot be regarded as an up-to-date review of the whole field, however, since the choice of papers is conditioned by the usual limitations of a conference report. The reader is primarily struck by the wealth of good physics, both experimental and theoretical, spanning many different fields, that has come out of the work of the last two decades. The field of phase transitions can truly be regarded as a paradigm for a successful assault on a deep and challenging problem in physics.

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Neurobiology

Glial-Neurone Interactions. Papers from a meeting, Titisee, Germany, April 1981. J. E. TREHERNE, Ed. Cambridge University Press, New York, 1982. iv, 246 pp., illus., + plates. $60. *Journal of Experimental Biology*, vol. 95.

This book is the result of the third Company of Biologists Ltd. discussion meeting. The papers in the book cover most of the current ideas about glial-neuron interactions and help to clarify some of the important remaining questions about this difficult subject.

Papers by Lane and by Landis and Reese that describe anatomical studies in which freeze-fracture and electron microscopy were used to investigate cell-cell interactions in the nervous system give a good synopsis of what is known about cell membrane specializations. The papers emphasize the possible relations of such specializations to cell adhesion or coupling, ions and metabolic exchanges, axonal guidance, and trophic support.

Since Kuffler's work in the 1960's, glial cells have been thought to be involved in the ionic control of the fluid environment of the nervous system. Using *Necturus* as a model, Orkand *et al.* present an extensive study of membrane properties of neuroglia and relate ionic changes to control of glial metabolism. Similarly, Treherne and Schofield explain the mechanism of ionic homeostasis in an insect by an interesting model in which active and passive processes involving the neuroglia and an extracellular matrix are required for cation regulation. With a very useful preparation, the retina of the honeybee drone, Coles and Tsacopoulos investigate the possible relations between ionic and metabolic control and suggest interesting correlations between K^+ movements and glycogen metabolism. Extending the physiological approach, Sykova reports that K^+ modulates neuronal transmission by modifying glial cell function and some of its metabolic pathways.

Glial cells are also thought to be involved in more specific interactions with nerve cells and axons. Villegas reports an extensive study of the relation of axons and Schwann cells in the giant nerve fiber of the squid, presents evidence for the synthesis, storage, and release of acetylcholine by Schwann cells, and suggests a feedback mechanism acting on the Schwann cell that regulates its membrane potential and ionic permeabilities following axonal excitation. Lasek and Tytell describe a particular protein (traversin) synthesized by the glial cell and transferred to the axon. They also discuss the role of other macromolecules in such transfers and suggest different mechanisms that may be involved in other, similar transfers. Following the same general idea, Currie and Kelly report specific uptake of different amino acids and demonstrate a high-affinity glutamate uptake property of glial cells. In a very clear paper, Mudge reports that the peptide content of cultured sensory neurons may vary depending on whether nonneurons are present or absent. Such properties are viewed as vitally important in cell-cell interactions within the nervous system.

Roots and Brockes *et al.* discuss the use of glial markers, the limitations of their specificity, and, most important, the changes in them during development and in tissue culture. The paper is an excellent summary of changing glial cell performance in vivo and in vitro, and the reader is well advised to be careful when using glial "markers" as tools to define cell types.

The last three papers in the book deal with more general ideas about the role and importance of glial-neuron interactions during growth, differentiation, myelination, and regeneration in the nervous system. Schacher reviews the role of support cells in growth and differentiation of neurons and suggests that granules are released from the glia at different steps during development and may play a role in the general performances of neurons. In a very concise paper Brockes *et al.* report an extensive study of the immunological properties of Schwann cells and summarize some current ideas about the involvement of Schwann cells in myelination and regeneration. They also summarize the present work on the purification of a glial growth factor. In the last paper, Aguayo *et al.* summarize the evidence concerning the putative role of glial cells in the regeneration of central axons after injury. They suggest that influences arising from the nerve cell environment may play an important role in the success or failure of regeneration.

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Geology of a Passive Margin

Geology of the Northwest African Continental Margin. U. VON RAD, K. HINZ, M. SARNTHEIN, and E. SEIBOLD, Eds. Springer-Verlag, New York, 1982. xii, 704 pp., illus. $49.

Because of their importance to our understanding of the origins of oceans and the building of mountains, modern continental margins are of great interest to a broad spectrum of earth scientists. And in these times of dwindling energy supplies the petroleum potential of continental margins is well recognized.

Although many major scientific questions about the northwest African margin remain unanswered, so much has been learned recently via six legs of the Deep Sea Drilling Project and many modern geophysical studies done by the University of Hamburg and the Bundesanstalt für Geowissenschaften und Rohstoffe that it is timely to synthesize this work. The volume is a tribute to the German institutions that have aggressively researched this area and greatly expanded our knowledge of this margin, especially over the last decade.

The quality of the production is satisfactory, even with the variety of typefaces used in the 28 papers. Only a few typographical errors are apparent, and the English is of high quality. (It should be noted that the 50 contributors represent a broad spectrum of the international community, including the United States, Canada, United Kingdom, Norway, France, and Switzerland.) Maps and cross-sections are used effectively to communicate massive amounts of information and to illustrate interpretations. Historical block diagrams of various parts of the margin are extremely well done in many of the papers. Even the front and back inside covers have well-

done maps. A small inconvenience results from labels' being placed in the legends for figures rather than directly on the figures themselves.

