

WATER WHEEL, LAXEY, I. O. M.

 TO VISIT LAXEY WHEEL 

TRAVEL ON THE POPULAR OPEN ELECTRIC CARS OF THE

## MANX ELECTRIC RAILWAY

THE SCENIC COASTAL ROUTE BETWEEN DOUGLAS AND RAMSEY.  
BREAK OF JOURNEY ALLOWED AT ALL FOLLOWING BEAUTY SPOTS:—

GROUDLE

GARWICK

LAXEY

DHOON and

BALLAGLASS

WHEN IN LAXEY do not miss the opportunity of travelling on the

### SNAEFELL MOUNTAIN RAILWAY

and seeing from the Summit—the highest point of the Isle of Man—A GLORIOUS  
PANORAMA of the Island and the Five Kingdoms.

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Road Vehicles CANNOT do so.

HIGH-CLASS REFRESHMENTS AT ALL PRINCIPAL STOPPING PLACES

LICENSED HOTELS EN ROUTE

# The Big Wheel

(LADY ISABELLA)

LAXEY

Isle of Man

History and Description of this Famous Landmark



INTRODUCTION TO  
**THE LADY ISABELLA WATERWHEEL**

**1854**

of the Great Laxey Mining Company  
Isle of Man

**1954**

A Past Chapter in British Engineering  
by A. Jespersen, Denmark

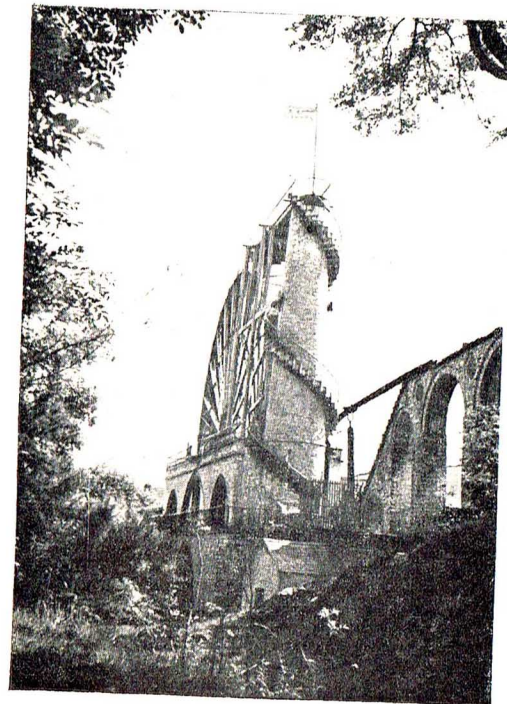
**T**HIS is about a waterwheel, perhaps the largest ever built. The Wheel was erected in 1854 in the Isle of Man, and was used for a century to pump water off the lead mines. To-day, the Wheel is kept moving to amuse visitors. The Wheel is 22 metres in diameter, the height of an eight-storied building.

It is only natural that this unique piece of engineering should be created in Britain. The reputation of mechanical engineering in this country certainly justifies it. But to the stranger, who has never seen the Isle of Man, it appears odd that the Wheel should find its

way to an island of only 572 square kilometres. It is one of the objects of this survey to examine the reasons. They may be summarised thus:—

Although the Island is small, it is high; the highest point, Snaefell, is elevated 620m. above sea level, so there is ample head, and the larger the head or fall, the more power can be derived from the same, limited, supply of water.

The high grounds, touching the clouds, collect ample rainwater—anything up to 1,410 m.m. per annum, or 1.4 million tons of water on each km<sup>2</sup> — and the Wheel gathered



water from nearly 16km<sup>2</sup>, through an intricate system of lades.

The Island is rich in metal ores — lead, zinc, copper, and silver — but there is no coal. To operate the mines, waterpower proved useful, and numerous waterwheels were erected all over the Island — many of them up to 10-15m. in diameter. Yet, it was a bold effort to build a waterwheel of 22m. in diameter — in 1854. Most iron parts were shipped from the mainland. They fitted well enough: even after a century, the deflection is less than plus or minus 10 m.m.

But the water turbines developed, and the steam engines were improved, throughout the 19th century, and so Laxey Wheel found itself a record breaker; no one would dream of competing for the title to get a bare 200 horse power, which could now be obtained from a Francis turbine or a Pelton wheel of less than one-tenth the size.

So—in books on waterpower this line is frequently employed: The greatest waterwheel in the world is situated in the Isle of Man.

Several times had I read this, but I never expected to see the Wheel — in all probability it had disappeared ages ago? Then, when I was left with a fortnight's holiday from my temporary employment with the Fife County Council Planning Department in Scotland, I ventured a trip to the Island. As near the site of the Wheel as Douglas, I could not find

any definite information regarding the state of the plant, and this is perhaps my main reason for spending so much time through five years to compile this survey: It is my aim to convey to as many technically minded people as possible the news that the Great Wheel is still intact, still moving, and, indeed, still worth a visit. It is my hope that this book will help the student of this wonderful piece of early British Engineering to appreciate the many aspects of the plant, and to see details, the meaning of which was obscure to me until I worked my way through the analysis.

