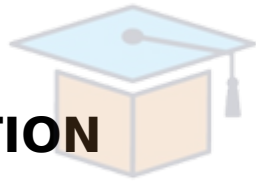


Records of A Family of Engineers

Records of a Family of Engineers by George H. B. Ward is a memoir that chronicles the achievements and personal stories of the Ward family, highlighting their significant contributions to engineering over several generations.



Summaryer

INTRODUCTION

The Stevenson surname, with its of variations like Stevinstoun, Stevensoun, and Stewinsoune, was widespread in Scotland from the 13th century. However, by 1700, the presence of land owned by Stevensons in Scotland was almost nonexistent, with a few exceptions. The narrative provides a broad sketch of the Stevenson family, revealing a history of modest progress and near extinction. Despite the bleak outlook of the family's future, records uncover numerous Stevensons involved in Scottish history, albeit in less conspicuous roles—ranging from members of Parliament to local physicians.

The narrative shifts to personal accounts and the ambiguous origins of the Stevenson name, suggesting Norse, Gaelic, or even a proscribed Clan MacGregor connection. Specifically, the detailed account of Stevensons alternating between their name and MacGregor highlights the adaptability and resilience of the family identity through periods of proscription and political turmoil. The author also entertains a family legend of descent from a French barber-surgeon connected to the Cardinal Beaton, reflecting on the complex web of heritage and identity defining the Stevenson lineage.

Despite the lack of distinguished achievements or noble lineage, the Stevensons are portrayed as a family of decent, reputable individuals engaged in various professions. The rare anecdote of John Stevenson's piety during a storm and his silent prayers

highlights the family's simple yet strong character. The text encapsulates a journey through the Stevenson family history, exploring its potential origins while acknowledging the fluidity and uncertainty of identity. Ultimately, the narrative serves not as a definitive genealogy but as a meditation on the nature of heritage, symbolized by the diverse stories and possible roots of the Stevenson family.



CHAPTER I DOMESTIC ANNALS

In 1665, James Stevenson, likely a tenant farmer from Nether Carsewell, Renfrewshire, married Jean Keir. Their son, Robert Stevenson, was born in 1675 and later became a maltster in Glasgow. In 1710, Robert remarried Elizabeth Cumming, with whom he had a son named Robert in 1720, also a maltster. The narrative traces the lineage to Hugh Stevenson (born 1749) and Alan Stevenson (born 1752), focusing on their lives, early deaths, and ventures in the West Indies, which included a hunt for a deceitful agent that ultimately led to their demise.

The family inherited only a ship painting as a memorial to their adventures and losses. Jean Lillie, a widow passionate about ensuring a prosperous future for her son through education, struggled financially. These domestic and professional ambitions intertwined with Thomas Smith's life, a successful businessman interested in engineering and lighthouse construction who later married Jean Lillie's daughter, effectively blending familial and professional alliances.

The early parts of the family's narrative unfold against a backdrop of perseverance amidst adversity, including considerable infant mortality that deeply affected the family. Letters from the era reveal the emotional toll these deaths took on the family and their community, showcasing a blend of personal tragedy and steadfast piety.

Robert Stevenson, Jean Lillie's grandson and Thomas Smith's stepson, showed early promise and took up engineering under Smith's mentorship. This marked the beginning of the family's enduring legacy in lighthouse engineering. Robert's marriage to Jean Smith, his stepsister, solidified the intertwining of personal and professional realms. Their life, filled with aspirations for their children's futures and the shadow of loss, symbolizes the blend of domestic life with the ambitions inherent in the Stevenson lineage.

The narrative is rich with historical context, detailing the Stevenson family's ties to Scotland's development and the personal trials they faced. This early history sets the groundwork for understanding the significant contributions the Stevensons would make in engineering and beyond, rooted in resilience, ambition, and a profound sense of duty to both family and profession.



I -Records of a family of engineers

Chapter II of "Records of a Family of Engineers" chronicles the dedicated endeavors of Thomas Smith and Robert Stevenson in establishing and maintaining lighthouses along Scotland's perilous coasts, showcasing a profound contrast between their adventurous engineering pursuits and the domestic tranquility of their family lives. In the late 18th and early 19th centuries, the Scottish coastline, notorious for its shipwrecks, was predominantly unlit, save for an ancient beacon on the Isle of May. Undertaking commissions from the Northern Lighthouse Board, Smith, followed by Stevenson, embarked on arduous journeys to inspect, design, and construct lighthouses in remote and dangerous locations, facing both natural and bureaucratic adversities.

