

Sir William Rowan Hamilton

Illnesses and Astronomy

It has often been claimed that Hamilton was not a very enthusiastic practical astronomer. I had not doubted that conclusion when I first started on my Hamilton essay, and I therefore did not give much attention to it. But when I started to write the sketch about Catherine Disney, I had to reread those early years, and realized that there were more references to his weak health than I had noticed. In what follows I will not give references, it can all be found in my essay and in my sketch, and in Graves' biography, which is arranged chronologically.

1 Early years, and Trim

In August 1807 Hamilton's father went bankrupt, which had to do with what he had done for Archibald Hamilton Rowan, against whom he later won a lawsuit about money. But in the meantime the family's belongings had been publicly sold, up to their washing machine, and a year later Grace and William were living in Trim. Graves does not know when exactly the children were brought to Trim; the first letter showing they were in Trim is from September 1808, and he supposes they were there for some time weeks already.

Because there seems to be no further information it has often been assumed that the bankruptcy and the sending the children to Trim was directly connected. Yet the family did not lose their house in Dominick Street, and Archibald and Sarah Hamilton thereafter raised five more children. Moreover, there was a year in-between these circumstances; therefore also realizing that Hamilton's mother had already noticed that something was different about William when he was a month old, it is perfectly possible that the sending to Trim had nothing to do with the bankruptcy.

But there may have been yet another reason; Hamilton seems to have suffered regularly from bronchitis. Graves mentions as a later problem with observing in the dome at the observatory Hamilton's "delicacy of chest," and that in his last year Hamilton suffered from a combination of gout and bronchitis,¹ which means that Hamilton's bronchitis may have been more or less chronic. Because the air in Dublin seems not to have been very healthy

¹ Graves wrote that in his last weeks "bronchitis supervened, and, with other ailments, led on to the inevitable close."

overall, which was illustrated by Lady Campbell's remark about "the smoke and stir of that dim spot which men call Dublin," it is therefore very well possible that Hamilton suffered from the bad air in the city.

Then also knowing that at that time James Hamilton, one of Archibald's brothers, lived with their sister Sydney in Trim, a small rural town with much fresh air, and was teaching in one of the best schools in Ireland, the school of Richard Butler who then was vicar of Trim, sending Hamilton to Trim sounds like a perfect decision for an extremely intelligent boy with bronchitis, for which there was no medication yet. Sarah and Archibald already had lost two children then, and such an opportunity may have been very attractive for the worried parents.

Graves mentions Hamilton's interest in astronomy, especially eclipses, in 1820; Hamilton then already possessed a telescope. He observed planets and their satellites, "but the occurrence of two lunar eclipses, one on the 29th March, and the other on the 22nd September, and of an intervening Solar Eclipse on the 7th September, all visible at Trim, became of absorbing interest to him." In February 1822, next to his studies Hamilton made calculations for the progress of an eclipse of the moon, seen from Trim. He rose around three o'clock and saw the eclipse, which agreed very well with his calculations. He also calculated the next eclipse early in August, for both Trim and Dublin, and twice observed the satellites of Jupiter, concluding that their configuration corresponded very well with that given in the Nautical Almanack.

In April 1822 Hamilton suffered from whooping-cough, but that same month he was able to attend the funeral of his little cousin Kate.² Graves then writes: "His uncle's objections, on account of loss of time, to his accepting an invitation from his cousin [Arthur] to change the air by a visit to him having been overruled by the Doctor, Hamilton went up to Dublin early in May. The change was required, for he had been for some time forbidden to read, coughed much, and had to struggle with great difficulty of breathing."

This might contradict the idea of Dublin's bad air, yet it might also refer to changing surroundings, which may help to refreshen the mind. According to Graves, going to Dublin proved "beneficial to his health;" Hamilton resumed his studies and, amongst others, wrote a short paper about chronology in the Aeneid which again included astronomical calculations, and he read the *Mécanique Céleste* of Laplace. Finding a "flaw in the reasoning by which Laplace demonstrates the parallelogram of forces," brought him in contact with Dr. Brinkley, who then was Royal Astronomer and lived at Dunsink Observatory.

