

Original Article

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John Robert Lawrence Allen FRS, FSA (25 October 1932–18 October 2020): a personal tribute

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John Robert Lawrence Allen (Fig. 1), an internationally distinguished sedimentologist, was born on 25 October 1932 in Birmingham, UK. He died in Thatcham, UK, on 18 October 2020, aged 87, after a short illness.

1. Short biography

John attended St Philip's Grammar School in Birmingham. His academic career was unusual and remarkable in the context of scientific history. After attaining a first-class degree in geology at the University of Sheffield, UK, in 1955, he began a PhD at the same university, supported by a maintenance award from the Department of Scientific and Industrial Research. His PhD work was on the Old Red Sandstone of the Clee Hills (note: sandy rocks deposited in a fluvial regime called the Old Red Sandstone). However, he was never actually awarded a PhD degree. In John's own words, 'but never presented a thesis (partly my own fault)'. One can imagine how hard this must have been for him.

'Thus, when Heaven is about to confer a great office on any man, it first exercises his mind with suffering, and his sinews and bones with toil. It exposes his body to hunger, and subjects him to extreme poverty. It confounds his undertakings. By all these methods it stimulates his mind, hardens his nature, and supplies his incompetencies.'

The Works of Mencius (372–289 BCE), Book VI, *Kaou Tsze*, part II¹

Thanks be to Heaven. Fortunately for John and for sedimentology, his talent was recognized by Professor Perce Allen FRS (1917–2008)², of the Department of Geology at the University of Reading, UK. To avoid confusion between the two Allens, many referred to John as JRL. With the help of Perce Allen, John received the GM Lees³ Research Fellowship in 1958 and a successful academic career began. He became a Lecturer in Geology in 1961, a Reader in Geology in 1967 and was promoted to a Personal Professorship of Geology in 1972. The University of Sheffield awarded John an honorary LLD (Doctor of Law) degree in 1969 for an extended history of wide-ranging research. John also held a Visiting Scientist position at the Department of Geology, Brown University, USA, in 1964 (Allen, 1965a, p. 91, bottom footnote) and in the Department of Physical Geography, University of Uppsala, Sweden, in 1971 (Allen 1971, p. 157, the first affiliation). John was the Ernst Cloos Memorial Scholar at the Department of Earth and Planetary Sciences, Johns Hopkins University, USA, from 1976 to 1977. He was appointed Director of the Postgraduate Research Institute for Sedimentology (PRIS) at the University of Reading in 1988. From 2001, as an Emeritus Professor, John was a Visiting Research Fellow in the Department of Archaeology at the University of Reading. In 2010 John was awarded an honorary DSc degree of the University of Reading for a wide-ranging body of international lauded research.

2. John's major research interests, contributions and impacts

'I have in a way spent all my life playing with sand. My maternal grandmother, the daughter of a fisherman and sometime lifeboat coxswain, lived all her days on the Lancashire coast. She loved the sea and, since a baby, and until she died in 1965, I have spent each year many delightful hours in her home, frequenting with her the shore at every opportunity. The sound of the wind sifting sand grains through the marram, and the sight of waves smoothing the beach beneath a sky filled with the sunset, are amongst my earliest and strongest memories, and have unquestionably shaped my later life and interests.'

What motivated John to be interested in physical sedimentology? The lines above are from John's reply after the President's citation for John's presentation with the Lyell Medal in

¹J Legge (1930) *The Four Books*. Shanghai: The Commercial Press Ltd, pp. 929–930.

²www.geolsoc.org.uk/About/History/Obituaries-2001-onwards/Obituaries-2008/Perceval-Allen-1917-2008

³George Martin Lees FRS (1898–1955); for his obituary, see WJ Arkell (1955) George Martin Lees 1898–1955. *Biographical Memoirs of Fellows of the Royal Society* 1, 162–173.



Fig. 1. A formal portrait (reference GSL/POR/55/2) of John Robert Lawrence Allen taken for his presentation with the Lyell Medal in 1980. Photo credit: the Geological Society, London. Reproduction with permission of the Geological Society, London.

1980 (Society meetings January–June 1980, *Journal of the Geological Society*, 138, 1 July 1981, p. 503, para. 1). Clearly, in his own words, John's primary interest in physical sedimentology was motivated by 'playing with sand' during his early life with his maternal grandmother on the Lancashire coast.

