

CHAPTER ONE



A COUNTRY BOY

Glenlair 1831–1841

When they had their first glimpse of the newcomer, the boys of the second year class could scarcely contain their hostile curiosity. He was wearing an absurd loose tweed tunic with a frilly collar and curious square-toed shoes with brass buckles, the like of which had never been seen at the Edinburgh Academy. At the first break between lessons they swarmed around the new boy, baiting him unmercifully, and when he answered their taunts in a strange Galloway accent they let out whoops of jubilant derision. At the end of a long day he arrived home with clothes in tatters. He seemed to be dull in class and soon acquired the nickname 'Dafty'. The rough treatment went on, yet he bore it all with remarkable good humour until one day, when provoked beyond endurance, he turned on his tormentors with a ferocity that astonished them. They showed him more respect after that, but the name 'Dafty' stuck. So started the academic career of one of the greatest scientists of all time, James Clerk Maxwell.

The first 8 years of his life had been wonderfully happy. He was born in Edinburgh¹ but brought up at Glenlair, his father's estate in the gently rolling Vale of Urr in the Galloway region of south-west Scotland². His parents, John and Frances Clerk Maxwell, had married late and their first child, Elizabeth, had died in infancy. Frances was almost 40 when James was born. She and John adored their son and watched over his development with

A COUNTRY BOY



indulgent devotion. As soon as he could walk and talk a little it became plain that he was a remarkable boy. Like all children he was curious about everything around him, but his curiosity was of a different order and reached into places rarely explored. For example, it was not enough for him to discover how to ring the house bells; he had to find out which of the bell-pulls around the house rang which bell in the kitchen and where all the wires ran. And he could turn everyday objects to surprising uses. One day his nurse Maggy gave him a tin plate to play with. Perhaps he first tried banging it with a spoon or rolling it across the floor but soon he was excitedly calling his mother and father to come and see how he had brought the sun into the house by reflecting its image off the plate on to a wall.

As he grew, he played rough-and-tumble games with the local children, climbed trees, explored the fields and woods and watched the animals and birds with rapt attention. He enjoyed the morning chore of fetching water from the river by cart. Nothing that went on in the house escaped his attention. Nobody could do anything without having young James appear, demanding a full explanation and insisting on having a go himself. He knitted, made baskets, took a hand in the baking and helped his father design and plan improvements to the estate. Like all boys he could be a little monkey at times. One evening, just after dark, he blew out the candle as Maggy was approaching with the tea tray and lay down in the doorway.

He quickly learnt to read and, under his mother's guidance, began to understand the wider world. He enjoyed history and geography and, especially, literature. Before long he was reading everything within reach. Milton and Shakespeare were particular favourites. What is more, he seemed to remember most of what he had read.

For entertainment, the family would often read novels or poetry aloud or act out a play. And religion was an important part of the domestic routine: every day the household, including servants, met for prayers and every Sunday they went to Parton church, five miles to the west. His father's background was

THE MAN WHO CHANGED EVERYTHING



Presbyterian, his mother's Episcopalian, but both took a tolerant view of doctrinal matters. The Clerk Maxwells played their full part in the social life of the area; there were fairs and dances and visits exchanged with other leading families. There were also visits to and from relations in Edinburgh and Penicuik, the estate of James' uncle.

Life at Glenlair was harmonious, stimulating and gently bustling. It was also full of jokes and banter. There was no pomposity whatever—no person, institution or topic was above some gentle debunking. The spirit of these times stayed with James all his life. We shall see this demonstrated time and again but, even so, let us cheat a little by taking a glimpse now at a poem he wrote when he was 26, teasing his friend William Thomson, who was consultant to the Atlantic Telegraph Company, when its cable-laying ran into difficulties.

