George Howard, the fifth child of Charles and Emma Darwin, was born at Down, July 9th, 1845. Why he was christened George, I cannot say. It was one of the facts on which we founded a theory that our parents lost their presence of mind at the font, and gave us names for which there was neither the excuse of tradition nor of preference on their own part. His second name, however, commemorates his great-grandmother, Mary Howard, the first wife of Erasmus Darwin. It seems possible that George's ill-health and that of his father were inherited from the Howards. This, at any rate, was Francis Galton's view, who held that his own excellent health was a heritage from Erasmus Darwin's second wife. George's second name, Howard, has a certain appropriateness in his case, for he was the genealogist and herald of our family, and it is through Mary Howard that the Darwins can, by an excessively devious route, claim descent from certain eminent people, e.g. John of Gaunt. This is shown in the pedigrees which George wrote out, and in the elaborate genealogical tree published in Professor's Pearson's Life of Francis Galton. George's parents had moved to Down in September 1842, and he was born to those quiet surroundings of which Charles Darwin wrote, "My life goes on like clockwork, and I am fixed on the spot where I shall end it." It would have been difficult to find a more retired place so near London. In 1842 a coach drive of some twenty miles was the only means of access to Down; and even now that railways have crept closer to it, it is singularly out of the world, with little to suggest the neighbourhood of London, unless it be the dull haze of smoke that sometimes clouds the sky. In 1842 such a village, communicating with the main lines of traffic only by stony tortuous lanes, may well have been enabled to retain something of its primitive character. Nor is it hard to believe in the smugglers and their strings of pack-horses making their way up from the lawless old villages of the Weald, of which the memory then still lingered.

George retained throughout life his deep love for Down. For the lawn with its bright strip of flowers, and for the row of big lime trees that bordered it; for the two yew trees between which we children had our swing, and for many another characteristic which had become as dear and as familiar to him as a human face. He retained his youthful love of the "Sand-walk," a little wood far enough from the house to have for us a romantic character of its own.

George loved the country round Down, and all its dry chalky valleys of ploughed land, with "shaws," i.e. broad straggling hedges on their crests, bordered by strips of flowery turf. The country is traversed by many foot-paths; these George knew well and used skilfully in our walks, in which he was generally the leader. His love for the house and the neighbourhood was, I think, entangled with his deepest feelings. In later years his children came with their parents to Down, and they vividly remember his excited happiness, and how he enjoyed showing them his ancient haunts.

In this retired region Charles Darwin's children led a singularly quiet life, practically without friends, and dependent on their brothers and sisters for companionship. George's earliest recollection was of drumming with his spoon and fork on the nursery table because dinner was late, while a barrel-organ played outside. Other memories were less personal; for instance, the firing of guns when Sebastopol was supposed to have been taken. His diary of 1852 shows a composite
interest in current events and in the picturesqueness of Natural History: "The Duke is dead. Dodos are out of the world."

He perhaps carried rather far the good habit of re-reading one's favourite authors. He told his children that for a year or so he read through every day the story of Jack the Giant Killer, in a little chap-book with coloured pictures. He early showed signs of the energy which marked his character in later life. I am glad to remember that I became his companion and willing slave. There was much playing at soldiers, and I have a clear remembrance of our marching with toy guns and knapsacks across the field to the Sand-walk. There we made our bivouac with gingerbread and milk warmed (and generally smoked) over a "touch-wood" fire. I was a private while George was a sergeant, and it was part of my duty to stand sentry at the far end of the kitchen-garden until released by a bugle-call from the lawn. I have a vague remembrance of presenting my fixed bayonet at my father to ward off a kiss, which seemed to me inconsistent with my military duties. Our imaginary names and heights were written up on the wall of the cloak-room. George, with romantic exactitude, made a small foot rule of such a size that he could conscientiously record his height as 6 feet, and mine as slightly less, in accordance with my age and station.

Under my father's instruction George made spears with weighted heads, which he hurled with remarkable skill by means of an Australian throwing stick. I used to skulk behind the big lime trees on the lawn in the character of victim, and I still remember the look of the spear flying through the air with a certain venomous waggle. Indoors, too, we threw at each other wooden javelins, which we received on beautiful shields made by the village carpenter and decorated with coats of arms.

Heraldry was a serious pursuit of his for many years, and the London Library copies of Guillim and Edmonson were generally at Down. He retained a love of the science through life, and his copy of Percy's Reliques is decorated with coats of arms admirably drawn and painted. In later life he showed a power of neat and accurate draughtsmanship, and some of the illustrations in his father's books, e.g. in Climbing Plants, are by his hand.

