

The Geology of Continental Margins

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convection may be implausible", will excite no one. H. Jeffries uses the modified Lomnitz law to invalidate the notion of mantle convection and thus the principle of plate tectonics. After a swipe or two at plate tectonics, V. V. Belousov expounds the virtues of primary vertical tectonics. L. S. Dillon finds the principle of plate tectonics inadequate and proposes that volcanism can explain all.

A. J. Boucot finds that early Paleozoic paleobiogeography, lithofacies and structures do not support plate tectonic models, and K. M. Khudoley concludes that neither continental drift, polar wandering nor expansion can explain the distribution of Mesozoic carbonates and ammonoids. C. J. Smiley considers that the distribution of fossil plants conforms to the continents always having been in approximately their present positions, and C. Teichert judges the distribution and composition of marine sedimentary rocks from western Australia, southern Africa and Antarctica to be inconsistent with the hypothesis of Gondwanaland.

Four major papers accept the principle of plate tectonics, although D. W. Scholl and M. S. Marlow find the absence of significant compressive deformation beneath the outer walls of oceanic trenches difficult to explain. L. de Loczy relates synchronous diastrophic events in South America and Africa to phases of seafloor spreading, and M. H. Salisbury examines the evidence for aseismic movement along fracture-zones beyond transform faults. R. C. Bostrom and others conclude that tidal forces may explain the movement of lithospheric plates. The *Memoir* is completed by four short notes.

An unfortunate feature of the *Memoir* is its repetitiveness: too often the same argument occurs in more than one paper. Its main fault, however, lies in many authors writing as if the principle of plate tectonics could not possibly be valid. It is this lack of objectivity, more than anything else, which detracts from the effectiveness of the *Memoir*.

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The Geology of Continental Margins

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In my view this is probably the most important geological book of this decade. Its scope, extent and depth of insight is such that no professional geologist can afford to do without access to its thousand pages and some 71 constituent papers. The compendium was produced in the wake of a Penrose Conference which has clearly been successful and fruitful. The volume has been beautifully printed and handsomely produced. Illustrations are clear and there are several fold outs. The subject matter has been divided into 13 sections of which the first and the last by the editors review the geological significance and the perspectives of the margins. Section II sets out the Atlantic and the Pacific types by B. C. Heezen and R. L. Fisher and XII by L. G. Weeks and M. J. Cruickshank discusses the resources. The other nine sections deal with the following topics: III - Transition from continent to ocean; IV - Recent sedimentation; V - Deformation at continental margins; VI - Atlantic Region, VII - Pacific Region; VIII - Indian Ocean Region; IX - Selected small oceans. X - Ancient continental margins; XI - Igneous activity and ancient margins. It is true that metamorphism is included with the igneous activity, but even a petrological purist may disregard this *faux pas* in the context of the overall and clean distinction of the book.

In reading it through it is difficult to select any part or even pages that one assumes to be better than the rest. It is most impressive throughout how up to date all the contributions are. For instance the paper on the "Continental Margins of Galicia - Portugal and Bay of Biscay" by L. Montadert, E. Winnock, J. R. Deltiel and G. Grau has 12 references to 1973 - 1974, while the paper by D. E. Hayes on the Continental Margin of

West South America has 13 references to 1973 - 1974. Thus modern notions are summarized and analyzed in the context of large number of contributions.

The scope again is most impressive. The very first unnumbered map of the world at the beginning of the book shows the coverage of the margins attempted in the volume. The only conspicuous gaps are in the Soviet Arctic, Western Equatorial Africa, a part of Indonesia and Antarctica. Considering how extensive the continental shelves are, this is a very considerable achievement. It is also perhaps significant that side by side with a large number of North American geologists, geophysicists and oceanographers there are many contributors from Europe, Latin America and Australasia. The choice of many contributors from industry probably has helped in making the volume many sided and interesting.

Of the systematic section, that dealing with the Deformation at Continental Margins is probably particularly useful since it discusses the deep structure of continental shelves in detail; and most usefully the paper by Robert E. Sheridan, in which he reconstructs the Atlantic Continental Margin of North America, is also very well treated. One could go like this for a long time and the tendency is to go from one important topic to another and then to return back again.

The interests of the editors have led to a treatment which combines geology and geophysics, sedimentation and tectonics. After this book it would be much easier to understand and interpret ancient rocks and structures. Much of the information is that gathered by industrial companies and their presentation now leads one to the conclusion that contributions of petroleum companies are both useful and extensive. Despite its expense the book is a must with anyone who wants to understand modern geology.

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