In September 1822 Hamilton mentioned in a letter to Cousin Arthur that in the beginning of 1821 having bought an Ephemeris, his "favourite amusement was calculating and observing occultations of stars by the moon;

² Remarkably, Hamilton wrote that Kate was buried "by the side of her little brother and mine;" apparently his parents had had more close bonds to Trim than was described in letters given by Graves.

eclipses too, but there were not any to observe.” Then he gave his attention to mathematical reading and Newton’s *Principia*, yet having received two Nautical Almanacks, they gave him “a new impulse to observe the heavenly bodies.”

2 Illness and TCD

It was apparently planned that Hamilton would enter TCD in the spring of 1823, but referring to a letter written in October 1822 Graves writes: “The following letter announces the postponement till the summer of the next year of his entrance into College. This decision was arrived at after much discussion between his uncle and his Cousin Arthur, the determining motive being the state of his health, which during the spring and the summer had caused much uneasiness.”

And in the aforementioned letter to Eliza Hamilton wrote, “We shall probably not meet until Christmas, as I am not to enter College till next July, which is a disappointment to us both. [...] I had been prevented by my cough from attending at several returns of that holy ordinance, and even from joining at all in public worship. I am convinced that the precept is wise which enjoins us not to forsake the assembling of ourselves together.”

In January 1823 Hamilton wrote to Eliza that he would enter TCD in July, and that although he was very busy, he had to tell her about “the eclipse of the moon, last Sunday evening. I had made calculations of all the circumstances six months ago, and I showed them to uncle as soon as dinner was over. He wrote a note to ask Mr. Butler and his brother to come to observe, and drink tea; they came, but not till all was nearly over. When the time of emersion approached, for the moon was totally eclipsed, I went out to the garden: the stars and planets were glowing, but their queen was absent. I sought her, but her place was nowhere to be found. Shortly afterwards, I saw through my telescope the first Satellite of Jupiter and knew that the emersion of the moon must have taken place. For it is a remarkable coincidence that Jupiter’s moon emerged from a total eclipse only three minutes and a-half before ours did. At the same time Saturn was on the meridian, and in some parts of the world the moon was seen to cover a small star while itself totally eclipsed. So I think an astrologer would say something wonderful was portended. I went out and saw that the moon had just begun to emerge. What then must have been the feelings of one who worshipped the host of heaven, and knew not that their motions were reduced to calculation! For myself, as I gazed, my delight was blended with awe. That instant, I observed a falling star, and the circumstance struck me. I observed a similar one during the last eclipse of the moon, and told Cousin Arthur that the heavens seemed to sympathise in commotion with the astonished earth. [...] The shadow of the earth went rapidly off the moon, moving apparently in a north-west direction, as I had calculated, such as this /. The whole course of

emerging from total darkness to perfect light did not occupy an hour. It was interesting to observe the gradual increase of the moonlight on the scenery. At last the shadow went off entirely, to wander through space until the 23rd of July, when it will again cause a total eclipse.”

In February Hamilton wrote to Cousin Arthur, “I observed, four weeks ago, that while part of the moon was still under the eclipse the centre was less visible than the circumference. Since that time I have found an adequate cause of the phenomenon in the rarity of the lunar atmosphere. In the sun, on the contrary, which has a dense atmosphere, it is ascertained that the centre is brighter than the circumference. [...] Another thing that struck me was the near coincidence in point of time between the eclipse of our moon and that of the first Satellite of Jupiter. By an investigation founded on the successive propagation of light, I ascertained that there were places (not in this earth) at which the emersion of Jupiter’s moon and the middle of the eclipse of ours would have appeared to synchronise, and also that these places are all contained in a hyperboloid of revolution, Jupiter being in one focus, the earth in the other, and the axis equal to the space that light traverses in the difference of the times of the phenomena: about ninety millions of miles. The result is remarkable.”

In April 1823 Hamilton mentioned in a letter to Eliza that he had “a cold, as usual.” In May he wrote to Cousin Arthur that he had visited Dunsink Observatory, and had forgotten to tell him “one thing about the Pole star. When I saw it through the telescope, to my great surprise I observed it move from west to east, and cried out “It is going wrong!” Doctor Brinkley was amused, and explained that the telescope inverted objects. He also remarked that the Pole star moves with about thirty times less velocity than one in the Equator.”