John made many contributions to quantitative sedimentology, particularly in the field of experimental sedimentation. He also made notable contributions to the study of fluvial and deltaic sedimentation. His outstanding work was notable for the way in which it was brought to bear on problems concerning the origin, transport and deposition of clastic sediment and the tectonic significance of the Old Red Sandstone. He made a distinguished contribution to fluvial sedimentology and palaeogeomorphology, the latter of which skilfully blended field studies of modern and ancient fluvial environments with laboratory experiments. His influence can be felt throughout modern sedimentary geology.

John published his first paper in 1957, which was on the Pre-Cambrian geology of Caldecote and Hartshill, Warwickshire and which arose from his undergraduate thesis (mapping) possibly under the supervision of Professor Leslie Rowsell Moore (1912–2003) (Allen, 1957). John's first paper in the *Geological Magazine* also appeared in 1960 (Allen, 1960a). The Mam Tor paper (1960b) was important because it was concerned with a classic area. The Cornstone paper (1965a) was the first of his PhD

thesis papers. John must take a lot of credit for his work on the nature and significance of palaeosols, particularly the caliches (Cornstones) of the Old Red Sandstone. Allen's (1962) paper entitled 'Petrology, origin and deposition of the highest Lower Old Red Sandstone of Shropshire, England', which was published in *Journal of Sedimentary Petrology* 32, 657–97, John's third paper, won the Best Journal Paper Award⁴.

John was a prolific writer, and some suggested, semi-seriously, that his many published papers were written by three different authors: John Allen, Robert Allen and Lawrence Allen. John seemed to write faster than one could read. He enjoyed writing lengthy papers (e.g. Allen, 1965a, 2000a). His 101-page landmark review of 'Recent alluvial sediments' was published in 1965 (Allen, 1965a). His productivity was the envy of the vast majority of geologists at the height of their academic careers. Many of John's publications are single-authored. John published at least 226 books and papers (University of Reading research website) spanning the years from 1957 to 2019 (see Appendix) before his passing. John also published a number of classic books, e.g. the 433-page book on *Current Ripples* (Allen 1968) and a 272-page book on *Principles of Physical Sedimentology* (Allen, 1985a). There were two contrasting reviews of Allen's (1968) *Current Ripples*, one by Collinson (1970), the other by Kennedy (1970). Allen (1985a) and its predecessor *Physical Processes of Sedimentation* (Allen, 1970) were the standard undergraduate sedimentology textbooks in most British geology departments for a quarter of a century. One may say that John's magnum opus *Sedimentary Structures* (Allen, 1982a,b) is much more important than his *Current Ripples* (Allen 1968). One cannot see how any account of John's output and impact could leave out his truly seminal book *Sedimentary Structures* (Allen, 1982a,b) that perhaps is his greatest assembly of information – cited now over 3000 times.

One would see a number of John's contributions as seminal works – it's personal as to which: his work on the Old Red Sandstone of course as mentioned above, but also that on sand-waves, bedform theory, grain dynamics, flow separation, etc. Indeed, there are so many to choose from that one may feel it would actually be better to highlight some of their impacts.

How have they influenced our thought and knowledge on these areas? Why was John pioneering in these areas? How did they advance the field? On looking back at his published papers and books, it is seen that John was fully aware of the great importance of fluid mechanics to sedimentary geology. His readings of the classic books on fluid mechanics were extensive, including Prandtl (1952), Lin (1955), Schlichting (1960), Chandrasekhar (1961) and Yih (1965). At a young age (Fig. 2), John already thought that teaching fluid mechanics to young geologists was important. As an example, he wrote a paper for young geologists entitled 'Simple experiments to demonstrate wave-motion, flow-separation, helical flow and stationary vortices' (Allen, 1965b).

In his short 'Note on the use of Plaster of Paris in flow visualization, and some geological applications', which was published in the *Journal of Fluid Mechanics*, Allen (1966, p. 331, lines 1–3) wrote that 'The methods of fluid mechanics are helpful to geologists interested in the origin and environmental significance of current-formed structures present in sedimentary rocks and in modern sediments.' He applied one of the conventional methods of fluid mechanics, i.e. flow visualization, to promote understanding of bed ripples and sand waves, and other sedimentary features.

⁴<https://sepm.org/Best-Journal-Paper-Award-1952-1977>



Fig. 2. This portrait of the young John at about the age of 33 appeared on the front page of his paper (Allen, 1965b) in the *Journal of Geological Education*. Reproduced with permission of the *Journal of Geological Education*.

