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THE BELL ROCK LIGHTHOUSE

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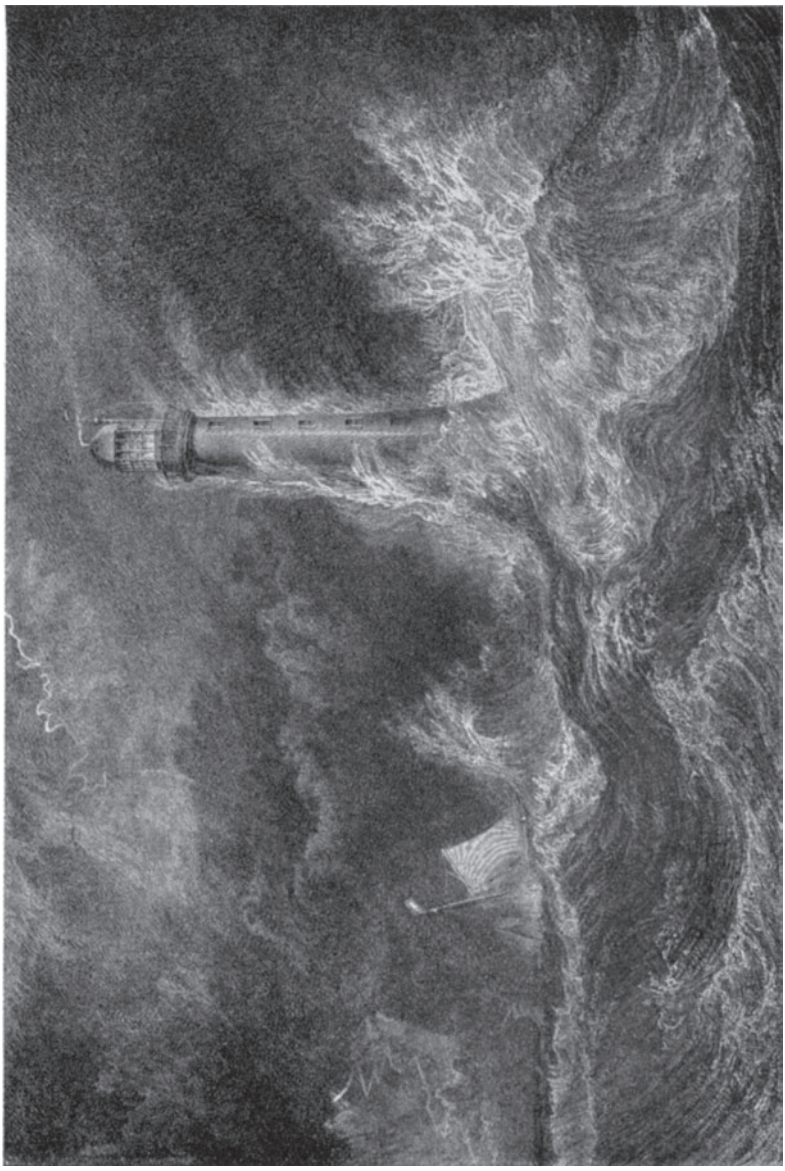

The Bell Rock Lighthouse in a storm

From a drawing by J. M. W. Turner, R.A.

The BELL ROCK LIGHTHOUSE

BY

ROBERT STEVENSON
Civil Engineer

Passages selected from
An Account of the Bell Rock Lighthouse
(published in 1824)

and edited by

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EDITOR'S PREFACE

An examination of the literature suitable to the needs of adolescent readers and available for their use, especially in schools, brings to light the fact that it includes few books which reveal the personality of the craftsman as well as the interest of his work. Yet no reflective person can fail to realise how great a part the development of constructive activities in the sphere of material things has played in the progress of mankind.

That young people are interested in craftsmen and their work is clear from the popularity, particularly among boys, of books which describe the more spectacular achievements of the engineer and inventor. Such books are, however, for the most part written more with the aim of presenting technicalities in a popular and readable form than of showing us the craftsman himself—the man behind the work. Moreover, their literary standard is often such that they are not regarded as subjects for other than purely recreative reading.

Records of their work written by practising craftsmen, or by those who, while directing the work of others, show an intimate knowledge of a craft gained through an arduous apprenticeship, are not common. They do exist, however, and contain literature of real worth, full of human as well as of technical interest.