On the last day of May Hamilton mentioned to have made a curious discovery in Optics, and Graves suggests that he was referring to his ‘Characteristic Function.’ Graves continues: “On the 7th of July, 1823, preceded by rumours, not unfounded, of the intellectual prowess of ‘Hamilton the Prodigy,’ he made his appearance in the courts of Trinity College, and underwent the Entrance Examination. As was expected, he came out first of one hundred candidates, and on the next day obtained a premium for his answering at an examination in Hebrew.”

College apparently did not start immediately after Entrance, but after the summer holidays. In July Hamilton again visited Brinkley at the observatory, mentioned the upcoming eclipse of the moon in a letter to Eliza, and on the day of the eclipse, the 23rd of July, he wrote the ‘Ode to the Moon under total eclipse’. He made excursions, for instance to the Dargle river. In September 1823 he finally started his “life as a Student.”

3 College years

In August 1824, just having started on his second college year, he met Catherine Disney at Summerhill, and fell in love with her. Also in August he learned to know Maria Edgeworth, having visited Edgeworthstown with his uncle. In September he was preparing for examinations while at the meantime pursuing his ‘curious discovery in Optics.’

In February Hamilton wrote the Valentine poem for Catherine, and very shortly thereafter, still in February, he was told by her mother that she was going to marry in May.* In March he won a premium for the Catechetical Examinations, having been lent several books by for instance Edward and James Disney. He was able to provide the sought after answers to questions regarding the standstill of the sun in Canaan just after sunrise, leading to the long night in Greece preceding the birth of Hercules, and why that did not disrupt the systems of Astronomy. He received the premium “as well for regularity of attendance as for goodness of answering.” Just before Easter Hamilton was “occupied in scientific pursuits and projects,” leading uncle James to express “some misgiving [...] as to whether he was doing justice to his Classical preparation.” Uncle James was right; in the Easter Examination Hamilton received a lower grade than usual, which has been taken as a proof that Hamilton was in distress over having lost Catherine. That in itself was doubtlessly true, but there was clearly more to it, moreover, his answering in Science was as usual.

“What occurred at the Examination [...] was, that while [Hamilton’s] success in Science was what it always had been, Mr. Kennedy, as his Examiner in Classics, gave the secondary judgment of bene to his answering in both Greek and Latin authors, appending to his theme the usual valde bene; but Mr. Kennedy was not content with this amount of depression of Hamilton’s established character as a Classical scholar; he went so far as to stop, as it was called, the Classical Certificate in the division; thus intimating that neither Hamilton nor his competitors for the honour had reached the standard of positive merit required. He also withheld the Classical Premium from the division. This decision of the Examiner was loudly exclaimed against at the time. Mr. Kennedy’s character protected him from all dishonouring imputations; but his Examination was freely charged with unreasonableness, and it was moreover averred that, persuaded as he was that no Examiner in College was qualified to give an optime in Greek but himself, the remembrance of this honour having been conferred on Hamilton by another, and in a subject, the Iliad of Homer, which he had made his own by publishing an edition of the work, had brought him down upon the distinguished Undergraduate, animated by a personal feeling which caused actual, though it might be unconscious, unfairness. However, we have seen that Hamilton’s preparation in Classics had not been careful, and he wisely took his disappointment without a murmur as an admonition for his future guidance.”

In a footnote Graves adds: “By reference to the Examination books in Trinity College, I have verified the fact of the stoppage both of Certificate and Premium; and it is certainly remarkable that not only Hamilton, but several other students in this division, who both before and after this Examination uniformly obtained valdes in Classics, suffered on this occasion the same depression of their judgments as he did: I may name Halliday, who subsequently obtained the Classical Medal in his class, and Bartholomew Lloyd, brother of the late Provost.”