The week I spent in the Isle of Man did not allow me to cover every corner of this complex subject, and but for the help and kindness I have received from Manxmen and others, I should never have been able to arrive at the conclusions.

Finally, it is my hope that this volume will contribute to raise a feeling of pride in the Britisher, so that the Great Wheel may live to see its second centenary! Let us bear in mind that but for the prompt action taken by Mr. E. C. Kneale, the Wheel's 36 tons of iron and steel might well have landed in Hitler's foundries in 1938!

Thanks to Mr. Kewley, of Laxey, who worked with the Mining Company before the close down in 1929, we know quite a bit about how the pumps worked, and an old

Mining Plan, now filed in the Manx Museum in Douglas, has given a wealth of clues to the layout of the Mines, drained by the Great Wheel. The study of the old Plan gives us a surprising view of the crude methods of surveying employed in those days. In all probability a compass needle/theodolite survey was used, and as the magnetic variation remained unaltered on the Plan throughout the 70 years of its life, the 13° alteration of the actual magnetic variation resulted in a warped representation of the levels on the Plan. Consequently the Plan had to be "re-warped" to make it possible to superimpose it on the surface map.

In conclusion, it is safe to say that in the Laxey Wheel we have a superb example of early British Engineering at its best. The designers and the builders of this Wheel had a first-class knowledge of their craft and its materials. They did not possess the knowledge of theory employed today, but they laid the foundation on which the Britain of to-day is building the best jet turbines in the world and the first nuclear power stations.

May this historic monument be preserved for coming generations of engineers to learn how to exploit to the full the technical possibilities their own age affords.

ANDERS JESPERSON.

49 Skolebakken, Virum, Denmark.  
November 1953.

## GIANT OF THE VALE

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### LAXEY and its BIG WHEEL

TO place a giant of timber and steel in a pleasant natural valley of gentle slopes and murmuring streams seems wanton sacrilege, the sort of heedless vandalism which would blot a Turner landscape with smoking chimney stacks.

Happily, Laxey and the vale of green meadows, gorse lit and foliage clad, stretching leisurely from distant mountain to wave-crested beach, have suffered no such desecration. For, when, over four score years ago, a force was needed to repel invading volumes of water, which menaced the lives and operations of the miners burrowing below ground for treasures of silver, lead and copper, Laxey and its mines found a saviour in one of its sons—Robert Casement,

who must have been artist as well as engineer, architect as well as builder. And the true artist in the engineer, the fond lover of his native glen provoked a vision of a circling giant, a giant graceful in bigness, cleanly and elegantly fashioned, a titan, which, though man-designed and man-created, would evoke no discordant harmonies in the chaste symphony of the valley's green-leaved slopes and heather-purple heights. This vision he transmuted into one of the engineering wonders of his time; and though of wood and iron and stone lays no ugly blot on Nature's canvas, but, whether viewed from near or far, appears a serenely colourful integral essence of the whole fair scene.





ROBERT CASEMENT  
who created the Wheel.



RICHARD ROWE  
Captain of the Mines in 1854.

### A VIKING INVASION

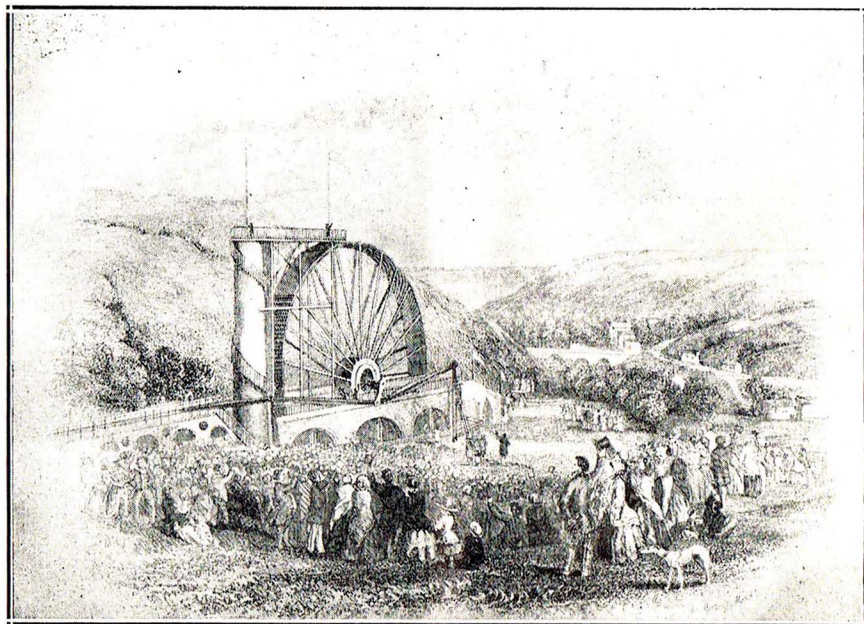
It would, if it was possible, be a pleasant pre-occupation to endeavour to lure one's mind back to Laxey in the days of its genesis. Of these simple, primitive days, when the rude barbarians of this Isle covered their bodies with woad and went to the sea and rivers for most of their food, little is told in ancient books of Laxey's first inhabitants. But that they, like other dwellers on the water-fronts of Mann, were frequently harassed by ferocious bands of sea rovers is certain. One writer of some eminence—though he does not pose as an authority on Manx lore — emphatically declared to me that Laxey's history probably goes further back than that of any other part of the Island. And, true or not, he explained that it is written in some heavy document that two thousand years ago, a blustering gale drove two Viking war galleys into the quiet, peaceful bay. These rugged warriors, lusty and powerful and bloodthirsty, swept over the little village like devouring wolves, and so it is written, speared or clubbed all the men and appropriated the women. Evidently, the blonde Viking Chieftain and his ruthless followers found Laxey with its salmon-infested river, and the secure shelter of the bay from which to sail forth on their marauding expeditions, much to their liking. for they made it their retreat and settled here for many years. So it is not unlikely