The object of "The Craftsman Series" is to make this literature available in a form convenient for school use, especially at the present time when so much attention is being given to the practice of the crafts as a part of general education, and to the need for a suitable literary and historical background for more specialised technical studies.

Robert Stevenson's "Account of the Bell Rock Lighthouse"

is an outstanding example of the type of literature suitable to our purpose. Stevenson often acknowledged his own debt, as an engineer, to Smeaton's "Narrative of Eddystone", and the "Account", which, as its lengthy title-page shows, was "drawn up by desire of the Commissioners of the Northern Lighthouses" and published in 1824, was clearly intended as a similar contribution to the technical records of lighthouse building.

It is a substantial folio volume containing 533 pages of text and many beautifully drawn plates, and is a monument to the thoroughness of the author. In addition to the story of the building, which is written in diary form, he includes a report upon the progress of the Northern Lighthouses, detailed technical descriptions of the various operations at the Bell Rock, and page after page of exact accounts of the material used and of its cost.

Yet, technical as is the "Account" as a whole, in the description of the progress of the building which forms the major part of the book we have a remarkably human document. It is a picture of the great engineer whose one object was to build well, and of his band of workmen who were bound to him by no mere ties of sentiment or self-interest, but by a profound respect for his ability and his unswerving devotion to duty. In reading it one feels that here indeed is a man whose character is as upright as the tower which still stands to bear testimony to his engineering ability.

The Editor's task in reducing so large a volume so as to bring it within the compass of the present pages has involved the selection of such passages as appear to be of the greatest interest to the general reader, and the joining together of these extracts to form a continuous narrative. This has occasionally necessitated the rearrangement of a sentence, a slight alteration in punctuation, or the rendering of a word into modern spelling,

but apart from these insignificant changes no departure has been made from the text of the original, and throughout this book Robert Stevenson speaks for himself.

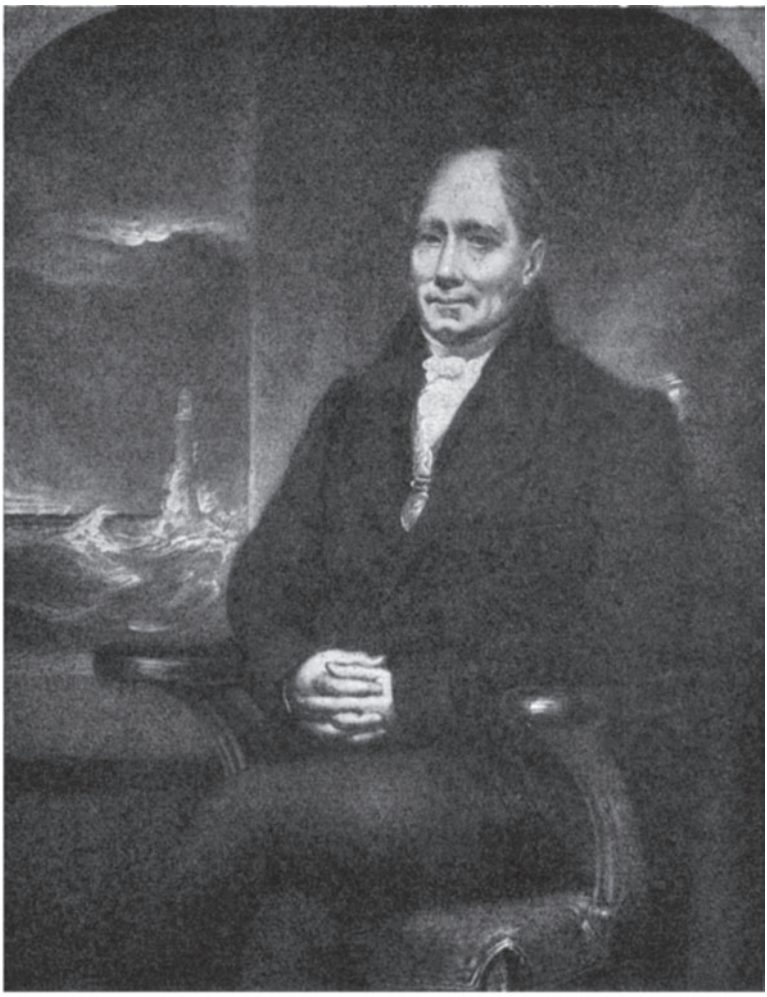
The introductory chapter, the short glossary, the occasional footnotes and linking-up passages, and the division of the text into chapters for convenience in reading, complete the Editor's contribution.

