



Quaternary carbonate and evaporite sedimentary facies and their ancient analogues

A Tribute to
Douglas James Shearman

Edited by
Christopher G. St. C. Kendall
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Douglas James Shearman (1918-2003): Father of the sabkha model

Douglas James Shearman (1918-2003): “The Father of the sabkha model”

This volume is dedicated to the late Professor Douglas Shearman, who is best remembered for his outstanding research contributions to unravelling the nature and origin of the sabkha evaporites of the United Arab Emirates, and his recognition that these were probably analogues for many ancient evaporite sequences.

Douglas James Shearman ([Figs. 1](#) and [2](#)) was an amazingly perceptive and innovative geologist who showed remarkable courage and determination to proselytise his views, both to the geological community and to any others who crossed his path. He was renowned for his all-embracing bursts of enthusiasm for the latest subject that had caught his attention. He would drag academics, students and even cleaners into his room and lecture them on problems they never knew existed.

[Figure 1](#) Douglas Shearman examining a section revealing anhydrite showing a dish-form just beneath the surface of the sabkha, Abu Dhabi, 1964 photograph courtesy of Christopher G. St.C. Kendall



Figure 2 Douglas Shearman recounting one of his many adventures to, as always, an attentive and amused audience. Christopher G. St.C. Kendall fourth, and Abdullah Al-Zamel fifth from left. Kuwait 1986 photograph courtesy of Professor Claudio Vita-Finzi



Douglas was born in Isleworth on 2 July 1918. Before the Second World War, he trained and worked as a post-office engineer. His war service was as a radio operator on a minesweeper on the Arctic convoys to Russia with the British Royal Navy. He waxed eloquently on epic hours chipping ice off radio aerials. His interest in geology was triggered by meeting a soldier and a terebratulid in the Dover NAAFI canteen. After the war he graduated from Chelsea Polytechnic, that nursery of many famous geologists, and obtained a post as Lecturer in Sedimentology in the Geology department of Imperial College, London, where he was to spend the rest of his professional life.

Douglas spent his first eleven years in academe busily studying the structural geology and geomorphology of North Devon, UK. His research demonstrated that the *en echelon* offset of the West Country granites was the result of series of lateral crustal tears. This was to have been submitted for a PhD, but the research was never completed. It was typical

of Shearman that this work was never written up, neither as a thesis nor for wider publication; until a short paper appeared in 1967. This habit of solving one geological problem and leaving it unpublished to move on to another typified his career. He worked as a consultant geologist a great deal, particularly in south-east England but also in Africa, where he worked on the Kariba dam site and in other remote locations. In addition, he supervised research students, unofficially, as he did not have a PhD and this contravened the rules of the University of London for supervisors at that time. These students' research work was on diverse topics including: Carboniferous limestones and turbidites, Jurassic limestones, Cretaceous sands, Holocene intertidal-flat deposits and carbonates.

During these early years, he had little interest in carbonates and evaporites. In fact he never lectured on the latter in his courses to undergraduates, and the teaching collection at Imperial contained only a few drawers of rather dusty samples of rock salt and gypsum crystals. Douglas' interest in carbonates started with the arrival in the department of Derek Price, a mature student who worked on the Yoredale carbonates of Yorkshire. It developed further when Shearman became involved in the supervision of some students engaged in a study of the Mesozoic carbonates of the Jura Mountains, France, which had been initiated and organized by Derek Ager. This led to a series of papers on dedolomitization, a process that had hitherto not been recorded as occurring in sedimentary rocks (Shearman *et al.*, 1961; Shearman & Shirmohammadi, 1969).

The study of carbonate rocks took up more and more of his time with the initiation of a programme of research into the Quaternary deposits of the Trucial Coast (now the United Arab Emirates, UAE) in the early 1960s by the sedimentology section of the Geology Department at Imperial. At that time, the site now occupied by Abu Dhabi

City was a scorching coastal salt flat that extended for several kilometres from land to sea, and the airport was a bamboo “lean to” with a windsock. The opportunity to investigate modern carbonates allowed him and his co-workers to develop, and at times to confirm, suggestions that they had made in earlier papers, on the basis of studies of ancient carbonates, on limestone diagenesis (Skipwith & Shearman, 1965; Evamy & Shearman, 1969; Shearman *et al.*, 1970).

His interest in evaporites, one which was to occupy every moment of his later life, started when he realized that some scattered crystals in the wash of a sample collected by David Kinsman from the edge of the saline coastal plain (the sabkha) were anhydrite. He immediately recognized the significance of this discovery, and in the following years pursued this discovery and its significance (Shearman, 1965, 1966). He and his co-workers P.R. Bush, G. Butler, G. Evans, D.J.J. Kinsman, C.G. St.C. Kendall and Sir P.A. d'Estoteville Skipwith, produced several papers describing the now famous coastal sabkha evaporites of Abu Dhabi.

This stimulated Douglas into an investigation of various ancient evaporite deposits: firstly, those of the Purbeck of the Warlingham borehole in south-east England (Shearman, 1966), later with studies in Canada with J. Fuller on the Middle Devonian Winnepegosis Formation (Shearman & Fuller, 1969), and then more cursory studies on other famous evaporite deposits of the geological column. He never made a detailed study of any particular deposit except the Winnepegosis. Instead, he merely picked the plums which supported his growing conviction (which later mellowed a little!) that all evaporites were probably of a coastal plain origin! His lack of willingness to provide detailed comprehensive descriptions of any succession led to the remark of one of his assessors, when Douglas attempted to obtain promotion to the status of Reader in

Geology in the University of London: *“the trouble is, Shearman, you have not produced a single major paper for the Quarterly Journal of the Geological Society of London”*. Shearman had to wait several years for his promotion!

