BUILDINGS AT RISK

Extracting 'The Salt of The Earth' in the Isle of Man

*Buildings at Risk covers buildings and structures in our island, domestic and industrial – those currently at risk, those lost, and those which have survived. This week, **Dave Martin of the Isle of Man Natural History and Antiquarian Society** continues the story of the Saltworks, looking at how the brine was extracted and just how much can be discovered from neglected, deteriorating, at-risk remains.*

An aerial shot of the Saltworks which features the following: 1, deep bore brine well; 2, Well pumping engine bed; 3, Drive bed for pump rod; 4, Support column for steam pipe; 5, Boiler bed; 6, Brine output pump; 7, Fresh water well and pump; 8, Settling tanks; 9, Brine holding tanks; 10, Header tank for boiler feed; 11, Connecting rod between engine and well head Peter Geddes/Charles Guard

Key to the 20th century industrial-scale production of salt in the Isle of Man was the reserve of salt under the north of the island, its extraction at the Point of Ayre and pumping it as brine to the Saltworks in Ramsey (see Buildings at Risk, Examiner April 27).

There were two problems in getting the salt/brine to the Saltworks for processing, both of which were addressed by typical Victorian engineering –extracting the brine at the Point of Ayre and pumping it to Ramsey.

Whilst there are modest written records which shed some light on the plant and buildings at the Saltworks site alongside Ramsey shipyard, there is very little historical documentation on anything salt-related north of the shipyard site.

But there are some remains to be seen.

The lengths of broken-apart pipeline seen from time-to-time along the head of the beach are recognised by many, but the remains of the pumping station at the Point of Ayre are ill-recognised.

Caine Bros first 1891 coal-seeking borehole, at the head of the beach just to the north of the Point of Ayre Lighthouse fields, accidentally found a shallow pocket of brine only two foot six inches deep some 615 feet below the surface and then several layers of salt, some 33 feet thick, trapped between layers of saliferous marl (mixed clay and salt).

To confirm the extent of salt deposits, in 1897-98 Craine Bros drilled a second deeper test bore 335 yards southeast of the first bore which went down to 920 feet.

This found numerous layers of salt totalling some 80 feet in thickness, interspersed with layers of saliferous marl but no brine.

This confirmed potentially vast reserves of salt. The geology was not conducive to cost-effective mining of crystalline salt, but it was believed the salt could be brought to the surface as brine.

As described in the last article (Buildings at Risk, Examiner, April 27), salt flats were formed when seawater was trapped and then evaporated on layers of clay (marl), and this was a feature of parts of the northern Irish Sea basin which had a glacial-debris sea floor.

These horizontal patches of dried-up seawater lakebed salt could be relatively shallow in depth but quite wide horizontally and some survived if they were then covered in more layers of clay or marl.

There was no solid rock between the salt and the surface, just layers of glacial debris – sand, gravel, 'beach stones', and clay.

Lack of solid capping rock meant that water could percolate downward in places – whether from the sea or from the water table on land - to re-dissolve the salt into brine.

It has been suggested that the run of brine reached the surface in the first bore because the 'brine lake' was under artesian pressure – i.e. it had a head of water from a source in the hills from which water could flow into and replenish and pressurise the lake.

This, however, is unlikely given the distance from sufficiently large rain catchment areas and the intervening glacial debris through which it would have to flow for miles or even tens of miles.

More likely is that some percolated water (sea or fresh) had at some time trickled down and dissolved the salt and was under pressure from the glacial debris above.

The only economic way to get the salt to the surface was as brine, but in the absence of artesian pressure it wouldn't reach the surface by itself – it would need mechanical pumping. John Todd initially estimated that the natural head of fresh water from the northern plain, if that was the source of the water which was dissolving the salt, would bring the denser brine to within 100 feet of the surface.

In fact, Todd reported that the brine came naturally to within 74 feet of the surface purely as a result of the head


Pumping station in operation, looking east. The brine well is to the left underneath the sheer-legs used to raise the pump when it needed maintenance. The long connecting rod can be seen emerging from the engine shed and running to the inverted T-rocker at the head of the well - that inverted T-rocker converted the engine's horizontal stroke into the vertical stroke needed for the brine lift pump. The fresh-water pump can be seen at the extreme right of the picture iMuseum


Pumping station in operation, looking west (lighthouse buildings visible far left of picture). In this photograph, the settling tanks can be seen in the foreground, with brine from the lift pump flowing into them, while the pipes from the delivery pump can be seen exiting the left of the picture at the start of the Ramsey pipeline iMuseum

of water from the surrounding land.