Allen (1984, p. 227, introduction, para. 1, lines 1–5) wrote that ‘A major development in the field of fluid mechanics of relevance to sedimentology is the realization that turbulent flows are both deterministic and stochastic in character, and that they are composed of coherent flow configurations whose properties depend uniquely on such flow characteristics as thickness, mean velocity and shear stress (see reviews by Laufer, 1975, . . .).’ Allen (1984, p. 227, introduction, para. 2, lines 1–4) further wrote that ‘Coherent structures occur on two main spatial scales in turbulent boundary layers, represented naturally by river, tidal, and turbidity currents and by the wind blowing past a surface, provided that the flows are hydraulically smooth or transitional.’ ‘Coherent structures’, which is the advanced concept in turbulent boundary layers, was applied to an improved understanding of parallel lamination developed from upper-stage plane beds (Allen, 1984).

In his review of ‘Loose-boundary hydraulics and fluid mechanics’, Allen (1985b, p. 7, left column, bottom line, right column, lines 1–4) wrote that ‘Sorby (1859, 1908) a century previously had demonstrated the power of a quantitative and experimental approach to sediments, but we did feel that now its time had come.’ John, as a geologist, also read applied mathematicians’ books on turbulent shear flow written by Townsend (1956, 1975). John also read the advanced papers of British fluid dynamicists, e.g. Simpson (1972), Sleath (1974), Britter & Linden (1980) and Longuet-Higgins (1981). Allen (1985b, p. 7, Summary, lines 1–4) believed that ‘A major and acknowledged role in the advance of

sedimentological knowledge is played by the methods of physics as expressed through fluid mechanics and loose-boundary hydraulics. Turbulence is increasingly being seen as involving orderly flow structures, and these are significant for the origin of several sedimentary structures and for suspension transport.’

Clearly, John was pioneering in these areas by applying the following methods and theories to sedimentary geology: (1) the methods of fluid mechanics; (2) the theories of fluid mechanics, e.g. the turbulent boundary layer; (3) the methods of loose-boundary hydraulics; (4) the theories of loose-boundary hydraulics, e.g. erosion, deposition, bedload, suspension, etc.

In the author’s view, these studies by John advanced the field by: (1) providing physical insights into sedimentary processes; (2) relating sedimentary geology with fluid mechanics and hydrodynamics, e.g. tidal bedding vs tidal cycles; (3) semi-quantifying the mechanics of sedimentary processes; (4) enabling some simple mathematical modelling and prediction.

After his ‘retirement’ John also worked on estuarine processes (Severn Estuary) (e.g. Allen 1985c, 1986, 1989, 1990a, b, 1991, 1994, 2000a, b) and geoarchaeology (e.g. Allen & Fulford 1986, 1987, 1990). It is astonishing how he turned his mind to new fields of fascination. In his own words, John ‘wanted a new scientific challenge’. John used mathematics in several different areas of his work from an early date (e.g. one-dimensional mathematical modelling of salt-marsh growth) with the assistance of others (e.g. H. Begg, who was acknowledged in Allen (1990a, p. 745, right column, line 1)).

The 29th Annual Meeting of the British Sedimentological Research Group (BSRG), chaired by Andrew Parker, was held at the University of Reading on 16–19 December 1990. It was at this meeting that the author first met John. The meeting included a one-day field excursion to the salt marshes of the Severn Estuary, England, on Wednesday 19 December 1990. John led this field excursion (Fig. 3).

Together with Kenneth Pye, John organized the Workshop on the Morphodynamics, Conservation and Engineering Significance of Saltmarshes, at the Postgraduate Research Institute for Sedimentology, University of Reading, on 24 April 1991. The outcome of this workshop was a book (Allen & Pye, 1992). The author attended this workshop and got to know John better.

One day in June 1992, the present author presented his first scientific talk, entitled ‘Recent sedimentation in the Dyfi Estuary, west Wales’, at the PRIS. John listened to the talk very carefully. As was the tradition, there was a celebration in the pub after the talk. John, together with Andrew Parker (1941–2017)⁵, was kindly present and chatted with the present author there.

John was a great contributor to his field and one whose research impact has had, and will continue to have, a direct impact in many areas. All physical sedimentologists across the globe have read and used his work extensively – from early to later studies. As such, John’s impact on his field has been enormous.

