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Cornish buddles unearthed at a Michigan copper mine

David B. Landon

The recent excavation of two well preserved round buddles of the 1850s at the Ohio Trap Rock mine provides evidence of an 1850s' Cornish connection in the rich copper mining belt on the Michigan shores of Lake Superior, USA.

The copper mines of Michigan's Keweenaw Peninsula were America's most important source of copper for most of the nineteenth century. Copper in this region exists in its native metallic state, unalloyed with other minerals. Large-scale development of the district began in the 1840s, when a geologist's report on the prospects of the area helped spawn a mineral rush. Numerous companies bought tracts of land and sent crews to begin exploratory work. Cornish mining technology came to the region with immigrant miners and was a key factor in the district's development. The organisation of underground work and the stamping and washing practises all drew on Cornish precedents. A small number of mines, the Cliff, the Minesota [sic], and later the Quincy, and the Calumet & Hecla, were very productive and profitable. Most of the early ventures were not so successful and expended the investors' money without returning a profit.

Michigan Technological University students and faculty, Ottawa National Forest archaeologists and volunteers have been researching one of the early failures, the Ohio Trap Rock mine, for several years. Mining began at the site in 1847, and by 1858 the original company had expended its capital and closed down. Other companies continued to work the same copper veins, but appear not to have used Ohio Trap Rock's surface works. Over the last four years we have mapped the site, surface collected approximately 10 acres (primarily the domestic area of the site), test excavated three structures, and studied historic information about the site.

The most extensive excavations have taken place at the company's stamp mill, one of 35 surface buildings the company constructed. At the stamp mill, mine rock was crushed and washed to liberate small grains of copper. The mill at Ohio Trap Rock was apparently built in 1852, and was probably out of use by 1858. The mill had 24 stamp heads run off a 40 horsepower steam engine. Over the past three seasons we excavated 19 test units covering 56 m² of the structure. The

combination of archaeological and historical research has given us a very good idea about the construction, layout and organisation of this early mill.

The 1994 and 1995 excavations centred on portions of the washing and laundering system where the copper was concentrated after the rock was crushed. Most of the test units had very similar stratigraphy. The first 5-10 cm were a dark brown mat of roots and decaying twigs, leaves, pine needles and other organic matter. Beneath this organic layer was sand, the byproduct of the stamping process of the mill. The sand was olive green, and ranged in consistency from silty sand to very coarse sand. The residual copper in the stamp sand sediments acted as a biocide and contributed to excellent organic preservation. Wood, leather and other organic materials were preserved, and the buried wooden components of the structure were in virtually perfect condition.

The sill of the washing house, sections of working

floor, drainage and supply trenches, a classifying or jiggling area and sections of two circular buddles were all found in the excavations. The mill burned, and there were many charred wooden pieces of the structure that had fallen down and been buried. The most striking example was a portion of a wooden door. This was constructed of several layers of planks held together with clenched nails, and still had a fragment of a hinge attached. Only the bottom of the door remained, as the upper portion had burned away. This door remnant was lying on top of a preserved section of wooden floor, which also yielded several intact barrel bottoms.

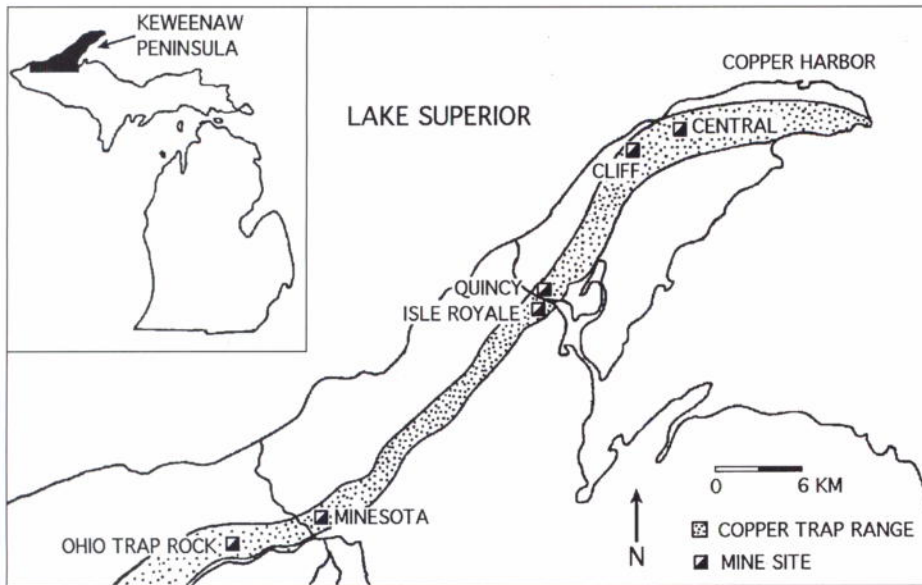
Nails, bolts, washers, spikes, window glass, pieces of lumber and other architectural artefacts were scattered throughout the stamp sand deposits. Two major artefact concentrations were also excavated. One was a mix of fill, trash and destruction rubble that contained several copper alloy brackets, barrel parts, textiles, sections of metal pipe and a host of other



