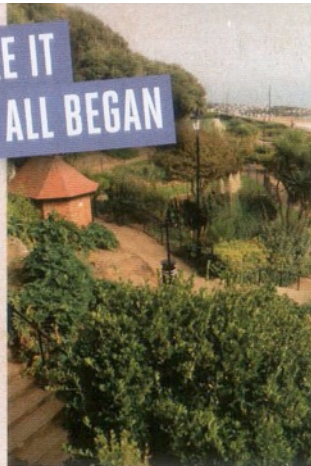


FELIXSTOWE - WHERE IT ALL BEGAN

The importance of the coprolite stones in the base of the Red Crag was discovered by Professor Henslow in the cliff (now covered by beach huts) at Brackenbury. Further south, the gardens of the Spa Pavilion (illustrated) cover the cliff and numerous fragments of fossil crag shells occur in the soil amongst the plants. Modern sea level is clearly below the Red Crag sea-bed in the cliffs here.



BAWDSEY CLIFF

The Red Crag sea extended over parts of present-day Suffolk and north Essex nearly 3 million years ago. This sea-cliff at Bawdsey showing Red Crag, a ferruginous shelly sand, resting on local London Clay is an SSSI (Site of Special Scientific Interest - no digging allowed). A thin and discontinuous bed of coprolites occurs at the base of the crag here, and these and occasional boxstones may be seen in the fallen crag at the base of the cliff. Note - access to this section of the coast is tide-dependent.



COPROLITE BED

A temporary exposure at East Beach sea-cliff, Bawdsey, shows a half metre thick bed of coprolites at the base of the Red Crag. The Victorian coprolite pits were dug out (often under water) by hand. The material was sieved to remove the sand, washed, then boxstones, flints and any fossils picked out before the coprolites were carted or shipped to the factory. The high level of phosphate which enriched these nodules is suggested to have originated from upwelling of water from the ancient North Atlantic Ocean.

JOHN STEVENS HENSLAW

In 1843 John Stevens Henslow, Professor of Mineralogy and Botany at the University of Cambridge, first identified the coprolite nodules whilst on holiday with his family in Felixstowe. The eroding cliff at this time had fallen masses strewn with vast quantities of the nodules and the Professor had them analysed. They were found to be rich in phosphate, a valuable boon to agriculture and so began our local coprolite industry. This portrait of the Professor is in Ipswich Museum where it may be seen in its entirety and in colour.



COPROLITE PUZZLE



Spiral-shaped coprolites are occasionally found in the Red Crag. Could they be real coprolites of sharks or rays, or could they be vertical burrow traces of shrimps or worms? Note the two illustrated spiral in opposite directions - are they from different animals or from one whose spiralling changed direction? Specimens of coprolites are displayed in Ipswich Museum.

LEARN MORE

This leaflet is published by GeoSuffolk, 2019 - visit our website www.geosuffolk.co.uk and its many links. (Text by R Markham; photographs by A M Blyth, R A Dixon, B & J Hall, C & R Markham.) The Deben valley is within the Suffolk Coast and Heaths AONB - <http://www.suffolkcoastandheaths.org/>. For your safety while exploring please follow the Countryside Code - <https://www.gov.uk/government/publications/the-countryside-code/the-countryside-code>



The Ipswich Society

Designed by **The Ark Design Consultancy Ltd**

SUFFOLK'S CRAG COPROLITES

Discover our Victorian Phosphate Rush



WHAT ARE THEY?

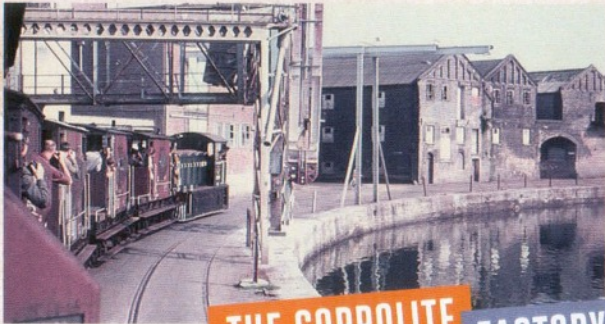
They are nodules rich in phosphate, found in the Red Crag sand (a sea bed nearly 3 million years old) particularly that underlying parishes close to the Deben estuary. These specimens (up to 65 mm in size) are from a pit at Bucklesham. One of them shows adhering fossil barnacles. They are largely mudstone nodules, many eroded out of the underlying London Clay, becoming phosphatised and incorporated into the Red Crag. An initial thought was that they were coprolites (fossil animal droppings - possibly some are!) and thus the word coprolite became the commercial name for these phosphatic stones.



COPROLITE STREET

IPSWICH

This is a reminder of an almost forgotten local industry of the 1840s – 1890s, superseded by Cambridgeshire coprolite and then imported phosphatic rock. Phosphate is essential for our bones, so we need it in our food. The 1840s were a time of shortage of phosphatic manure and the local coprolite stones provided a new way to increase production of grain, peas and beans. Does Ipswich have the only Coprolite Street in the world? Geology enthusiasts come from far afield to take 'selfies' in it – so can you!