that it was by this fearsome band of sea wolves that the village was first named LAXE-VOE, which in Norse means Salmon River, from the clear waters of which these early settlers obtained a great amount of their daily food.

### ANCIENT GREEK VISITORS

Whether the roving men from the Northlands were the first to discover the wealth of minerals that lay beneath the glen of Laxey, or whether they were too much occupied with the more warlike pursuit of raiding and pillage we know not. There is much speculation, and little actual knowledge to formulate any conclusion as to when mining first began in the Isle of Man. There is no history existing that can give any certain clue as to whom the first lead and silver diggers were in Mannin-Veg-Veen. The late Doctor Bradbury, of Laxey, in a fascinating little volume, expounds a delightful theory, which would have us believe that the Island was celebrated in the most remote ages before the Roman Empire, and that silver from the Laxey mines went to the making of the diadems, bracelets, brooches and rings that adorned the ladies of the princely families of ancient Greece and Phoenicia. If there is any foundation of such a surmise it is quite likely that the far-famed galleys of Tyre and Sidon pushed their graceful prows through the waters of Salmon River Bay. The Doctor





The Christening of the "Lady Isabella," 27th September, 1854.  
(From an old print in the Manx Museum).

bases his theory on what? — The Three Legs of Mann, which are supposed to have first been given to the Island by Alexander of Scotland, the arms previously used being a galley in full sail, which appears in connection with the Norse Kings of Mann. But long before the Norse invasion of the Little Kingdoms, says the Doctor, the Three Legs probably had floated over the Manx sea. Ancient British history tells us that the ancients obtained lead and tin from the Cassiterides (first mentioned by the old writer Heroditus) where the merchant sailors of Carthage bartered for minerals. The Cassiterides were generally identified as the Scilly Isles, or Cornwall, but to again quote the Doctor: "Cassiterides were not Scilly, but Mann, and its Islets. The Manx words for Three Legs are 'Trie Cassyn,' and this by transposition and a slight alteration of spelling are easily convertible into Cassiterides, or Island of Three Legs, the name which may have originated from the ensign borne by the Greek merchantmen. . . . It is very probable that the ensign of the Trie Cassyn was adapted from a Greek Diety, and was used by the Greeks trading to Mann and there handed on to the Islanders. . . ." The Doctor also observes that "again there are traces of a Greek colony at Laxey in some few local names. . . ." In further support of the Doctor's theory there is in existence to-day a Greek coin over 2,000 years old, and on which the Three Legs are plainly discernible.

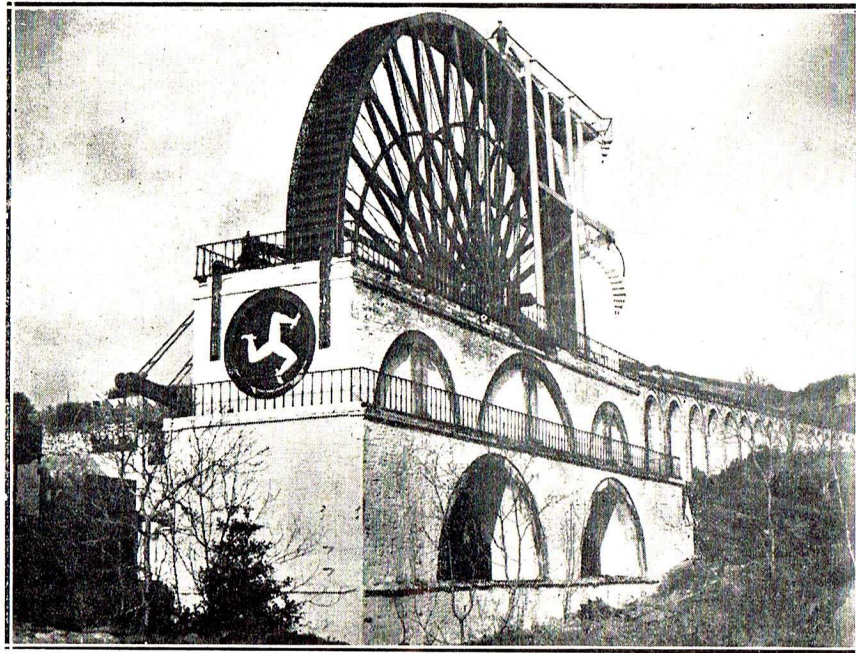
### THIRTEENTH CENTURY ACTIVITIES

Whatever antiquity may be attached to the dark and now unhappily deserted mines beneath our feet, they have yielded through numerous centuries rich argosies of silver, lead, zinc and copper. In the year 1292 we are told that John Comyn, Earl of Buchan, obtained a licence from Edward I to dig for lead in the Island, that he might cover eight towers at his castle in Galloway. And at a Court of Tynwald held by Sir John Stanley in 1423 it was ordered, "that my mine be set forward by my Lieutenant-Receiver and Controller for my best profit, and that they see the miner do his duty." Further, there is evidence that during the reign of Henry IV of England, the Laxey mines, and those of other parts of Mann, were regularly worked, and so through successive centuries.