His early education was given by governesses, but the boys of the family used to ride twice or thrice a week to be instructed in Latin by Mr. Reed, the Rector of Hayes, the kindest of teachers. For myself, I chiefly remember the cake we used to have at 11 o'clock, and the occasional diversion of looking at the pictures in the great Dutch Bible. George must have impressed his parents with his solidity and self-reliance, since he was more than once allowed to undertake alone the 20-mile ride to the house of a relative at Hartfield in Sussex. For a boy of ten to bait his pony and order his luncheon at the Edenbridge inn was probably more alarming than the rest of the adventure. There is indeed a touch of David Copperfield in his recollections as preserved in family tradition. The waiter always said, "What will you have for lunch, Sir?" to which he replied, "What is there?" and the waiter said, "Eggs and bacon"; and though he hated bacon more than anything else in the world, he felt obliged to have it.

On August 16th, 1856, George was sent to school. Our elder brother, William, was at Rugby, and his parents felt his long absences from home such an evil that they fixed on the Clapham Grammar School for their younger sons. Besides its nearness to Down, Clapham had the merit of giving more mathematics and science than could then be found in public schools. It was kept by the Rev. Charles Pritchard, a man of strong character, and with a gift for teaching mathematics by which George undoubtedly profited. In, I think, 1861 Pritchard left Clapham and was succeeded by the Rev. Alfred Wrigley, a man of kindly mood but without the force or vigour of Pritchard. As a mathematical instructor I imagine Wrigley was a good drillmaster rather than an inspiring teacher. Under him the place degenerated to some extent; it no longer sent so many boys to the Universities, and became more like a "crammer's" and less like a public school. My own recollections of George at Clapham are coloured by an abiding gratitude for his kindly protection of me as a shrinking and very unhappy "new boy" in 1860.

George records in his diary that in 1863 he tried in vain for a Minor Scholarship at St. John's College, Cambridge, and again failed to get one at Trinity in 1864, though he became a Foundation Scholar in 1866. These facts suggested to me that this capacity as a mathematician was the result of slow growth. I accordingly applied to Lord Moulton, who was kind enough to give me his impressions:
My memories of your brother during his undergraduate career correspond closely to your suggestion that his mathematical power developed somewhat slowly and late. Throughout most, if not the whole, of his undergraduate years he was in the same class as myself and Christie, the ex-Astronomer Royal, at Routh's. {158a} We all recognised him as one who was certain of being high in the Tripos, but he did not display any of that colossal power of work and taking infinite trouble that characterised him afterwards. On the contrary, he treated his work rather jauntily. At that time his health was excellent and he took his studies lightly, so that they did not interfere with his enjoyment of other things. {158b} I remember that as the time of the examination came near I used to tell him that he was unfairly handicapped in being in such robust health and such excellent spirits.

Even when he had taken his degree I do not think he realised his innate mathematical power. . . . It has been a standing wonder to me that he developed the patience for making the laborious numerical calculations on which so much of his most original work was necessarily based. He certainly showed no tendency in that direction during his undergraduate years. Indeed, he told me more than once in later life that he detested arithmetic, and that these calculations were as tedious and painful to him as they would have been to any other man, but that he realised that they must be done, and that it was impossible to train anyone else to do them.

As a Freshman he 'kept' (i.e. lived) in A 6, the staircase at the N.W. corner of the New Court, afterwards moving to F 3 in the Old Court, pleasant rooms entered by a spiral staircase on the south side of the Great Gate. Below him, in the ground floor room, now used as the College offices, lived Mr. Colvill, who remained a faithful but rarely seen friend as long as George lived.

Lord Moulton, who, as we have seen, was a fellow pupil of George's at Routh's, was held even as a Freshman to be an assured Senior Wrangler, a prophecy that he easily made good. The second place was held by George, and was a much more glorious position than he had dared to hope for. In those days the examiners read out the list in the Senate House at an early hour, 8 a.m. I think. George remained in bed and sent me to bring the news. I remember charging out through the crowd the moment the magnificent "Darwin of Trinity" had followed the expected "Moulton of St. John's." I have a general impression of a cheerful crowd sitting on George's bed and literally almost smothering him with congratulations. He received the following characteristic letter from his father: {159}

DOWN, Jan. 24th (1868).

My dear old fellow,

I am so pleased. I congratulate you with all my heart and soul. I always said from your early days that such energy, perseverance and talent as yours would be sure to succeed: but I never expected such brilliant success as this. Again and again I congratulate you. But you have made my hand tremble so I can hardly write. The telegram came here at eleven. We have written to W. and the boys.

God bless you, my dear old fellow?may your life so continue.

Your affectionate Father,
CH. DARWIN.

In those days the Tripos examination was held in the winter, and the successful candidates got their degrees early in the Lent Term. George records in his diary that he took his B.A. on January 25th, 1868; also that he won the second of the two Smith's Prizes?the first being the natural heritage of the Senior Wrangler. There is little to record in this year. He had a pleasant time in the summer, coaching Clement, the nephew of Sir Charles Bunbury, at his beautiful place Barton Hall in Suffolk. In the autumn he was elected a Fellow of Trinity, as he records, "with Galabin, young Niven, Clifford, (Sir Frederick) Pollock, and (Sir Sidney) Colvin." W. K. Clifford was the well-known brilliant mathematician who died
Comparatively early.