THE COPROLITE FACTORY

The long-disused factory is seen in the right of this 1960s photograph and reflected in the water of Ipswich dock. Coprolite Street runs back from the dock alongside the factory. It was here in the late 1840s that phosphate nodules from local crag pits were ground to powder and treated with sulphuric acid to make superphosphate, which is soluble for plant uptake. By 1854 acidic fumes caused manufacture to be removed to new works at nearby Bramford. In time this fertiliser industry grew into the giant Fisons Fertilisers.

IPSWICH WATERFRONT

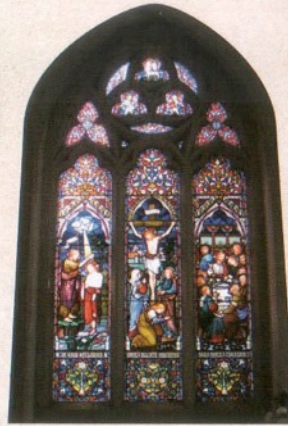
2019

The coprolite factory has gone, the railway has gone, yachts have arrived and the locality has changed its name. But Coprolite Street remains, between the University of Suffolk building (reflected in the water) and the high-rise apartments. In Victorian times the dock was home to many sailing barges. Edward Packard, who owned the coprolite factory and many coprolite pits also owned several barges, including *Fossil* and *Ammonite*.



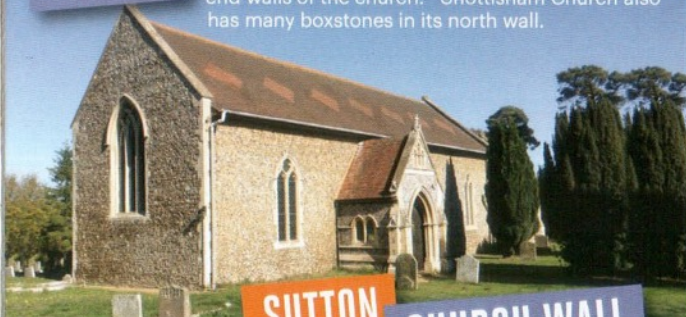
WALDRINGFIELD CHURCH

Much work was carried out in the parish in mid-Victorian times, using money from the coprolite industry. In the church, coprolite funds paid for painted walls, oak benches and the splendid stained glass in the east window, with its words of thanks – 'of his fullness have all received and grace for grace'. At the local hostelry coprolite workers – 'the men in red' (from the iron-rich staining of the Red Crag) were welcome patrons. Here and at nearby Newbourn, Fred Hill, Bob Button, Arthur Wardley, 'Dinks' Eley, William and Bob Kemp, Sam Mowles and Arthur Iles were well-known names.



SUTTON CHURCH

This medieval church was restored in the mid-nineteenth century using waste stones from the local coprolite diggings in the Red Crag. They include numerous sandstone cobbles - the crag boxstones - to be seen in the south and end walls of the church. Shottisham Church also has many boxstones in its north wall.



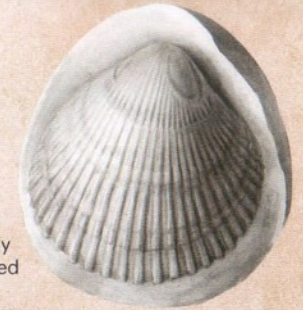
SUTTON CHURCH WALL

Interspersed with the flints in this section of wall are crag boxstones – brown sandstone cobbles which harden when exposed to the atmosphere. In one part of the south-west wall as many as 25 boxstones have been counted in half a square metre – see how many you can find. Flint is the commonest material used and the mortar contains broken crag shells.



CRAG BOXSTONES

These are rounded, irregular-shaped sandstone cobbles found at the base of the Red Crag in south Suffolk and north Essex. Occasionally they contain the mould of a (dissolved away) fossil shell, hence the name *boxstone*. They contain a distinct fauna, including cone-shells. The cockle illustrated (55 mm diameter) was originally named after Frank Woolnough, Curator of Ipswich Museum. Crag boxstones are the only surviving remnants of an older (Miocene-age) sea-bed, destroyed by erosion but with pieces incorporated nearly 3 million years ago in the Pliocene Red Crag sea-bed.



FOSSIL WHALE EAR-BONE

Most fossil bones found with the crag coprolites are those of whales. They are mostly broken, but the very dense tympanic ear-bone, (as illustrated, about 100 mm long) preserves well, is easily recognised and many hundreds have been found. The Red Crag sea would have been full of the sound of whale-song. In the coprolite pits, boys picked out fossil teeth and bones to take to Woodbridge, where they found a ready sale to collectors. This is why so many in collections are labelled 'from Woodbridge'.



MEGALODON TOOTH

The spectacular teeth of this giant extinct shark, usually somewhat water-worn, were common finds in the coprolite pits. This one from Bawdsey is about 85 mm in length. What did Megalodons eat with those big teeth? Whales were their likely food source and such encounters can but be imagined. Why did they become extinct? One factor might be the evolution of the modern Great White Shark - its greater agility successfully competing with young Megalodons for food. Some fine Megalodon teeth are displayed in Ipswich Museum and Colchester Natural History Museum.