Detail of circular buddle centre, Ohio Trap Rock mine, Michigan, excavated in August 1995

Photo: David B. Landon

Barrie Trinder leaves ● Michigan buddles ● Norfolk bridges ● Navy huts
Belgian beer ● AIA Forward Plan ● Current thinking ● Welsh IA



Map of the Keweenaw Peninsula, showing some early mine locations. Inset shows outline of Michigan State



Exposed section of circular wooden buddle, with wash-house sill in foreground, Ohio Trap Rock mine, August 1995

Photo: David B. Landon

artefacts. The second concentration was in the fill of one of the drainage trenches. This contained many well preserved organic artefacts including textile fragments, several pieces of leather boots or leather leggings and several sections of wooden trough. It also contained half of a metal-bound wooden crown gear. The gear was originally about a metre in diameter with projecting wooden pegs around the edge to engage another gear. This might have been part of the drive mechanism to power the sweeps on one of the buddles.

The remains of two circular convex wooden buddles are the most interesting discovery. Each of these had a vertical metal shaft in the centre, surrounded by vertical planking approximately 55 cm out from bearing. Outside the vertical planking was a horizontal wooden floor that sloped down slightly away from the centre. The floor was made of wood planks radiated out from the centre of the buddle. These were tongue-and-grooved together, and cut with a taper so

that they widened towards the edge of the buddle. The outside edge of floor was not truly round but polygonal. Vertical planking about 25 cm high was attached to the exterior edge. The floor butted up against the vertical planking on one side, and in another area a wood-lined trench was next to the edge of the buddle. The trench seems to have been designed to help drain water and fine sand out of the buddle. We excavated from the centre of one buddle across to the outside edge, and it proved to be about 9 metres in diameter.

In 1851 the Ohio Trap Rock company fired the English mine captain who was their on-site agent, and hired an experienced Cornish miner, Captain Joseph Buzzo, in his place. Buzzo tripled the workforce to more than 100 workers and directed the construction of additional surface facilities. It is likely that Buzzo and the Cornish miners he hired built the stamp and washing house. The wooden buddles at this site represent a serious investment of time and effort, yet

they were only in use for a few years before the company shut down. Circular buddles are distinctly Cornish-style technology, and were the leading edge of ore dressing technology in the 1850s. This technology was not well known in North America. The presence of these buddles at the Ohio Trap Rock mine site shows the early transfer of Cornish copper processing techniques to Michigan's Keweenaw Peninsula.

Any suggestions for interpreting these features would be greatly appreciated. I would also be happy to supply additional information. Please write to: Dr David B. Landon, Department of Social Sciences, Michigan Technological University, Houghton, Michigan 49931, USA.

AIA

ASSOCIATION FOR INDUSTRIAL ARCHAEOLOGY

ANNOUNCING THE THREE FIELDWORK AND RECORDING AWARDS FOR 1996

The AIA Fieldwork Award scheme exists to encourage recording of the physical remains of the industrial period to high archaeological standards. The awards are open to both amateur and professional field workers, and have been operating successfully for almost a decade. Work submitted may already have been published or if not, may be encouraged to publish. As well as the main award there is also the Initiative Awards for innovative projects eg those from local societies and to encourage the future industrial archaeologists, a Student Category.

THE CLOSING DATE FOR ENTRIES IS 1ST MAY 1996

Successful Entries will be notified in August
The successful authors will be invited to attend the AIA annual conference in Bangor to collect their awards in September 1996

Entries should be sent to:
Victoria Beauchamp, c/o The Division of Adult Continuing Education
University of Sheffield, 196-198 West Street, Sheffield S1 4ET

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All proceeds contribute to the costs of the Newsletter and the work of the Association which is a Registered Charity. Inserts may be mailed with IA News at a charge of £25.

