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COVER PICTURE

All aboard for the Lynton-Lynmouth cliff railway (see AIA
conference report, page 4)

Photo: M Harrison

Copperas, the first major chemical industry in England

Tim Allen

From 1995 onwards, an extraordinary array of timber posts set in bright red-orange mortar was exposed by marine erosion on the Tankerton foreshore at Whitstable, Kent. In 1997, Canterbury Archaeological Trust began a two-year investigation to identify these remains. Some of the remains were identified as part of a late sixteenth/seventeenth-century copperas works, evidence of perhaps the first major chemical industry to be established in England. It later became clear that the southern copperas industry had played a prominent and previously unsuspected role in the industrialisation of the national economy from the late sixteenth to the late eighteenth centuries and that no comprehensive history for this industry had previously been compiled. Consequently, its economic importance and its complex relation with the sixteenth/seventeenth-century immigrations from the Low Country have not previously been recognised. Nor has the industry's role as the basis for the modern chemical and pharmaceutical industries received sufficient recognition. The Canterbury Archaeological Trust's work won the AIA's Fieldwork and Recording Award for 1998, as reported in IA News 107, pp8-9. A fuller report is planned for IA Review.

Copperas is a vitriol (a metal/sulphate, generally termed 'alumen' in antiquity), the production and uses of which were known to the ancients. Vitriols are described by Herodotus and Pliny and by medieval authors, with the Spanish Moor Jabir-ibn-Hayyan (AD721-815) distinguishing between green vitriol (ferrous sulphate) and blue vitriol (copper sulphate). By the fourteenth century, vitriol production was centred in Asia Minor and controlled by a Genoese syndicate. With the fall of

Constantinople to the Turks in 1453, the Genoese returned to Italy and re-established the industry at Tolfa under Papal monopoly.

The Whitstable copperas industry revolved around the production of ferrous sulphate, known as 'copperas' and 'green vitriol' but confusingly, also identified by the generic terms 'alum' and 'brimstone', the latter denoting sulphur or sulphur-rich materials. Copperas was produced from ferrous disulphide (iron pyrite), otherwise 'copperas stones' or 'gold stones'. The pyrite occurs as nodules within London Clay, an Eocene deposit ubiquitous in the Thames Basin. Copperas works therefore proliferated around the Thames estuary, especially on the Essex and north Kent coasts, where the nodules are washed out by the action of the sea. Production was also established where pyrite occurs on the coasts of Hampshire, the Isle of Wight and Dorset. In the latter case, pyrite was mined from deposits of the Bagshot and Bracklesham Beds, near Bournemouth.

Copperas was produced by a long, noxious and dangerous process involving hundreds of gallons of boiling liquid containing sulphuric acid. Evocatively, the *Kentish Gazette* reported in 1788 that: '... as John Wellard, one of the men who work at the copperas houses at Whitstable, was assisting in running the copperas ink coolers, he unfortunately slipped in up to the breast...in 24 hours a mortification ensued and in two hours after, he expired.'

The principal importance of copperas was as a dye fixative for woollens. Thus, copperas was greatly in demand as long as woollens dominated the English export trade. It was also used extensively in the embryonic chemical and pharmaceutical industries and for many other purposes (tanning, the manufacture of printer's ink, as a black dye, as sheep dip), all of which increased its value. Pyrite may have been used to produce



The Tankerton site from the south, showing copperas bed and triangularly-arranged jetty supports. Note sea beyond.

Photo: T Allen, Canterbury Archaeological Trust