receptors of the insect retina is a particularly effective review of recent work.

The theories of image formation for the two major anatomical types of compound eyes, which were advanced by Exner in the early 1890's, have provided the basis for textbook accounts of how compound eyes work. Chapters by Horridge and P. Carricaburu, however, draw attention to the great anatomical diversity present among insects, the functioning of several alternative mechanisms of image formation, and the difficulties in making appropriate measurements for an understanding of how light is distributed within the eye. A recent development in physiological optics has been the application of dielectric waveguide theory to the functional properties of photoreceptor organelles. The contribution of A. W. Snyder, who has been one of the leaders in this enterprise, describes some of the consequences for spectral and polarization sensitivity. J. Palka and R. B. Pinter present an excellent account of how measurements of visual acuity are beset with artifacts unless exquisite attention is paid to the design of the stimulus. And R. Wehner's chapter on behavioral analysis of pattern recognition can be profitably read in conjunction with the chapters by R. B. Northrop, L. Kien, K. Mimura, and T. Collett and A. J. King dealing with various response properties of visual interneurons.

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Transition Zones

The Geology of Continental Margins. CREIGHTON A. BURK and CHARLES L. DRAKE, Eds. Springer-Verlag, New York, 1974. xiv, 1010 pp., illus., + plates. $34.80.

This book aims at presenting a summary and synthesis of all that is known of the transition zones separating the exposed continents from the deep oceans, that is, the continental margins. The volume succeeds to an extent beyond what most scientists would regard as admirable for a subject so controversial and covered by so many diverse studies and types of measurement.

A major factor influencing this outcome is the partnership of the editors, who have been leaders in the conduct both of individual research dealing with continental margins and of national and international projects bearing on the problem of the transition zone.

Burk and Drake presided at the Penrose Conference of the Geological Society of America that provided the stimulus for this book. It is evident that the overview of the subject they thus obtained has to a significant degree governed their selection of authors. The geographic areas covered by the various contributors are indicated in a useful map printed on the inside covers of the book. It is apparent from the map that geographic coverage of margins of the Americas and Europe is complete. To varying degrees gaps exist for the remaining continents.

The organization of the volume is a logical outgrowth of the editors' aim to offer a broad inventory and synthesis of knowledge pertaining to continental margins. Modern margins are classed as Atlantic or Pacific types depending on the absence or presence of associated earthquake seismicity. Seismically passive margins are characterized by broad shelves and relatively smooth topography. Seismically active margins are typically narrow with rough topography and tend to be bounded on their basinward sides by deep trenches. One-third of the book is devoted to area-by-area descriptions of modern margins. Rabinowitz's paper dealing with the western North Atlantic is exemplary among a number of important contributions. It gives a comprehensive account of the available data for the area and sets forth the meaning of the data with respect to the ocean-to-continent transition.

Rabinowitz points out that the compositional change from basic oceanic crust to granitic continental basement does not occur along a specific contour of the slope break of the continental shelves. The paper describes the numerous geological and geophysical lineaments that border the margin of the northwest Atlantic. Rabinowitz shows that the continuous free-air gravity high located near the shelf break is associated with a subsurface ridge defined by refraction seismic measurements. Ridge topography alone is insufficient to explain the gravity anomaly, and it follows that the ridge is related to an intrabasement density high.

It is inferred that the East Coast magnetic anomaly reflects basic intrusions into subsided continental crust. North of the New England seamounts the magnetic anomaly is associated with another subsurface ridge system the presence of which is confirmed by reflection seismic profiles. South of the seamount chain, this outer ridge is indiscernible, and the East Coast magnetic anomaly is in close agreement with the continuous gravity high and the associated subsurface ridge system. The gravity and magnetic anomalies diverge at a point east of southeastern Georgia, where the magnetic anomaly bears westward, intersecting the coastline.

Rabinowitz identifies an anomaly E within the magnetic quiet zone. Landward of this anomaly the inner quiet zone is believed to overlie subsided continental crust. Seaward of E, low-amplitude magnetic anomalies within the outer quiet zone are believed to be situated above oceanic crust formed during the Newark interval of predominantly normal geomagnetic polarity. The explanation of quiet zones as reflecting the presence of subsided continental crust has the advantage that it avoids the contrivance of calling for quiet zone formations at different geologic times all during periods of constant magnetic polarity.

In addition to areal studies such as that of Rabinowitz, the volume contains series of papers treating a number of special problems. Various aspects of sedimentation in the transition are analyzed, interactions of small ocean basins with margins are examined, and ancient margins reconstructed from the geologic record are described and discussed. Several papers contain descriptions augmented by figures presenting stacked multichannel reflection seismic profiles that make possible elimination of obstruction of primary reflections by long-path multiple reflections.

The Geology of Continental Margins is a mine of valuable information for students and researchers interested in the problems of the crustal transition zone. Most earth scientists will want to own a copy.

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Useful Magnetic Reversals

Magnetic Bubbles. T. H. O'DELL. Halsted (Wiley), New York, 1974. x, 160 pp., illus. $24.50.

In magnetic bubbles we have a technology based on the realization that "particles" can provide storage and logic in structures viable in today's computer world. O'Dell treats magnetic bubbles—highly mobile, minute magnetic reversals in an otherwise saturated magnetic film—in a fresh and interesting manner. He discusses bubble statics, bubble dynamics, materials (only briefly), bubble devices, and bubble systems. His presentation is strong in novel mathematical approaches, often drawing upon equivalences between magnetic and electric systems.

That stable cylindrical magnetic do-