Making Graves’ biography sometimes hard to grasp is that it is mostly chronological but not always. Although this Examination happened in April 1825, Graves next combines this disappointment to the disappointment of hearing about Catherine’s marriage, on the one hand by mentioning these disappointments in one sentence, and on the other by mentioning the having been told about the marriage after the report about the Examinations instead of before. Thereafter Graves gives the poem ‘the Enthusiast’, which was written in January 1826, and adds that Hamilton later wrote, “The Enthusiast was composed on a sick bed, during almost the only time of serious illness that I can remember, and one brought on chiefly by brooding on that youthful grief, notwithstanding great and successful efforts to maintain a high (indeed at that time brilliant) reputation in my own University. The gloom described at the close is therefore not a fair description, or anticipation, of my subsequent life.”

After having given the poem, as well as the poem ‘A Farewell’, written in May 1825, Graves writes: “It was well for Hamilton that the calls upon him for intellectual exertion were imperative, allowing of no remission, of no brooding over sorrow. He sedulously prepared himself at Trim for the June Examination [1825], in which his old success attended him, valde in omnibus, and the two Certificates in Science and Classics.” From which it can be inferred that Hamilton then seems to have learned what he tried to do for the next six years: work hard and “maintain his philosophical calm.”³

Graves thus made a combination between the lower grades, the sad poem and the illness, but only having arrived at the descriptions about the end of the year, therefore thirteen pages later, he mentions that the illness may have been serious. “Concerning the end of the year 1825, little information is supplied by the correspondence in my hands. It is certain that he went in at the October Examination [1825], and obtained both Certificates, though with a bene for theme; and from letters in the early part of the succeeding year, and from the fact that he did not present himself at the January Examination

³ Only in 1832, after his melancholy over having lost Ellen de Vere having become quite unhealthy again, Hamilton discovered how to handle such feelings. Regarding his 1853 remark about the poem in the light of this discovery, it may have been a contemplation about how unable he had been in his younger years to handle such feelings. Yet Graves does not seem to have recognized the importance of this 1832 discovery, probably because very soon thereafter, in 1833, he left for England, and they did not see each other frequently any more. Graves thus may have kept the image of Hamilton as he had known him, as having been prone to melancholy and brooding over sorrow.

[1826], it appears that in the first half of the winter he must have been seriously out of health. Indeed in one of the ‘Stanley Papers’ he refers to his indisposition as a ‘long and painful illness.’ It is not to be wondered at that the strain upon heart and mind which he had undergone should have told upon him.”

Therefore, even if Hamilton had been brooding, only after this addition it can be seen that it was not just a depression of some sort, it was a serious illness, which adds to the previous mentions of illnesses. What Graves probably had intended was to show Hamilton’s distress over Catherine without saying it too explicit. But the vagueness he did it with led to later simple conclusions about a year of grief, low grades and a probably psychosomatic illness. Even though in that same year he met Maria Edgeworth and Arabella Lawrence, to whom he wrote a beautiful letter about his love for poetry and fascination and passion for science.

In April 1826 Hamilton received his second optime, having received the first one in 1824 for answering in Greek, Homer, this one was for Mathematical Physics. About the optime Graves had written, “In explanation of the value of this honour, it should be stated that in the examinations a scale of judgments applicable to each subject was in use, descending from *valde bene* through *bene*, *satis*, *mediocriter* to *vix medi*, with its accompanying caution. *Valde bene* was the judgment bestowed upon thoroughly good answering. Of the judgment optime, only to be thought of when the Student appeared by his answering to have proved his complete mastery of the subject, the examples were very rare.” Having received two optimes, in Science and the Classics, made him a celebrity. But he had also worked on his earlier mentioned ‘curious discovery in Optics’ which he had made when he was seventeen, and it led to his ‘Account of a Theory of Systems of Rays’ which he presented in April 1827, when he was twenty-one.

4 Illnesses and astronomy in later years

In the meantime Hamilton had become a regular visitor at the observatory. And knowing how good he was in astronomy, it was not at all too strange that in 1827 he was nominated for the post of Royal Astronomer of Ireland. In October 1827 he moved into Dunsink Observatory.

