

Sand mining on the Ridge – from pickaxe to kitchen floor

The Sandstone Ridge, throughout its length, plays host to several large caves that were excavated in the process of mining for white sand.

But what was it about this sand that once supported a chain of activity, from the miners themselves and the dangers they faced, to the people involved in selling the sand and to its use as a cleaning agent? This is the story of white sand extraction from the mid Cheshire Ridge; from pickaxe to kitchen floor.



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As part of the Beneath the Ridge project, we are cataloguing and researching the history of caves and shelters along the mid Cheshire Sandstone Ridge. Many of the larger caves are those which have been painstakingly mined with pickaxe and chisel, in dangerous conditions, to extract white sand to sell for potentially a wide range of uses, but certainly for the cleaning of floors. It is not known when this mining commenced, but documentary evidence indicates that mining was very active in the 1700's and 1800's, but declining from the second half of the 1800's.

This story commences with a discussion of the sand itself and its specific characteristics, leading on to the mines themselves and how this sand was extracted. This follows on to a discussion of the dangers they faced in the mines, the people involved in selling the sand and finally to its use as a household cleaning agent, particularly in keeping floors clean.

What is white sand?

The rocks of the ridge comprise a range of sediments from pebbly sandstones to occasional claystones. But it is the red-coloured sandstone that dominates the ridge geology (Picture 1).



Picture 1. Red sandstone cliff, mid Cheshire ridge

Much of the high ground of the ridge is predominantly made up of red-coloured Triassic sandstones (Sherwood Sandstone), deposited around 245 to 235 million years ago. Within this group of rocks, much of the higher parts are made of hard, resistant Helsby Sandstone, once used extensively as a building stone. This sandstone has slowed the processes of erosion relative to the Cheshire Plain, resulting in the elevated nature of what is now the Sandstone Ridge. Underlying the Helsby Sandstone, in many areas, the flanks of the ridge are composed of often quite crumbly, red and white mottled rock, the Wilmslow Sandstone.

Sandstone, simply put, is sand cemented together into rock. The red colouration is caused by the oxidation of iron within the sediment, which has then coated each sand grain resulting in this rust colour. This iron oxide, sometimes along with other minerals, binds or cements the sand grains together into sandstone rock.

The action of ancient underground circulating fluids has, in certain places, chemically removed this binding iron oxide, leaving the normally red sandstones locally bleached to a white or cream colour and thus unmasking the true colour of the minerals in the sediment.

This white sand has a high silica content but a low content of other mineral or rock impurities. Silica sand today, as in the past, has many uses; from industrial abrasives, glass making, mortar, landscaping/sports fields, water filtration and historically, foundry casting. The white sand extracted from the ridge may have had several uses, but it is only its use as an abrasive and cleaning agent that is discussed in detail here, as this is the only documented use. However, there is documented evidence of medieval glass making at Glazier's Hollow near Manley (1). All the raw materials were certainly here; wood for fuel, white sand and potash, but the actual source of sand is not known.

In addition to the past removal of the iron oxide, in the present day, variable surface weathering and deeper dissolution of the cement that binds the sand-sized grains together has also occurred in a number of places. As a consequence, the Ridge sandstones show a great deal of variation in colour from deep red to white with the rock occurring variably as a dense, hard sandstone or an extremely weak rock.

It is this white, friable and crumbly rock that has been mined for its sand, throughout the length of the Sandstone Ridge.

Sand Mines

The white sand has been excavated by digging underground cavities or tunnels, resulting in a sand mine (also known as a sand hole), today we would call this a sand cave. Many much smaller excavations can also be identified, where cliffs have been dug back to an overhang (or possibly shallow cave), such as the feature just up from the Coppermine chimney, on Coppermine Lane. There are numerous other, undocumented small excavations down to those measuring just 1m across, these may have been more for extracting sand for personal use.

It is only the co-occurrence of white sand, surviving pick-axe tool marks and a rare implement which indicate their origin as sand mines.

The larger caves are all characterised by the Pillar and Stall method of mining in which large chambers are excavated, leaving pillars of ore, coal, salt, or in our case sandstone, to support the roof. Excellent examples include Beresford's Cave, Beeston (Picture 2) and Queens Parlour, Raw Head (Picture 3). Two other caves that are great examples of this style of mining are Upton (Frodsham) and Conker Cave (Helsby).