### MINES' VARYING SUCCESSES

I have seen old reports and balance-sheets relating to Laxey mines, which reveal that over a century ago the quest in the bowels of the earth for minerals was a profitable enterprise. In 1828 over 500 tons of lead ore were raised, and in 1830, 548 tons of lead ore and black jack were exported. At other periods the mines have yielded upwards of 100 tons of lead, 30 tons of copper and 200 tons of black jack per month, whilst the yield of silver has sometimes been as much as 50 ounces per ton of lead secured. Black





View of the Wheel from the lower end, showing the large casting of the Three Legs of Man.

jack is the miners' term of blende for sulphide of zinc. The prosperity of these mines was not always continuous. Two companies in the early years of the past century failed to remunerate themselves. But they sank the mines so deeply that one of their successors—The Great Laxey Mining Company—had only to take possession and, upon commencing work, almost immediately came upon a profitable lode.

Such is luck, even in a lead mine.

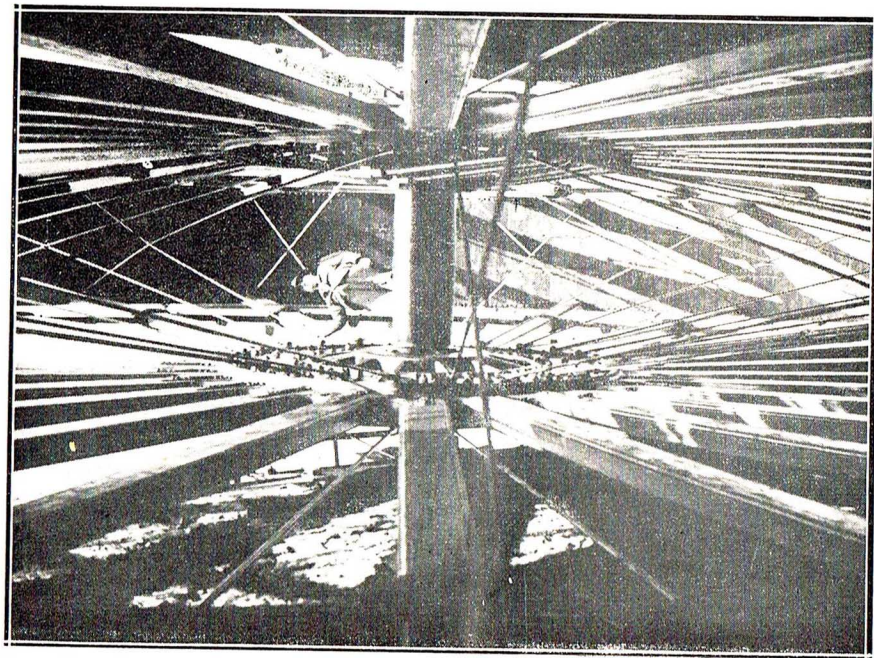
#### BUSY SCENES OF LONG AGO

Visitors to Laxey these days can have but a vague idea of the busy scenes, pulsating with life and activity, that would have focussed their interest when The Great Wheel first revolved. The washing floors, which are still to be seen lower in the valley, probably provided a more animated picture than even the nimble-fingered fisher girls at Peel to-day. To these floors were taken the produce of the mines in small wagons along a special tram track, and here was first subjected to the hammers of men, women and boys, to be crushed smaller by machinery preparatory to the ore going through the numerous washings, which separated the zinc from the lead and both from the matrix. Being thus to a certain extent purified, the crude metals were conveyed to Old Laxey for shipment to various English and Welsh ports for the process of smelting.

#### THE MINERS

I very much doubt if any of the old miners remain. They were a hardy race of a long line of sweating delvers who climbed to darksome depths to tear from the old earth her metals deeply buried. A writer of 1876 described the Laxey miners as "appearing strong, healthy, ruddy complexioned, and apparently capable of bearing arduous tasks, and when they walked in procession they were a fine body of men, with neither a bow-leg nor a knock-knee amongst them." On the whole, they were a sober, industrious and thrifty lot, many of them owning their own cottages and collectively two Working Men's Institutes. If you met them going and returning from the mines, you would have been attracted by their quaint, stiff, drab hats, to which were always stuck candlesticks fashioned from lumps of moistened clay in which partly burnt candles were esconed. Other noticeable items would be the flashes of tea or jough (old Manx ale) slung over their shoulders, a pound or two of candles, and empty powder casks. The miners had to provide their own powder, candles and tools. Of necessity, the miner had to wear hats that were stiff and hard to provide some protection for their heads against the low jagged rocky roofs of the mine levels. Not for decoration either were the primitive headlights in their hats. The mines went to a depth of nearly 2,000 feet with 21 levels





