

# HUGH PRUDDEN (1929-2015) GEOLOGIST AND TEACHER, AND THE “BLACK FILE”

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Elsewhere in this edition of the Bath Geological Society Journal, there is an article entitled ‘An Unsolved Mystery’ in which I recount the story of how a black spring-backed file, containing 264 sheets of paper of typewritten articles transcribed from papers in scientific and geological journals and from newspapers and magazines, came into my possession for safe keeping as Archivist for the Society. I also tell how, coincidentally, a few days after looking through the contents and discovering a paper on the ‘Cannon Shot Flints’ of Norfolk, we went away for a week to near Cromer, north Norfolk. This was the first coincidence associated with the Black File.

On 8<sup>th</sup> January 2015, at the age of 86, Hugh Prudden died, having lived at Montacute near Yeovil, Somerset, for much of his life. Hugh was a much respected geologist who remained active in his chosen subject, particularly in Somerset, very much to the end of his life. At his funeral service there were over 200 people with one of the tributes given by Professor Hugh Torrens, being a fine demonstration of how much he was respected. I first met Hugh Prudden in

October 1992 when he led a field trip for the Bath Geological Society to Minehead and I remember well his enthusiastic and distinctive style of speaking and teaching. It was not Hugh’s style to stand in front of an exposure or geomorphological feature, tell us what we were looking at and how it had happened or give an explanation. His style was very much the teachers’ way – we were told to look at the feature or subject, work out what we could see and then come up with explanations or descriptions. On that trip we walked from Minehead harbour west along the coast to the flat grassy apron underlain by cobbles and pebbles at the base of North Hill known as Greenaleigh. I remember that, after giving us a clue or two, he asked us to work out why this grassy patch, bordered at the edge of the sea by a bank of cobbles, had formed and what mechanism was responsible for its formation. Because we had to work it out, I took in and retained the information to this day.

Earlier in this article I referred to the first coincidence associated with the Black File. In early February 2015, not a month after Hugh Prudden’s funeral, having been fascinated by the mystery and contents of the black file, I was re-examining the contents and reading many of the articles. Then the second coincidence occurred. On pages 373 and 374, I found an article, typewritten with 3 photos, entitled ‘Boulder Clay of Bedford’ by H C Prudden, from the ‘Bedford Magazine’. (Boulder Clay is the old name for glacial till). There was no date or volume number. At first I could not believe that it was the same author but ‘Prudden’ is not a common surname, and with the initials ‘H C’, I had to assume that our Hugh Prudden and the author of this typewritten transcript was one and the same.

The internet is unbelievably helpful to us in the 21<sup>st</sup> century so I naturally went to it to start my investigations with the intention of finding the original article in the Bedford Magazine. The name of the magazine was not helpful so I looked up H C Prudden. Unsurprisingly, there was a wealth of entries under his name, almost exclusively concerned with the geology of Somerset, its districts and environs. Disappointingly, there was no reference to the article ‘Boulder Clay of Bedford’ although his name did appear in

other links with boulder clay. My next attempt was to email the Bedford Tourist Information Centre with the information and why I was interested in tracking down the article. Their prompt reply was that they had not heard of the publication but had passed my enquiry to the Archive office at the Borough Council. The reply from the Bedfordshire and Luton Archives Service office was more promising in that they hold copies of the Bedfordshire Magazine and that they had found the article that I was interested in. However, it was entitled "The Ice sheet that invaded Bedfordshire" written and illustrated by H.C.Prudden'. Published in Spring 1953, vol III, pages 345-348, it was about boulder clay and was written by Hugh when he would have been about 24, probably around the time he graduated from Cambridge University. The title was a surprise because, as a result of my investigations on the other articles in the Black File, the titles of the transcribed articles always matched those of the original paper in the geological journal, magazine or paper. However, the Archive service passed me on to the Bedfordshire Historical Record Society which holds the copyright of the now defunct Bedfordshire Magazine and they were very happy to give permission, for which I thank them, to reproduce the article for the Bath Geological Society Journal. The original article is longer than the transcribed version in the Black File and is reproduced here as scanned from the Bedfordshire Magazine.