Some personal experiences are used to show how John’s interest in salt marshes has influenced the present author’s work. John’s influence on the author has been very strong. As a Visiting Scientist, using John’s Armstrong flume (Fig. 4), the author did a laboratory flume study of vegetated flow structures. John had kindly provided the author with his flume. This work resulted in two papers (Shi & Hughes, 2002; Shi *et al.* 2013).

⁵www.geolsoc.org.uk/About/History/Obituaries-2001-onwards/Obituaries-2017/Andrew-Parker-1941-2017



Fig. 3. (Colour online) John, wearing a worn, light blue hat, leading the BSRG-meeting one-day field excursion to the salt marshes of the Severn Estuary, England, on Wednesday 19 December 1990. The thick yellow arrows point to John. Photo credit: John Z. Shi.

On looking back at John's flume (Fig. 4), not surprisingly, one may think it is not just a sedimentology laboratory but also a fluid mechanics laboratory or hydraulics laboratory. It is hardly different from the one at the GK Batchelor Laboratory, at the Department of Applied Mathematics and Theoretical Physics

(DAMTP), University of Cambridge, UK. This is why John was a pioneer in physical sedimentology.

After the author returned to China from his visit to Reading, John maintained contact and was interested in the present author's work on salt marshes, requesting reprints of e.g. Shi *et al.* (1995)

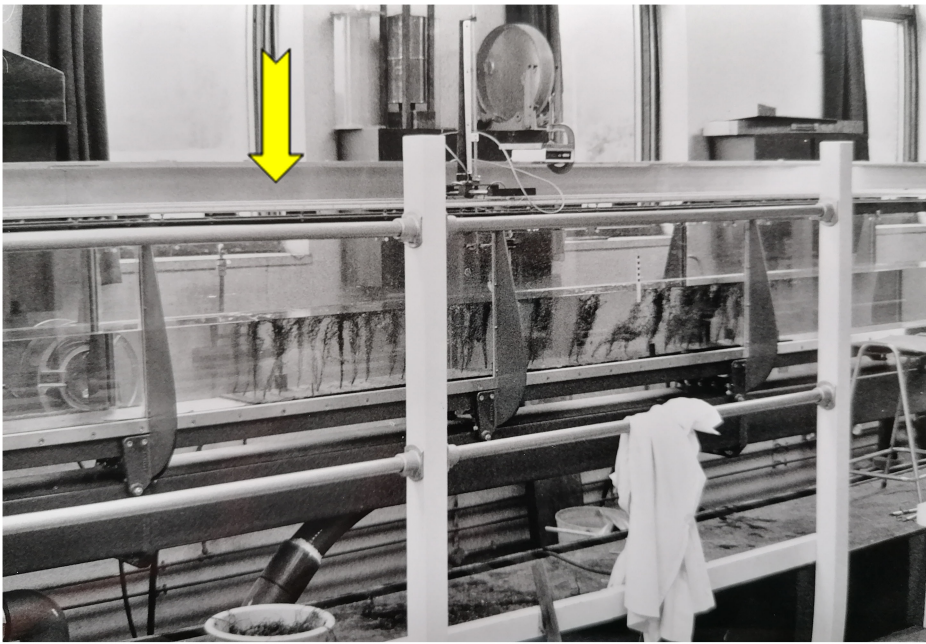


Fig. 4. (Colour online) A portion of John's Armstrong flume in the Sedimentology Research Laboratory at the PRIS, University of Reading. The present author used the flume for a study of vegetated flow structures. The photo was taken by Erika Mellor in 1993.

and Shi *et al.* (2000). In the author's Chinese-language book *Physical Processes of Estuarine and Coastal Fine Sediment* (Shi, 2013), which was inspired by John's style of citing references, a total of 2655 references are made. The book was dedicated to John. When the author emailed John about it during the author's visit to the GK Batchelor Laboratory, John replied, 'Dear John, I do hope your stay at Cambridge will be enjoyable and profitable. I'm flattered that you should dedicate a book to me – I hope it does well and brings you great acclaim' (email to the author, 10 October 2012). In the author's recent review paper (Shi, 2021), a total of 397 references are cited. John's influence on the author's research is still continuing.

