The Cambridge Years
1863-1871

I want to take up my cross and follow the true Christ, humanity;
to accept the facts as they are, however bitter or severe,
to be a student and a lover, but never a lawgiver.
(William Clifford to Lady Pollock. 1871)

The best impression of William Clifford's early days in Cambridge is that given by Frederick Pollock in the 1879 Introduction to Clifford's *Lectures and Essays,* which he and Leslie Stephen prepared for publication after William's death. Pollock and Clifford both went up to Trinity College in 1863 and became friends when they were third year students. For each of them the friendship became a major influence in their lives. Pollock had first heard of Clifford very early in their first term. He wrote:

> Not many weeks of my first year had passed when it began to be noised around that among the new Minor Scholars there was a young man of extraordinary mathematical powers, and eccentric in appearance, habits and opinions. He was reputed, and at the time with truth, an ardent High Churchman.

Clifford's early High Church religious convictions and belief in Catholic theology were a result of his family background, the teaching he had received at Templeton's Academy, and his studies of St Thomas Aquinas at King's College, London. Pollock reminds us how singular such a stance would have been in those days when the effects of the Church of England's evangelical revival led by Charles Simeon of King's College were still very strong in Cambridge. It was not in Clifford's nature to remain a silent witness to his faith. Pollock describes how William's reputation grew as a result of his lively participation in religious debates through which he tried to find ingenious ways to reconcile advances in scientific thought with traditional Christian beliefs. As the furious discussions raged over the ideas propounded by Darwin in the *Origin of Species,* Clifford found his early formal Christian faith becoming eroded. He was also influenced by the writings of the early proponent of evolutionary theory, Herbert Spencer, and he began his friendships with Thomas Huxley and John Tyndall. His scepticism grew and, by his third year, he had become an eloquent and zealous advocate of agnosticism and, later, of atheism. Edward Carpenter, the social reformer and poet, wrote of meeting Clifford at Cambridge:

> I belonged to one or two little societies which used to meet and discuss literary and other topics. At one of these, which W. K. Clifford organised, I used . . . to take part in the Sunday evening readings of

> Mazzini's *Duty of Man*; illustrated by a plentiful accompaniment of claret-cup and smoke! Clifford was a kind of Socratic presiding genius at these meetings – with his Satyr-like face, tender heart, wonderfully suggestive, paradoxical manner of conversation, and blasphemous treatment of existing gods. He invented just at that time a kind of inverted Doxology which ran:
>
> O Father, Son and Holy Ghost –
> We wonder which we hate the most.
> Be Hell, which they prepared before,
> Their dwelling now and evermore!
>
> and his influence, combined with that of Mazzini, was certainly part of my education at that period.[1]

This blasphemous ditty would have been pounced upon by protagonist and antagonist alike. It says much for Clifford's boyish charm that he could shake off the weight of disapproval that such irreverence must have incurred. As his views changed he spent less time on divinity and the classics, and concentrated more on higher geometry and philosophy. Not that he had neglected mathematics previously, for in 1864, one of his longest papers, *Analytical Metrics*, was written and published in the *Quarterly Journal of Pure and Applied Mathematics*.

He was actively interested in a wide range of subjects. Besides literature, history and the modern languages, he studied Arabic, Greek and Sanskrit, and, because he was interested 'in all methods of conveying thought', he learned shorthand and Morse code. He certainly made an early impression on Frederick Pollock, himself no mean scholar, with his remarkable ability to cut through conventional treatment of mathematical problems. For an example of this ability, Pollock cited Ivory's Theorem, a proposition in the analytical treatment of statics concerning the attraction of an ellipsoid. This was tackled in the textbooks of the day by using a formidable array of co-ordinates and integrals, which achieved the solution without imparting any real understanding of the proposition. He recounts how Clifford described, in one memorable conversation, the geometrical conditions on which the solution to Ivory's Theorem depended and effortlessly made it crystal clear.[2] This solution was not just the provision of a useful geometrical picture; it involved a recognition that the mechanical problem could be expressed and solved in geometrical terms, and prefigured his later belief that the whole of physics could be reduced to geometry. Fred Pollock, who was the same age as Clifford, came to love him 'as his own soul' and, after William's death, kept his wife Lucy as one of his closest friends. In 1868, the year that both he and Pollock were elected Fellows of Trinity, William, together with Fred and his brother Walter and some other friends, visited Dresden during the long vacation. He loved foreign travel, and it was to be a sad consequence of his illness that most of his subsequent travels were undertaken in the search for health and strength. During these early Cambridge years the few surviving letters to his father and step-mother, whom he called Dearest Mama,

