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Preface

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Preface

In December 1982 the British Sedimentological Research Group celebrated its 21st anniversary at its annual meeting, held at the University of Liverpool. To mark the occasion twelve speakers were invited to review progress in various aspects of sedimentology. This book is the collection of those reviews.

The founding meeting of the BSRG took place at Reading on 16–17 November 1962, when the Geology Department was celebrating its occupation of the new Sedimentology Research Laboratory. The occasion was attended by about ninety guests, including the laboratory's benefactors from geology-based industries and by soft-rock geologists and geo-administrators from most U.K. universities (all research students were invited) and relevant public bodies and consulting firms. Active British sedimentologists, virtually all of whom came, formed a minority, such was the state of our science at the time.

The celebrations comprised demonstrations (with demonstrators) of research in progress, an informal social evening, addresses by three distinguished visitors from overseas, and a winding-up session.

The three 'keynote speakers' (a novel buzz-word then) symbolized the major areas of sedimentology in which the new laboratory would work: Al Fischer (non-clastic and geochemical sedimentology), spoke on the Capitan reef-complex, Ake Sundborg (clastic and experimental), on fluvial deposits and Adolf Seilacher (palaeoecology), on his trace-fossil depth-zone model.

Demonstrations (concerned by request with work still in progress) were organized by research students and staff from several British universities and by workers from the IGS (now British Geological Survey), National Coal Board and major oil and quarry companies. The projects being unfinished, lively and informal discussions were generated, with free and easy participation and no sense of who was 'senior' or 'junior'.

At the closing session Perce Allen's address began with a straight question: 'Do you think this sort of meeting is a good thing?' On receiving a clear 'yes' he asked 'Oughtn't it to be repeated at intervals, say annually or biennially, at other centres?'. The response being an enthusiastic and unanimous affirmative, Perce went on to outline how this might be done. He suggested that the basic need was an organization that depended for life on its own enthusiasm (and died without it). It therefore had to have the simplest possible constitution. In his view this should be: 'There shall be no organization (or semi-permanent committee or whatever) except a convenor. A new convenor shall be elected at each meeting. He will be responsible for ensuring that the next meeting is arranged and then retire'.

Independence from other geological bodies should be preserved 'to avoid ossification (and to be free to die if enthusiasm waned)'. Emphasis should be on the younger worker and on informality. Meetings should include field demonstrations and be always mindful of the need to re-integrate theoretical, experimental and field work on the modern and ancient sediments in all their physical, chemical and biological aspects.

The BSRG was thus born in those distant 'pre-North Sea' days when our science in the U.K. went little further than sedimentary petrology and probably had fewer than a score of serious followers.

The style and general format of the annual meeting has been retained over the subsequent years in spite of the vigorous growth of the meetings. The annual meeting which, apart from the first 3 years, has been held at the Christmas period, has visited

respectively the Universities of Reading, Newcastle, Belfast, Bristol, Dundee, Keele, Oxford, Aberystwyth, Cambridge, Durham, East Anglia, Reading, Leeds, Swansea, Strathclyde, Bristol and Liverpool in 1982.

Three-hundred-and-forty people attended the Liverpool meeting when there were seventy-three 10-minute talks and forty poster displays. On this occasion the usual 2-day meeting was extended to 3 days to allow time for the review lectures.

The choice of topics for review was influenced by three factors. Firstly, we wished the topics to reflect themes which have been of concern to BSRG members in past meetings of the Group. Thus we included reviews of clastic and carbonate diagenesis but excluded the geochemistry of sediments which has never figured prominently at the meetings. Secondly, we wished to reflect the influence which the development of hydrocarbons in the North Sea has had on British sedimentology, and reciprocally the role sedimentology has increasingly played in hydrocarbon exploration. Our third concern was a practical one, namely that the published collection of reviews would not overlap in content too much with other recently published books on sedimentology. Arising from this policy we confined the discussion of sedimentary environments and facies sequences to a few broad reviews in spite of innovative research in this field which has formed an important part of many recent BSRG meetings. A good deal of this work was guided by Harold Reading and was summarized in *Sedimentary Environments and Facies*¹ which he edited. A new edition will be completed in the near future and there was little to be gained by duplicating this excellent guide to the interpretation of ancient facies.