Some idea of the Wheel's size can be gauged by this unusual view of the axle.

at varying depth, piercing the underground for one, two or more miles. To reach the many levels the miners' only means of descending were rough wooden ladders secured against the practically straight walls of the narrow shaft. Can you, brother or fair sister, imagine yourself stepping from the bright sunshine of this happy dale on to a ladder with rungs weakened by much usage or rotted by dripping water, and going down, down to the black unknown? Thus, with both hands occupied in gripping the ladder, the miner on entering and leaving the mine had to feebly light his toilsome way by the guttering candle on his head. At a time when nearly 400 men had to use these ladders it is stated that it occupied them two hours each, out of their working day of eight hours, to descend and ascend from the underground caverns.

#### BIRTH OF A GIANT

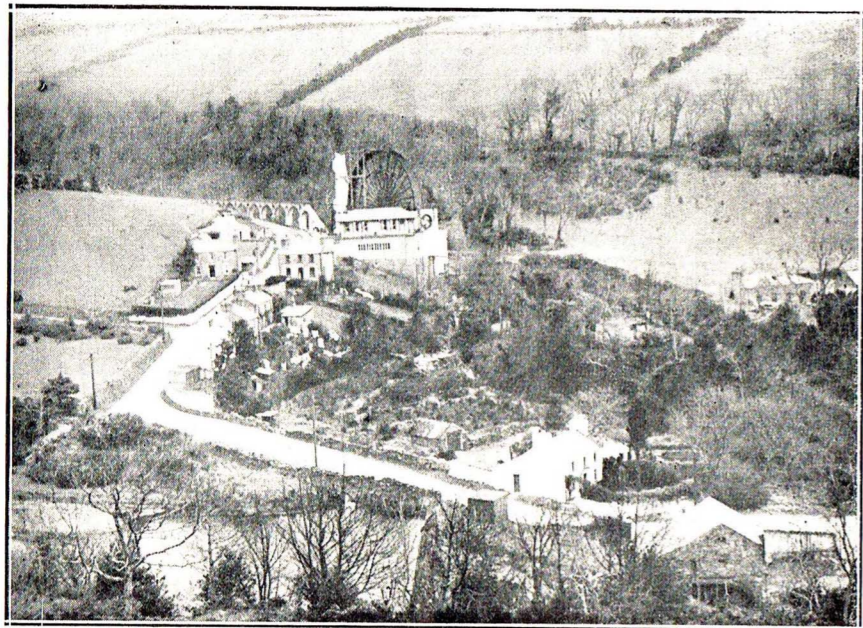
In the stirring days of '54 when the redoubtable Gladstone was at the Exchequer, Palmerston at the Home Office, and Britons pouring out their blood in the Crimea, water entering the mines through the rocks became a serious danger to the miners as well as an obstruction to their activities. It was realised that only by the aid of some powerful machinery could the constant inrush of water be expelled. To the young mines' engineer, Robert Casement, who was then 37 years old, was entrusted the task of finding a method of

making an ally out of the mines' enemy, to throw out the invading floods. With consummate ingenuity and skill he overcame many difficulties, finally creating this mighty circle, which at one time was the largest water-wheel in the world. Casement trapped the water with which he desired to spin the wheel in a small cistern just a little further up the valley, and which is only two feet higher than the peak of the giant. Through underground iron pipes he brought the imprisoned water, which is syphoned up the 72 feet stone tower, to drop in a steady flow on the treads or buckets of the wheel. Because the water does not pass right over the top of the wheel, but falls on to it lower than the summit, the circle revolves anti-clockwise, and is termed a breast-shot.

#### INTERESTING DETAILS

The wheel has a circumference of 228 feet, a diameter of  $72\frac{1}{2}$  feet, and a breadth of six feet. The giant has the drawing strength of 200 h.p., and makes  $2\frac{1}{2}$  revolutions per minute, in which time 250 gallons of water were hauled from a depth of 1,800 feet. There are 192 buckets on the wheel, each capable of holding 20 gallons of water. The axle, made of malleable or hammered iron at the Vulcan Foundry, Liverpool, has a length of 17 feet, with a diameter of 21 inches and a weight of 10 tons. When it was unshipped from a schooner at Laxey Beach it was drawn proudly to its final resting place





THE WHEEL FROM LAXEY VILLAGE.