***The Ice-sheet that invaded  
Bedfordshire  
Written and Illustrated by H. C. Prudden,  
B.A.***

*For the most part the land of Bedfordshire is made up of formations of clay, limestone, sand and chalk rock. Of these deposits the limestone rocks are the oldest. They date back to Jurassic times, about 135 million years ago, when Bedfordshire was part of the southernmost of two great islands which lay in a sea between ancient 'North Atlantis' on the west and an extension of the present Scandinavia covering most of the North Sea on the east.*

*Over these millions of years vast changes took place in the relative positions of land and of sea. Rivers, wasting the land, carried into the sea sediments which, after chemical and physical*

*changes, became stratified rocks. The sea-bed rose and fell, and accumulated the thick deposit of Oxford Clay that underlies the whole northern half of the county. Then it was raised as a great land mass. Gradual denudation followed, and it is believed that the Greensand was deposited in turbulent straits, existing intermittently, making what is now mid-Bedfordshire a region of shifting sand-banks and powerful currents. In the extending sea was deposited the Gault Clay that forms a narrow strip across the county; during further subsidence of the seabed the thick Chalk of south Bedfordshire was deposited, derived in part from the skeletons of countless millions of minute marine animals and in part from chemical precipitation. Again the whole area was raised as a land-mass, and subjected not only to denudation but also to gentle tilting and folding, the distant effects of the tremendous epoch of mountain-building that formed the Alps.*

*When we come to more recent geological times, say the last million years, we begin to see the present physical landscape emerging. Several times the climate deteriorated, and great sheets of ice accumulated and flowed out from the mountains of northern Europe; the sea-level fell, and rivers cut down to lower levels; the severe climate intensified erosion, and valley bottoms were choked with debris in the form of gravel.*

*The ice that invaded Bedfordshire was an extension of the ice-caps that were expanding from the mountains of Britain and Scandinavia under the influence of heavier snow falls and lower temperatures. Streams of ice from the British hills converged with the Scandinavian ice in what is now the North Sea, turned southwards along the East Coast and probably approached this county from the north and east.*

*The most extensive of the deposits brought by the ice-sheet was the Boulder Clay. Mostly a fine-grained and soft material, it contains an astonishing variety of ingredients. In it can be distinguished igneous and metamorphic rocks from the Cheviots, southern Scotland and Scandinavia; sandstones and quartzites from the Midlands; Jurassic limestones, fossils and clays; and chalk, flint and limestone from Lincolnshire.*

*The mixture was deposited partly from the underside of the moving ice-sheet and partly from melting stagnant ice. It differs from the gravel deposits in that it has been little, if at all, sorted by running water and therefore contains boulders of rock, large and small, in its clay matrix. Farmers*





*A typical section of Boulder Clay, the most extensive of the deposits brought by the ice-sheet, showing large boulders in the clay matrix*