3. John's role in the former Postgraduate Research Institute for Sedimentology

In the late 1950s, sedimentology was just emerging as a discipline. A small group of UK researchers, including Harold Garnar Reading (1924–2019), John, and Peter Furneaux Friend, set it on the route to becoming a very significant part of modern geology (based on the citation for the Prestwich Medal of the Society for 2010 awarded to Peter Friend⁶). Perce Allen's most important geological achievement at Reading was probably the foundation of the Sedimentology Research Laboratory in 1962. Undoubtedly, however, John, together with Andrew Parker, played a pivotal role in establishing the former Postgraduate Research Institute for Sedimentology. It is a pity that this Institute does not exist anymore. One may argue that John never established a 'research school' in the way that other contemporaries did. As shown in Figure 5, however, John, as the first Director, was leading the PRIS. Mark Brian Roberts, an archaeologist at University College London, is best known for his discovery and subsequent excavations at the Lower Palaeolithic site of Boxgrove Quarry in southern England. John, as the first Director, had taken part in the

PRIS's field trip to Eartham Pit near Boxgrove, West Sussex, England, in the summer of 1992 which was organized by Peter Worsley (Fig. 6). Roberts was invited to be a guide. In this author's view, inviting cooperation in this way can be considered one of the functions of a 'research school'.

4. John's philosophy of physical sedimentology

In this tribute, the author does not attempt to give a detailed account of John's scientific mind and character. However, like other geologists, John was very much influenced by the uniformitarian principles developed by James Hutton (1726–1797), John Playfair (1748–1819), William Whewell (1794–1866) and Charles Lyell (1797–1875) in the early 18th and 19th centuries.

John appears to have been most strongly influenced by Hugh Miller (1802–1856), Henry Clifton Sorby (1826–1908) and Ralph Alger Bagnold (1896–1990). The following lines are from the citation by the President of the Geological Society of London for John's presentation with the Lyell Medal in 1980 (Society meetings January–June 1980, *Journal of the Geological Society*, 138, 1 July 1981, p. 502, right column, para. 4):

Like Hugh Miller's researches of long ago, John's have laid bare many secrets of the Old Red Sandstone and its environment: its source geology, tectonics, hydrology, climate, topography and stream dynamics. Like Hugh Miller's, too their importance is basic to a far wider area of soft-rock geology. In the experimental and theoretical fields John has also taken on the mantle of Sorby, that great Sheffield polymath whose sedimentological seeds fell largely on stony ground. Over half a century later John, schooled in the same city, made them grow and inspired others to extend the harvest.

On looking back at the Contents of Sorby (1908, p. 171) (Fig. 7), one can see what the President's citation really meant in saying '... sedimentological seeds ... made them grow ...' since they also clearly outlined what John had done following Sorby, and how he had done it.

My object is to apply experimental physics to the study of rock.

HENRY CLIFTON SORBY (1908)

⁶www.geolsoc.org.uk/About/awards-grants-and-bursaries/society-awards/citations-replies-2001-onwards/2010-Awards-Citations-Replies#prestwich