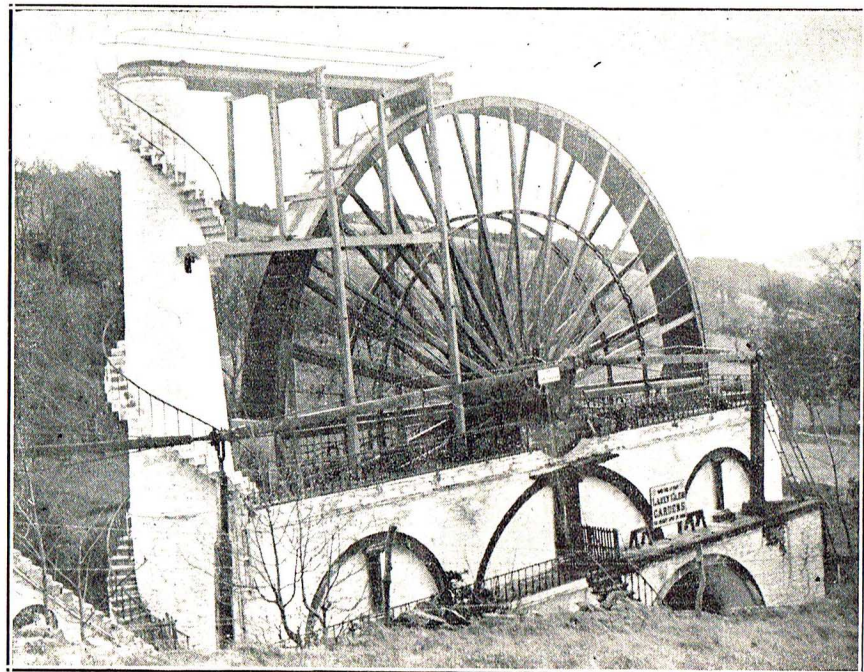
by 200 miners. The arms are of Horn Beam and Green Heart timber with a cast-iron rim. which, with other metal sections, were made at Vauxsall and Mersey Iron Works, Liverpool. The wheel has an estimated weight of 100 tons. With a 10 feet stroke at the crank, the wheel has a vertical pump action of 8 feet, the crank attached to the main shaft weighing  $4\frac{1}{2}$  tons. Casement set his wheel so truly that a deflection of one-eighth of an inch could not be detected. It is in the handsome stone case in which the wheel is placed, and the graceful curves of the long row of 35 arches, which bear the rod carrying the wheel's strength to the working pump at the mine shaft—200 yards away—that the artist in Casement found expression. The wheel casing, 90 inches in thickness, shows great taste of design, the lower part being pierced by arch openings which gave it a light appearance and allow the base of the wheel to be seen. The stones of the white tower, the arches and the wheel case were quarried only 100 yards away from the wheel's location. At the south end of the stone casement you will see the largest iron casting in the world of the Three Legs of Mann. These arms of the Island have a diameter of 8 feet 2 inches, and weigh about one ton. On a plate fixed to the wheel's main bush are the names of Richard Rowe, the captain of the mine at the birth of the wheel, and of the wheel's creator—Robert Casement.

The spiral staircase which encircles the water tower has 96 steps and provides the visitor with an easy, safe means of ascent to the roomy platform, from which to look down on the broad back of the giant, and view the sweeping panorama of hill and dale, wide ocean expanse, with silent Snaefell, 2,034 feet above sea level throwing its shadow against the western sky.

#### HE DIDN'T HEAVE-HO

A good story is told in Laxeey to this day concerning the hefty band of miners who towed the 10-ton axle from the beach to the little platform pushed into the defile, where the wheel now stands. Or rather it mostly concerns one of the 200, as you will see. Straining like Volga boatmen with slanting backs and legs rigid, muscles taut, heels firmly planted, they had almost got to the completion of their "long pull" when the rope suddenly snapped near the end attached to the bogey on which the axle rode. And in a moment that straight orderly line of straining, heaving men became a confused jumble of sprawling, struggling, twisting bodies, embarrassed in their attempts to rise by laughter convulsions—all of them but one gloomy fellow who remained sheepishly standing with loosely clenched hands. This lone attitude led to the conclusion that he had not been pulling his weight, and so the story goes, the slacker was sacked the same day.



