the field of molecular genetics—namely, to the recombinant DNA era. The second part is an extensive and valuable guide to tools and experimental systems that are being used to explore the mysteries of the eukaryotic genome. With these tools in hand, the authors now launch the reader into a 400-page account of current understanding of the anatomy, the expression, and the regulation of eukaryotic genes. The final section of the book is an introduction to more complex biological systems and a preview of things to come in a projected second volume. Each section includes a series of references extensive enough to direct a student to more primary literature.

Clearly the emphasis of *Genes and Genomes* is on modern molecular genetics, that is, the recombinant DNA approach. In spite of the generality of its title, this book is not suitable for a course that concentrates on classical prokaryotic and eukaryotic genetics. On the other hand, it is ideal for a course in molecular genetics and molecular biology or even one that encompasses both classical and molecular genetics. One aspect of the subject glossed over by the authors is the impact of mutational studies on many genetic concepts. The isolation and characterization of random mutations in living organisms have contributed to numerous important findings in genetics. The operon concept and all of its variations leading to an understanding of positive and negative control, the model of DNA replication and the requirement for products of many genes, and the role multiple gene products play in DNA repair pathways are a few that come to mind. Truly this is the era of the new genetics, and the mutational approach may be out of vogue (as evidenced by the authors' statement on p. 886: "Rather than depending on random mutations, the amino acid sequence of a protein can now be systematically changed by site-specific mutagenesis of its cloned gene or cDNA"), but the older approach deserves more appreciation.

Overall, this is a superb textbook suitable for college seniors and first-year graduate students. Its quality derives from the authors' ability to discuss complex concepts in ways that make the very difficult clear, coupled with excellent illustrations that are invaluable for following many of the detailed discussions. This book provides a perspective on what we know, what we don't know, and what we need to find out. In pointing out our ignorance in many areas of genetics the authors open new vistas and present new questions to be answered by future scientists now entering into their graduate careers. The excitement of the authors about science and their awe and respect for nature and her way of creating and changing the genome pervade the chapters and are transferred to the reader. Even though some of the information presented will be, and probably already has been, made out of date by the rapidity with which this field is moving, the basic approach of the use of recombinant DNA technology to explore genetic questions will prevail, and this book, which presents the field so well, should provide a valuable resource for students in the coming years.

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Basin Formation

Tectonic Evolution of the North Sea Rifts. D. J. BLUNDELL AND A. D. GIBBS, Eds. Clarendon (Oxford University Press), New York, 1990. xiv, 272 pp., illus. $125. International Lithosphere Programme Publication no. 181.

As a result of two decades of intense oil exploration a considerable quantity of data have been amassed on the North Sea rift basins, with the consequence that these basins are comparatively well understood. Owing to this ample documentation, these basins have attracted the attention of basin modelers ever since the seminal work of McKenzie in 1978 on the development of sedimentary basins. This volume is a useful guide to the present understanding of basin formation beneath the North Sea. The research papers cover a diverse suite of topics and approaches to describing and interpreting the tectonic framework. These include paleogeographic reconstructions, gravity, crustal structure recorded in deep seismic reflection profiles, basin architecture, rift-related magmatism, quantitative basin models, and the nature of extension.

The North Sea rifts developed along the suture where three continental plates came together in the early Paleozoic. Two subsequent periods of lithospheric extension are recognized (Permo-Triassic and Late Jurassic-Early Cretaceous) followed by a period of lithospheric cooling. Several authors have stressed the importance of older structures in guiding the course of Mesozoic extension and magmatism. Each episode of basin subsidence tends to cannibalize the previous one, thus limiting somewhat the assumptions in attempts at basin modelling. A complete understanding of the post-Jurassic evolution, for example, requires an appreciation of Triassic extension. There are several worthwhile contributions on gravity observations and supporting seismic data. A new and coherent gravity map for the North Sea is presented. For both the Viking and the Central grabens there is a correspondence between gravity and seismic data in describing the Moho.

At the core of this book is a dialogue on the nature of extension. It is here that understanding tends to founder. Two extremes are argued: symmetrical, coaxial stretching

versus lithospheric simple shear involving a low-angle decollement. Eight years and more than 10,000 kilometers of deep reflection seismic have failed to resolve this issue directly. The seismic has been interpreted to support both models. Unfortunately, the causes of lower crustal reflectivity are not understood. One approach infers intracrustal detachment on the basis of asymmetry of the Viking and Central grabens and interpretation of structurally balanced sections from seismic data. Another attempts to show that a uniform stretching model can successfully account for most observations. This is a useful test of admissibility, but otherwise adds little new to the debate. An alternative approach incorporates differing rheological properties of the upper and lower crust in a flexural cantilever model. These authors succeed in matching structural and stratigraphic evolution to observations on seismic sections.

Overall, this collection of papers provides an excellent background for an understanding of the important North Sea petroleum province. The book is not about petroleum geology and is weak on stratigraphy. Nevertheless, it is a valuable source of information, ideas, and current controversies for anyone involved with the study of sedimentary basins.

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