Picture 2. Beresford's cave, showing Pillar & Stall mining. The extensive white sandstone is this cave is in part now covered by green algae (at least near the entrance).



Picture 3. Queen's Parlour cave, Raw Head, showing Pillar & Stall mining. The incomplete bleaching of the original red-coloured sandstone can be seen.

In Pillar and Stall, material is extracted across a horizontal plane creating horizontal arrays of rooms and pillars. To do this, "stalls" (or rooms) of sand are dug out while "pillars" of untouched material are left to support the roof. This technique has widely been used where large and extensive deposits allow a regular pattern and uniformity of stall dimensions and pillar size. Pillar and Stall mining is one of the oldest mining methods. And like our sand caves, early mines were developed more or less at random, where pillar sizes were determined empirically and headings driven in whichever direction was convenient. This latter point may be key to the shape of the white sand mines on the ridge. In the sometimes patchy nature of the white sand, as well as variability in grain looseness, new stalls were possibly guided by the occurrence of the best sand (in terms of looseness and colour). This would lead to a seemingly random, branching distribution of stalls.

Given that there are numerous sites flanking the ridge from which loose sand can be obtained (for example open sand pits extracting sand that was deposited at the end of the last ice age), there must have been an economic or practical reason for undertaking the much harder extraction of sand from underground.

Sand Extraction

These sand mines were all excavated by hand, however, very little evidence of the tools used exists. The only actual tool that can be directly associated with local sand is a badly rusted shovel from a 2016 archaeological dig at Queens Parlour (Picture 4). It is assumed that this shovel was used for shovelling sand into a container to take out of the mine.



Picture 4. Remains of a shovel found during a dig at Queen's Parlour, 2016

The main clue to the mining activities are the numerous pickaxe or chisel tool marks that are to be seen on the cave walls. Being loose sandstone, these pick marks tend to weather out on exposed surfaces, but within caves, some very well preserved marks are seen (Picture 5 and 6)



Picture 5 and 6. Tool marks left by a miner using a pickaxe or chisel

Often diagonal marks are seen which are inclined, dropping to the left (Picture 6), and would indicate a right handed person striking the wall. It is to be expected that this would result in pieces of stone breaking off which would necessitate the subsequent milling of the sand stones into loose sand.

In some locations where the sandstone is highly weathered, very loose grains can simply fall off or be scraped off the wall surface. This can be seen in the very loose sandstone walls of Bloody Bones cave, Raw Head (Picture 7).



Picture 7, Loose white sand readily dropping from a wall, Bloody Bones cave, Raw Head.

Loose sand would then have been loaded onto carts to be taken off-site to market. Several art works show this activity. Although it should be noted that in the example below (Picture 8), sand is being quarried from a sand pit, not mined from a sand mine, (unknown location).

Picture 8. *Labourers quarrying and loading Sand with Shire Horses*, c.1840. Augustus Samuel Boulton



Mining accidents

In order to protect the roof from collapse, pillars were left as supports. However, sand recovery rate is lowered by leaving pillars. In the past the temptation to 'rob' a pillar must have been high, and taking out a pillar would greatly increase the risk of roof collapse. In addition, unsupported walls must have been at a higher risk of collapse simply because of the friable, weak nature of the sandstone.

Fatalities have been recorded at a number of known sites. For example in Beresford's cave when in 1827 *The Cheshire Chronicle* recorded a fatal accident to a worker, Samuel Murrey...

"...killed in a Sandhole. The deceased was at work ...at the foot of Beeston Castle, and picking out the sand when a quantity of it fell upon him from the side of the hole and nearly buried him, whereby both his legs were broken, and he was otherwise so severely crushed that he died in the afternoon of the same day."