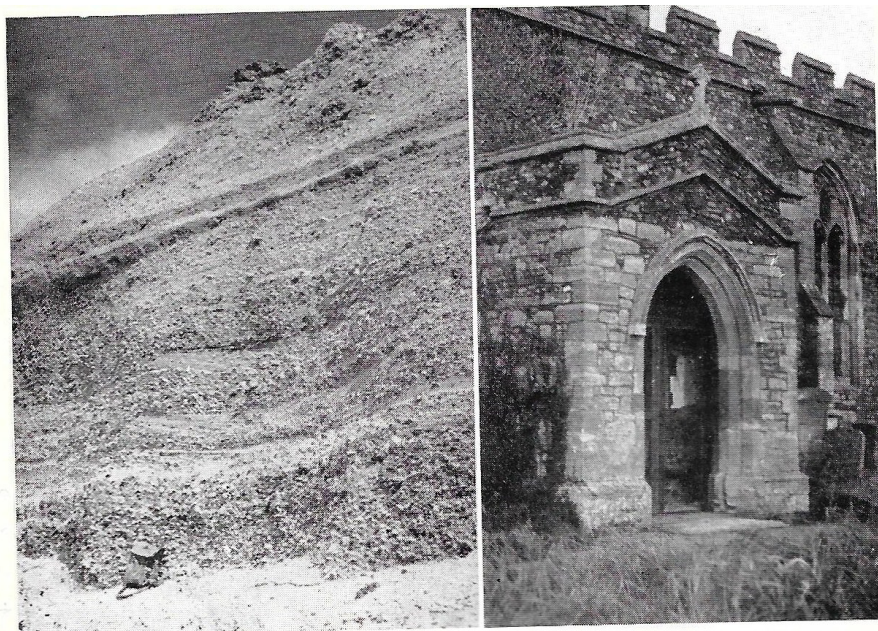
**Figure 1:** A typical section of Boulder Clay, the most extensive of the deposits brought by the ice-sheet, showing large boulders in the clay matrix

*and hikers in north and mid Bedfordshire will have met the Boulder Clay in newly ploughed fields on hilltops, where it forms a stony, tenacious clay with lumps of chalk. Church-builders outside the limestone belt of the Ouse*

*resting on Oxford Clay at about sea level. It was once thought that this deep infilled valley was cut at a time when the sea level was low, but since no outlet to the sea has been demonstrated, it is more probably a great basin scoured out by a*

*constricted stream of ice or by melt-water below the ice. There is evidence of similar action near Hitchin and Stony Stratford.*

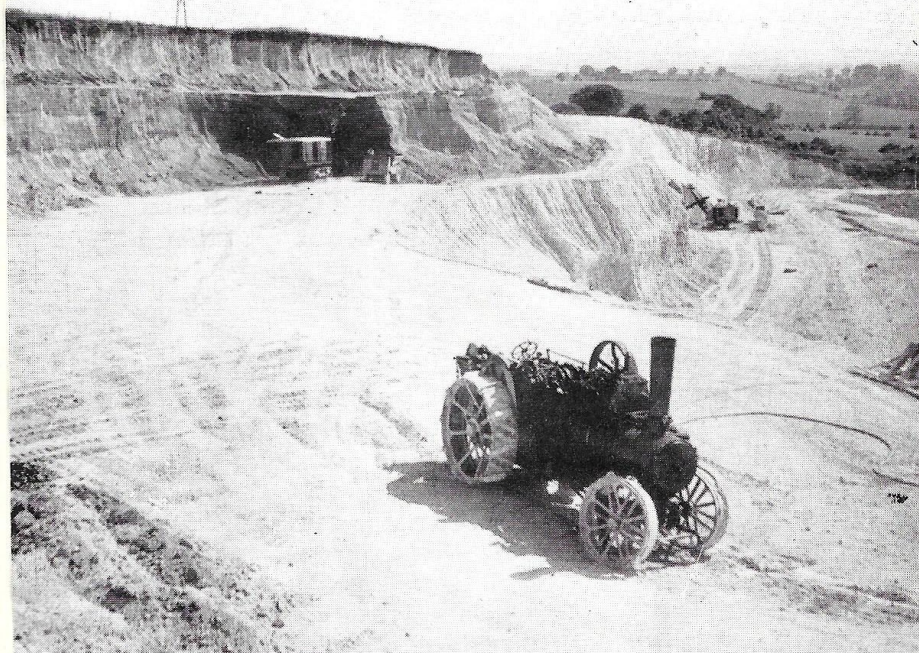
*Like a huge blanket the Boulder Clay lies over the higher ground in the north of the county and is widespread about the centre. In places between the Ouse and the Nene it is over 100 ft. thick and there are thick drifts to the south-east of Woburn. Curious exceptions are the hills three or four hundred feet above*



*Left : Gravels at Sundon, which were probably laid down by streams of melt-water draining off the nearby ice-sheet. Right : The upper part of Wilden Church porch incorporates Boulder Clay stones from neighbouring fields*

**Figure 2:** Left : Gravels at Sundon, which were probably laid down by streams of melt-water draining off the nearby ice-sheet. Right : The upper part of Wilden Church porch incorporates Boulder Clay stones from neighbouring fields.