demonstrate the warmth of his affection for them and his concern for their health and that of his young step-brother and sisters.[3]

Clifford made an impression on all who met him; soon after his arrival in Cambridge he received an invitation to join the Cambridge Conversazione Society, founded in 1826 and known as The Apostles. Frederick Pollock's father had been a member and he recalled this description of the Apostles:

> Their number was very few, and their mode of election was the most remarkable I have ever known. The vacancies were exceedingly rare – perhaps one or two in the course of the year – and the utmost care and study were bestowed on choosing the new members. Sometimes months were given to the consideration of a man's claim. Rank neither told for a man nor against him. The same with riches, the same with learning and, what is more strange, the same with intellectual gifts of all kinds. The same too with goodness; nor even were the qualities that make a man agreeable any sure recommendation of him as a candidate. . . . The man was not to talk the talk of any clique; he was not to believe much in any of his adventitious advantages, neither was he to disbelieve in them – for instance to affect to be radical because he was a lord. I confess I have no one word which will convey all that I mean; but I tell you that above all things he was to be open-minded. When we voted for a man we generally summed him up by saying, 'He has an Apostolic spirit in him' . . . no honour ever affected me so much as the being elected, as a youth, into that select body . . . and some of the foremost men of the time belonged to that society.[4]

Frederick Pollock goes on to fill out the picture of the Apostles and the way in which his own membership of the Society enriched his life. He mentions Clifford among the glittering array of members as one who, 'if the fates had suffered it, would have been in line with Einstein as his companion or maybe precursor'. The Society, as its members knew it, has a fascination and a mystique about it that has attracted attention over the years. For many of those favoured with election it became the most important influence in their lives. Henry Sidgwick, the great nineteenth-century moral philosopher, described it as a group through which members acquired 'a belief that we could learn, and a determination that we will learn, from people of the most opposite opinions'. William Clifford clearly enjoyed belonging to the group. At the meetings one member would speak to a proposal, and the fundamental rule of honest thought and speech, would guide the open discussion which followed. On leaving Cambridge the status of 'Apostles' changed; they became 'Angels'. After 'taking wings' they could still attend the meetings and the annual dinner. In 1871 when Clifford had rooms in Whewell's Court, he sent notice of the next Apostles meeting to Lord Houghton, who was at that time one of the most prestigious 'Angels'. Clifford jokingly referred to Houghton as the 'Most Apostolic' and announced that he proposed to discuss the subject: '*Is rebellion the whole duty of Man?*'[5]

Besides election to the Apostles, William was winning prizes for his academic work, but he counted it a greater honour when his gymnastic and athletic feats drew praise. In 1869 he wrote:

> At present I am in a very heaven of joy because my 'corkscrew' was encored last night at the assault of arms: it consists in running at a fixed upright pole which you seize with both hands and spin round and round descending in a corkscrew fashion.[6]

When he took his degree it was noted in the university journal, *Bell's Life*, that intellectual distinction and manly exercises were not incompatible since 'the second Wrangler was also one of the most daring athletes in the University'. One can imagine the charm of this brilliant student, able to gain the highest academic honours and yet so boyishly proud of his physical prowess and the acclaim it received. There was more bravado to come; a gymnast friend reported:

> His nerve at great heights was extraordinary. I am appalled now to think that he climbed up and sat on the cross bars of the weathercock on a church tower and when by way of doing something worse I went up and hung by my toes from the bars he did the same thing.[7]

