BOOK REVIEWS

Pakistan Geology

Stratigraphic Boundary Problems: Permian and Triassic of West Pakistan. Edited by Bernhard Kummel and Curt Teichert. (Department of Geology, University of Kansas, Special Publication No. 4.) Pp. 474. (University of Kansas: Lawrence and London, December 1970.) $25.00.

THIS book is an expansion of a summary by Kummel and Teichert (*Neues Jharb. Geol. Pal., Abh.*, **125**, 297; 1966). It starts with a paper of 110 pages by Kummel and Teichert dealing with general geology, history of research, stratigraphy as defined by the study, comparative palaeontology, conclusions, the full descriptions of twelve measured sections and a list of all sample localities. This is followed by seven papers, each by a specialist, systematically describing the ammonoids, brachiopods, ostracods, conodonts, achritarchs, and tasmanitids with one paper on palynology. Conclusions are drawn; the papers are well illustrated and all conform to a high standard.

The volume forms part of a re-study of the problems connected with evolutionary changes that took place among marine organisms at the passage from the Palaeozoic to the Mesozoic. It is pointed out that most authors who have considered this contact have emphasized the factor of suddenness in the changeover of marine forms.

One sees the same suddenness operating in the changeover from Mesozoic to the Tertiary and, in view of the abundant literature concerned with this, may wonder why published works on the Permian–Triassic boundary in marine facies seem so rare. As the authors point out, the answer is to be found in the scarcity of sections where marine conditions persisted across the boundary. Their worldwide survey revealed only five areas where such marine sections are known to occur: Southern China, Kashmir (to which Spiti can be added), Salt Range, Azerbaidjan-Armenia and North-East Greenland. In choosing the Salt Range for the initial study, Kummel and Teichert have selected a standard, or type, area fundamental to the understanding of the geology of the Indian subcontinent and it is important to note exactly where they have placed the Permian–Triassic boundary and for what reason.

Formerly it was generally accepted that the boundary fell between the Upper Productus Limestone and the Ceratite Limestone. The authors have split the Upper Productus Limestone into two units: a lower Chhidru formation (alternating sandstone and limestone) and an upper Kathwai member (dolomite and limestone). The Kathwai becomes the basal member of Gee's Mianwali formation of which the middle, or Mithwali, member is the former Ceratite Limestone.

The first appearance of the ammonoid genera *Glyptophiceras* and *Ophiceras* at the base of the Kathwai member is taken to mark the base of the Triassic. A similar boundary can be found in Kashmir and in North-East Greenland.

The authors have thus placed the boundary lower than that commonly accepted previously. They also mention that the new boundary coincides with a lithological change from a white sandstone, forming the top of the Chhidru, to a dolomite which is basal Kathwai.

I believe that this whole work forms an important contribution to the understanding of evolutionary changes at the Palaeozoic–Mesozoic contact and it is to be hoped that a study of equal quality may soon be made in Kashmir and Spiti where comparable marine sequences exist.

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Victorian Attitudes

Victorian Science: a Self-Portrait from the Presidential Addresses of the British Association for the Advancement of Science. Edited by George Basalla, William Coleman and Robert H. Kargon. Pp. 510. (Anchor: Garden City, New York; Bell: London, February 1971.) £1.20.

Victorian Attitudes to Race. By Christine Bolt. (Studies in Social History.) Pp. xviii+254. (Routledge and Kegan Paul: London; University of Toronto: Toronto, January 1971.) £3.

BEATRICE WEBB once asserted, without necessary qualifications, that one of the most widely held assumptions of the mid-Victorian period was that "physical science could solve all problems". However naive and threadbare this doctrine might sound today, we would be wrong to think that two world wars and several decades of social evolution have led to a wiser estimate of the role of science in society. In fact, the remarkable thing about the two works under review is the extent to which they show continuities between the Victorians and ourselves.

We should be most grateful to Messrs Basalla, Coleman and Kargon, whose editing of presidential addresses to the British Association does provide an admirable self-portrait of Victorian science. With the BA now in such desperate financial (and intellectual) straits, this collection almost reads as a eulogy to a once-powerful institution. The primary tasks which the association set for itself in the nineteenth century were those of popularizing scientific knowledge and professionalizing scientific activities. The link between these two activities was money, of which there was little available for serious research. If the boundaries between altruism and self-interest were as ill-defined then as they are now, at least the great Victorian scientists were largely untroubled by second thoughts as to whether or not their calling was the engine of social progress.

The concerns and intellectual achievements of the period's "cultivators of science" are well documented in *Victorian Science*. By providing short commentaries on each of the speeches, the editors have succeeding in making their book suitable both for the general reader and for initiates into the history of science. Their introduction, however, does not plumb very deeply into the sociology of nineteenth century scientific life. In particular, it fails to indicate convincingly—beyond a few allusions to evident scientific and technological advances—why the Victorians seemed to be so enamoured of science in the first place.

One hypothesis might be that, for the life sciences at least, the absence of a sharp dividing line between "scientific" and social thought encouraged a pattern of mutual influence between scientists and social philosophers. To the extent that popular (and political) metaphors found their way into scientific laws, the practising scientist was helping to reinforce "non-scientific" world views. Much of R. M. Young's recent work on the Darwinian debate has served to highlight some of these connexions.

Further evidence for this contention can be found in Christine Bolt's *Victorian Attitudes to Race*. In her open-