Of course, I would be the first to admit that my views may be entirely subjective, since I look for a book which does attempt just such an integrated approach to the subject, written from the view-point of a structural geologist. Failing such a book, I would have preferred Nicolas to have written one just on structural petrology.

More objectively, the book can also be criticized on other grounds, which are all too common in scientific writing. Firstly, there is an excessive reliance on a terminology which is often used to state the obvious in the most obscure way possible. I am reminded here of the anecdote about the sociological theory which divides all human relationships into just three categories: mutuality, non-mutuality and pseudo-mutuality. In plain language: some people get on together; some people don't; and some people say they do, but don't. Whether these terms promote any real understanding is a moot point. Equally, to classify folds as an example of continuous but heterogeneous deformation adds little to our understanding of such structures, given their complexity. Many folds are not the result of continuous deformation, if we consider the case of flexural-slip folding, while the deformation might well be considered as homogeneous on a much larger scale than the structures themselves, or if the bedding acts simply as a passive marker. So why not call a fold, just a fold?

Secondly, the use of a complex terminology has a knock-on effect since it almost always results in a book that is very difficult to read, full of sentences with too many nouns and not enough verbs. The present book is no exception. I need take only one example, almost at random. Nicolas writes on p. 103: "In response to an applied stress, a crystal of calcite twins or not depending on its crystallographic orientation in relation to the orientation of this stress". Surely, it would be better to write: "Whether or not a crystal twins in response to an applied stress depends on how its crystallographic axes are orientated in relation to this stress". Two sentences later, he writes: "Only the crystals that are orientated in a favourable direction with respect to the applied stress orientation are twinned", which virtually repeats the first statement, equally clumsily. I spent much time in mentally translating the text into plain English, wondering at the same time how anyone without an adequate background in structural geology could make head or tail of its meaning.

Such deficiencies in the writing are compounded by the production of the book itself. The type-face is poor, and the printing has placed subscripts on the same line as the symbols to which they refer. Obviously, the publisher bears a responsibility for the translation and subsequent production of the book. Even so, it seems likely that the original edition had its deficiencies, since the present edition appears to be almost a literal translation from the French. No doubt, these deficiencies have coloured my reaction to this book, but that's the nature of any market.

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European Dinantian

Miller, J., Adams, A. E. & Wright, V. P. (editors) 1987. *European Dinantian Environments*. John Wiley & Sons, Chichester. Price: £60.00.

This volume contains 18 papers focusing on the Dinantian Subsystem, the lower part of the European Carboniferous broadly equivalent to the Mississippian of North America. The papers are a selection of those presented at a conference in Manchester in April 1984. In the context of both the conference and this volume, the term 'environment' is interpreted widely: "from Europe-wide palaeogeographic reconstructions, through studies of particular sedimentary units to small-scale features such as the ecology of fossil soils". In addition to this variation in scale, there is an attempt to integrate the approaches of different disciplines: sedimentology palaeontology, biostratigraphy, structural geology and geophysics.

Despite this last aim, the volume is written firmly from a sedimentological perspective. Structural and tectonic geology appears in only a minority of the papers. On the largest scale, there are discussions by Leeder and by Bott on the plate tectonic setting of NW Europe in the Dinantian. In particular, did the extensional tectonics in Britain occur in a back-arc setting above a north-dipping subduction zone or in crust attached to a south dipping slab? These authors also discuss crustal scale subsidence mechanisms, particularly the influential 'block and basin' model for the British Dinantian where persistent highs are localized by underlying Caledonian granites. The general applicability of this model is challenged by Grayson and Oldham, who argue for control by fault-bounded tilt-blocks, perhaps in a regional transtensional regime. There are case-studies of individual fault-influenced basins by Black (Clair Basin, West of Shetland), by Gjelberg (Svalbard) and by MacCarthy and Gardiner (Munster basin).

Tectonic control of sedimentary facies is discussed extensively in relation to the Dinantian carbonate/clastic cycles. Leeder and Strudwick argue for a direct link to periodic movement along listric normal faults bounding the basins, and set up testable models to discriminate tectonic, eustatic and sedimentary controls on cyclicity. Walkden discusses cyclicity, particularly in relation to diagenetic histories, and favours a strong eustatic influence. MacCarthy and Gardiner suggest a eustatic control for four of the six cycles in the Munster Basin, with tectonic control of the others.

The remainder of the papers in this volume have a more exclusive sedimentological or palaeontologocal bias and are of less direct interest to structural geologists.

This book is welcome as a timely review of sedimentation in the European Dinantian. Its high price will deter any but specialist Carboniferous workers from buying it, but it can be recommended as an up-to-date reference for anyone needing an overview of tectonic controls on early Carboniferous sedimentation.

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Rhenish Massif

Vogel, A., Miller H. & Greiling, R. (editors) 1987. *The Rhenish Massif.* 160 pp. Price: £34.35.

This book represents a selection of papers from a workshop meeting held in Boppard/Rhein in 1984. Anyone interested in Palaeozoic evolution of Europe would be excited by the title and sub-title of this book *The Rhenish Massif: Structure, Evolution, Mineral Deposits and Present Geo-dynamics.* However, your excitement will die away as mine did when you read the editorial. The editors warn the reader from the outset not to expect a comprehensive presentation of the geological evolution of the Rhenish Massif. Instead, a very wide range of different and separate subject areas are covered with only abstracts of interdisciplinary reviews attempting to link them together. This is a pity, since the apparent aim of this international monograph series is to bring together interdisciplinary views on a particular problem or subject area.