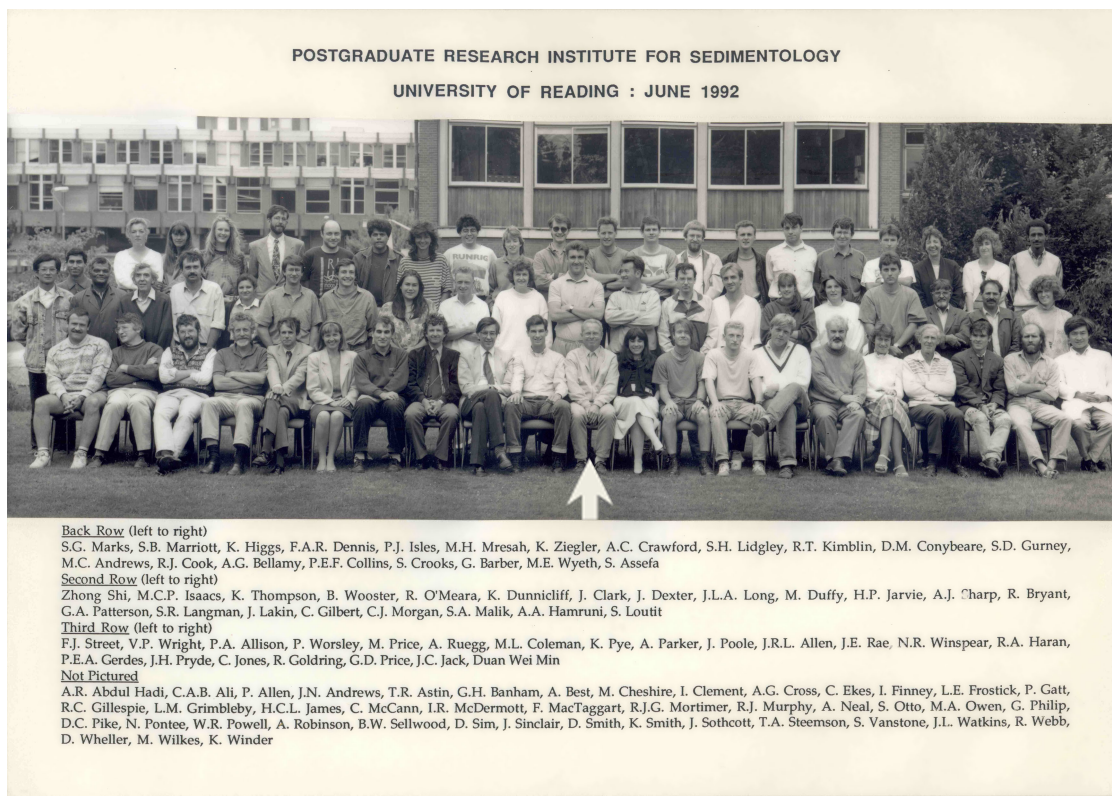


Fig. 5. Group photo of the PRIS in June 1992. The white arrow points to John. The photo was taken by JL Watkins.



Fig. 6. (Colour online) John, wearing a worn, light blue hat, as Director of the PRIS, taking part in the Institute's field trip to Eartham Pit near Boxgrove, West Sussex, England, in the summer of 1992. The thick yellow arrow points to John. Photo Credit: John Z. Shi.

As shown in Figure 8, this was quoted just below the title of Section '1. INTRODUCTION' in John's 42-page review 'Some recent advances in the physics of sedimentation' (Allen, 1969, p. 2). Clearly, in a way, John regarded Sorby as his scientific research

model and made the philosophy of his own research clear via Sorby's objective (or philosophy).

In his Volume 150 Celebration Paper for the *Journal of the Geological Society, London* entitled 'Sedimentary structures:

10. *On the APPLICATION of QUANTITATIVE METHODS to the STUDY of the STRUCTURE and HISTORY of ROCKS.* By the late HENRY CLIFTON SORBY, LL.D., F.R.S., F.L.S., F.G.S. (Read January 8th, 1908.)

[PLATES XIV–XVIII.]

CONTENTS.	
	Page
I. Introduction	171
II. Final Velocities	172
III. Angles of Rest of Sand and of Small Pebbles.....	174
IV. The Effects of Currents	176
V. Ripple-Drift	181
VI. Varying Size of the Grains	185
VII. Drift-Bedding	186
VIII. Joints of Encrinites, etc.	189
IX. Very Fine-Grained Deposits	189
X. The Green Slates of Langdale	196
XI. Washing-up, etc. of Clays.....	199
XII. On the Interspaces between the Constituent Grains of Deposited Material	200
XIII. Segregation	203
XIV. Contraction of Rocks after Deposition	214
XV. Concretions.....	215
XVI. Spots in Welsh Slates	220
XVII. Slip-Surfaces	222
XVIII. Surfaces of Pressure-Solution	224
XIX. Determination of the Pressure to which Rocks have been Subjected	227

I. INTRODUCTION.

In the case of nearly all branches of science a great advance was made when accurate quantitative methods were used instead of merely qualitative. One great advantage of this is that it necessitates more accurate thought, points out what remains to be learned, and sometimes small residual quantities, which otherwise would escape attention, indicate important facts. Since it applies to nearly all branches of geology, it is necessarily a wide subject, but so connected together that it seems undesirable to divide it.

My object is to apply experimental physics to the study of rocks.

At least six different kinds of physical questions are involved, some of which have been sufficiently studied, but others require experiments which would be very difficult to carry out, and all that I can now do is to endeavour to deduce plausible results from what is known. In doing this, it may be necessary to assume cases sufficiently simple for calculation, which may but imperfectly correspond to natural conditions, so that the results may be only approximately correct. In some cases, facts seem to show that there are important properties connected with subsiding material

Fig. 7. (Colour online) The front page of Sorby (1908), showing the main contents and Sorby's object. Reproduced with permission of www.biodiversitylibrary.org.