This interest and involvement in physical exercise was not in any way eccentric in undergraduate life in early and mid-Victorian times in Cambridge. There is much recorded fact and anecdotal detail about the athletic prowess and physical feats of eminent mathematicians during their Cambridge years.[8] The heavy academic demands of the Tripos could bring about mental exhaustion and many candidates, including, in 1856, Henry Fawcett, achieved lower placing than expected because of this stress. Academic tutors and coaches encouraged the idea that physical and mental fitness were linked. By the 1840s regular physical exercise was established as an integral part of the would-be senior wrangler's diet. James Clerk Maxwell, who was second wrangler in 1854, regularly carried out extremely vigorous – even violent – feats involving running and swimming. Leslie Stephen, twentieth wrangler in 1854, was renowned at Cambridge for his prowess as a runner and long-distance walker and went on to ambitious climbing expeditions of Alpine peaks which are recorded in his publications about mountaineering in the 1860s. But there was danger in the extreme belief that mind and body could always be strengthened by experiments which tested conventional limits.

William Clifford seemed at that stage to be able to keep the balance between physical and mental activity and to be set for a glittering career in Cambridge when he was brought to a head-on collision with University authorities because of his philosophical views.

At that time all Scholars were required to affirm their allegiance to the Church of England by publicly signing each year the Thirty-nine Articles, which had been drawn up three centuries earlier. William had signed three times, although he had had serious doubts in 1865, and had come to feel that by agreeing to sign he had compromised his integrity. In 1866 he refused to sign. Despite his religious views he was nevertheless elected a Fellow of

Trinity in 1868. Others were concerned about academic freedoms too, and, in 1868, thirty-two Fellows of Trinity signed a petition against required religious affirmations in academic life. Eventually, in 1871, Gladstone set up a reform of the statutes, and the break away from the domination of the entire University by the clergy began to take place. Also, while Clifford was a Fellow, he become involved the struggle to bring about reforms to the entire teaching structure of the Tripos. As a result, electromagnetic and thermodynamic topics were included in the curriculum for the first time.

Cambridge students attaining a first-class degree in the Mathematical Tripos examinations are titled 'Wranglers'. In Clifford's day the Wranglers were listed in order, and to be 'First' or 'Senior' Wrangler was a prestigious honour. To reach this high standard it was usual to work with a coach and follow a long and arduous course of specific problem-solving leading up to the examination. But William Clifford had wide-ranging interests. He refused the academic straight-jacket of working only on examination subjects as suggested by The Reverend Percival Frost who was his personal tutor. He chose to study the fresh, original works of J.J. Sylvester, Arthur Cayley and G. Salmon and their great continental contemporaries. In Pollock's words he 'omitted most of the things he ought to have read, and read everything he ought not to have read'. Yet, in spite of almost no preparation, his powers of original thought won him, like J. J. Sylvester, William Whewell, Clerk Maxwell and Sir William Thomson in their time, the place of Second Wrangler. He also shared first place in the other glittering award for mathematicians, the Smith's Prize. Clifford later wrote to Fred's mother, extolling the advantages of holding second place – 'much more secure than the First. It takes a King indeed to despise the Vizier!'[9]

While at Cambridge Clifford was a member of another prestigious group, the Grote Club. Other members were the famous economist Alfred Marshall, Henry Sidgwick the philosopher and John Venn the logician. Even among these giants, Clifford sparkled, and years afterwards Marshall would remember the brilliance of his discussions but remarked that 'he was too fond of astonishing people'.[10] This fluency and power had brought Clifford to prominence in his third year when he won the Trinity College declamation prize. He chose as his subject Sir Walter Raleigh and delivered his speech in the form of a dramatic dialogue; the original manuscript still exists among his personal papers. Clifford led his audience through the life of Raleigh from the age of twenty-four, and he used the story to enunciate his beliefs.