Their work, fundamental to the safety of maritime navigation, involved not only the architectural challenge of erecting lighthouses on rugged terrains but also entailed logistical complexities, such as transporting materials and maintaining supplies to these isolated outposts. The inadequacy of funds and the absence of infrastructure amplified the hardships encountered in these endeavors. The narrative vividly recollects instances of peril at sea, the physical toughness required for land travels in uncharted territories, and the unique, often primitive living conditions of the remote Scottish isles.

Moreover, the chapter delves into the cultural and social backdrop of the Orkney and Shetland islands, portraying the residents' lives marked by simplicity, isolation, and a keen reliance on the sea. Through anecdotal tales—ranging from shipwrecks contributing to the local economy to encounters with islanders whose customs seemed untouched by time—the text reveals the profound divide between the advancing technological achievements of the mainland and the static, time-honored ways of life in the islands.

The engineers' contributions, while initially met with skepticism or indifference by the island communities, eventually became integral to the regions' maritime safety, altering the islands' relationship with the sea. Yet, the Stevenson family's saga is also one of personal valor and intellectual curiosity, as they navigated not only the physical landscape of Scotland's coast but also its cultural and social frontiers, leaving a lasting legacy of light where there was darkness.



II -Records of a family of engineers

From the beginning of the century until 1807, Robert Stevenson partnered with Thomas Smith in serving the Board of Northern Lights, thereafter continuing alone. Stevenson, dedicated both to his profession and the well-being of his lightkeepers, dealt with the isolation and challenges lightkeepers faced, from quarrels in isolated sea towers to the temptations of sloth in maintaining the stations. With rigorous personal standards and a keen eye for detail, Stevenson's correspondence reveals a man of intensity, committed to excellence in every facet of the lighthouse service.

Lightkeepers, positioned in desolate and remote locations, faced unique challenges. Stevenson, noting the difficulties and occasional slothfulness of his keepers, emphasized the importance of diligence. An anecdote illustrates the challenge of surprise inspections, revealing ingenious ways keepers received advance warnings. Despite the strictness, Stevenson's care for his employees extended beyond their professional lives, involving himself in their personal well-being and their families' futures.

His approach was methodical, expecting high standards in cleanliness, maintenance, and personal conduct, evidenced by various correspondences urging keepers to uphold these values or face consequences. Special attention was given to social harmony within the lighthouse stations, revealing Stevenson's understanding of the human element crucial for smooth operation.

Stevenson acted as a patriarch, balancing discipline with genuine concern for his employees' welfare, engaging in their lives, extending hospitality, and offering assistance in times of need. His investment in their professional and personal development fostered a deep respect within the service.

An account of young foreman builder George Peebles, who tragically died in a shipwreck, glimpses Stevenson's personal connections and the losses endured during his tenure. This balance of strict professionalism and personal engagement defined Stevenson's legacy in the Northern Lights service, highlighting his multifaceted approach to leadership and care for his people.



III -Records of a family of engineers

In this chapter, we delve into the professional life and underlying philosophy of Robert Stevenson, an esteemed engineer known for his practical approach towards engineering challenges. Stevenson is renowned not merely for his mechanical inventions, such as the Jib or Balance Crane at the Bell Rock, but more so for his ability to project works against nature and modulate the natural environment to meet human needs. Whether it involved constructing roads, buildings, harbors, or managing river channels, Stevenson exercised a profound connection with the natural elements, demonstrating an unparalleled commitment to understanding nature's intricacies for over half a century.

A significant part of Stevenson's excellence lay in his meticulous observation and measurement of natural phenomena, a testament to his belief in the power of mensuration. He held a conviction that engineering essentially deals with what can be quantified and measured, emphasizing the importance of experience, intuition, and an 'exquisite sympathy' for nature in the field of civil engineering. Stevenson's approach to engineering was highly practical, always considering the unpredictable forces of nature and incorporating a certain 'transcendental sense' into his calculations and predictions.