The book follows a logical format, dealing with the basement and tectonic features first. There are good papers on geophysics and deep structure by Hinz *et al.*, Roeser, and Weigel *et al.* These papers do not merely describe the results of surveys but put forward original interpretations, such as the idea of Weigel *et al.* for a plume crust as the transition from continent to ocean. There are several good papers on deep stratigraphy, both onshore and offshore, based on the Deep Sea Drilling Project sites. In fact, the findings of leg 79, which was finished only a year ago, are included. Although preliminary, the findings are fundamental to our understanding of the margin. It is left to the reader to see the implications of the leg 79 results with respect to some of the other papers in the volume, some of which were obviously written before the results were available.

A paper by Jansa and Wiedmann compares the northwestern African margin with its conjugate partner, the eastern North American margin. Though this is an excellent paper for a stratigraphic comparison, it shows structural cross-sections in cartoon form and illustrates none of the original geophysical data from the American margin. There are similarities in crustal thickness, continent-ocean transitions, and magnetic and gravity anomalies between the two margins that might have been illustrated in an additional paper.

A transitional and very valuable paper by Jacobi and Hayes deals with the physiography and acoustic mapping of the modern margin facies, although only for the southern part of the area. The paper serves as a transition in that it provides acoustic evidence for the sedimentary processes responsible for pelagite, turbidite, and contourite deposition in the modern ocean, which then can be used to interpret the paleoenvironment. Several good later papers deal with the sedimentation and paleoenvironmental interpretations for the Cretaceous and Cenozoic.

Ideas about ocean currents and gravity processes are well employed by Einsele and Wiedmann to interpret the paleoenvironment of the Turonian black shales and by Einsele and by Behrens and Siehl to interpret the paleoenvironment of the Cretaceous clastics. And modern ideas about geohistory that take into account regional subsidence, relative sea-level rise, sediment accumulation, and compaction are well utilized by Ranke *et al.* in a paper on the development of the Aaiun-Tarfaya Basin and by Wiedmann *et al.* in a paper on the Moroccan continental margin. Conclusions about eustatic sea-level rise and subsidence caused by crustal thinning and sediment loading are similar to and supportive of those of recent studies of the American margin.

A discussion and comparison of the stratigraphy and geologic histories of the Cape Verde and Canary islands by Robertson and Bernoulli is extremely thorough and well placed in the context of the plate tectonic history of the area. Good comparisons with the Jurassic and Cretaceous facies in the western Atlantic are made.

Sarnthein *et al.* thoroughly synthesize data on the late Cenozoic paleoenvironment of the area. The complex interplay of oceanic currents, upwelling, and offshore wind transport are considered, and the variation in these factors through the changing climates of single-pole and double-pole glaciations is documented. Modern techniques that provide high time resolution, such as the oxygen isotope techniques, are employed by Thiede *et al.* to address the Quaternary paleoenvironment off Africa.

Finally, a paper on the origin of heavy metals in the black shales by Brumsack and Lew and one on the petroleum potential and maturity of these shales by Rullkötter *et al.* have possible economic implications for the northwest African margin. The conclusions of these papers regarding the source of metals from sea water and the source and preservation of the kerogen are of broad scientific interest.

The book is an excellent reference volume on the geology of the northwest African margin, one of the oldest rifted passive margins. The area illustrates many of the phenomena common to all passive margins. The book is vital to all researchers working on passive margins, and I would also recommend it for use in graduate seminars on continental margins.

One slight deficiency in the book is the absence of the most recent breakthrough in the use of long-range side-scan sonar in margin research. Several recent studies using these techniques have been done on the American margin, resulting in surprising new ideas about canyon formation and mass movements. Apparently no similar studies have been done off northwest Africa that might have been included in this otherwise comprehensive volume.

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British Thought on Race

The Idea of Race in Science. Great Britain 1800–1960. NANCY STEPAN. Archon (Shoe String), Hamden, Conn., 1982. xxii, 230 pp. $27.50.

The study of race has never belonged exclusively to a single discipline. In the 19th century, the concept of race was of central importance to certain areas of anthropology and a significant concern of ethnology, philology, phrenology, natural history, evolutionary biology, eugenics, and political theory. Nancy Stepan's book on the science of race in Britain displays an impressive command of both primary and secondary literature from an extraordinary variety of fields. At the same time, this interesting study is fully accessible to the general reader.

The main argument of the book, characterized in the preface as a "history of scientific racism," is that, from the mid-19th century until the Second World War, science provided spurious support for the belief that certain races are degraded or inferior to others. The author contends that the persistence of racist attitudes in these various sciences, even in the face of the transformation of the species concept brought about by Darwin's theory of evolution, makes the theory of race a cardinal instance of the continuity of scientific ideas. Stepan seems uncertain how to account for this fixity of ideas, for she argues both that ideas about race "gained weight in the scientific community precisely because they were based on the ideas and methods of the sciences of the day" (p. xv) and that "the history of racial science is a history of a series of accommodations of the sciences to the demands of deeply held convictions about the 'naturalness' of the inequalities between human races" (pp. xx–xxi). She places the watershed in the history of race science around 1940, when modern population genetics and Nazi excesses acted together, though in very different ways, to discredit the old orthodoxy.

Fixity has no history, of course. The least interesting parts of the book survey scientific movements like phrenology and eugenics, which were only marginally concerned with race, in order to announce that their practitioners, like everyone else, accepted racist assumptions. The chapter on the assimilation of biological evolution into a largely unmoved race theory is better, as is that on the invention of such measures as the cephalic index (ratio of head width to length) by craniometrists and physical anthropologists, who were mainly inter-