

BUDE CANAL & HARBOUR SOCIETY

Inclined Planes & Boats on Wheels

ALL YOU EVER NEED TO KNOW ABOUT INCLINED PLANES, BOATS WITH WHEELS & THE SAND TRADE

The main purpose of constructing a canal from Bude, inland to West Devon and North Cornwall, was to make a commercial enterprise out of the long-established practise of taking sand from the beach for use on the land to improve the quality of the soil. It is known that this had been happening over several hundred years. There was no charge for the sand, just the expense of loading and collecting it from the beach at Bude. At times sand was used as ballast on boats leaving Bude without a cargo.

In Carew's 'Survey of Cornwall, 2nd edition' printed in 1833, there are footnotes written by Thomas Tonkin (1678-1742). In relation to sand, Tonkin made the following observations:

"The use of sand from the sea was established by Richard, King of the Romans and Earl of Cornwall, by a grant to the Cornishmen to take sand freely of the sea and carry it throughout the whole County to manure their ground withal, which was confirmed by King Henry III. Ever since this has been the chief way of improving their ground. Henry VIII made an Act of Parliament as a prohibition to stop tin workings near havens to prevent the soil being washed into rivers and then into havens."

Additionally, Tonkin commented on the use of sand; "Sand depends chiefly upon the salt mixed with it, which is so copious that in many places salt is boiled up out of a lixivium made of the sea sand. The reason why sand, after it hath lain long in the sand and wind proves less useful and enriching, is because the dews and rains which fall upon it sweep away a good part of its salt."

Yet I know many of our farmers are of a contrary opinion and make no scruple of carrying the blown sand on their land, even in places where they may have the salt water sand as easily, making many runs to it in a day as to the other. Their pretence is that all sand of any sort is good for, if only to keep the ground loose and open and this being (they think) the lighter carriage, they chose to take it, but I cannot be of the same sentiment with, and believe a thorough experiment would convince them of their mistake."

By the 1800s the sand at Bude had been analysed and its composition was found to be; 'In 100 parts of sand at Bude there are 70 of carbonate of lime, 20 of muriate of soda and 10 of silicons and other matter.' Making it particularly good at conditioning the heavy clay soils in West Devon and North Cornwall making them more productive.

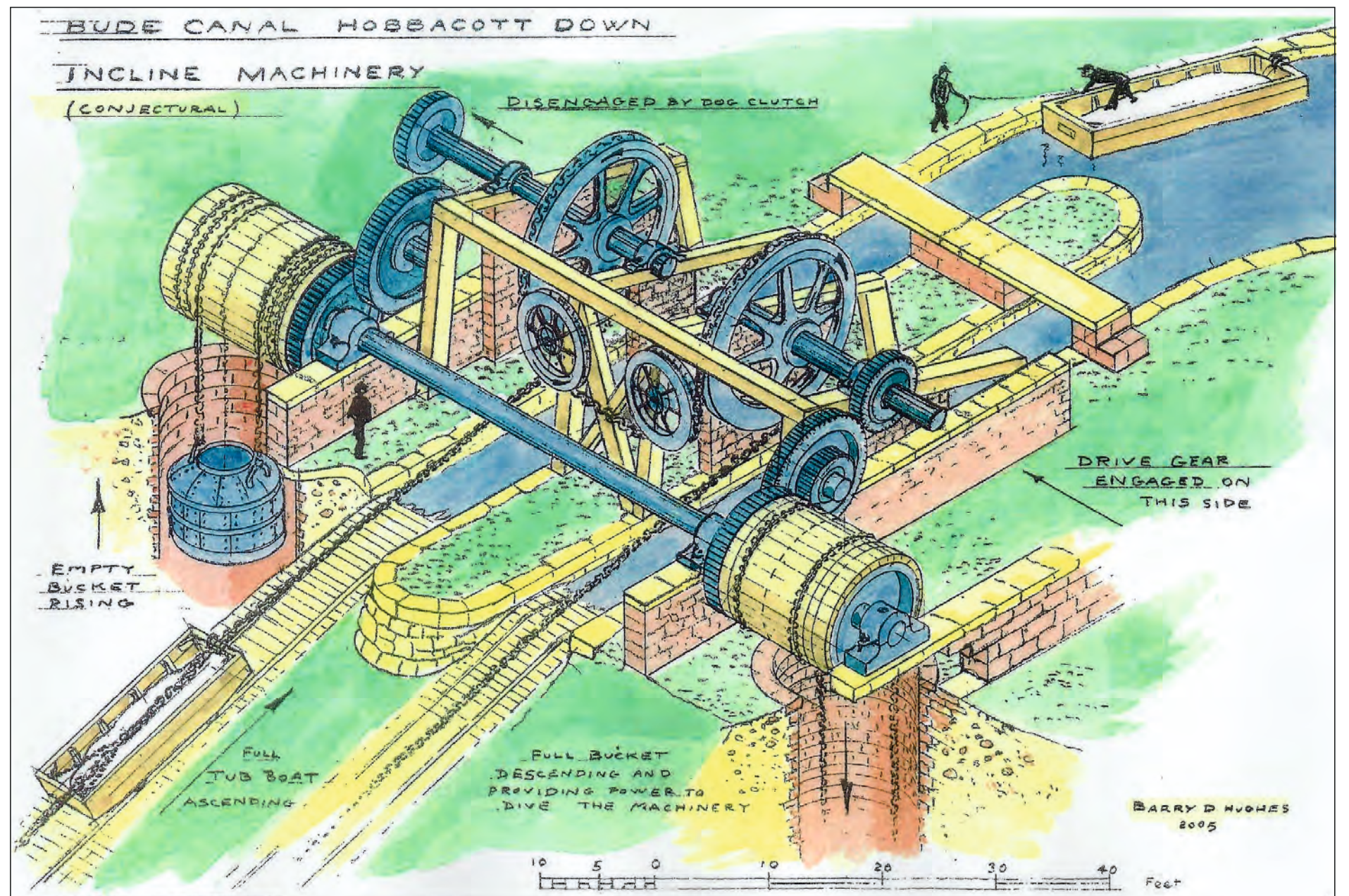
When the Canal at Bude was designed and built by James Green for the Bude Harbour & Canal Company the main purpose was to construct a canal that would take trade into the hinterland of North Cornwall and West Devon. The main import being the lime rich sand from the beach at Bude.