Under the sea, under the sea,
No little signals are coming to me.
Under the sea, under the sea,
Something has surely gone wrong,
And it's broke, broke, broke;
What is the cause of it does not transpire
But something has broken the telegraph wire
With a stroke, stroke, stroke,
Or else they've been pulling too strong.³

No *Schadenfreude* here. Maxwell admired the transatlantic cable project immensely and even suggested how they might lay the cable more smoothly and economically by using an underwater kite. He just couldn't resist poking a little fun.

James' parents were fairly new arrivals in the Happy Valley, as the Vale of Urr was known to its residents. John Clerk Maxwell was an advocate who had lived most of his life in Edinburgh. He had an adequate private income and it did not matter much to him that his practice never flourished. John's heart lay elsewhere—in his hobby, which was what we would now call technology. He had built up a wide range of friends in industry, agriculture

A COUNTRY BOY



and universities and enjoyed keeping abreast of new ideas. His life ticked away pleasantly but ineffectively until events took a turn when he was in his late 30s. A long-standing acquaintance with the sister of a friend blossomed into romance and she agreed to marry him. Frances Cay was a spirited and resolute woman who supplied the get-up-and-go he had so far lacked. Both their lives were transformed and Glenlair was the focus. John had inherited the estate some years before and had toyed with the idea of going to live there and applying his ideas on farming. Now the day-dreams changed into hard and purposeful activity—they resolved on setting up home at Glenlair.

Previous owners of the estate had been absentee landlords and there was no suitable dwelling there. But to John this was an advantage: the prospect of designing and building his own family house was irresistible. The house he designed was a modest one for a country gentleman of that time—he planned to extend it later. Impatient to start their new life, he and Frances moved to Glenlair soon after building started and lived in one of the estate cottages until the house was habitable. They launched themselves wholeheartedly into country life, then endured the anguish when their first child died. When Frances became pregnant for the second time they decided to go to Edinburgh for the birth, to be near relations and hospital if needed. Soon after James was born they returned home and family life began.

Glenlair had belonged to John's family for only three generations. It was the 1500 acre residue of a much larger estate called Middlebie, which had been the seat of the fierce Maxwell clan. John's family name was Clerk: by the normal reckoning he was not really a Maxwell at all; neither was James. The Clerks had acquired the Middlebie estate by marriage in addition to their own baronetcy of Penicuik, 10 miles south of Edinburgh. They arranged that Penicuik would be passed on to the senior heir and Middlebie to the second, and that whoever inherited Middlebie would add Maxwell to the family name. When John's grandfather lost a fortune in mining investments most of Middlebie had to be sold, leaving only Glenlair. So it came about

THE MAN WHO CHANGED EVERYTHING



that James' father was John Clerk Maxwell of Glenlair while his uncle was Sir George Clerk of Penicuik.

John and Frances came from exceptionally talented families—previous generations of Clerks and Cays had distinguished themselves in many fields⁴. To do justice to this point would take us too far from our story, but two examples from the Clerk line will give an idea.

James' great-great-grandfather, Sir John Clerk, was the kind of man whose easy brilliance at everything he did makes most of us despair of our own efforts. As well as being a Baron of the Exchequer of Scotland and a Commissioner of the Union he wrote good music that is still performed today. He was a Fellow of the Royal Society and an influential authority in archaeology, architecture, history, astronomy, geology and medicine.

One of Sir John's sons, another John Clerk, was a spectacularly successful businessman as well as a gifted artist and geologist. He worked with his friend James Hutton and illustrated a volume of Hutton's seminal work, *Theory of the Earth*. But his masterpiece was an essay on naval tactics. It is extraordinary that a landlubber—he never went to sea—should even think of writing such a book, but what is more remarkable is that it became the standard work on the subject. Nelson used several sentences straight from the essay in his orders for the battle of Trafalgar.