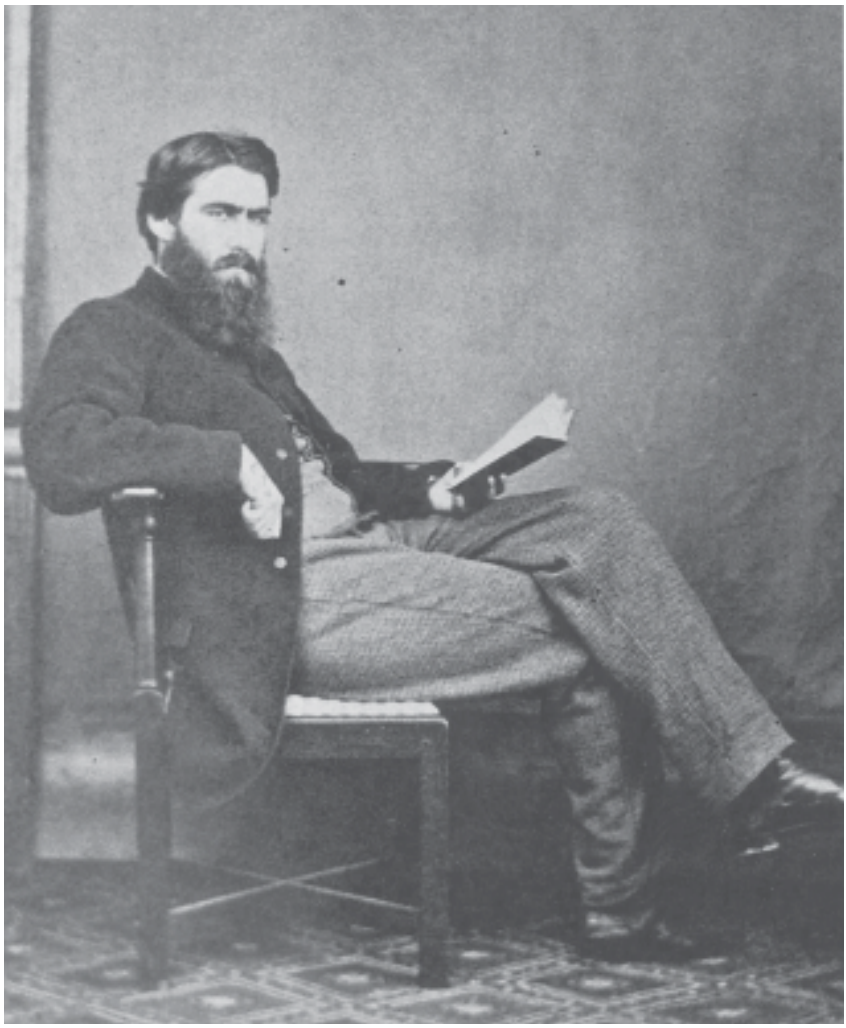
> Now, as then, there is a Dorado, meant for the good of all men, the gift of Him who sends rain upon the just and upon the unjust. The student of science lives in the consciousness that at any moment that may be revealed to him which shall change utterly the whole face of society, and alleviate in an enormous degree the physical miseries of mankind. And now, as then, there is the danger lest that which is meant for the good of all should be perverted into an

> instrument of evil; lest, after all, the only result should be that another portion of conquered Nature is cursed for the sake of man.[11]

This success resulted in his being asked to deliver the annual oration at the Commemoration of Benefactors. His brief then was to honour the recently deceased Master of Trinity, the famous Dr Whewell. Clifford again managed to make an original and unexpected approach. His opening words for the eulogy were 'Thought is powerless except it make something outside of itself: the thought which conquers the world is not contemplative but active. And it is this that I am asking you to worship today.' He used this allegory to support his thesis:

