

On Sundays she received her weekly housekeeping money, accompanied in early days with due directions as to "debit" and "credit"; and, after six weeks in England, she was trusted to go marketing alone, though her brother Alexander generally hovered at no great distance, in case she should find any insuperable difficulty in making known her requirements.

William was now making a considerable income by concerts, compositions, teaching, and organ-playing, and for a time her attention was principally devoted to making herself of service to him in the musical world.

By diligent practising, she made herself equal to performing in oratorios and concerts with no inconsiderable success, the only stipulation which she ventured to make being that, *only* when William was conducting should she be asked to do so. The marvellous activity of those first ten years may be guessed from the fact that William Herschel was giving from thirty-five to thirty-eight music lessons every week, and that during this time Caroline persevered in her novel duties—practising, performing, and copying scores, just as directed by the beloved brother. She saw and heard nothing save *through him*; but it is evident that, had self-aggrandisement been ever in her thoughts, she might have made for herself a permanent position in the musical world. For, incredible as it may

appear, she was soon counted worthy, even by such stern critics as her own brothers, to take the part of leading treble in oratorios; and the fashionable leaders of Bath society were loud in their praises of her voice and manner. This admiration, however, was not reciprocated, and, in her blunt German fashion, she denounced the ordinary young ladies as "very little better than idiots."

But the poor little prima-donna housekeeper had by no means exhausted her duties when she returned weary and jaded from a long evening of responsibility and exertion in the crowded concert-rooms of Bristol or Bath. Music to William was but a means to an end, and that end was Astronomy. Unconscious of fatigue himself, he seems to have lost all count of time when bent upon solving some of the mighty mysteries of infinite space; and his sister's aid was found invaluable. He had tested his brothers, but had found them wanting; and her obedient zeal in helping forward all his schemes made him realise that here, at last, was one upon whose deftness, adaptability, and strenuous help he could confidently depend. Night after night for eight years they worked together—calculating, measuring, mirror-grinding, examining, writing memoranda,—and not until daylight had chased away the stars did she allow herself to be tired.

Never was a man of science so favoured in his

assistant. Alexander, though both musical and mechanical, had no perseverance; and, while his 'cello solos were "divine," he lacked the steady fixedness of purpose which would have raised him to the first rank of public performers. It was Caroline, therefore, on whom William relied for help in the construction of tools, for grinding and polishing, "Logarithms made easy" is a book which has yet to be written; but with these also Caroline had to be conversant, as well as with mathematical problems of which her ready brain had to assimilate the working, while her tiny hands dispensed the frugal meals. Sometimes William used laughingly to make her forego part of her dinner if she could not describe the angle of the piece of pudding which she was cutting. She it was who fashioned the pasteboard model of the tube to hold the first large telescope, and her dexterous fingers and eager longing to be of service made her—as, with a touchingly proud modesty, she herself expresses it—"almost as useful as a boy."

At one stage of fashioning a reflector it is necessary for the workman to remain for many hours with his hands on the mirror. On one occasion William never stirred for sixteen hours, his sister meanwhile feeding him and reading to him, ready at any minute to obey his slightest wish. At such times as these she read aloud the novels of Sterne and

Fielding, and the gorgeous stories of 'The Arabian Nights'; but the fairy tales of science were all their own, and we can fancy that silence would often fall between them as they speculated upon the wonder-lands of the moon with its flame-breathing craters, the mazy labyrinths of the "Milky Way," or the faithful satellites of Saturn.

And she *never failed him*. In all his work she was his veritable "alter ego." In winter nights, when the ink froze upon her pen, she still was by his side—in garden or in garret—helping him to do work which, without her, would have been well-nigh impossible. As in music so in astronomy—her one idea was, "All I am, all I know, I owe to him. I did nothing for *my* brother but what a well-trained puppy-dog would have done: that is to say, I did what he commanded me. I was a mere tool, which *he had the trouble of sharpening*." The italics are our own, and in them, between the lines, we can read the faint, underlying bitterness with which she looked back upon her neglected education. In a note to her nephew (afterwards Sir John Herschel) she says, "My only reason for saying so much of myself is to show with what miserable assistance your father made shift to obtaining the means of exploring the heavens." This was her own self-estimate; ours is far different, and so we are convinced was his also. He might have discovered scores of planets; but, had he not appreciated her

skilful help, he would nevertheless have been a contemptible cur.

For some years they lived at 7 New King Street, but for the sake of better accommodation they subsequently (in 1779) removed to No. 19, where, on the 13th of March 1781, a planet of the third magnitude, with a diameter of 35,000 miles, was discovered by William Herschel. This vast planet was called by him *Georgium Sidus*—the Star of George—in honour of George II.; but the name of *Uranus* was subsequently given to it, as being more in harmony with those of the other planets. Not much imagination is needed to reproduce that important occasion before our eyes.

It is evening, in the early spring; the sky is clear and all is quiet, save when at intervals the watchman can be heard chanting the hours. Only too quickly to the busy students do they pass, for when dawn breaks upon the world their self-imposed labours must be discontinued. The telescope has been fixed for the nightly "sweeping"—star by star is carefully examined—but a new object in the silver-spangled sky arrests his attention. Caroline, who is taking rapid notes beside him, is called hurriedly to the instrument, lest perchance he should have been deceived; and not until her quick eye and ready intelligence have ratified it, does he feel for the first time the thrill resulting from a great discovery. Never again can they have felt quite the

same proud delight, for never again had they the same obstacles to overcome; and though the marvellous 40-foot telescope subsequently enabled them to make many and valuable discoveries, it was not quite the same, we may be sure, to either of them as the home-made instruments which, almost unaided, this wonderful pair had constructed and set up in the little garden behind 19 King Street, Bath.

