subfields of cognitive science: mathematical psychology, information processing, cognitive psychology, psycholinguistics, psycholexicology, and cognitive neuroscience. It offers insight into the development of the thinking, theorizing, and research of George Miller, who has contributed so much to the advancement of cognitive science, as well as illuminating the development of the chapter authors' work. All in all, it makes for fascinating reading.

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Surface Science

Physics at Surfaces. ANDREW ZANGWILL. Cambridge University Press, New York, 1988. xiv, 454 pp., illus. $69.50; paper, $27.95.

If a fresh surface exposed by cleaving a sheet of mica is sprayed immediately with distilled water, the water seems to disappear as it uniformly wets the surface. If several seconds are allowed to pass before the surface is sprayed, the water will generally bead up in distinctly visible droplets. In that brief interval, organic vapors from the laboratory air have contaminated the surface, profoundly altering its physical and chemical properties. Yet, before 1967, no general method existed by which the surface composition of a solid could be analyzed. The invention of Auger spectroscopy in that year seemed to release a creative force.

For two decades, new surface techniques have been spawned one after another. Driven by these inventions, surface physics has experienced phenomenal growth. Indeed, it is the techniques of surface physics, both experimental and theoretical, that define the field. Such disparate topics as heteroepitaxy of germanium on silicon and the reaction of cyclopentane on platinum, after all, have little in common aside from the fact that both systems have been studied by low-energy electron-loss spectroscopy. It is not, in my opinion, possible to understand surface physics without first understanding the methods of surface characterization.

Andrew Zangwill has taken up the challenge of writing a textbook for surface physics. He has attempted to synthesize this diverse field in just 450 pages, divided into two parts: Clean Surfaces and Adsorption. That is a lot of territory to cover. How did he manage to condense it into a book of such modest dimensions?

A little inaccuracy, it has been said, saves a world of explanation. Zangwill "covers" Auger spectroscopy in a record-breaking three pages and x-ray photoelectron spectroscopy in one paragraph. Field emission is confined to a single sentence in a chapter on kinetics and dynamics. This sort of condensation is not achieved without cost. One winces at the oversimplifications and at the occasional misuse of terminology.

In spite of these flaws, the book does manage to relate an enormous body of knowledge and provide a remarkably current picture of the field. I particularly liked the liberal use of figures taken from the recent literature. The figures serve in many cases to fill in gaps in the text, and they have a way of making the literature more accessible to the student. In some cases the figure captions are too cryptic, but that adds a note of realism.

Zangwill insists in the preface that this is not a textbook in the traditional sense. The field, he says, is too "untidy" for that. Anyone who has attempted to teach a course in surface physics will sympathize with that assessment. But if this is not a textbook, what is it? The question is, would I use this for a course in surface physics? I think good use could be made of parts of it, but it would have to be supplemented heavily in such areas of traditional surface concern as secondary emission and scattering theory.

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Sedimentary Geology

New Perspectives in Basin Analysis. K. L. KLEINSPEHN and C. PAOLA, Eds. Springer-Verlag, New York, 1988. xx, 453 pp., illus. $64. Frontiers in Sedimentary Geology. Based on a symposium, Minneapolis, MN, May 1986.

This significant addition to the literature of "soft-rock" geology derives from a conference of the same title held at the University of Minnesota to honor Francis J. Pettijohn (Ph.D. Minnesota 1930!). Pettijohn came to sedimentary geology with a lifelong passion for field observation (his presidential address before a learned society was "In Defense of Outdoor Geology") and after years devoted to integrating field observation with microscopic and laboratory analysis to unravel the mysteries of the very hard rocks of the Canadian Shield. He should be pleased to have a super-avuncular relationship to this collection of papers by a younger generation that includes his students' students plus other representatives of a wide spectrum of supporters and admirers. As is pointed out by Harold Reading in his introduction to a group of the papers, the conference and its product represent a return to the Pettijohn-fostered first principles of basin analysis after two decades of fixation on the fluid-dynamic, chemical, and organic processes represented by sedimentary rocks.

Basin analysis concerns the geography that controlled the sources and distribution paths of sediment reaching ancient sedimentary basins and that determined the equilibria (or disequilibria) between the critical rates of sedimentation, sea-level change, and basin subsidence. All of these were governed directly or indirectly by tectonic factors and all were important determinants of the volume, character, and distribution of the basin fill and the fluids it contains.

The book before us contains 21 separate contributions plus brief introductions to four subsets among which the papers are apportioned. As might be expected, the titles of the subsets (Source-Area Characterization, Lithostratigraphy and Chronostratigraphy, Tectonics and Sedimentation, and Precambrian Basins) are not particularly apt descriptors, but the divisions are welcome because each is preceded by a few thoughtful words by its organizer and each organizer has something interesting to say about the evolution of basin analysis and about Pettijohn's role in maintaining a focus on synthesis of significant observations from both field and laboratory.

The individual contributions range in length from a few pages to more than 30; many readers with a driving concern for sedimentary basins will profit from reading almost all of them. Those who are not totally enslaved by the subject but who want a quick and painless short course on forefront thinking on basis analysis will do well to study some of the longer contributions, which are fine review papers to which are added the authors' current pet solutions to major problems.

Many of the mechanisms that drive sedimentary basins (for example the initiation and recurrence of subsidence, sea-level change, and shifts in basin geometry and in depocenters) are incompletely understood. In these circumstances there is an almost irresistible urge toward the development of unique models that satisfy isolated data sets but that lose credibility in application to a wider universe of observations. The editors of this collection are to be congratulated for treating this problem with balance.

Finally, it should be noted that the section on Precambrian basins, included in recognition of Pettijohn's long interest in ancient