Chief among his Cambridge friends were the brothers Arthur, Gerald, and Frank Balfour. The last-named was killed, aged 31, in a climbing accident in 1882 on the Aiguille Blanche near Courmayeur. He was remarkable both for his scientific work and for his striking and most lovable personality. George's affection for him never faded. His daughter remembers her father (not long before his death) saying with emotion, "I dreamed Frank Balfour was alive." I imagine that tennis was the means of bringing George into contact with Mr. Arthur Balfour. What began in this chance way grew into an enduring friendship, and George's diary shows how much kindness and hospitality he received from Mr. Balfour. George had also the advantage of knowing Lord Rayleigh at Cambridge, and retained his friendship through his life.

In the spring of 1869 he was in Paris for two months working at French. His teacher used to make him write original compositions, and George gained a reputation for humour by giving French versions of all the old Joe Millers and ancient stories he could remember.

It was his intention to make the Bar his profession, and in October 1869 we find him reading with Mr. Tatham, in 1870 and 1872 with the late Mr. Montague Crackenthorpe (then Cookson), and in November 1871 he was a pupil of Mr. W. G. Harrison. The most valued result of his legal work was the friendship of Mr. and Mrs. Crackenthorpe, which he retained throughout his life. During these years we find the first indications of the circumstances which forced him to give up a legal career?namely, his failing health and his growing inclination towards science. Thus in the summer of 1869, when we were all at Caerdeon in the Barmouth valley, he writes that he "fell ill," and again in the winter of 1871. His health deteriorated markedly during 1872 and 1873. In the former year he went to Malvern and to Homburg without deriving any advantage. I have an impression that he did not expect to survive these attacks, but I cannot say at what date he made this forecast of an early death. In January 1873 he visited Cannes, and "came back very ill." It was in the spring of this year that he first consulted Dr. (afterwards Sir Andrew) Clark, from whom he received the kindest care. George suffered from digestive troubles, sickness, and general discomfort and weakness. Dr. Clark's care probably did what was possible to make life more bearable, and as time went on his health gradually improved. In 1894 he consulted the late Dr. Eccles, and by means of the rest-cure, then something of a novelty, his weight increased from 9 stone to 9 stone 11 pounds. I gain the impression that this treatment produced a permanent improvement, although his health remained a serious handicap throughout his life.

Meanwhile he had determined on giving up the Bar, and settled in October 1873, when he was 28 years old, at Trinity in Nevile's Court next the Library (G 4). His diary continues to contain records of ill-health and of various holidays in search of improvement. Thus in 1873 we read, "Very bad during January. Went to Cannes and stayed till the end of April." Again in 1874, "February to July very ill." In spite of unwellness he began in 1872?3 to write on various subjects. He sent to Macmillan's Magazine an entertaining article, "Development in Dress," where the survivals in modern costume were recorded and discussed from the standpoint of evolution. In 1873 he wrote "On beneficial restriction to liberty of marriage," a eugenic article for which he was attacked with gross unfairness and bitterness by the late St. George Mivart. He was defended by Huxley; and Charles Darwin formally ceased all intercourse with Mivart. We find mention of a "Globe Paper for the British Association" in 1873. And in the following year he read a contribution on "Probable Error" to the Mathematical Society; on which he writes in his diary, "found it was old." Besides another paper in the Messenger of Mathematics, he reviewed "Whitney on Language," and wrote a "Defence of Jevons" which I have not been able to trace. In 1875 he was at work on the "Flow of Pitch," an "Equipotential Tracer," on slide rules, and sent a paper on "Cousin Marriages" to the Statistical Society. It is not my province to deal with these papers; they are enumerated here as showing his activity of mind and his varied interests, features in his character which were notable throughout life.

The most interesting entry in his diary for 1875 is a "Paper on Equipotentials much approved by Sir W. Thomson." This is the first notice of an association of primary importance in George's scientific career. Then came his memoir, "On the influence of geological changes in the earth's axis of rotation." Lord Kelvin was one of the referees appointed by the Council of the Royal Society to report on this paper, which was published in the Philosophical Transactions in 1877.
In his diary, November 1878, George records, "Paper on tides ordered to be printed." This refers to his work, "On the bodily tides of viscous and semi-elastic spheroids, etc.," published in the *Phil. Trans.* in 1879. It was in regard to this paper that his father wrote to George on October 29th, 1878: {164b}