*General view at Sundon, where water-laid gravels and ice-deposited Boulder Clay rest on the white Chalk, a much older formation*

Figure 3: General view of Sundon, where water-laid gravels and ice-deposited Boulder Clay rest on the white Chalk, a much older formation.

sea-level west of Ampthill, and little trace of Boulder Clay can be found on parts of the plateau-like surface east of Sandy. Is this because later weathering processes have denuded some hilltops? Or did parts of south and mid Bedfordshire stand above the ice and so escape glaciation? It seems likely that there was some melt-water issuing from the ice, since water-spread gravels can be seen at Sundon chalk-pits interbedded with Boulder Clay.

All in all, the ice probably deposited more material in Bedfordshire than it removed, for the county was near the southern limits of the ice-sheet. This is evident from the frequent occurrence of a kind of fringe-drift of 'foreign' rocks lying on the local rock formations. The effect of the drift on the topography was probably to smooth and broaden it, choking up some former valleys in the process.

Let us climb the pleasant hills at Sandy, and in imagination blot out town, railway, and market gardens, and look out across the tundra that was Bedfordshire as it was during at least one stage of the Great Ice Age, a good 500,000 years ago. The nearest groups of Stone Age men

are chipping flints into tools and hunting mammoth, although the advancing ice has driven most of them south towards more genial climes. If I read the records correctly (and there may be other versions), we shall see vast streams of ice squeezing up the Ivel valley and moving over north Bedfordshire, the main body coming in from the north and east. To the south another stream of ice moves along the Gault Vale from

Cambridgeshire. As it meets the higher Chalk and Greensand hills it is

diverted and flows around them. Further away to the south and west, streams of melt-water rush towards the Thames basin, spreading sands and coarse gravels along the valleys.

The glaciation here described occurred in comparatively recent geological times, and although no further ice-sheets appear to have encroached on Bedfordshire, its physical landscape has been changed considerably during subsequent cold periods. At such times conditions must have resembled those of present-day Spitzbergen, where perennially frozen subsoils, heavy summer floods, and scanty vegetation, contribute to a much more rapid wastage of the land than we experience here today. This wastage has removed for ever much of the evidence with which we interpret geological history; yet there remain many unsolved problems and attractive lines of research concerning the formation of the Bedfordshire landscape awaiting those who care to peer back into the remote past.

I am very grateful to Mark, Hugh Prudden's

son, for allowing me to take extracts from the tribute that he gave at his father's funeral.

Hugh Prudden was born in 1929 at Bedford and educated at the Grammar School. During his time of National Service, Hugh discovered the Quantock Hills and Somerset. However, it was in his spare time in Bedford that he went to evening classes where he met Professor Norman Pounds who encouraged him to study at Cambridge, and who remained a lifelong mentor. Hugh studied Latin to a sufficient level, an impressive feat, to enable him to enter Cambridge. On leaving Cambridge, he navigated his way west with teaching posts in Geography and Geology at Tonbridge Wells, Cheltenham, Keynsham and finally at Yeovil. During his life, he was author of two books on geology and published over 50 articles of geological interest. I have used Hugh Prudden's book 'Geology and Landscape of Taunton Deane' (2001) in which he describes the geology and landscape to be experienced on the many walks listed. I have used the book on many occasions and, as a Somerset man myself, find it most interesting and useful about the area of my childhood home. He also published 'Somerset Geology – A Miscellany' in which there is a wealth of information on localities in Somerset, including a comprehensive bibliography. One section entitled 'Somerset Good Rock Guide' lists many articles and publications which he had authored over the years and is an invaluable guide to the information on the geology of Somerset.