The narrative also reveals Stevenson's passion for chronicling his experiences and observations, albeit acknowledging the limitations of conveying such a tacit knowledge through literature. His extensive records, described as a "voluminous handy-book of nature," reflect not only a diligent pursuit of professional expertise but also an ambitious, albeit impractical, attempt to document all conceivable knowledge relevant to engineering. Stevenson's lifelong endeavor to capture the essence of his work and the broader scope of engineering in his writings underscores a pioneering spirit amidst the evolving landscape of engineering in his time.

Through Stevenson's story, we come to appreciate the balance between empirical data and the inherent intuition required in civil engineering, a discipline deeply intertwined with the natural world. It highlights the indispensable role of personal experience, observation, and a nuanced understanding of nature's laws in developing engineering solutions that stand the test of time and elements. Ultimately, Stevenson's legacy is portrayed as a blend of innovative engineering achievements and an enduring quest to harmonize human endeavors with the unpredictable dynamics of nature.



CHAPTER III THE BUILDING OF THE BELL ROCK

Chapter III of "Records of a Family of Engineers" details the challenging endeavors surrounding the construction of the Bell Rock Lighthouse, positioned in the treacherous waters where the Tay and the Forth rivers meet the North Sea. The Bell Rock, notorious for its hazardous navigation conditions, lay submerged under the sea at high tide, revealing its menacing form only during low water, making it a perilous obstacle for mariners. Early efforts to mark this danger with beacons were futile until Robert Stevenson envisioned the ambitious project of erecting a stone tower on this remote reef, an idea initially met with skepticism.

This chapter emphasizes the historical significance of the Bell Rock, detailing early attempts to caution mariners through a legend of a bell installed by an abbot of Arbroath, only to be removed by pirates, leading to a tale of divine retribution. Despite these warnings, the rock continued to claim vessels, highlighting the dire need for a permanent solution.

Robert Stevenson, the chapter's central figure, is portrayed as a visionary engineer who, despite his limited experience, was undeterred by the immense challenges. His pioneering spirit was supported by influential figures of the era, such as John Clerk of Eldin, who recognized the unique nature of the endeavor that required innovative approaches rather than reliance on past experiences. Stevenson's initial proposals faced obstacles, including legislative hurdles and skepticism from the engineering community. However, through perseverance and the eventual support of John Rennie as an advising engineer (albeit with limited involvement in the design and execution phases), Stevenson managed to advance his project.

The chapter also delves into the technical and logistical preparations for the lighthouse's construction, from the selection of a suitable vessel, the PHAROS, to serve

as a floating lightship, to the meticulous planning and modeling of the tower's design. Stevenson's adoption and improvement of Smeaton's architectural techniques are highlighted, showcasing his contribution to the evolution of lighthouse engineering.

As the chapter concludes, the narrative sets the stage for the commencement of construction work, with the PHAROS moored by the Bell Rock, symbolizing the onset of a daunting but historic achievement in maritime safety. The tale is not just a recounting of engineering feats but a testament to human resolve, ingenuity, and the relentless pursuit of safeguarding lives against the unforgiving force of the sea.



Summaryer

I - OPERATIONS OF 1807

In the ongoing and perilous efforts to construct a lighthouse on the Bell Rock, significant progress was made, despite the constant battles against the elements and the limitations of working hours dictated by the tides and weather conditions. The construction team, led with exemplary dedication, often extended their working hours to the extreme, squeezing out as much time as possible on the rock - a practice that necessitated utmost caution to avoid being stranded by sudden changes in weather.

A noteworthy achievement was the erection of the beacon, a structure crucial not only for the immediate safety of the workers but also as a temporary marker for the rock itself. This task was executed with remarkable efficiency and speed, largely thanks to favorable weather conditions and the concerted efforts of the construction crew. The beacon's establishment significantly boosted morale, as it symbolized a preliminary conquest over the challenging conditions posed by the Bell Rock.

The construction process was marked by the introduction of innovative solutions to logistical challenges, including the setting up of a forge on the beacon platform for ironwork, which reduced the back-and-forth transport between the rock and the support ships. Furthermore, the workers experienced their first meal on the rock, a simple but morale-boosting change that further anchored their presence on this solitary outpost in the sea.

Throughout these endeavors, meticulous planning and the unwavering resolve of the team were evident. Working hours were maximized to an exceptional extent, with shifts extending up to sixteen hours, taking advantage of both low and high tides. Essential supplies, including food and water, were kept at hand on the beacon to prepare for any sudden changes in weather that might prolong the workers' stay on the rock beyond planned schedules.