All but two of the illustrations have been reproduced from the original "Account". The portrait of Robert Stevenson, and the photograph of the lighthouse as it stands to-day, have been lent by Mr David Stevenson, a grandson of the author and his present successor in the post of Engineer to the Commissioners of Northern Lighthouses. Mr Stevenson's help has not been restricted to the lending of these illustrations, for he has shown the greatest interest in the whole project of reprinting the "Account", and has supplied valuable information concerning the present state of the lighthouse. The Editor gratefully acknowledges the help and advice he has received in these matters.

This Preface would be incomplete if the Editor were not also to acknowledge with thanks the assistance he has received from Mr C. E. Carrington, M.A., of the Cambridge University Press, in the task of seeing this edition through the printer's hands.

A. F. C.

April 1931



Robert Stevenson

From a painting by John Syme, R.S.A.

INTRODUCTION

The Abbot of Aberbrothock
Had placed that Bell on the Inchcape Rock.

THE old legend of the Bell on the Inchcape Rock is known to every reader of Southey's famous poem. Whether the story be true or false, it has given the name to the rock which it bears to this day, and it is upon this rock, the scene of so many disastrous shipwrecks, that the great lighthouse was built which is the subject of this book.

The builder, Robert Stevenson, was born in Glasgow in 1772. As a young man he acted as assistant to his stepfather, Thomas Smith of Edinburgh, in the supervision of such lighthouses as then existed on the coast of Scotland. These were few in number, and but crudely illuminated with uncertain coal fires. Thomas Smith did much to improve them by the introductions of lamps with reflectors. Young Stevenson worked hard to qualify himself as a civil engineer, and we hear of him being entrusted, at the early age of nineteen, with the building of a lighthouse on the island of Little Cumbrae in the Firth of Clyde. In 1798, after having had further experience of lighthouse building, he succeeded his stepfather as Engineer to the Commissioners of Northern Lighthouses. He remained in this service until his retirement in 1843, devoting much energy to the improvement of lighthouses, and it was early in this period that he carried out the work of which he tells the story in these pages. His practice as a civil engineer also included harbour construction, bridge building and river improvements, but it is as a lighthouse builder that his name is best known.

Building is one of the oldest of human handicrafts, and all over the world castles, towers, cathedrals and other fine struc-

tures stand to testify to the skill which men had attained in this art long before the days of the Bell Rock Lighthouse. But the work which Stevenson began in 1807 was unlike any building which had then been attempted. Until that time no one had ever tried to build a strong tower upon a rock which was eleven miles from the nearest land, in the midst of stormy seas which barely uncovered it at low tide.

It is true that in 1759, nearly fifty years before, Smeaton had completed the first stone tower on the Eddystone Rock, fourteen miles off Plymouth, but the Eddystone was only just covered by the highest tides, whereas the Bell Rock was twice daily submerged to a depth of from twelve to sixteen feet.

We must remember that Stevenson and his men accomplished their work without the aids which modern builders would bring to such an undertaking. In 1807 the steamboat was a curiosity, not yet brought to practical use, and only small sailing vessels were available. The use of steam power for working the tackle for raising the stones was unknown, and even the cranes themselves had to be specially devised for the work. Stevenson foresaw this difficulty of the lack of suitable cranes, for in one of his notebooks he wrote "... morning, noon and night these difficulties have haunted me". To solve his problems he invented two special cranes; the jib or movable beam crane, which is now so common an object in all building operations, and the balance-crane for use at the top of the lighthouse building.

So stormy were the seas around the exposed position of the Bell Rock that work could only be carried on during the summer months, and, for the first two years, until the building had reached a sufficient height above the waves, only for a few hours each day while the tide was low. Even so, in the early stages of the building, rough weather often put a stop to the work for days together, during which time Stevenson and his

men had to stay on board of their tiny ship in conditions of the utmost discomfort, waiting for the weather to improve. When it did improve, their only relief from the ceaseless tossing of the waves was to snatch a few hours' work on the sea-washed rock before the rising tide drove them back to their close quarters for another long wait.