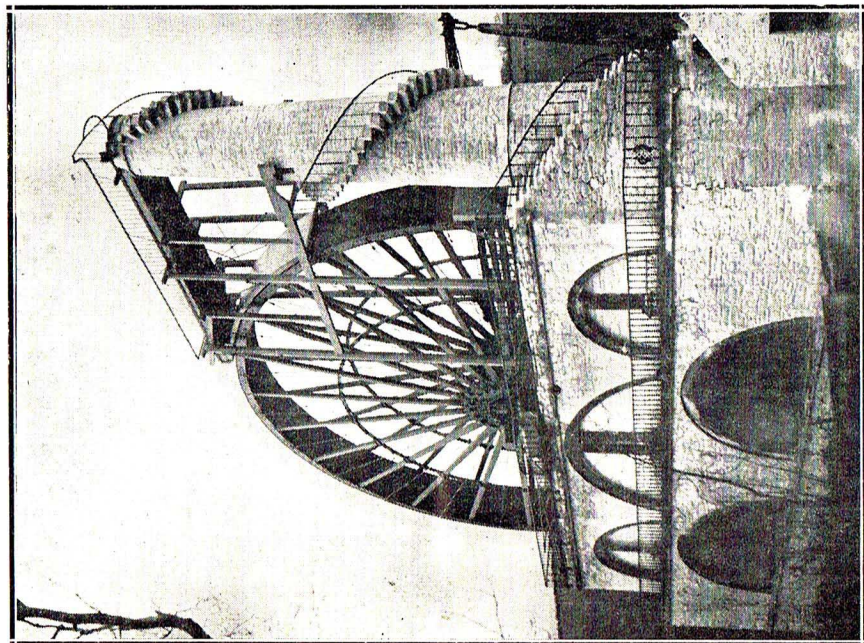


### WHEN THE GIANT WAS STARTED

Scenes of great rejoicing were staged in the mining valley when the great wheel was first set in motion on 27th September, 1854. The whole British nation was in a rejoicing mood, too, at this time, for the Allies had just won the Battle of Alma in the war with Russia. In later years Mann was to be directly associated with this episode in British history, for at that engagement the British were commanded by Lord Raglan, the father of Lord Raglan who became one of the most beloved and democratic Governors of the Island. At the time the Laxey giant was given life and movement, the Island Governor was Sir Charles Hope, and in honour of his wife the wheel was christened the "Lady Isabella." Autumn had lavishly emblazoned the glen with its warm hues, which a generous sun drenched with rays of gold on this memorable September day—a day on which the entire Island sent large hosts of happy folks to Laxey. For the Island generally was naturally proud of its mighty circle and the creative genius of Casement. We are told in the rather ponderous style of the newspapers of the Fifties: "The starting of the gigantic wheel was commemorated by an industrial fête with between 3,000 to 4,000 persons from all parts of the Island to witness so great an achievement. The workpeople, between 500 and 600 in number, dressed in holiday clothes, accom-

panied by two bands of music, walked from the washing floors to the large wheel led by the Chairman of the Company (Mr. G. W. Dumbell) and the agent of the mines (Captain Rowe), who, on their arrival at the wheel, conducted the Governor and his Lady, the Lord Bishop and his Lady, and Mrs. Dumbell to the first platform, where His Excellency, by means of a small handle, let the water on wheel, which immediately commenced moving. Simultaneously with the first motion of the wheel, Mr. Dumbell gracefully threw a bottle of champagne, ornamented with Manx lace, and named the wheel "Lady Isabella" in honour of the Governor's Lady. At the same moment a flag at the top of the wheel was unfurled and made known the title of the wheel to the assembled crowds, who greeted it in loud cheers. Whilst the shouts from the strong lungs of the miners vied with the booming of the cannon in proclaiming the satisfactory accomplishment of a great undertaking. The workpeople were then regaled upon the neighbouring green with substantial fare, after which they enjoyed themselves in various games. The guests of the Mining Company were entertained in a building which had been erected upon the green for the purpose. A variety of toasts were drunk, not forgetting that of "The Mines," proposed by the Governor. The day's rejoicings concluded with a display of fireworks from the viaduct near the new washings. . . ."





### A WISH RE-ECHOED

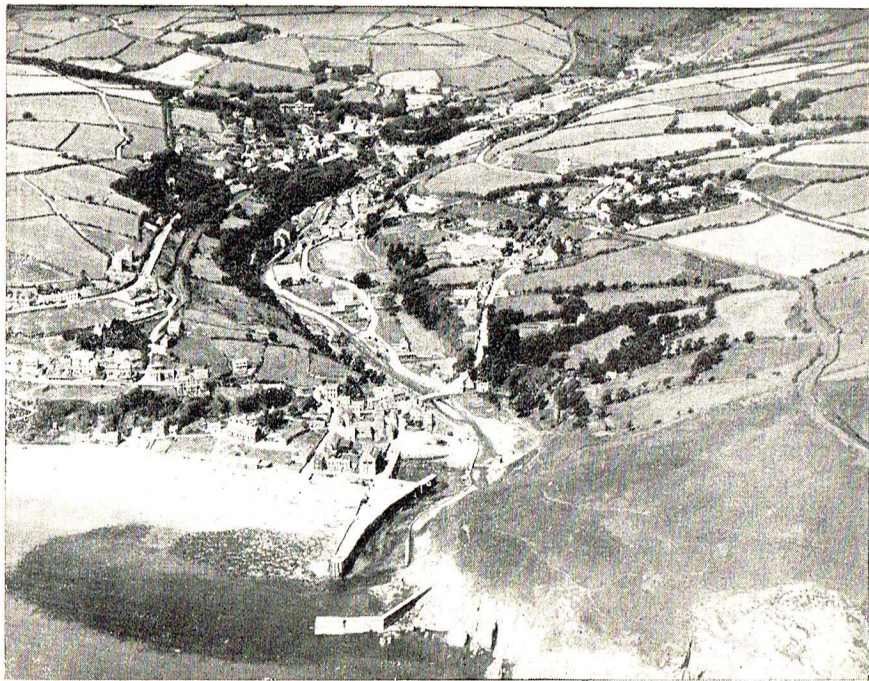
This account makes no mention of Lady Hope's part in the proceedings. But to her is credited the lively phrase, expressed feelingly during the momentous period when the water first stirred the circle into activity, "Let us damn the water and blast the mines. Turn on, Great Wheel, may your life be energetic and long."