There was little evidence in John and Frances' homely house at Glenlair of their illustrious antecedents. No grand family silver, no portrait gallery. Their one prized heirloom was a battered set of bagpipes which James' grandfather, a captain in the British East India Company's Navy, had used to keep afloat when he was shipwrecked. The lack of formal trappings made it a wonderful home for their son. James had a much closer relationship with his parents than was usual among the gentry; his mother became his tutor and his father often took him along when dealing with estate business. This still left him plenty of time to run around with the local children. He learnt their Galloway speech and acquired a local accent that he would never entirely lose. No child could have been happier, but sadness was to come.

A COUNTRY BOY



Frances became ill and abdominal cancer was diagnosed. She decided to have an operation without anaesthetic. The chances of success were slim but she wanted to live longer if possible for the sake of her husband and son and so chose to undergo this excruciating treatment. But the operation was not successful and Frances died soon afterwards. She was 47 years old.

Frances had been the hub of the family; without her the house at Glenlair must have been a desolate place for a while. Heavy of heart, John and James were glad, at least, that her suffering was over. The loss brought them even closer together and the father enjoyed his son's lively companionship. There was, however, the problem of schooling. The plan had been for James to be educated at home until he was 13, when he would go straight to university. But John was too busy with the estate and with various county boards and committees to teach the boy himself. There was no suitable school within daily travelling distance and he dreaded the loneliness that would follow if he sent James away.

He decided to engage a private tutor and chose a 16 year-old boy from the neighbourhood. The lad had done well in exams at school but delayed going to university so he could take the post. No-one then or since has been able to fathom how John Clerk Maxwell came to make such an ill-judged choice. Knowing he had an exceptionally gifted son, how could he entrust his education to a youth with little knowledge and no experience of life beyond school? Whatever the reasons, the results were disastrous.

The tutor used the methods by which he had himself been taught: rote learning encouraged by physical chastisement. The lessons became a moral and physical ordeal. James wanted to please his father but saw no sense in the mechanical recitation of words and numbers divorced from any meaning. No amount of ear pulling and cuffing about the head could persuade him to learn in that fashion. His local friends had no doubt suffered similar treatment at school, so perhaps he thought it was simply something that had to be endured. But eventually, after more than a year of torment, he rebelled.

THE MAN WHO CHANGED EVERYTHING



Beside a duck pond near the house was a large washtub that James used to use as an improvised boat. In the middle of a lesson, his tolerance exhausted, he ran out, pushed the tub into the water, jumped in and paddled himself to the deepest part of the pond. Ignoring the tutor's urgings, he refused to come in. Although reproved by his father for this act of rebellion, James had made his point.

His Aunt Jane, Frances' younger sister, who lived in Edinburgh, was quick to understand what had been going on and persuaded John that it was high time that 10 year-old James had proper schooling. John's widowed sister, James' Aunt Isabella, who also lived in Edinburgh, agreed. The Edinburgh Academy⁵, one of the best schools in Scotland, was only a short walk from her house; James could stay with her during term time and return to Glenlair for the holidays. Much as he hated the thought of parting from his son, John could see that Jane and Isabella were right and agreed to the plan.

Unfortunately, the first year class was full, so James had to enrol in the second. There he would be joining a class of 60 older boys who had already spent more than a year in the school, long enough to have absorbed its conventions and developed their own schoolboy culture. They were mostly from smart Edinburgh families and spoke with refined accents. Clearly, life was not going to be easy for the newcomer. What made things even harder was that his father had designed and made special clothes for him. From a logical standpoint, they were excellent: warm, hard-wearing and comfortable, with a loose tunic and square-toed shoes. But John seemed oblivious to the human factor: to the boys in James' new class, in their conventional tight jackets and slim shoes, the newcomer looked like a ridiculous peasant from a foreign land.

So it was that James arrived for his first day at the city school, a country boy with a strange accent and wearing peculiar clothes. As we have seen, he was tough enough to ride out his rough reception and parry the taunts. A hard time lay ahead, but in the end the attitude of his classmates was to turn from ridicule to acceptance, and finally to admiration.