Anyone interested in spatiotemporal organization in biological systems will enjoy and profit from reading Winfree's incisive and brilliantly inventive thoughts about cardiac function and failure.

Physics at Surfaces

Andrew Zangwill
Cambridge U. P., New York, 1988. 454 pp.
$69.50 hc ISBN 0-521-32147-6; $27.95 pb ISBN 0-521-34752-1

At last the physics and physical chemistry communities have available the book that has been so badly needed for so long. I am referring to the delightful *Physics at Surfaces* by Andrew Zangwill just published by Cambridge University Press. Zangwill calls the book "a traveling companion—a tour guide if you will—through the world of surface physics.... [but] not a textbook—at least not in the traditional sense." By rights it nonetheless will become the classic "teaching book" for graduate-level introductory courses in solid-state surface physics. But the book also provides the coherent synthesis of much of what purports to be surface physics that active teachers and researchers in the field are so in need of.

The book is sensibly structured, with an inevitable division between clean and adsorbate-covered surfaces. Thermodynamic arguments are presented as useful complements to the detailed microscopic models here, in contrast to the usual situation, in which thermodynamics appears to be invoked only by default. Within each half of the book, separate chapters cover crystal structure, electronic structure, phase transitions, and excitations and energy transfer. Such scope necessarily dictates a certain lack of rigor in a book of roughly 450 pages. Fortunately, Zangwill consistently comes up with enlightening simple arguments and physical pictures (which could easily be obscured by more rigor) presented in conjunction with actual data, either computed or observed. Zangwill displays in a very positive way to the reader the scenario by which system-specific individual studies are woven into the fabric of a "bigger picture." Make no mistake though, this is not a handbook or a "how to" recipe book for setting up shop as a surface-science tradesman; instead, it suggests by example how to look at nature, as surface physicists see it, from a vantage point where the attainment of understanding is deemed a more important goal than gathering in yet another concept-free number. The necessity of a symbiotic relationship between experimental and theoretical inquiry is evident throughout. For the reader who has a reasonable mastery of solid-state physics at the level of Neil Ashcroft and David Mermin's *Solid State Physics* (Holt, Rinehart and Winston, Philadelphia, 1976), the book is self-contained. Although not intended as either a comprehensive review or a research monograph, the book has nearly 600 well-chosen references. On this basis, the reader should be able to enter the research literature sensibly.

Physics at Surfaces, used together with Gerhard Ertl and Jürgen Küppers's fine, techniques-oriented monograph *Low Energy Electrons and Surface Chemistry* (VCH, Weinheim, FRG, 1985), would be an ideal combination for teaching a graduate course. Both Zangwill and Cambridge University Press are to be complimented for providing this handsome volume in not only hardcover but also inexpensive paperback, making the book financially accessible to everyone with an interest in surface physics. Certainly anyone who is now being introduced to the discipline of surface physics will find his or her training profoundly and positively influenced by the availability of *Physics at Surfaces*.

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Spin Glass Theory and Beyond

M. Mezard, G. Parisi and M. A. Virasoro
World Scientific, Singapore (Teaneck, N. J.), 1987. 461 pp.
$86.00 hc ISBN 9971-50-115-5; $48.00 pb ISBN 9971-50-116-3

The term "spin glass" first became widely used about 15 years ago. It was coined to describe disordered magnetic systems that appeared to have a phase transition to a state in which each magnetic atom was aligned but the direction of alignment varied randomly from one atom to another. In 1975 David Sherrington and Scott Kirkpatrick wrote a paper that had the provocative title "Solvable Model of a Spin Glass," but which presented a paradox rather than a satisfactory solution. Not until four or five years later did Giorgio Parisi find an apparently satisfactory solution. Several more years elapsed before the significance and physical interpretation of this solution were understood.