Many of the seeds of modern sedimentology had been sown before 1962, and the last two decades have seen their vigorous growth. For example, our understanding of the dynamics of sediment transport had advanced a relatively long way as early as 1941 with the publication of Bagnold's *The Physics of Blown Sand*²; in 1963 the recently acquired knowledge of the sea-floor was summarized in Shepard's classic *Submarine Geology*³ and 1958 saw the publication of Bathurst's paper on 'Diagenetic fabrics in British Dinantian Limestones'⁴. However, in spite of important progress in some fields, our understanding of water movement and sediment transport in the sea was still rudimentary, diagenetic studies were still in their infancy and in spite of Walther's early insight into the relationship between modern facies distribution and the resulting vertical facies sequences, there had been little progress in developing facies models. Furthermore the significance of magnetic 'stripes' in establishing a chronology of ocean-crust formation was not yet appreciated and the deep-sea drilling programmes of JOIDES and DSDP were in the future. Consequently the exciting history of the oceans was barely suspected two decades ago.

In the four sections of the book we have tried to reflect some of the important developments of the last two decades. In the first section John Allen has traced some of the developments in our understanding of sediment transport since Bagnold's classic studies. In the second section Roger Anderton and Maurice Tucker have respectively reviewed our present understanding of clastic and carbonate facies and the value of current facies models, whilst Roger Suthren has summarized recent developments in the relatively unexplored field of volcanoclastic facies. Modern shelf environments and processes of sediment transport (Nick McCave) and deep-sea clastic facies (Dorrik Stow) are reviewed whilst Jerry Leggett uses DSDP data and evidence from submersibles to review some aspects of the history of the oceans.

Our appreciation of diagenetic fabrics and processes has largely emerged during the last two decades. Diagenetic fabrics in carbonates have been the subject of several recent reviews, so Tony Dickson has concentrated his review on the relative value of

petrography, staining and cathodoluminescence as techniques of investigation and the value of the distribution coefficient, stable isotopes and fluid inclusions in our understanding of carbonate rocks. Emphasis is also placed on deep-burial diagenesis.

Studies of the petrography and chemistry of pore-filling cements in clastic rocks are mainly relatively recent and these are summarized in the review of Burley, Kantorowicz and Waugh.

The applied aspects of sedimentology are covered in the last section of the book. Harry Clemmey shows how the epigenetic theory of metallic ore formation has been substantially replaced by syngenetic models which draw on a knowledge of facies analysis, weathering and soil-forming processes, fluid migration and pore-water geochemistry. In the final two review papers the importance of sedimentology in the exploration for oil is highlighted. The role which sedimentology has played in the search for oil in the North Sea is described by Howard Johnson and David Stewart and a case history of how detailed carbonate-facies analysis can be used in modelling reservoir potential is given for the Middle East by Trevor Burchette and Selina Britton.

We have not tried to be comprehensive in this collection of reviews but we hope that the book reflects many of the concerns of sedimentologists today, that it helps to put this work into a history of development over the last two decades and may help to define the path into the future.

It was our hope that this book would be published within a year of the December 1982 BSRG Annual Meeting. However, although the first reviews were received early in 1983, others for various unforeseen reasons were not received until late in the year. This unavoidable delay slightly 'dated' those reviews which arrived early. To the authors and to the reader we offer our apologies.

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¹READING, H. G. (ed.) 1978. *Sedimentary Environments and Facies*, 577 pp. Blackwell Scientific Publications, Oxford.

²BAGNOLD, R. A. 1941. *The Physics of Blown Sand and Desert Dunes*, 265 pp. Methuen, London.

³SHEPARD, E. P. 1963. *Submarine Geology*, 511 pp. Harper and Row, New York.

⁴BATHURST, R. G. C. 1958. Diagenetic fabrics in some British Dinantian Limestones. *Lpool Manchr geol. J.* 2, 11–36.