The mines and the giant have passed through many vicissitudes since these words were uttered. But knowing how near the wheel has been to tumbling to an ignominious end through woeful neglect we devoutly re-echo Lady Hope's prayer to-day. The mines ceased to be a paying proposition some years ago, and those who worked them had no alternative but reluctantly to suspend operations, withdraw the miners, and let the vandal hand of time lay unchallenged its fingers of rust and decay on the plant and machinery which had hummed in the valley through many succeeding years. As a source of much interest to visitors, the wheel was cared for by those who had the custody of it. Then, finally, certain difficulties caused this care to be withdrawn, and the proud giant was left to rust, rust slowly towards its doom. Two years of this weakening rusting process nearly brought the splendid structure to its knees.

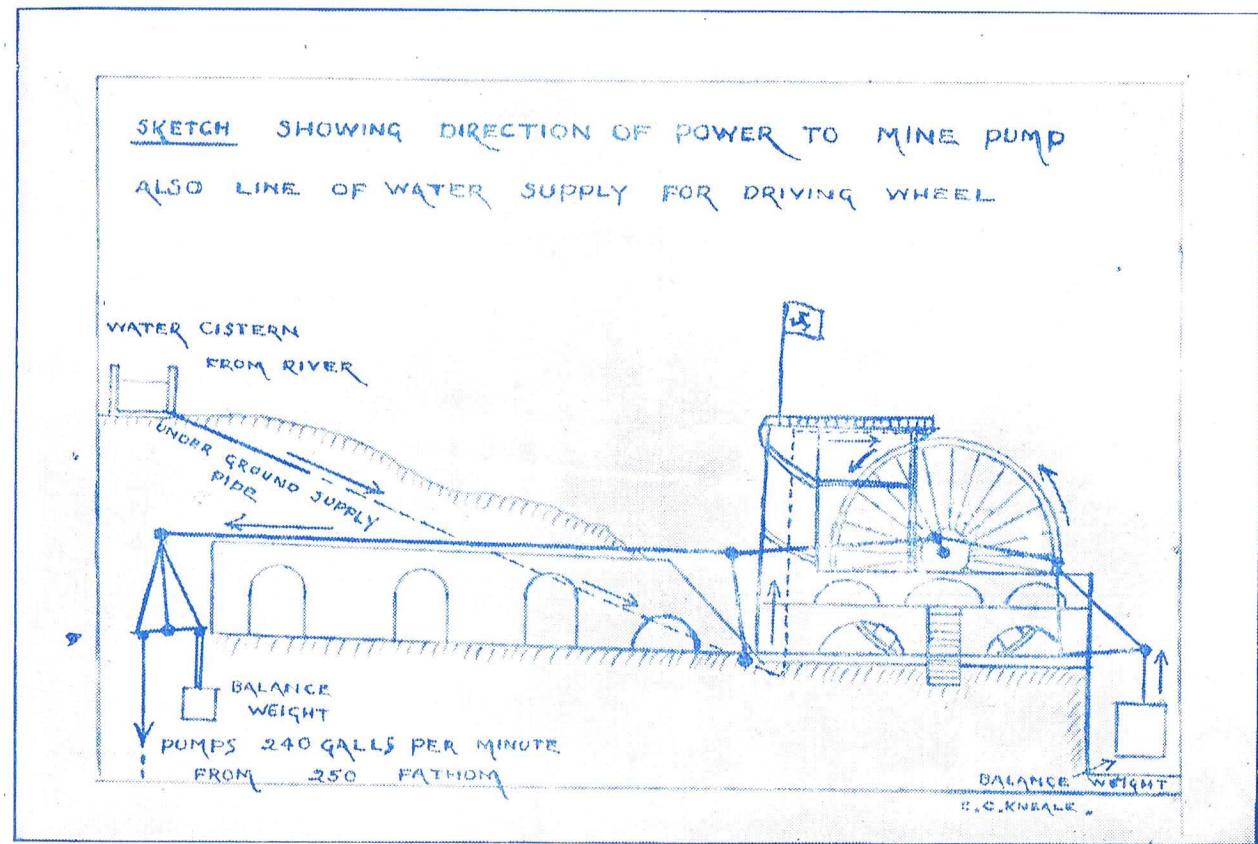
when, happily, stories about "Lady Isabella's" plight in national and insular newspapers called for some action, some remedy to save the wheel from tottering. The subject was mentioned in the Manx House of Keys, but before any definite official move was made to save the giant, Mr. E. C. Kneale, a Laxey joiner and builder, with commendable enterprise, made himself responsible for the wheel's welfare. During the winter months of 1937-38 he completely renovated and repaired the circle, so that now "Lady Isabella," whose new blushing complexion consumed one ton of paint, is again hale, strong and hearty, revolving as majestically as of old. Every attention has been given to ensuring the safety of the thousands of visitors who will welcome the opportunities in the Manx visiting seasons of visiting this "giant refreshed" and examining the many interesting details of its construction.

In conclusion, I would like to tender my sincerest thanks to many who have willingly assisted me in the compilation of this little book, without which assistance publication would have been impossible. Particularly do I appreciate the patience and time placed joyfully at my disposal by Mr. W. Cubbon, the Director and Librarian of the Manx Museum at Douglas, an institution of which the Isle of Man may very justly be proud.





LAXEY (Aerial View from Laxey Bay).





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