And from *The Chester Chronicle*, Saturday April 12, 1851:

FATAL ACCIDENT AT THE SAND CAVE, BICKERTON

On the summit of the hill at Bickerton, in the parish of Malpas, about 14 miles from Chester, there is a lateral excavation which has been wrought for the purpose of getting out white sand, for the purpose of retailing in the neighbourhood. As the work-people advance in the opening, they support the roof by rude pillars of stones and sand; but many of them to save trouble, and regardless of consequences to those who may come after, frequently dig at the base of the supports, and fill their barrows therefrom. Accidents have frequently occurred from such reckless practices; and the third within a few years took place on Wednesday last, when Ann Lydiatt, wife of a blacksmith at Buckley, while engaged in collecting sand, was overwhelmed by a sudden fall of stones and sand to the weight of several tons.

The above record is a particularly interesting one as it gives several related details. For example, reference is made to lateral excavation; does this suggest a wider excavation of a cliff, requiring pillars as the overhang became potentially unstable? It also tells us that the sand was removed from the cave in barrows and was for selling locally, and the cause of the accident was due to 'robbing' sand from the supporting pillars.

Sand selling (or peddling, hawking....)

There are several records of the excavation of locally mined white sand. Unfortunately local records tend only to describe the dealers of sand, not the work of a sand miner or labourer. For these we have to use records from elsewhere in the country.

Billy Tweedle (1827 – 1901) was recorded in the census of 1851 as a "Dealer in Sand" (1). On a map from 1846, the white sand cave know as Conkers Cave (Helsby) was leased to his father, Charles, who, in contemporary censuses, is recorded as a besom manufacturer. A besom is a broom made of twigs tied around a pole. It is interesting to note that in accounts from elsewhere besom and sand selling are often linked together. Perhaps not surprising as applying new and removing old cleaning sand on floors would need frequent sweeping.

English Heritage also refers to the cave entered from the outer ward of Beeston Castle, known as Beresford's Cave (2). George Beresford (in the 1841 English census) occupied a plot of land called Sandhole Croft, sited directly above the present cave (but outside the perimeter wall). EH describes how Beresford made a living from quarrying sandstone which was used for the cleaning of canal boat hulls. Interestingly, Beresford also leased a plot of land very close to the canal at Beeston, leading down to Wharton's Lock, (3).

From records elsewhere in the country we can get a good understanding of the business of sand extraction and the 'street' selling of sand, with its use here primarily for cleaning, especially floors. There is an excellent account from the 1840's by Meyhew (4) concerning Hampstead Heath, London. The first article tells of some of the problems facing the industry:

"Times are greatly changed, sir; we used have from 25 – 30 carts a day hawking sand, and taking between 6 or 7 men to fill them every morning.....This heath, sir, contains about every type of sand (for uses other than scouring), ..., but Sir Thomas won't allow us to dig it. The greatest number of carts now filled is 8 – 10. Sir Thomas has also raised the price, from 3s 6d to 4s a load, of about 2 1/2 tons."

The account goes on to say that the scouring sand trade is now much smaller than it used to be, with saw-dust superseding it in "*gin palace, tap room and butcher's shop*".

Another street seller from the same article describes the rising costs of selling sand, and having to reduce from 2 carts to 1 cart (and employing 2 (from 4) labourers. As he says, "*Hawking sand is a poor job now*". Not surprisingly, this is a particular tough job; "*My men work very hard for their money, sir; they are up at 3 o'clock of the morning, and are knocking about the street, perhaps till 5 or 6 o'clock in the evening*". He provides an interesting list of the associated costs:

- 2 labourers: 6s 4d per day
- Beer money (to the man at the turnpike gates): 2s per week
- Cost of one load of sand: 5s
- Cost of keeping a horse: 10s per week
- Licence to dig sand: £8 per year
- Retail value of sand: 21s (1 load presumably)



Sand was sold on the street by street vendors, from the back of a cart (Picture 9). They went under different names; Sand Hawker, Sand Peddler, Sand Higgler, Sand Knocker and Sand Kitter.

Picture 9, *London sand seller, early 1800's*

The reference above to street knocking is continued in a tale from Lancashire (5):

"There is a race of hereditary sand-sellers, or "sond-knockers," in Smallbridge,—a rough mountain breed, who live by crushing sandstone rock, for sale in the town of Rochdale, and the villages about it. The sand is used for strewing upon the flagged house floors, when the floor is clean-washed; and while it is yet damp the sand is ground over it by the motion of a heavy scouring-stone.....The people who knock this sand and sell it have been known over the countryside for many years by the name of Th' Kitters'. Calling at each house with the cry "Dun yo want ony sond this mornin'?"