A hundred years ago Bath was a small provincial town. The population was a varying one—never numbering more than 31,000—and there was not a single optician in the place. Every lens and piece of mechanism had to be sent from London, thus increasing their difficulties enormously, as waste of time, trouble, and money were thereby entailed. In spite of the most careful frugality, they still found it impossible to give up the earnings derived from music,

The "heavenly maid" had helped them consistently hitherto, but the time was nigh, even at the door, when organ and oboe should be put aside, and when science, the first love of William Herschel's life, should reign pre-eminent over the lives of both brother and sister. They made their last public appearance together, on the Whit-Sunday of 1782 at St Margaret's Chapel, Bath,—the anthem, in which Caroline sang, being composed and conducted by William himself

Henceforward, astronomy was their only care and

study; though, when her allotted threescore years and ten were long past, Caroline was constantly to be seen at the concerts in Hanover, and the "little old lady" was a familiar figure in the stalls of the opera-house.

It was in August 1782 that, through the influence of His Majesty, George II., the Herschels left Bath for Datchet, William having been created Astronomer-Royal, with a salary of £200 per annum. It was a post that brought with it more honour than honoraria; but money with the Herschels had never been plentiful, and the deceitfulness of riches was to them an unknown danger. They cheerfully determined to live upon eggs and bacon, and set to work upon the construction of that wonderful 40-foot telescope which swept the heavens with such unthought-of results. Recognising her share in its construction with gratitude and astonishment, we see in it a monument of unremitting industry and endurance, such as dwarfs all other astronomical instruments into insignificance, and her woman's wit doubtless supplied suggestions as to ways and means, and expedients which would not have occurred to the less practical mind of her brother. Hers is not a solitary instance of deliberate self-effacement, but the world will never know how much more than the mere discovery of eight comets was due to the tireless energy and unselfish adaptability of Caroline Herschel. It is beautiful to think that

she lived to enjoy the fruits of their joint labours, and to see her brother recognised as one of the most celebrated men of the day. The house at Datchet was in a state of great dilapidation, but at any rate it was large, and the stables and laundry were speedily glorified by them into workshops and observatories.

One winter's night, when the snow lay a foot deep upon the ground, they were examining stars outside the house. She was hurrying to a little distance from the telescope to make some special observation when she fell heavily upon an unseen butcher's hook, which penetrated deeply into her leg. "Make haste, Caroline," came his voice across the dark whiteness. "I can't, William, I'm hooked," was the feeble answer; and when, with much difficulty, the bleeding limb was extricated, nearly two ounces of flesh had to be left behind. Even then her only thought was of him, and her only comfort amid the pain was that, as clouds were coming up rapidly, she had not materially hindered his night's work.

Such fortitude as this reminds us of the well-known "carriage incident" of which Mrs Disraeli, to whom the great Prime Minister was so justly devoted, was the heroine. On an anxious House of Commons night in the early 'Fifties she drove down with him to Palace Yard. Her finger was caught and crushed in the door on entering the



carriage; but she bore the agony unflinchingly for fear of disturbing his thoughts, and not until he had left her for the House of Commons was she released from her torture.

The Datchet landlady proved herself a failure, and Clay Hill, Windsor, their next abode, was insufferably damp, so that in April 1786 they again had to move themselves and their weighty belongings,—no slight consideration,—and at last got comfortably settled in Slough. The king now gave to William Herschel a further grant, in order to enable him to prosecute his scientific labours unhampered by pecuniary anxiety, and, as Astronomer - Royal, he was frequently summoned to London. Many of Caroline's observations were now made in solitude. Alone, in the cold star-lit nights, the sweeping of the heavens was not an unmixed pleasure, though the discovery of "the first lady's comet," which so much interested Fanny Burney, must have been a really delightful experience. When she found herself invested with the dignity of a discoverer she surely must have realised, if only for the first time, that she was neither a tool nor a fool. In reply to her modest announcement, we find the famous scientist Alexander Aubert writing—

"You have immortalised your name, and you deserve such a reward from the Being who has ordered all these things to move as we find them,

for your assiduity in the business of Astronomy, and for your love for so celebrated and so deserving a brother."

A salary of £50 per annum was now granted her as "assistant" to the Astronomer-Royal, and in 1787 she received "the first money that ever in all my life I thought I could spend as I liked."

We find from another entry in her Diary that she had been accustomed to put down her little personal expenses in her brother's account-book as "for Car."; but that, since leaving Bath, they had never exceeded £8 per annum. Such a statement is too touching in its simple honesty to need comment; but in these days, when the papers think it worth while to discuss the question as to whether £100 per annum is a niggardly dress allowance, we can but admire, and wonder, and adore!

It was to Slough that there came one day the Princesse de Lamballe and her suite to see *the* telescope, and to make the acquaintance of the astronomers. Little did any of the party think what a few weeks would bring to that dainty and beautiful lady. In Carlyle's matchless history the last scene of her life is thus described: —

"Princesse de Lamballe has laid down on bed.

"'Madame, you are to be removed to the Abbaye.'