To be able to take the Canal inland from Bude, James Green decided that the conventional use of locks was not appropriate or feasible to cope with the hilly nature of the land, also the lack of a sufficient supply of water in order to operate flights of locks throughout the route of the Canal was a major issue.

He chose inclined planes for most of the route where the greatest rise between canal sections lay. He used 3 locks to cater for the Sea Lock and two inland land rises between Bude and Helebridge, coping easily with the modest rise in levels.

The Inclined Plane is a level plane on the slope of a hill to which two sets of rails were laid upon which tub boats fitted with four wheels would travel. Each tub boat would attach to a continuous chain, driven by water power. There would be similar tub boats travelling in the opposite direction to provide some counter balance.

There were 6 Inclined Planes, 5 driven by waterwheels and 1 by a 'bucket in a well' system – this is where 'a bucket' would be filled with water until the weight caused it to descend the well. The cistern was connected to a chain at the head of the



plane and dropped down the well, this being the source of power for the continuous chain. This system was a development of the work done previously by Robert Fulton, Edmund Leach and Earl Stanhope.

The waterwheel system involved a suitably sized overshot waterwheel, contained in a purpose built wheel pit where water from the Canal was used to drive the wheel which through various mechanisms provided the power to drive the continuous chain. The water used left the wheel pit by means of an adit which returned the water to the Canal at the foot of the plane, thus avoiding wastage.

At the foot and head of the plane were boat bays; tub boats would enter the bays and come onto the rail system, the end of which was submerged in the water. The rails were 'U-shaped' to secure the position of each boat. Once the tub boats were connected to the continuous chain, power was applied and the tub boats at each end of the plane would ascend and descend accordingly. Upon reaching their destination the tub boats were unhooked from the continuous chain and moved into the next section of the Canal to await more tub boats in its 'train' before continuing seaward or inland along the Canal. These 'trains' were usually of 4 tub boats and pulled by 1 horse under the control

of 1 man, sometimes also with a 'boy'. It is not clear if the horse was used along the whole journey or changed at some point on the route.

An integral part of the plane was the 'rollers', these were set in the face of the plane at regular intervals. The rollers, fitted centrally between the rails, would support the continuous chain therefore avoiding being snagged on the plane's surface and ensuring a smooth operation of the system.

The only boats to use the tub boat canal were the tub boats – these were approximately 20' x 5' 6" x 2' 10", each fitted with 4 cast iron 14" diameter wheels for use on the incline planes. Initially these were fitted externally to the boats but was modified around 1838 when engineer James Walker reported on the destruction of the canal banks by the wheels. The wheels were then incorporated in the side beams of the boats.

The boats were constructed of a mixture of pine, elm and oak with the lead boat in the 'train' designed with a bow to assist the passage through the water when being towed, each to carry 4 to 5 tons.

The other type of boat used on the Canal was much larger, being 50' x 14' x 4' and able to carry up to 45 tons of sand but were confined to the section of the Canal between the Sea Lock and Helebridge Basin.