The test bores were only four-inch diameter holes and not only was that a little small for the desired flow of brine, it was definitely too small to accommodate the pump which Todd decided should be at some 160 feet below the surface to ensure reliable delivery.

It appears that a separate larger-bore well was sunk for brine extraction and there was a separate shallow bore for fresh water.

Whilst there are fragmentary insights in the written record into the Manx Salt and Alkali Company's commercial affairs, like quite a number of other aspects of our heritage little record was made of its detail and operation at the time.

The pumping station at the Point of Ayre went out of use after the company ceased operations in the 1950s and a combination of metal removal for scrap, neglect and vandalism has reduced it to an ill-recognised footprint.

However, just like a palaeontologist or archaeologist studying a site, there are clues which can be interpreted – a handful of external photographs, the derelict masonry footprints and a few scattered metal 'bones'.

The island is fortunate that Pete Geddes MBE of the Laxey Mines Research Group has studied, identified and analysed these clues at the Point of Ayre pumping station before any more is lost.

The author of this article is indebted to Mr Geddes for access to his recent extremely detailed research from which the main illustration and the following highlights on the pumping station and equipment have been drawn by the author.

There were in fact three engines and pumps: one to lift the brine to the surface, one to pump the brine to Ramsey, and one to lift fresh water for the boilers etc.

The broken remains of the concrete engine bed and bearing blocks have fortunately provided enough evidence to piece together the mechanism for the raising of brine from the deep well.

The engine bed is 12ft 3ins in length and 29ins wide, which would probably have given a cylinder bore of around 15ins with a 24-in stroke.

A rather large and powerful engine for the requirements of raising brine which may just be as a result of a 'good deal' or it may have been in case the lift pump had to be relocated deeper in future.

Brine was pumped to Ramsey by a Pearn's double ram banjo-type, sited immediately adjacent to the tanks. It was in fact two vertical steam engines and pumps merged as one unit.

Freshwater was essential for the daily running of the plant and in particular the continuous demand for the boiler.

The engine was a diagonal type but so far it has not been possible to identify the make.

The engine operated a small crank shaft and rod that was coupled to the well head.

The water was pumped directly to a cylindrical gravity header tank mounted horizontally in the upper part of the brine pump engine house in order to provide sufficient head to feed the water injector on the boiler.

The pipeline from the Point of Ayre to Ramsey is probably the most-remarked remains of the Saltworks operation.

For expediency and cost, the pipeline was laid along the head of the beach – a decision which was to come back and haunt the company on a number of occasions.

The pipeline was constructed of 10-foot long cast iron pipes, with lead sealing between them.

The pipe was just laid at the head of the beach, it had no protection from the power of the sea.

Nowadays segments can be seen from Cranstal to the Vollan, usually part-way down the beach - this is as a result of both erosion at the top of the beach and storms washing parts of the pipe down the beach.

The pipeline ran along the beach from the Point of Ayre to the Vollan, and then went underground along Park Road and North Shore Road to the Saltworks at the Shipyard.

However, it made a short diversion just before Ramsey – up and then back down the brooghs. Whilst the pump at the Point of Ayre could get the brine to Ramsey – and indeed had enough pressure to deliver it at a modest height – those pumps had a limited throughput – perhaps only a couple of hundred gallons an hour.

