

BOOK REVIEWS

Suspecting terrane analysis

Dewey, J. F., Gass, I. G., Curry, G. B., Harris, N. B. W. and Şengör, A. M. C. (editors) 1991. *Allochthonous Terranes*. Cambridge University Press, Cambridge, U.K. 199 pp. Price £37.50, \$64.50 (hardback).

This volume resulted from a Royal Society Discussion Meeting in November 1989 convened "to assess the past, present and future significance of the terrane concept". The volume contains 12 papers by conference participants, selected discussions and replies following some papers, and a Preface and Concluding Remarks by J. F. Dewey. All of the contributions were previously published in the *Philosophical Transactions of the Royal Society*, as Volume 331, Number 1620.

The first paper, "Terranology: Vice or Virtue", by Şengör and Dewey, seems to have tried to set the tone for the conference serving as the 'pro' argument to some unstated 'proposition' such as "terrano-logy is a useless, and indeed dangerous, outmoded, and flawed exercise as a methodology of regional tectonic analysis and synthesis". The paper is articulate and forcibly argued in the style of classical debate. Unfortunately, no one was either given, or took, the opportunity to write the rebuttal. The second paper by D. L. Jones is a review and synopsis of his current thinking on terrane accretion in western North America. Only 6 pages long, with one figure and no references, the paper is more an expanded abstract, but characteristically includes some rigorous and cogent observations. E. Irving and P. J. Wynne discuss the status of older and more recent paleomagnetic data and its bearing on the tectonic evolution of the Canadian Cordillera. The paper is well written and illustrated and would provide readers with a fairly clear vision of the paleomagnetic data for the more 'mobilistic' interpretations of the Cordilleran 'collage'. The fourth paper, titled "On Terrane Analysis", by W. B. Hamilton, is actually two papers which are somewhat awkwardly combined into one contribution. The first 'part' is a vituperative critique of the terrane concept and those that practice it, with particular emphasis on the cluttering of the literature with myriad non-genetic terrane names and an unfortunately quite personalized implication that those scientists that use the terrane approach do so because they are somehow inadequate, lacking in understanding of plate tectonics. This, of course, is a rather serious charge, particularly when no specific citation is offered so that the accused and the scientific community at large can evaluate if the charge has substance. The paper then moves into a fresh analysis and interpretation of the Carpathian region, but unfortunately has no illustrations, thus is very difficult for the unfamiliar to follow. A paper by P. F. Hoffman, in my view one of the best in the volume, discusses the geologic and seismic tomographic evidence that the mostly Archean Precambrian shields, as opposed to Archean-Proterozoic cratons in general, are supported by an anomalous deep mantle root perhaps derived from special subduction processes typical of the Archean. The paper has fresh observations, ideas and insight, and will have implications for those thoughtful of geodynamics and the evolution of tectonic process through geologic time. The next paper, by N. B. W. Harris, I. G. Gass and C. J. Hawkesworth, applies isotopic and geochemical data to terrane distributions of the Pan African Afro-Arabian shield and argues the collage is an amalgamation of mainly late Precambrian intra-oceanic arcs and minor continental fragments which accreted against a continental margin in northeast Africa. This is 'chemotectonic' fingerprinting of terranes, also now being undertaken in other mountain belts, and is probably one of the more important areas of research now focused on the 'suspect' terranes. This is followed by a review of metamorphism in the western United States by W. G. Ernst, and then a paper by M. G. Audley-Charles and R. A. Harris which discusses allochthonous terranes in the Southwest Pacific and Indonesia. The next paper by Jin-Lu Lin and M. Fuller presents paleomagnetic data which they feel supports a Late Triassic-Early Jurassic collision of the North and South China blocks. An interesting paper on the Scottish Caledonides by B. J. Bluck uses various terrane linkage, or the lack of, arguments to conclude the region is a collage of truncated fragments caught along the destructive margin of Laurentia

as it closed with 'Pan Africa'. Next is a paper by Y. Yilmaz which states Turkey consists of a number of tectono-stratigraphic terranes (he calls them entities) which were successively accreted to Eurasia since the late Paleozoic. The final paper by I. Metcalfe, in my view the most useful paper in the volume, describes the terranes of Southeast Asia and their history of transfer across Tethys from Gondwanaland to Asia. Metcalfe's work is the first I have read that makes this complex region for me at last more comprehensible.

In summary, this volume has several very interesting and useful contributions, but is quite uneven. There are an unusual number of typographical errors and/or spelling mistakes. A number of the papers read like expanded abstracts of more complete work already, or to be published elsewhere and are not adequately illustrated. The discussions about the 'terrane concept' found for the most part in the first paper by Şengör and Dewey, in the contribution of Hamilton, and a sentence in Yilmaz's paper are discussions about methodology. Methodological discussions are always of interest, but the arguments that ensue are often emotional and in the end rarely have much to do with the way scientists behave in the field or laboratory, as recent research in the cognitive sciences has shown. In the end, we all seem to recognize the same objects, as most of the fine regional geologic papers in the volume amply show, and whether we call them terranes, entities, belts, micro-continents, intraoceanic magmatic arcs, etc., becomes a semantic rather than a scientific debate. The somewhat personalized tone of some of the methodological arguments in this book however, in my view, is unfortunate and mars the volume. The remarks mentioned above in Hamilton's paper, and also, for example, the last sentence in Dewey's "Concluding Remarks", would be expected and appropriate to a jolly good post-session evening at the pub around the corner from the Royal Society, but seem inappropriate to a scholarly scientific publication. But perhaps all this emotion is understandable, for the use of the term "Dewey-grams", for example, early on in the enthusiasm of some of the 'terrano-logists', which made me wince at the time, was also personalized and very unfortunate. John Dewey's papers and their illustrations, after all, were instrumental in helping us all conceptualize "The New Global Tectonics" and use it more effectively. But in the end it is the key issue surrounding the terrane concept from the beginning that was not addressed very much in the methodological contributions in this volume, but is very clear in most of the regional tectonic contributions, and that is the *uncertainty* in paleogeographic and paleotectonic settings of many large objects, entities, or terranes found in orogenic systems. This still plagues all of us 12 years later as we try to reconstruct the tectonic evolution of the world's mountain chains. No matter if you call the Coast Plutonic belt of western Canada a micro-continent, a continental margin arc, a metamorphic overprint, or the Tracy Arm terrane, you cannot, as we speak, fill a phone box with people who agree on exactly what it is or how it got outboard of three major oceanic terranes between it and the North American cratonic margin. Eventually the problems will be resolved, I predict, by good scientists doing good science whatever particular methodological flag they fly.

Peter J. Coney

Tucson, Arizona, U.S.A.

Appalachians and Ouachitas: a single chain?

Hatcher, R. D. Jr, Thomas, W. A. and Viele, G. W. (editors) 1989. *The Appalachian-Ouachita Orogen in the United States*. Geological Society of America, Boulder, Colorado, U.S.A. 767 pp. + 12 plates in slipcase, (ISBN 0-8137-5209-4.) Price \$75.00.

The Appalachian-Ouachita belt is one of the best known mountain belts in the world—a region that has been studied for more than 150 years, and one that has provided the geologic framework for a number