> Once upon a time – much longer than six thousand years ago – the Trilobites were the only people that had eyes; and they were only just beginning to have them, and some even of the Trilobites had as yet no signs of coming sight. So that the utmost they could know was that they were living in darkness, and that perhaps there was such a thing as light. But at last one of them got so far advanced that when he happened to come to the top of the water in the daytime he saw the sun. So he went down and told the others that in general the world was light, but there was one great light which caused it all. Then they killed him for disturbing the commonwealth; but they considered it impious to doubt that in general the world was light, and there was one great light that caused it all. And they had great disputes about the manner in which they had come to know this. Afterwards another of them got so far advanced that when he happened to come to the top of the water he saw the stars. So he went down and told the others that in general the world was dark, but that nevertheless there were a great number of little lights in it. Then they killed him for maintaining false doctrines: but from that time there was a division amongst them, and all the Trilobites were split into two parties, some maintaining one thing and some another, until such time as so many of them had learned to see that there could be no doubt about the matter.[12]

The whole performance made a great impression on the academics present, and William developed and extended this theory of the intellectual growth of mankind in his essay *On Some of the Conditions of Mental Development,* first given as a lecture at the Royal Institution in 1868. Clifford's tribute to Dr Whewell was remembered by two young women who had attended the declamation at Trinity. They were nieces of Samuel Page Widnall, a well-known and much loved resident of Grantchester, a picturesque village near to Cambridge. Clifford had become something of a favourite with this family and in the late 1860s and early 1870s he was a frequent visitor at their beautiful home The Old Vicarage. He is remembered in family diaries as a most lively young man who was fond of entertaining the children with tricks and puzzles. Alice and Amy Smith liked to visit Cambridge – chaperoned as was the custom in those days – and at different times in 1866 they attended a Union



William Clifford in 1868, photographed by the keen amateur photographer, Samuel Page Widnall, probably in the garden of The Old Vicarage, Grantchester, outside Cambridge.

debate, a Trinity College chapel service, and a display in the Gymnasium in which Clifford may well have been a participant. One of their friends, who became a professional artist, Charlotte Mary Greene, an aunt of Graham Greene, remembered William Clifford's irreverent sense of humour. One day in King's Parade, as she was admiring a picture by Turner in a shop window, Clifford approached her and said: 'I can tell you how that picture was painted. The artist squeezed a lot of his paints on to a canvas and sat on it!' In old age, Polly Greene as she was known, wrote a nostalgic poem in the style of Rupert Brooke's *The Old Vicarage, Grantchester,* and again remembered Clifford with these lines:

Who sits and writes beneath the pines?
'Tis Clifford making nonsense rhymes,
For Euclid's science here would seem
Unfitted for this home of dream.

She also remembered his nonsense contribution to an amusing pamphlet sold to gather funds at the church bazaar. It ran

> Among the things not generally known is this – the report of a pistol, seen at the distance of five ounces, smells like the taste of half an hour, only it is not white.

Samuel Page Widnall's practical, artistic and literary talents included photography, and his striking image of Clifford, probably taken in 1868, shows Clifford with no signs of the illness that would prematurely end his life.[13]

William did not lose his delight in frivolous verse and the following example, titled 'On coming in sight of the sea from the hills above Porlock', was composed a few years after he left Cambridge, and was found amongst his personal papers.

This, this, I said with deep emotion
Is what is called the briny Ocean.
Propelled alike by tail and fin
The little fishes swim therein.
The great ones also find their quarters
In this expansive waste of waters.
Its bosom, which the wild winds whip,
Is sailed upon by many a ship,
And steamers also you may view
Which go by paddle wheel or screw.
In fact there's nothing half so grand
Excepting what is called the land
And that receives a different name
Because it is not quite the same.
Signed W.K. Clifford.

While at Cambridge, William met and became a close friend of Henry Fawcett, a follower of John Stuart Mill, who, though blind, had in 1863 been appointed Professor of Political Economy. They were both active members of the Republican Club and their friendship continued after William moved to London.