Sorby and the last decade', Allen (1993, p. 417, abstract) wrote that 'Henry Clifton Sorby pioneered in the last century the description and especially the hydrodynamic interpretation of sedimentary

structures, together with their use as palaeocurrent indicators.' He further wrote that 'Henry Clifton Sorby (1826–1908) of Sheffield may with every justification be called the "Father of

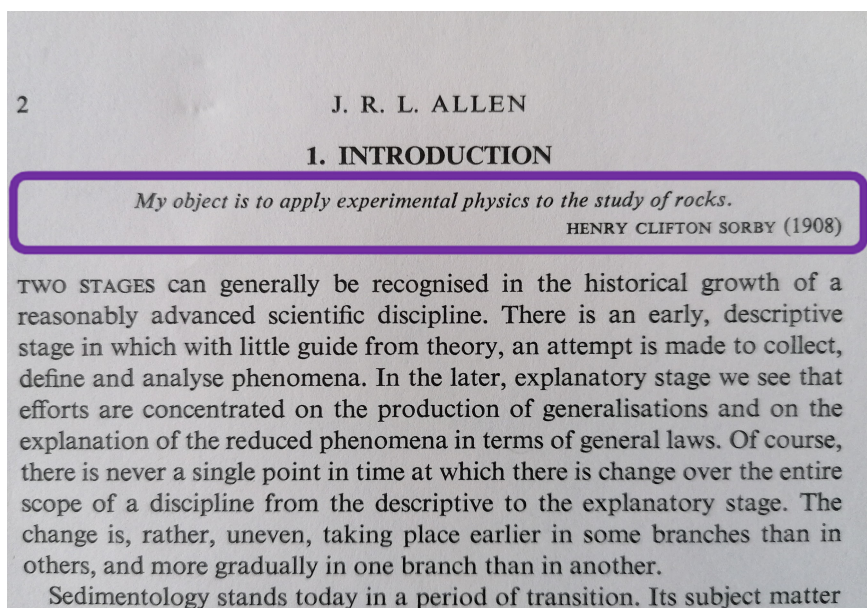


Fig. 8. (Colour online) A portion of Allen (1969, p. 2) showing his quotation of Sorby's (1908, p. 171, Introduction, para. 2) *raison d'être*.

Sedimentology” (Allen, 1993, p. 417, lines 1–2). In the author's view, since John was also from Sheffield, he might be thought of as the reincarnation of Sorby. The author sees John as the natural successor to Sorby.

John had a really unique career, first playing with sand, then playing with mud and finally playing with pottery. Through the whole of his career the publication of research was a prime motive in his life. As stated in the citation by the President of the Geological Society of London for John's presentation with the Lyell Medal in 1980, 'John, you have kept faith with Michael Faraday's statement of a scientist's responsibilities: Work, Finish, Publish!' (Society meetings January–June 1980, *Journal of the Geological Society*, 138, 1 July 1981, p. 502, right column, last para., lines 1–2). John's output in papers and books was prodigious. Given the fact that modern universities impose funding, teaching and publications pressures on scientists, it would be difficult to carry out research in John's style nowadays.

5. Awards and recognition

Distinguished for many contributions to quantitative sedimentology, particularly in experimental sedimentation (dynamical significance of current structures), alluvial sedimentation (low- and high-sinuosity streams) and deltaic sedimentation (large deltas formed under conditions of high energy). This outstanding work is notable for the way in which it is brought to bear on problems concerning the origin, transport, depositional environments and tectonic significance of the Old Red Sandstone. His two textbooks are widely used in the earth sciences and his many critical reviews have stimulated other workers. Overall, his integrated approach has profoundly influenced sedimentary research, and thereby a broad area of geology.

From the election certificate of the Royal Society for John Robert Lawrence Allen⁷

⁷Buchanan, Sir George: certificate of election to the Royal Society, 1979. Archive of the Royal Society, EC/1979/02.

There are many geologists with extraordinary achievements to their names, and many who have won major prizes. But even in this illustrious company, John stands out. He was elected a Fellow of the Royal Society in 1979 (for his election certificate, see the above) and a Fellow of the Society of Antiquaries of London in 1991. He was the recipient of many awards: the Lyell Medal of the Geological Society of London (1980)⁸; the David Linton Award of the British Geomorphological Research Group (1983) (for the citation, see Whalley, 1985); the Twenhofel Medal of the Society of Economic Paleontologists and Mineralogists (1987)⁹; the GK Warren Prize of the US National Academy of Sciences (1990)¹⁰; the Sorby Medal of the International Association of Sedimentologists (1994)¹¹; and the Penrose Medal (and an Honorary Fellowship) of the Geological Society of America (1996)¹².

