Bookreview

Cook, H. E. & Enos, P. (editors) 1977: Deep-water carbonate environments. *Society of Economic Paleontologists and Mineralogists, Special Publication,* 25, 336 pp.
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This S.E.P.M. Special Publication No. 25 presents the results of a symposium on basinal carbonates held in Dallas, Texas in 1975. It is the first book to cover the special subject of deep-water carbonates although there is some overlap with Special Publication Int. Assoc. Sediment. No. 1: »Pelagic sediments«. Deep-water carbonates comprise both autochthonous and allochthonous deposits and whilst the subject is fascinating the result is somewhat disappointing. The majority of the papers are initial field studies containing little or no data obtained by standard laboratory techniques. In the case of allochthonous carbonates such as resedimented conglomerates, detailed field work is the main tool in unravelling the problems of transport distances and modes. Only a few of the papers are, however, the results of application of refined field techniques. In spite of this several papers are of outstanding quality and deserve special mention.

Fischer & Arthur have collected a great bulk of data from published studies and from their own work to demonstrate that the diversity of pelagic biotas varies with a rhythm of about 32 million years. They distinguish between »polytaxic« times of maximum diversity, higher and more uniform oceanic temperatures, continuous pelagic deposition, wide-spread marine anaerobism, eustatic sea level rise; and »oligotaxic« times with lower marine temperatures, sharper latitudinal and vertical temperature gradients, marine regression, well oxygenated sea floors, lowered diversity of pelagic communities, and blooms of »opportunistic« species. »Oligotaxic« events in the Meso- and Cenozoic occur at the following dates: 222 m.y. (Permo-Triassic boundary); 190 m.y. (Triassic-Jurassic boundary); 158 m.y. (Bathonian-Callovian boundary); 126 m.y. (Valanginian); 94 m.y. (Cenomanian); 62 m.y. (early Paleocene); 30 m.y. (mid-Oligocene); and 2 m.y. (Holocene). The authors offer a number of reasons for this quite convincingly demonstrated cyclicity but do not settle for any specific causal mechanism. The paper is outside the scope of the volume, but is nevertheless well written and thought provoking although it to some extent is characterized by a certain obscuring of data.

This is not the case with the paper by Hubert, Suchecki and Callahan on the Cambro-Ordovician Cow Head Breccia of New Foundland. This outstanding contribution demonstrates how sophisticated field techniques can result in a detailed and convincing interpretation of a very complex deposit. This contrasts strongly with several papers on related topics in the book where the field techniques seem to be restricted to taking a few photographs. The Cambro-Ordovician Cow Head Breccia is accumulated on the western side of the proto-Atlantic Ocean. It consists of limestone breccia and thin beds of lime mudstone, calcarenite, green silty shale, marl, and radiolarian – sponge spicule chert. The breccias and conglomerates were deposited by gravity-controlled viscous mass flows that travelled downslope from the narrow carbonate platforms. The texture outlined by clast orientation is mainly wavy or seems to show a down-current dip. This type of conglomerate does not fit into the well-known models for resedimented conglomerates proposed by R. G. Walker in a series of papers. The limited applicability of these models fits well with my own experiences in Mesozoic and Lower Palaeozoic conglomerates in East and North Greenland, and I believe that only detailed field work along the lines of the present study by Hubert and others will lead to deeper insight in depositional mechanisms of resedimented conglomerates.

J. C. Hopkins demonstrates how differential submarine cementation in foreslope carbonates

of the well known Miette and Ancient Wall Buildups from the Canadian Devonian profoundly influence the nature of resulting redeposited breccias.

In a beautifully illustrated paper D. L. Smith describes the transition from deep- to shallow-water Carboniferous carbonates from Central Montana. He describes intraformational truncation surfaces from the deeper water facies that may represent submarine mass movements. These features are described in several of the papers in the book, most notably by G. R. Davies from Palaeozoic deep-water carbonates of the Sverdrup Basin. While this study is mainly of a reconnaissance nature, the lucid presentation, extremely good outcrop photographs and abundant petrographic data makes it the outstanding paper in the book. The truncation surfaces described by Davies are submarine in origin and occur in a setting distal to a zone of debris sheets. Individual truncation surfaces can be traced for at least 1.5 km and have as much as 150 m of section removed. Such features are strongly reminiscent of structures in modern continental slopes and rises that are also interpreted as gravity slides and slumps. Submarine truncation surfaces should also be looked for in deposits more familiar to most Danish geologists. As a possible example can be mentioned the well-known Upper Cretaceous chalk mounds described from the Normandy by Kennedy and Juignet (Sedimentology 1974, 21, 1–42). I have a strong suspicion that a reexamination of this outcrop will show that the flanks on the alledged banks actually are intraformational truncation surfaces.

The last paper worth special mention is by P. Enos on the major oil-producing Albian-Cenomanian limestone of the Tampico Embayment. Several earlier authors have proposed that the reservoir rock is an *in situ* reef. Enos demonstrates convincingly by combination of detailed sedimentology on core material, contour maps, and regional stratigraphy, that the shallow-water component of the rocks was deposited by various types of sediment gravity flow from the adjacent Golden Lane escarpment into water as much as 1000 m deep. This points to the petroleum potential of baisinal carbonate.

This book in conclusion presents a number of case studies on a long-neglected realm. This latter point is somehow reflected by the rather superficial treatment of the deposits in several of the papers. It is especially noteworthy that adequate field techniques are only applied convincingly in the paper by Hubert and others, and this paper plus the papers by Enos and Davies are strongly recommended reading for everybody interested in sedimentology.

Finn Surlyk