1870 was an exciting year for Clifford. He was very much looking forward to going to Göttingen where he was to meet the mathematician R.F.A. Clebsch, but that trip never materialised. However, in the summer vacation he and his college friend George Crotch, with whom he had enjoyed various gymnastic and athletic escapades in Cambridge, set off round Europe for some weeks. William wrote to Fred's mother about their adventures. They travelled informally and walked a lot of the way through France and Spain. They climbed the Pic du Midi to view the range of the Pyrenees having walked

Royal Astronomical Society commemorative photograph of the 1870 Eclipse Expedition with William Clifford seated at the far right.

'over twenty miles, with rise of 10,000 feet'. They thoroughly enjoyed their casual wanderings, living on five francs a day, getting drunk on cheap wine, observing and sketching butterflies and buildings, and sometimes sleeping rough.[14]

The previous December, quite suddenly, the government had put up the money to finance a Royal Astronomical Society Expedition to Sicily to view the 1870 eclipse of the sun. William was invited to be one of the team. He wrote from Florence to Lady Pollock, after the ship, the Psyche, carrying the scientists and their equipment struck rocks and was wrecked off Catania. The spelling has not been corrected.

> No ink, no paper, no nothing – well if ever a shipwreck was nicely and comfortably managed without any fuss – but I can't speak calmly about it because I am so angry at the idiots who failed to save the dear ship. At Catania, orange groves and telescopes; thence to camp at Augusta, great fun, natives kept off camp by white cord; 200 always to see us wash in the morning – a performance which never lost it's charm – only five seconds totality free from cloud, found polarization on moon's disk. . . . At Rome two and a half days, pictures, statues, Coliseum by moonlight. . . . This morning arrive in Florence – Pitti Palace – spent all my money. . . . Addio.[15]

The team had to struggle, penniless and hungry, back to Ostend. Clifford writes: 'I saw the corona; its breadth was about an eighth or tenth part of the moon's diameter, on the side where the sun was about to emerge. I also caught a glimpse of a prominence but the time was too short to pay any attention to it.' The Society's report concluded that 'photographs taken at the time with a rapid rectilinear photographic lens, showed great extensions and were considered specially successful'. In fact, they were fortunate to have been able to make any observations at all since there were comparatively dense, low-lying cumuli in the region.[16]

During his seven years at Cambridge Clifford had dramatically evolved from precociously devout Anglo-Catholic to radical critic and fierce enemy of all organised religions. Although some of the constricting religious requirements at the University had been relaxed, Cambridge could not be a comfortable place for one who would later pronounce that 'There is only one thing in the world more wicked than the desire to command and that is the will to obey.' Fortunately, University College, London, which had been founded in 1828 and become fully incorporated into the University of London in 1836, had, unlike its sister college King's, no religious restrictions in its statutes. Jews and Dissenters who had previously been precluded from graduating were welcomed at what was familiarly known as the 'Godless Institution of Gower Street'. For this freedom and for other academic reasons William Clifford now turned his eyes to London.

Notes

1. Edward Carpenter, *My Days and Dreams,* George Allen and Unwin, 1921.
2. F. Pollock, Introduction, Vol 1, *Lectures and Essays*, W. K. Clifford, Macmillan, 1879.
3. W. K. C's papers in the Valehouse Collection.
4. Sir W. F. Pollock, quoting from Sir Arthur Helps in *For My Grandson*, John Murray 1933, p. 30.
5. ALS, Valehouse Collection.
6. As note 2.
7. ibid.
8. Andrew Warwick, *Exercising the Student Body*. Chapter eight, 'Science Incarnate', C. Lawrence and S. Shapin Eds, University of Chicago Press, 1998.
9. ALS, February 1870, University College London Archive, Folder MS add. 136.
10. John Maynard Keynes, *Essays in Biography*, (On Alfred Marshall), London 1933.
11. As note 3.
12. W. K. Clifford, *Lectures and Essays*, Vol 1, Macmillan 1879, Introduction.
13. Photograph of W.K.C. and the Polly Greene anecdote contributed by Lady Jennings of Grantchester.
14. As note 2.
15. ibid.
16. The Royal Astronomical Society *Memoirs,* Vol. 41.