It is interesting to note that the discovery of modern anhydrite produced little interest in the older establishment of the British oil industry. One of these asked the writer: *“Why are you chaps wasting the Government's money studying the sabkha and these coastal areas?”* However, younger members of the geological fraternity were enthused by the discovery and its implications, as were researchers in the Shell Oil Company, The Netherlands. Shell had its own carbonate research group which included Bruce Purser, A. Wells, V. Colter, P. Zeigler and Brian Evamy (one of Shearman's former research students), as well as a group of eminent American carbonate and evaporite specialists, including James Wilson, E.A. “Gene” Shinn and Raymond Murray. These scientists were very supportive, and after a series of lectures by Shearman and the writer, gave the Imperial group what was in those days, a handsome donation to their research budget. The Trucial Coast project had been funded originally by the Department of Science and Industrial Research (now NERC) and Shell oil company and was later supported by Socony-Mobil Dallas (Henry Nelson and Volkmar Schmidt of that company participated in the drilling of the first line across the sabkha plain that revealed the history of the development of this interesting feature).

In 1965, Shearman astounded the geological fraternity and produced cries of disbelief from the gurus of the evaporites, with his audacious claims that they had all misinterpreted ancient evaporite deposits, and that the hypothesized evaporating-dish origin of these was incorrect. Instead, he suggested that the classical evaporite sequence, together with its frequent replacement textures, was the result of the

deposition of a pile of carbonate-gypsum/anhydrite sabkha sediments, and the subsequent upward expulsion of the connate brines to produce mineralogical changes whilst leaving the lower part unaltered. He developed this thesis in his most famous paper (Shearman, 1966, and discussion, 1967) in which he introduced the term “sabkha measures”. After a visit to Baja California, this was extended to include layered halite deposits and their chevron-type habit; these, he showed, were not indicative of deep water, thus supporting the earlier conclusions of Holliday (1967). In addition, he argued that individual salt layers did not always represent annual layers, thus supporting the earlier denial of this by Phleger (1969).

Douglas became intrigued, together with two Canadian research students, by the evidence provided by gypsum veins of hydraulic fracturing in the subsurface (Shearman *et al.*, 1972, 1973), and later by the changes of gypsum fabrics during the exhumation of evaporitic rocks (Mossop & Shearman, 1973). Acceptance of his theories was followed by academic recognition. Shearman was awarded a DSc, and then a personal Chair by the University of London (1978). One of his final papers on sabkha evaporites was written with his old friend and colleague Amanda Gunatilaka, when he was a visiting professor in the University of Kuwait. They described some laminated gypsum-carbonate deposits from an ephemeral channel on the sabkha (Gunatilaka & Shearman, 1988). It was an attempt to answer some of his critics who claimed that he had never demonstrated the presence of laminated evaporites in an intertidal-supratidal setting.

Later, Douglas became fascinated by the curious mineral ikaite ($\text{CaCO}_3 \cdot 6\text{H}_2\text{O}$) and supervised work on this in the Greenland fjords, as well as writing a review of the occurrences of this mineral and its variously named pseudomorphs (Shearman & Smith, 1985). Subsequently, he

and a colleague carried out some laboratory studies on the formation of this mineral (Shaikh & Shearman, 1986). His last episode of fieldwork was in the USA to examine the tufa mounds of the Lake Lahotan and Mono Lake Basins, which he and his co-workers claimed were originally formed of ikaite but had later been replaced by calcite (Shearman *et al.*, 1989).

Whilst Shearman was not always the originator, rather sometimes reviving interest in earlier ignored or forgotten views, and was occasionally incorrect in some of his suggestions on the origin of evaporites, he will always be remembered for his persuasive skill as a teacher and lecturer, with his beautifully drafted figures, and as the initiator of the re-examination of these deposits. His impact was considerable, and led to him being appointed as the first Professor of Sedimentology at Imperial College in (1978), and being awarded the Lyell Fund (1967), the Lyell Medal (1984) and the Wollaston Medal (1997) of the Geological Society of London, the Matson Award (1971) of the American Association of Petroleum Geologists, and the Geological Association of Canada Medal (1999). Above all, he will always be remembered by former colleagues, students and acquaintances for his unbounded enthusiasm and skill as an articulate exponent of his views, and his bottomless fund of entertaining stories of his escapades in the Royal Navy during the Second World War, and others from his earlier travels.

As his old student Dick Selley remarked "*an account of Shearman's academic achievements tells little of his character. He was unforgettable, eccentric, charming, frustrating to administrators who required forms filled in. Generations of students worshipped him. He had a special soft spot for overseas students. Shearman had a puckish sense of humour, a delight in practical jokes, and an ability to attract unforeseen events. When wrongly convicted of*

some naval misdemeanour he was set to paint the ship's funnel. This he did - complete with black swastika. The Israeli army shot up his tent when he was working for the UN looking for water in Jordan. Fortunately he was out at the time."

Further and more detailed information on Douglas Shearman's life and people's appreciation of him can be found in Bush (2003), Evans (2003, 2005) and Selley (2003).

Graham Evans

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