Previous monographs have included the much quoted review of the tectonic evolution of the Caledonide–Appalachian Orogen and two modern monographs on earthquake prediction. Unfortunately this particular monograph does not reach the same high standards.

There is a distinct lack of an introductory chapter on the geological history of the Rhenish Massif and therefore this book lacks a unifying theme. The only common linking factor is that most of the nine papers and five abstracts concern themselves with the Rhenish Massif and the along-strike equivalents in the Ardennes and the Bohemian Massif. However, there is no location map or regional geology map where the different study areas can be related.

For the benefit of potential readers, I will now briefly summarize each of the papers and abstracts. H. Arlar describes the lithological and ecological facies development of three Devonian formations in the Ebbe Anticline. Differential subsidence and sedimentation rates are used to explain the facies distribution. L. Lorenz then presents an abstract of his 1984 Tectonophysics paper on late Hercynian plate and interplate processes. This work was recently updated by P. Matte (*Tectonophysics*, 1986, **126**, p. 329). R. Dreesen presents the Upper Devonian event-stratigraphy of the Ardennes Shelf in terms of epeirogeny: for example, oolitic ironstones of the shelf can be correlated with synchronous volcanics and turbidites of the basin. W. Loske and H. Miller have statistically analysed heavy minerals of the Lower Devonian of the Ebbe Anticline and found a correlation between quantity of heavy minerals found and subsidence and sedimentation rates under marine and terrestrial conditions. Three types of zircon population can be recognized, two originating from distal polycyclic–granitic and sedimentary–metamorphic sources and a third from a local volcanic source.

H. Nesbot and H. Flick describe the mineralogy of a spilitized dolerite sill from the Lahn Syncline. The occurrence of albite, aegirine, arfedsonite and stilpnomelene indicate to them that the dolerite is an intraplate alkali basalt although no chemical data are presented. O. Oncken uses coal rank measurements on dispersed vitrinite to evaluate palaeogeothermal aspects of the development of the Rhenish Basin. Comparison of sedimentation rates, subsidence rates and

palaeogeothermal gradients at different times indicate that the present anticlines developed from zones of lesser basin subsidence with elevated heat flow. Changes in the subsidence/sedimentation rates can be correlated with volcanic phases.

J. Rathore and H. Hugon have compared the strain fabric ellipsoids in the Rocroi Massif of the Ardennes using magnetic susceptibility, mica fabric orientation and reduction spot parameters. Although the Cambrian strata were tightly folded prior to the unconformable sedimentation of the Lower Devonian sediments, all three methods of strain analysis surprisingly show the same amount and orientation of strain in both Cambrian and Devonian strata. Pre-Devonian strain has apparently been completely overprinted by the Hercynian deformation.

D. Grezegorczyk and H. Miller use stereograams to describe the joint pattern in Devonian sandstones of western Sauerland in terms of either external rotation of original joints during folding or internal rotation along the foliation.

G. Hirschman remarks on the position of the Rhenish Massif between the Variscides and the Caledonides. But he confuses me by concluding that "the metamorphic and magmatic processes in the internides during Orodovician to Devonian time (i.e. synchronous to Caledonian events north of the Variscides) therefore should be considered as belonging to the Variscan rather than the Caledonian development". Hirschman even suggests that the "Variscides can be seen as a long-term process from Proterozoic to Palaeozoic". Clearly with this view point, the significance of Suess's original definition of the Variscan, viz. mountain building in Central Europe in late Palaeozoic times, is lost.

The results of base-metal and barite geochemical prospecting in the Rhenish Massif west of the Rhine, are presented by M. Rimmel. The first phase of exploration involved the analysis of 6000 stream sediments and the discovery of 200 anomalies, of which 28 were chosen for further work. Detailed stream water and stream sediment sampling proved to be less effective indicators than deep soil or hard rock sampling, due to urban and industrial pollution.

The contribution by E. Czuczor, P. Lux and R. Strauss describes the present status of the gravity fixpoint (*sic*) field being set up in the Federal Republic. The aim is to have a density of 1 fixpoint (*sic*) per 5 km^2. No results are presented.

One of the more important papers in the book is the one by C. Tomek, I. Ibrmajer and K. Cidlinsky on the first reflection seismology experiments in the Bohemian Massif. Although relatively short lines (<9 km) have been shot, the results confirm the Geological Survey of Czechoslovakia's mapping that the eastern margin of the Bohemian Massif has been thrust ESE over the Moravian Zone during the Upper Visean and Lower Namurian. Imbricate stacks and duplex structures can be recognized, dipping gently to the WNW. Results from the Central Moldanubian area show strong reflectors in the upper 9 km of the crust, dipping gently to south east, similar to those shown in the DEKDRP seismic traverse in West Germany (see *J. Geophys.*, 1985, **57**, p. 137). A 6 km long line in the Tepla–Barrandian area near Pilsen shows both steeply dipping (to the SE) and shallow dipping (to the NW) reflectors at 1–4 km depth. The steep reflectors may be late Proterozoic spilites (island arc tholeiites) whilst the shallow reflector may be intra-Proterozoic thrust faults of the Cadomian Orogeny.

V. Lorenz, L. Ahorner and A. Vogel have each written an abstract on the Quaternary alkali–basaltic volcanic field of West Eifel, the seismicity of the Rhenish Massif, and the way geophysical studies have contributed to the study of the geological evolution of the Rhenish Massif.

The book is 160 pages long, does not have an index, and in my opinion is not worth £34.35. I cannot see it selling much outside Germany.

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