6. Personality

John's personality was pleasant and friendly; he liked people to call him simply 'John'. In the author's view, John seems a revered, if sometimes controversial, personality. He enjoyed working independently, with minimum help from others. Of course, John did have a productive relationship with Brian Williams on the Old Red Sandstone in South Wales. In addition, he had other very productive and successful working relationships, particularly with Joy Rae, Kenneth Pye, Michael Fulford, Simon Haslett, Petra Dark and Martin G. Bell.

In the author's view, nevertheless, as a dedication to John (Shi, 2013, p. 2), his early scientific life is best described by the

⁸www.geolsoc.org.uk/About/awards-grants-and-bursaries/society-awards/lyell-medal

⁹<https://sepm.org/Past-Winners>

¹⁰<http://www.nasonline.org/programs/awards/g-k-warren-prize.html>

¹¹https://www.sedimentologists.org/repository/docs/awardees_sorby_medal.pdf

¹²<http://www.geotimes.org/poc106.html>

poetic line, ‘... a mind forever Voyaging through strange seas of Thought, alone’ (words used by William Wordsworth (1770–1850) to imagine Newton, in *The Prelude*, book III, ‘Residence at Cambridge’, 1805; Wordsworth, 1894).

7. Postscript

The author has profound respect for John’s achievements and has tried to give a short account of John Robert Lawrence Allen as he knew him and to indicate some of the ways in which the author’s own scientific ideas were inspired by John. The geographical separation of home countries in particular makes it impossible for the author to claim to be one of John’s intimate friends, but the author hopes he has conveyed some impression of how much he liked and admired John. The author believes that many geoscientists worldwide will appreciate this initiative.

After John’s passing, there were a number of heartfelt obituary notices available online, e.g. <https://www.sedimentologists.org/repository/newsletters/4477dea4701011e9a9231301>: page 4 <https://www.geol Soc.org.uk/About/History/Obituaries-2001-onwards/Obituaries-2020/John-Allen> <https://www.livinglevels.org.uk/news/2021/5/27/professor-john-rl-allen>.

Acknowledgements. Graham Evans (1934–2021), who pioneered in the sedimentological study of intertidal flat sediments in the Wash, England (Evans, 1965), on the recommendation of Ying Wang, intended to accept the author to be a PhD student at the Imperial College, London, in 1987. Early in the author’s scientific career, it was his good fortune to be brought into close personal touch with John. The author would like to thank John Robert Lawrence Allen, Kenneth Pye and Jocelyne Marie Ragody Hughes for having provided him with the position of Visiting Scientist from April 1992 to August 1993 at the University of Reading, UK. When at Reading, Roland Goldring (1928–2005) unintentionally left the author two important books (Rouse, 1961; Raudkivi, 1967) which, together with the author’s laboratory flume study of vegetated flow structures, chiefly stimulated the author’s move from coastal science into a different scientific field, environmental hydraulics. It was at Reading that the author realized how important mathematics is in his pursuit of science and this led to the third stage of the author’s scientific career. Shu Gao alerted the author to John’s passing during our gathering in Shanghai on 24 November 2020. Ellen Embleton, Burghard W. Flemming and Les J. Hamilton have kindly corrected the early versions of this tribute. Caroline Lam, Archivist & Records Manager, The Geological Society, London, kindly found the formal portrait of John shown in Figure 1 and the President’s citation for the award of the Lyell Medal and John’s reply. Virginia Mills, Archivist (Early Records), the Royal Society, London, kindly found the author the election certificate for John’s Fellowship. Four anonymous referees and Hugh Jenkyns are thanked for critical and constructive comments which have improved the quality of this tribute. Other people have kindly read and commented on the different early versions of the final revision, including Burghard W. Flemming, Robert Kirby, Michael G. Fulford, Martin G. Bell, Peter Worsley and Kenneth Pye. The final revision was carefully read and corrected three times by Les J. Hamilton. Peter Clift, Editor, *Geological Magazine*, is thanked for his encouragement and patience. Kenneth Pye and Peter Worsley are thanked for their careful readings of the proof, in particular, Kenneth Pye spotted a few errors.

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Appendix

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