The story is one long record of hardships and dangers cheerfully borne by men whose one determination was to do their work well.

Throughout the book we see Robert Stevenson, the master craftsman, carefully planning every step of the work in advance; watching over every operation with the closest attention; the first to land and the last to leave the rock, sharing his men's dangers and discomforts and ever mindful of their safety and well-being.

No wonder that we are assured by those who knew him that Robert Stevenson was esteemed above all others by his workmen, many of whom continued in his service for many years after the Bell Rock Lighthouse was completed.

In reading the story we cannot fail to be impressed by Stevenson's modesty and singleness of purpose. To him the success of the work was all that mattered, and, were he alive to-day, he would be the first to say that his men were, equally with himself, the true heroes of the story. Skilled masons, smiths and carpenters, taken from the workshops and workyards ashore to spend their hours of work in unremitting toil upon an exposed rock, and their hours of leisure cooped up in the hold of a tiny sailing vessel, these men proved themselves worthy co-workers with the great engineer who was their leader. Stevenson gives us many glimpses of the characters of these men. We read of George Forsyth, to whom the motion of the ship "was death itself", and who preferred to spend his nights alone "with a small black dog" in the unfinished

beacon-house perched upon stilts above the raging seas—surely one of the strangest habitations ever built by civilised man.

Another is Peter Fortune, the versatile and good-natured "cook, steward, surgeon and barber"; another, James Glen, who with tales of his own earlier hardships reconciled his mates to the terrible discomforts of their situation when they were marooned upon the beacon. Also there are the four men who, for conscience' sake, declined to work on Sundays, but who were among the first to volunteer for work at the rock when their fellows, alarmed by their narrow escape from drowning on the previous day, hesitated to leave the ship.

And so throughout the story we see that these men were very real people to their leader Stevenson; they were not merely "hands" to do his will.

How well this band of sixty men did their work is best shown in the words of Mr David Stevenson, the grandson of Robert Stevenson and the present Engineer to the Northern Lighthouse Board. Writing in 1930, he says: "The Bell Rock Lighthouse is now the oldest seawashed tower in existence, and the masonry stands exactly as Stevenson designed and completed it. It has required no repair whatever during the 119 years which have elapsed since it was built. The only changes that have been made are in the arrangements for fog signalling and for the light itself, which were modernised in 1902, when a much larger lantern was built". A comparison of the pictures on pages 127 and 132 will show these changes in the lantern.

Robert Stevenson was the first of a great family of lighthouse engineers. After him three of his sons in succession took over the duties of Engineer to the Northern Lighthouse Board, and for the last forty years his grandson has held the position. Other members of the family are also connected with this work, and since Robert's time the name of Stevenson has always been an honoured one in lighthouse engineering. "The courage,

wisdom, and other fine qualities", writes Mr David Stevenson, "with which Robert Stevenson was endowed were an inspiration to his sons who succeeded him and to his grandson. I trust and believe that they will inspire the young people who read this volume."

Robert Louis Stevenson, the famous writer, best known to boys as the author of "Treasure Island", was a grandson of Robert Stevenson, and as a young man intended to become a lighthouse engineer, until his health compelled him to give up the idea. "R. L. S." has given us a charming description of his grandfather in his book "Records of a Family of Engineers", in which he speaks highly of the "Account of the Bell Rock Lighthouse" and quotes freely from it.

In the pages which follow you will be able to read for yourself Robert Stevenson's own record of a great task nobly accomplished.

GLOSSARY

ARCANUM OF VULCAN. The mystery or secret of the smith's trade. Vulcan was the ancient Romans' god of fire and metalwork.

BALLAST. Heavy material placed in a ship's hold to weight the vessel so that it will sail properly, especially when no other cargo is being carried.

BOWER-ANCHOR. One of the anchors carried at the bow or forward part of a ship.

BUSH. A metal lining or bearing for an axle, such as that of a windlass. When 'the bolt of the bush gave way' (p. 101) the axle of the machine became loose and let the stone fall.

COXWAIN. The man who steers a boat.