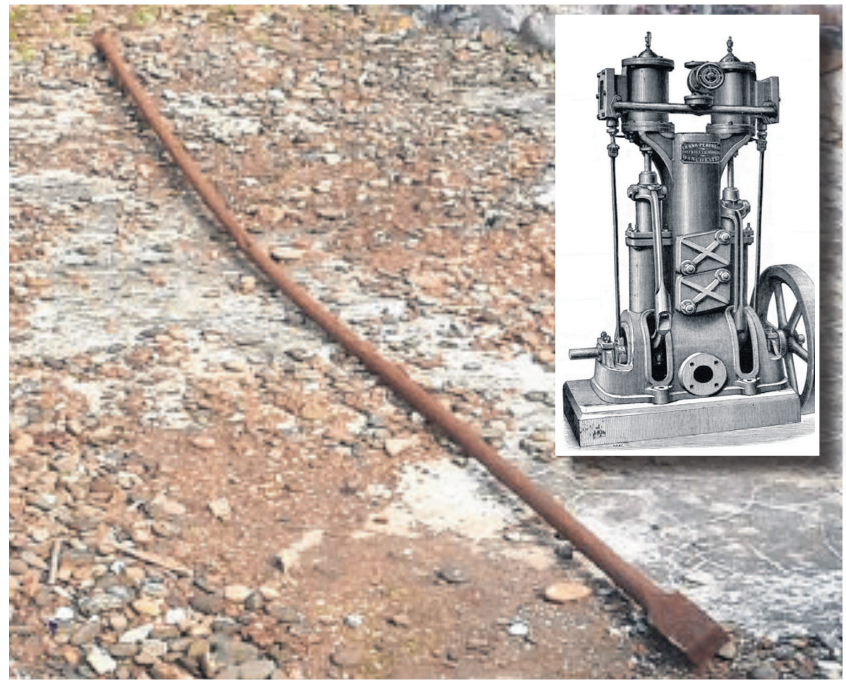
The salt evaporating pans at the Saltworks operated on a cycle: boil, rake out the salt, then fill again as quickly as possible.

To guarantee the pans could be filled quickly, John Todd decided a large break or holding tank would be required, from which the brine could run at a greater flowrate when needed, rather than depending on the slower pumps.

This tank was built on land bought for the purpose just north of the former Hydro/Grand Island site.

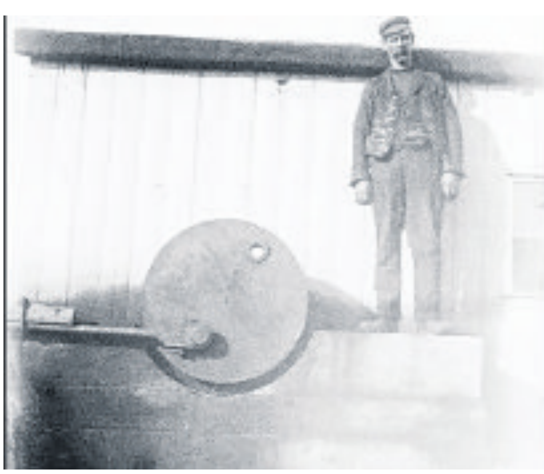
It provided a buffer and helped guarantee pressure to fill the salt pans, much in the same way that most domestic hot water systems have a header tank in the attic or roof space.

TO BE CONTINUED

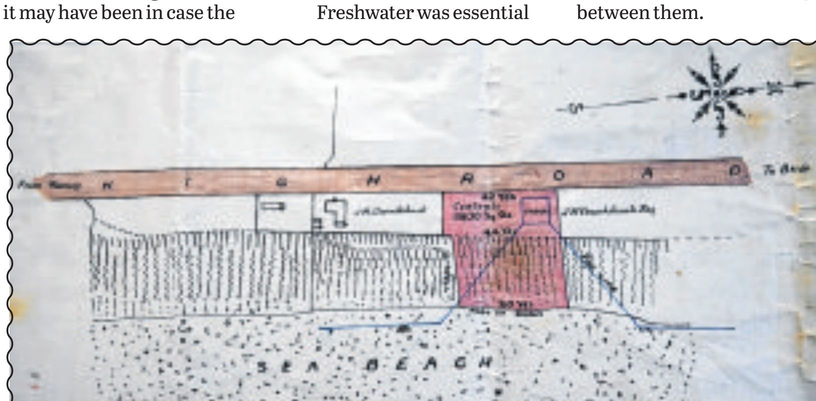


(Left photograph) the remains of the main lift pump engine bed and (right image) the connecting rod. (Inset) Pearn's double-ram banjo type combined engine pump, the type used to pump the brine from the settling tanks to Ramsey Peter Geddes

Segments of the pipeline strewn across the beach by wave action



David Cassidy standing alongside the engine's crankshaft Francis Southward/iMuseum



Balladoole header/break tank Manx Museum Library