It is available to everyone via the Bath Geological Society website <http://www.bathgeolsoc.org.uk>

Hugh Prudden was a good friend of the Bath Geological Society. In addition to the first field trip he led, referred to above, he lectured to the Society on 9<sup>th</sup> July 1992 'Rocks and Landscape – The Yeovil Sands from Glastonbury Tor to the Dorset Coast', and on 9<sup>th</sup> March 1995 'Soil erosion in south Somerset'. I remember this lecture and the concern he expressed about the loss of good land due to the sandy nature of the soil and methods of soil husbandry to prevent the wash-off. My parents had lived at South Petherton for many years and I recall seeing the fields where the sandy soil had washed into the lanes and roads, making them

impassable at times. He led field trips, as well as the one referred to above, on 13<sup>th</sup> April 1997 to 'The Rocks and Buildings of Hestercombe House near Taunton', where he enthused about the Hestercombe lamprophyre which had only recently been cleared of vegetation. On 28<sup>th</sup> April 2001 we were taken over Ham Hill near his home at Montacute, Somerset, and on 20<sup>th</sup> July 2002 on 'The Geology and Wildlife of Mid Somerset'. Then, on 22<sup>nd</sup> May 2004 he led us around Glastonbury showing us, or, as was Hugh's way, getting us to examine and comment on the building stones of the Abbey, followed by another trip to Minehead and Greenleigh on 15<sup>th</sup> May 2005. The last field trip he led for us was called 'The Yeovil Trail' on 16<sup>th</sup> July 2006.

Not only did Hugh lecture to the Society and lead field trips, he also provided three articles for the Bath Geological Society Journal and collaborated with Gilbert Green on a fourth. As would be expected from an enthusiast for his adopted county, they were all concerned with Somerset –

Volume 25 p.33 2006 'Ilchester-Barrington pipeline'.

Volume 28 p.39 2009 'Somerset's fantastic coastline seen from space'.

Volume 30 p.17 2011 'Book review – Butterflies in Somerset and Bristol'.

Volume 27 p.34 2008 'The new BGS Mendip Guides' with Gilbert Green.

I am sure there will be other tributes to Hugh Prudden, but I humbly suggest that they read the tribute to Hugh Prudden, written by another geologist who has adopted Somerset, albeit much later in life than Hugh, Eric Robinson. It can be found in Volume 14, No 1, March 2015, page 12, of the Magazine of the Geologists' Association where he adds some more strands to the life of Hugh Prudden. At the time of writing (April 2015) volumes of the Magazine of the Geologists' Association are available on the internet up to volume 13, no 3, 2014.

As recognition of Hugh Prudden's contribution to geology, in 2007 he was awarded the R. H. Worth Prize by the Geological Society of London, recognizing his work in bringing local geology to the notice of the public. He was also awarded the Halstead Medal by the Geologists' Association in 1994.

In the tribute given by Hugh's son at the funeral, he speaks of a thread running through his father's life of someone always seeking to learn and apply his learning to improve things for the benefit of all. Concluding his tribute, he said that his father was a generous person, that he had achieved many things that are valued today, and that this value will live on, which was the hope of Hugh Prudden, geologist, teacher and so much more. We in the Bath Geological Society have known that generosity and value that he put on learning for all and are much the better for it.

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There must be many more between 1953 and 1983 which have not come to light!

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This book was reviewed in the Magazine of the Geologists' Association, vol. 1, no. 1, March 2002 and the reviewer's comment was 'this modest book.....is a compendium of topographical and geological delight, full of arresting observations. It ranks as a best buy.'

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