COURSE. One of the horizontal layers in which bricks or stones are laid when a building is being erected.

CUTTER. A small single-masted sailing vessel, with a rigging somewhat different from that of a sloop. (See 'Sloop'.)

DAVITS. A pair of curved arms forming a kind of crane, used for lowering a small boat into the water from a ship's side.

DEAD-LIGHT. A shutter to protect a cabin window, skylight, or porthole from the force of the sea.

DOVETAILING. A method of joining wood or stone in which one piece, shaped like a dove's tail or reversed wedge, is fitted tightly into a corresponding hole in another piece, thus locking the two parts together. (See illustration on p. 54.) The method is very common in woodwork; dovetails may be seen at the sides of any drawer. In masonry it is used only for special buildings such as lighthouses which have to withstand great shocks.

DULSE. A kind of edible seaweed.

EMBARGO. An order forbidding ships to enter or leave port.

FREESTONE MASONS. The men who worked the sandstone, as distinct from those who worked the harder granite (the granite masons).

FUCI. Seaweed with flat leathery leaves or fronds.

GALLEY. A ship's kitchen.

GROUND-TACKLE. The anchors and cables by which a ship is moored or anchored.

GROUTING. Pouring thin fluid mortar into the joints between the stones. It percolates into crevices which could not be reached with the trowel, and afterwards sets hard, forming a solid joint.

GUNWALE. The upper edge of a boat's side.

GUY-TACKLES. The ropes or 'tackle' used as stays to hold the upright beams of the crane in place.

HAWSER. A heavy rope or cable used to moor a ship.

HELM. The tiller or wheel by which the rudder of a ship is controlled and the vessel is steered.

JOGGLES. The small stones let in between each course or layer of masonry, to prevent one course sliding over the other. They can be seen in the section on p. 129.

JOISTINGS. The cross beams upon which the boards of a floor are nailed.

JUMPER. A steel rod or chisel used for boring holes in rock or stone. It is held in position and repeatedly struck with a hammer. Between each hammer-blow it is 'jumped' or turned slightly, so that the cutting edge gradually eats its way into the rock.

KEDGE-ANCHOR. To 'kedge' a ship is to move it by winding in a cable fastened to a small anchor (the kedge-anchor) sunk at a distance from the original position of the vessel.

LEEWARD. Away from the wind; in the direction towards which the wind is blowing (cf. 'Windward'). The lee side is the quiet or sheltered side of a ship or rock.

LEWIS-BAT. A wedge-shaped iron device for attaching a chain or rope to a block of stone for the purpose of lifting it.

LIMBERS. Holes cut in the floor-timbers of a ship to allow water to drain into the well of the ship's pumps.

LINKS. An old name for torches.

MORTISED. The upper ends of the main beams of the beacon were let into holes ('mortises') cut in the central block of wood. The 'mortise and tenon' joint is very common in woodwork, especially in framing of all kinds.

POZZOLANO. A kind of cement which will set solid under water.

PURCHASE-TACKLE. An arrangement of ropes and pulleys used for hoisting heavy weights.

REGISTER TONS. The 'tonnage' or capacity of every ship is entered in the official Register of Shipping. It was upon this 'Registered Tonnage' that the amount of Lighthouse Duty to be collected from each ship was calculated.

SAW-DRAUGHT. A saw-cut.

SCUTTLES. Holes, with lids over them, in a ship's deck or side. When waves break over the deck the water is allowed to escape into the sea or into the well of the ship's pumps by opening the scuttles.

SLOOP. A small single-masted sailing vessel rigged with a large four-sided 'mainsail' and a smaller triangular 'jib' or 'foresail'.

STANCHION. An upright post or pillar.

THWARTS. The cross benches or seats of a boat, upon which the rowers sit.

WAIST (of a ship). The central part of the vessel, midway between the 'forecastle' (forward) and the 'quarterdeck' (aft).

WINCH-MACHINE. A machine used for hauling ropes or chains by winding them upon a drum. It is similar to a windlass. At the Bell Rock the winches were turned by hand, using a crank; nowadays many winches are steam-driven.

WINDWARD. Towards the wind; in the direction from which the wind is coming (cf. 'Leeward'). The windward side is the windy or exposed side of a ship or rock.