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'De Snoek' malthouse and brewery

Robert Carr

The quality and variety of Belgian beer is beginning to be appreciated in England and is now quite widely available. At Alveringem (which as the crow flies is only about 60 miles from Dover) is an opportunity to visit a traditional small village brewery and taste its unique product on-site where it is sure to be unspoilt by travel.

During the Great War, the invading Germans failed to completely conquer Belgium – a small area in the north west held out, hence the phrase 'gallant little Belgium'. The Lo canal runs south eastwards from Veurne to Lo-Reninge, and by the canal at Alveringem was a small brewery and malthouse. There had been brewing here since at least 1767 but the old establishment had to be demolished to allow for the canal to be widened. The old malthouse was retained in 1871, and the brewery equipment re-used in a new building designed by the architect Medard Delanghe.

In most of occupied Belgium during the Great War, the Germans commandeered industrial plant, and brewing coppers were valuable scrap for their war effort. Being on the right side of the front line, this did not happen at Alveringem and the brewery continued brewing in the traditional way with its old equipment right up to 1952. Even then the coppers were not sold for scrap despite high prices due to the Korean War, and the complete equipment remained in situ until 1989. That year the buildings and their contents were taken

over on a long lease by the charitable trust 'Westhoek Monumenten' with the aim of restoration and opening to the public. Work started in 1991 when the malthouse was legally protected as a historical monument by the Flemish government. Work has been co-financed by the European Community, the Flemish Region, Flemish Tourist Board, the King Boudewijn Foundation, the Province of West Flanders, the Town of Alveringem and other sponsors.

On 2 July 1994, the brewery museum 'De Snoek' (The Pike) was opened to the public and it is now possible to see the old malt kiln, brewing coppers, cast iron mash tun and cooling vessel, fermenting tuns, stirring rods and a period gas engine. This splendidly restored village brewery is the only one in Flanders to retain its nineteenth-century coppers and machinery.

Flanders has one of the most important and diversified brewery traditions in the world. More than 200 different beers are still brewed there. A century ago there were more than 2,000 Flemish breweries. It is now possible to taste again the traditional Snoek beer at Alveringem. It is a high fermentation type brewed with malt, hops, water and yeast. It is not filtered and there is after-fermentation in the bottle or tun.

The Malthouse and Brewery Museum 'De Snoek' is near the Flemish-French border between Ieper (Ypres) and Veurne, not far from the sea. With transport arranged the other side of the Channel, it is possible



Malt House and Brewery 'De Snoek', Alveringem, Belgium
Photo: Adriaan Linters

to make a day visit from England, say, via Calais. The museum is open on Saturdays and Sundays and at least some of the staff speak English. For further information, contact Westhoek Monumenten vzw, Fortem 40, B-8690 Alveringem, Flanders-Belgium. ☎ 00 32 58 289674.

The Norfolk bridge survey

Derek Manning

The proposed increase in lorry weights to 40 tonnes after 1999 has implications for every county's bridges, of whatever age. The Norfolk IA Society has responded in their county by undertaking a survey in advance of bridge strengthening or replacement.

Over the last few years there has been a major effort in Norfolk to strengthen bridges to meet load requirements for the introduction of 40-tonne lorries after 1999. These requirements affected some bridges more than others and the Norfolk Industrial Archaeological Society decided to begin a survey of those bridges requiring strengthening or replacement. At first it was thought that only a few bridges would be

completely rebuilt but the programme of major work has grown steadily and survey will take several years to complete. The extent of the work can be seen in the following table:-

Bridges in Norfolk requiring assessment		864
Bridges assessed in	1988/89	16
	1989/90	20
	1990/1	29
	1991/2	35
	1992/3	51
	1993/4	112
1994/5	148	

The existing bridges have been built over many years from the medieval to the modern period. The earliest were all of brick or masonry and are now usually ancient monuments or listed for protection, and have often been bypassed to remove traffic from them. No wood bridges survive. However, there are many brick-arched bridges still in use and it is interesting to note that in the main these still have adequate strength but require new parapets to withstand collision. From the nineteenth century there are few cast iron bridges left in the county, but there is a good stock of a simple girder bridge that was used for many years. This is a side girder bridge with a metal troughing deck supporting the road surface. In some cases the side girders are being replaced by a reinforced concrete beam but in others the girder is being retained and the bridge strengthened by a concrete mat over the deck. At road level there is no change to appearance.



Banningham Bridge was built a year after the great 1912 flood in Norfolk. It was one of nine bridges built to a standard design. East elevation, TG231295

Photo: Derek Manning



Banningham Bridge, as rebuilt in 1994-5. West elevation

Photo: Derek Manning