Despite the progress and successes, the work was not without its hazards and discomforts. The crews contended with the physically taxing environment, the ever-present danger of being stranded by unexpected storms, and the challenge of maintaining morale under such trying circumstances. Yet, the collective commitment to the task, underpinned by careful planning and adaptability to the unpredictable North Sea environment, drove the project forward, laying the groundwork for the eventual success of the lighthouse construction.



III - OPERATIONS OF 1809

In the chapters of "Records of a Family of Engineers," the narrative continues detailing the intricate and arduous process of building the lighthouse on the Bell Rock. The work is marked by strenuous efforts to transport and lay stones despite the challenges posed by the tides and weather. Beginning with detailed accounts of landing materials, setting up cranes, and laying stone courses, the narrative underscores the laborious nature of construction at sea. The workers faced numerous obstacles, from unloading stones in windy conditions to working within limited windows of low tide. The mention of specific dates provides a chronological insight into the construction phases across different seasons, highlighting the project's slow progression against the elements.

The construction is not just a technical feat but also a deeply human endeavor. The narrative delves into the lives of those involved, from Peter Logan, the foreman builder, to Peter Fortune, the beacon-house's cook and steward. Character sketches of individuals like Forsyth, an upholsterer preferring the isolation of the beacon for his aversion to the sea, enrich the narrative, showcasing the diverse backgrounds and personalities contributing to the lighthouse's construction.

Incidents of bravery and endurance punctuate the narrative. For instance, during a gale, some workers chose to stay on the rock, illustrating the resolve inherent in the project. The text also reflects on the logistical nightmares, such as the embargo affecting shipping and the consequent scramble to keep the work going. The completion of stone courses amidst these challenges is celebrated with cheers, demonstrating the crew's camaraderie and shared goal.

The narrative also touches on adaptations and innovations, such as the beacon-house serving not only as a storage and workshop but eventually as accommodation, signifying the transition of the Bell Rock from a mere rock to a site of human habitation.

and industrious activity.

Beyond the construction efforts, the text notes weather patterns, from thick fogs causing disorientation to gales demanding adjustments in work plans, underscoring the unpredictable environment that constantly tested the resolve and resourcefulness of the engineers and workers.

In sum, these chapters of "Records of a Family of Engineers" offer a vivid glimpse into the monumental task of building the lighthouse amidst the North Sea's challenges. It combines technical detailing of construction with human stories of resilience, teamwork, and innovation, illustrating the multifaceted endeavor that the construction of the Bell Rock Lighthouse was.

IV - OPERATIONS OF 1810

Having landed at seven, and found everything in an orderly state, the landing-master's crew again commenced the work of getting the cast iron rails of the stair into the house, several of which, being upwards of 400 pounds weight, required considerable tackle for lifting them out of the hold of the ship and into their places, which was done by fixing a pair of shears or a triangle of spar upon the solid rock.

This piece of work, the rails being all of different figures and numbers, was found to be more intricate, and to require more labour and management than had been anticipated, as the different pieces could not be distinguished without being measured and accurately fitted to their respective places.

On a subsequent visit on the 5th of December, a storm caused significant damage. The beacon-house, although shaken by the tempest and its lower parts filled with water and rubble, stood firmly. The powerful seas had, however, swept away several of the temporary fixtures of the lighthouse, including a small temporary wooden rail around the balcony, storm shutters, and even one of the principal beams supporting the temporary rail or fence. This event highlighted the absolute necessity of the permanent iron railings planned for the balcony.

Captain Wilson, the landing master, laid up with a severe cold, left the rock after landing the essential provisions. The rest of the crew, including Mr. John Reid, the principal lightkeeper, worked diligently to secure the lighthouse and beacon against future storms. The ongoing efforts included the installation of the light room's remaining fixtures and the permanent railings around the balcony. These preparations were crucial for the upcoming winter, when working conditions would become even more challenging.

Throughout these efforts, the resilience and ingenuity of the construction crew, as well as the meticulous planning and supervision of the engineering and leadership teams, were evident. Their dedication ensured the lighthouse would not only serve as a vital navigational aid but also stand as a testament to human perseverance in the face of nature's magnificent fury.

