

REPORT

The Craggs of Sutton Knoll, Suffolk

The SSSI at Sutton Knoll (TM305441), also known as Rockhall Wood, southeast of Woodbridge, reveals excellent exposures of a fascinating aspect of the Neogene Craggs of East Anglia. Here the Coralline Crag, about 3.75 Ma in age, forms an upstanding hill, while the later Red Crag, about 2.5 Ma in age, can be seen lapping over the Coralline Crag around the sides of the inlier. Prestwich (1871a,b) is the classic description, while Boswell (1928) wrote the Geological Survey memoir of the Woodbridge area. Later descriptions are given by Balson and Long (1988), Balson *et al* (1990), Balson (1999) and Wood (2000), and Dixon (2006, 2007) describes recent developments. Balson *et al* (1993) describes the stratigraphy of the Coralline Crag as a whole. The Coralline and Red Craggs are the lowest two of the four formations within the Crag Group, the Red Crag being succeeded by the Norwich Crag and finally the Wroxham Crag (Hamblin *et al* 1997, Hamblin 2001).

The site was visited by the Society on September 1st 2007, during a day's excursion led by Roger Dixon and Peter Norton. At that time, members of the GeoSuffolk society, led by their conservation officer, horticulturalist Barry Hall, were in the process of cleaning up the site, and an explanatory panel was planned. In appreciation of Roger's and Peter's efforts that day the EMGS offered to fund this panel, and the completed panel was unveiled at a ceremony on May 14th 2009. Bob Markham, chairman of GeoSuffolk, gave a brief talk on early workers at the site, which has been studied

for over 170 years, and Roger Dixon, treasurer of GeoSuffolk, explained his own researches. Guy and Jenny Quilter, owners of the Sutton Hall Estate, were in attendance, and Jenny Quilter unveiled the panel. Roger Dixon also showed us a painting of the site as it would have appeared in Red Crag times, painted by A-level art student Louis Wood, and this could well be used in a future explanatory panel.

After the ceremony, Roger Dixon led a walk around the site exposures. These reveal the Ramsholt and Sudbourne members of the Coralline Crag Formation, and the overlapping Red Crag Formation. The London Clay lies at shallow depth but is not now exposed. The visible exposures are mostly old pits dug to extract Coralline Crag to improve and repair farm tracks. One pit had been dug in 1860 to extract phosphate nodules commercially from a bed at the very base of the Coralline Crag where it overlies the London Clay, but this was not economical and the pit was filled in 1862. The GeoSuffolk explanatory panel has been placed at the northeast end of the site so that it may be read by walkers on the adjacent public footpath. Behind the panel, steep faces of bioclastic sands, at the top of the Ramsholt Member and base of the Sudbourne Member, show current bedding that indicates a derivation from the north.

The Bullockyard Pit was cleared by Natural England in 2006 and has been cleaned up further by GeoSuffolk, to expose a length of over 13 m of the wave-cut platform by which the Red Crag Formation overlies the Ramsholt Member. This surface dips southwards and small blocks of Sudbourne Member Rock Bed can be seen resting upon it, within the Red Crag. The surface is difficult to see because of the quantity of

SUTTON KNOLL
Site of Special Scientific Interest

INTRODUCTION
This Earth Heritage site lies within an Area of Outstanding Natural Beauty and takes the form of a small hill composed of approximately 20 metres of hard massive shaly sands called the Coralline Crag, which is surrounded by younger Red Crag sands, and even more unconformably on much older London Clay.

MUSSELS
Colonies of fossil shells occur in the Red Crag in significant numbers near to the Coralline Crag boundary in several places. Mussels are typical of shallow rocky shores, and will attach to the ground the Coralline Crag island. Sometimes also found in this environment.

'COPROLITES'
Fossilised faeces, usually called coprolites (to name countless to fossil animal droppings which they contained), are found in the Red Crag. They are usually associated with the Red Crag and are found in the Red Crag. They are usually associated with the Red Crag and are found in the Red Crag.

BRYOZOANS
Bryozoans live in colonies of many tiny individual animals, and are found in the Red Crag. They are usually associated with the Red Crag and are found in the Red Crag.

PIDDOCKS
Abundant bivalves can be found in the London Clay surface in the Chicken Pit. These belong to the red piddock, *Zofvea* sp. They are usually associated with the Red Crag and are found in the Red Crag.

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Suffolk Wildlife Trust
The Trust Associates
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REFERENCES
Balson, P. & Long, J. (1988) *et al* (1990), Balson (1999) and Wood (2000), and Dixon (2006, 2007) describes recent developments.

The panel, produced by Elizabeth Hall.



Painting by art student Louis Wood showing the sea floor at the time of the Red Crag transgression.

derived Coralline Crag material in the Red Crag, but colonies of *Mytilus edulis* are found at the base of the Red Crag. The valves are articulated and closed and the full range from juvenile to adult are present, and since this is typically an intertidal rocky shore species, the communities are clearly in their life positions, attaching themselves to the wave-cut platform in between loose blocks of Rock Bed. The Red Crag was formed in a high-energy shallow sea with strong tidal currents, dominated by molluscan shell assemblages indicating a climate similar to the present day, while assemblages in the underlying Ramsholt Member indicate a warmer, Mediterranean climate. Shell-beds here indicate larger, more robust bivalves including *Arctica*, *Cardita*, *Pecten*, and Britain's largest fossil brachiopod, *Terebratula grandis*, implying strong currents.