Hamilton seems to have been quite serious about becoming a good astronomer; yet Graves starts the description of the year 1828 with a telling sentence. “The commencement of Hamilton’s practice as an Observer rather seriously affected his health. He suffered from constant cold in head and chest, and was much of his time confined to the house. He, notwithstanding, persevered in the occupations of the meridian-room, at this time rendered more trying by roof-shutters out of gear. This perseverance is proved by an active correspondence which began in the early part of 1828, between him and Dr. Robinson [of Armagh Observatory] exchanging observations of

moon-culminating stars, with a view to determine the difference of longitude between Dunsink and Armagh. He was also employed in preparing for the printer the conclusion of his *Essay on Systems of Rays* by expanding some of the discussions. At length intermission of study, and to this end change of scene, became evidently necessary; and as his friends both at Armagh and Edgeworthstown had been competing for him as a guest, he acted successively upon their invitations. At Armagh he could scarcely have escaped more observing than he was fit for; and therefore, though feeling that the second half of his visit to his brother-Professor was an outstanding debt, he gave precedence to Edgeworthstown.”

In May 1828 Hamilton wrote to Maria Edgeworth, “I have found time to prepare a Table of the corrections necessary to be used in reducing observations made at the side-wires of your transit to the meridian-wire for twenty-four of our principal stars. The Table is partly on a new plan.” And also in May 1828 he wrote to Robinson, “I have been star-gazing a good deal, I scarcely dare to say observing, but I find my interest in practical astronomy [returning] gradually on me, and I am sure that as soon as I can hope to be of any use to Science by my observations, I shall not [grudge] any labour or shrink from any exertion. My *Essay* has been quite finished for some time, at least the First Part of it, so far as depended on my own revisions. ... Airy [of Greenwich Observatory] says in his last letter, which he dates from the Observatory of Cambridge [...], that he will perhaps think it necessary for his astronomical education to revisit my Observatory, a remark which I may with much greater truth [apply] to my deferred visit to Armagh.”

And in December 1828 Robinson wrote, “I am glad to hear so good an account of your Lectures [on Astronomy], and regret that I could not hear one of them for the pleasure of seeing my expectations so perfectly fulfilled. Good-bye, and go to bed and rise early, for I hear you are not as well as everyone who knows you will wish you to be. The intemperance of study is as fatal as any other, or even more so, for it cuts off only the noblest of our race.”

Hamilton indeed periodically observed regularly; in May 1829 he wrote to his aunt Mary Hutton, “A line to tell you that, having had a good deal of observation for some time past, I always muffle myself up, and have found your dressing-gown very comfortable. I cannot say so much for the beautiful fur cap, which, as well as my hat and college cap, I find badly suited for hard work. In their stead I wear a night-cap, and over it a Welsh wig, which make me a comical figure.”

By 1831 Hamilton was so used to looking through a telescope that he wrote to his sister Grace, “While I am on the subject of blunders, I must give you [one], for the benefit of Eliza’s collection. While wandering on our steamer on Lough Derg, [...] I cast my eye on the nearest vessel of the chain which we were towing after us, and read its number as 189. In truth it was 681; but my eyes, accustomed to inverting telescopes, made this my optical blunder.”

But after 1831 the correspondence with Robinson diminishes, and Hamilton's sisters Sydney and Grace seem to have done the larger parts of the observations. Hamilton wrote to Robinson in January 1832, "My eldest sister has grown quite a diligent observer, and she makes also a good many of the easier reductions herself. I have, since I returned from Adare, been very busy in my optical investigations,⁴ of which in a joint letter with my pupil I gave you lately some account."

5 Conclusion

Although Hamilton certainly greatly preferred mathematics over astronomy, it is totally unknown what would have happened if he had not gotten ill so often when observing. There is an account of Hamilton being actually very good as practical astronomer; he wrote, in 1846 having visited Greenwich Observatory and Airy having being absent, "I also amused myself [...] and idled the younger Mr. Breen, by my taking a transit of Polaris over a side-wire in the day-time, without an eye-glass. I estimated the error of my observation at five seconds: Mr. Breen concluded it to have been less than three."

Realizing how much Hamilton's health suffered from observing, and that it can easily be assumed that regularly becoming ill doing something will not enhance any one's attraction to it, I do not think I would again call Hamilton, as I did, a "reluctant practical astronomer." Or claim, as his Wikipedia page does, that he "paid little attention to the regular work of the practical astronomer."

⁴ The investigations which led to the Theory of Systems of Rays.