The sand was sold in the old imperial unit of a peck or half peck measure, for "pennoths" and "hawpoths" (1d and 1/2d respectively). A peck of dry sand would weigh 20lbs.

Interestingly, and combining the accounts from above, there are 280 pecks in a load (2.5 tons) of sand, and at 1d/peck, that equates to a value of 280d per load, or 23s 4d (in old money), if you bought in Rochdale. This value is close, but slightly higher than the Meyhew account of 21s per load. Nevertheless, a rare reversal of London prices!

Uses of white sand

There must have been an economic benefit associated with the mining of white sand, which would cover the expense of this difficult form of extraction. The characteristic red sandstone of the ridge is much more readily available, with many of the same geological characteristics: rounded sand grains, high percentage of silica (quartz) sand with minimal other mineral content.

Clearly it was the white, bleached colour itself that was important. So why was this? The answer may be a simple one: Red sand, whose grains are covered in iron oxide would

impart a red stain on any damp, porous surface, whereas white sand would not. This is shown by the two images, where damp white and damp red sand has been left for 24 hours on a porous wood surface. After cleaning the sand off, the red sand has stained the wood red, whereas the white sand left no discolouration, (Picture 10). So with the use of sand as a cleaning agent, in order not to stain whatever was being cleaned, white sand was required.



Picture 10. *Left board, damp white and red sand. Right board, after 24 hours, red stain left after removing sand*

The principle, widespread use of sand was as an abrasive, whether for cleaning floors, cutlery, pots, or even canal boat hulls. From at least the sixteenth century, one of the cleaning agents found in nearly every household in England was sand (6).

Sand was always spread on the floor of the kitchen. In the more affluent households, the sand would be spread only over the hearthstone and in the immediate area of the fireplace. In less opulent households, sand would be spread over the entire kitchen floor. It would also often be spread over the floors of each room of a house which got a lot of traffic, particularly in homes in rural areas. The sand near the kitchen fireplace would absorb grease and other cooking spills, as well as protecting the floor from any stray coals and sparks which might escape from the fire.

Regardless of the material of which the floor was made, whether wood, stone or brick, any floor covered with sand remained singularly free of any marks or stains, due to both the sand's absorbency, and the regular abrasive action as it was constantly trodden over in the course of the week. A layer of sand would also absorb and dissipate moisture.

In most homes, the sand was swept out on Saturday, with a broom or besom, to ensure the house was clean for Sunday. Once the old, soiled sand was swept out of a room, the floor may be sluiced down with cold water. After mopping, those floors which were kept regularly sanded would be re-sanded with clean sand, ready for another week.

Cleaning with hot water and soap is a practice which came into general use in the late nineteenth century, following the repeal of soap tax in 1853. Along with the painting of floors, floor coverings and as we have seen above in London, the use of saw dust, this hastened the demise of domestic sand use.

So the next time you pass a cave while walking along the ridge, spare a thought for the community of people involved in this now forgotten sand mining industry and the dangers they faced; the miners, the sand sellers and those with the laborious task of cleaning or spreading sand on floors.

Nick Holmes

Due to conservation risks and the inherent dangers of underground exploration, the Sandstone Ridge Trust does not support visits to any caves without the permission of the landowners and due attention to safety. We cannot accept responsibility for personal injury should anyone choose to explore caves on the Ridge.

- (1) See our article on the Sandstone Ridge Trust's website: The Conker Cave and the Tweedles – sandmen off Helsby.
- (2) <https://historicengland.org.uk/listing/the-list/list-entry/1020705>
- (3) See our article on the Sandstone Ridge Trust's website: The Beresfords of Beeston, - Early Victorian sand merchants.
- (4) Mayhew, H., Vol.11, London Labour and London Poor
- (5) Waugh, Edwin, Lancashire Sketches, 1869, pp.130 – 132
- (6) <https://regencyredingote.wordpress.com/2011/11/11/sand-a-regency-cleaning-agent/>