The Chicken Pit at the western end of the site also reveals blocks of Rock Bed at the base of the Red Crag, again with colonies of *Mytilus*, but in this case the blocks are much larger boulders, up to 1.5 m in length, interspersed with pockets of relatively clean sand with perfectly preserved bivalve shells. Barnacles encrusting blocks of Rock Bed show that this was fully lithified by the time of the Red Crag deposition. At one side of the



The panel unveiled: left to right, Bob Markham, Roger Dixon, Barry Hall, Jenny Quilter.

Chicken Pit, excavations have revealed the Red Crag resting directly upon the London Clay, a surface heavily bored by the bivalve *Zirfaea crispata*. The absence of the Ramsholt Member at this point reminds us that at the time of the Red Crag transgression, the site was an isolated hill outlier of Coralline Crag surrounded by a flat terrain of London Clay.

The Quarry Pit was not visited on the occasion of the unveiling, but was seen by EMGS members in 2007, where about 5 m of shelly sands of the Sudbourne Member are exposed. These sands are calcite-cemented to form the relatively durable Rock Bed, significantly more resistant than the underlying Ramsholt Member and accounting for the upstanding mass of Sutton Knoll. Post-depositional solution has dissolved the aragonite of the bivalve shells and precipitated this as calcite to bind the rock, and clearly this happened before the Red Crag transgression since blocks of this rock are found lying on the Red Crag beach. The Rock Bed has been used locally as a building stone.

Sutton Knoll is a great tribute to GeoSuffolk. It is an important site and has been expertly cleaned and described. The Coralline and Red Crag formations form an important part of the relatively recent history of Britain, and since these formations are so easily eroded, we should have few sites to look at if it were not for the efforts of such societies. For any reader of *Mercian Geologist* who fancies a holiday in Suffolk, a visit to Sutton Knoll is strongly recommended; the hand-out produced for us by Roger Dixon in 2007 is still available, and has been very useful in writing this account. Although the site lies beside a public footpath and the explanatory panel can be read from the footpath,



The exposure in Bullockyard Pit shows Red Crag that rests on a wave-cut platform cut in the Ramsholt Member; Roger Dixon points to blocks of Rock Bed resting on the platform.

the site itself is privately owned by the Quilters and potential visitors planning access to the pits are advised to approach GeoSuffolk via their website. A visit could readily be linked with a visit to the important ship-burial archaeological site at Sutton Hoo, which lies between Sutton Knoll and Woodbridge and is now expertly managed by the National Trust. Go to Sutton Hoo in the morning, because if you go to Sutton Knoll first then you will get so absorbed that you will miss the guided tour at Sutton Hoo in the afternoon, as we did. Have lunch at the Ramsholt Arms on the banks of the River Deben, then go to Sutton Knoll. Finally, on your way home, buy some sausages from Five Winds Farm butchers at Melton railway station, they are amazing!

Acknowledgements

Thanks are due to GeoSuffolk, in particular Roger Dixon, Bob Markham and Barry Hall, for their sterling efforts in cleaning up and describing the site, to Barry's daughter Elizabeth Hall for her work on producing the explanatory panel, and to GeoSuffolk secretary Caroline Markham for organising the unveiling ceremony and making the sandwiches. Guy and Jenny Quilter are thanked for providing access to the site.

References

- Balson, P.S., 1999. The Coralline Crag. In: *British Tertiary Stratigraphy*. Geological Conservation Review Series No. 15, (B. Daley and P. Balson). Joint Conservation Committee: Peterborough, 253-288.
- Balson, P.S., Mathers, S.J. and Zalasiewicz, J.A. 1993. The lithostratigraphy of the Coralline Crag (Pliocene) of Suffolk. *Proceedings of the Geologists' Association*, **104**, 59-70.
- Balson, P.S., Humphreys, B. and Zalasiewicz, J.A. 1990. *Field Guide No.3: Coralline and Red Craggs of East Anglia*. 13th International Sedimentological Congress UK.
- Balson, P.S. and Long, P.E. 1988. Rockhall Wood, Sutton. 66-71 in Gibbard, P.L. and Zalasiewicz, J.A. (editors), *Pliocene-Middle Pleistocene of East Anglia Field Guide*. Quaternary Research Association: Cambridge.
- Boswell, P.G.H. 1928. *The Geology of the country around Woodbridge, Felixstowe and Orford*. Memoir of the Geological Survey of England and Wales.
- Dixon, R.G. 2006. Sutton Knoll. *Transactions of the Suffolk Naturalists' Society*, **42**, 97-101.
- Dixon, R.G. 2007. Autochthonous Mollusc Faunas from the Red Crag. In: Dixon, R.G. (ed) 2007, Proceedings of GeoSuffolk RIGS Meeting. *Transactions of the Suffolk Naturalists Society*, **43**, 12-16.
- Hamblin, R.J.O. 2001. The later Craggs and associated fluvial deposits of East Anglia. *Mercian Geologist*, **15**, 134-138.
- Hamblin, R.J.O., Moorlock, B.S.P, Booth, S.J., Jeffery, D.H and Morigi, A.N. The Red and Norwich Crag formations in eastern Suffolk. *Proceedings of the Geologists' Association*, **108**, 11-23.
- Prestwich, J. 1871a. On the structure of the Crag-beds of Suffolk and Norfolk with some observations on the organic remains. Part I: The Coralline Crag of Suffolk. *Quarterly Journal of the Geological Society of London*, **27**, 115-146.
- Prestwich, J. 1871b. On the structure of the Crag-beds of Suffolk and Norfolk with some observations on the organic remains. Part II: The Red Crag of Essex and Suffolk. *Quarterly Journal of the Geological Society of London*, **27**, 325-356.
- Wood, A.M. 2000. The stone tapestries of the Red Crag. In: Dixon, R.G. (ed): *Geological Society of Norfolk Jubilee Volume*, 41-49.

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