My dear old George,

I have been quite delighted with your letter and read it all with eagerness. You were very good to write it. All of us are delighted, for considering what a man Sir William Thomson is, it is most grand that you should have staggered him so quickly, and that he should speak of your 'discovery, etc.' . . . Hurrah for the bowels of the earth and their viscosity, and for the moon and for the Heavenly bodies, and for my son George (F.R.S. very soon). . . . {165a}

The bond of pupil and master between George Darwin and Lord Kelvin, originating in the years 1877-8, was to be a permanent one, and developed, not merely into scientific co-operation, but into a close friendship. Sir Joseph Larmor has recorded {165b} that George's "tribute to Lord Kelvin, to whom he dedicated Volume I of his Collected Papers {165c} . . . gave lively pleasure to his master and colleague." His words were:

Early in my scientific career it was my good fortune to be brought into close personal relationship with Lord Kelvin. Many visits to Glasgow and to Largs have brought me to look up to him as my master, and I cannot find words to express how much I owe to his friendship and to his inspiration.

During these years there is evidence that he continued to enjoy the friendship of Lord Rayleigh and of Mr. Balfour. We find in his diary records of visits to Terling and to Whittingehame, or of luncheons at Mr. Balfour's house in Carlton Gardens, for which George's scientific committee work in London gave frequent opportunity. In the same way there are many records of visits to Francis Galton, with whom he was united alike by kinship and affection.

Few people indeed can have taken more pains to cultivate friendship than did George. This trait was the product of his affectionate and eminently sociable nature, and of his characteristic energy and activity. In earlier life he travelled a good deal in search of health, {166} and in after years he attended numerous congresses as a representative of scientific bodies. He thus had unusual opportunities of making the acquaintance of men of other nationalities, and some of his warmest friendships were with foreigners. In passing through Paris he rarely failed to visit M. and Mme d'Estournelles and "the d'Abbadies." It was in Algiers in 1878 and 1879 that he cemented his friendship with the late J. F. MacLennan, author of *Primitive Marriage*; and in 1880 he was at Davos with the same friends. In 1881 he went to Madeira, where he received much kindness from the Blandy family?doubtless through the recommendation of Lady Kelvín.

Cambridge.

We have seen that George was elected a Fellow of Trinity in October 1868, and that five years later (October 1873) he began his second lease of a Cambridge existence. There is at first little to record: he held at this time no official position, and when his Fellowship expired he continued to live in College, busy with his research work, and laying down the earlier tiers of the monumental series of papers which he gave to the world. This soon led to his being proposed (in November 1877) for the Royal Society, and elected in June 1879. The principal event in this stage of his Cambridge life was his election in 1883 as Plumian Professor of Astronomy and Experimental Philosophy. {167} His predecessor in the Chair was Professor Challis, who had held office since 1836, and is now chiefly remembered in connection with Adams and the planet Neptune. The professorship is not necessarily connected with the Observatory, and practical astronomy formed no part of George's duties. His lectures being on advanced mathematics usually attracted but few students; in the Long Vacation, however, when he habitually gave one of his courses, there was often a fairly large class. George's relations with his class have been sympathetically treated by Professor E. W. Brown,
In the late '70's George began to be appointed to various University Boards and Syndicates. Thus from 1878-82 he was on the Museums and Lecture Rooms Syndicate. In 1879 he was placed on the Observatory Syndicate, of which he became an official member in 1883 on his election to the Plumian Professorship. In the same way he was on the Special Board for Mathematics. He was a member of the Financial Board from 1900-1 to 1903-4, and on the Council of the Senate in 1906 and 1908-9. But he never became a professional syndic—one of those virtuous persons who spend their lives in University affairs. In his obituary of George (Nature, December 12, 1912), Sir Joseph Larmor writes:

In the affairs of the University, of which he was an ornament, Sir George Darwin made a substantial mark, though it cannot be said that he possessed the patience in discussion that is sometimes a necessary condition to taking a share in its administration. But his wide acquaintance and friendships among the statesmen and men of affairs of the time, dating often from undergraduate days, gave him openings for usefulness on a wider plane. Thus, at a time when residents were bewailing even more than usual the inadequacy of the resources of the University for the great expansion which the scientific progress of the age demanded, it was largely on his initiative that, by a departure from all precedent, an unofficial body was constituted in 1899 under the name of the Cambridge University Association, to promote the further endowment of the University by interesting its graduates throughout the Empire in its progress and its more pressing needs. This important body, which was organised under the strong lead of the late Duke of Devonshire, then Chancellor, comprises as active members most of the public men who owe allegiance to Cambridge, and has already by its interest and help powerfully stimulated the expansion of the University into new fields of national work, though it has not yet achieved financial support on anything like the scale to which American seats of learning are accustomed.

The Master of Christ's writes:

May 31st, 1915.

My impression is that George did not take very much interest in the petty details which are so beloved by a certain type of University authority. 'Comma hunting' and such things were not to his taste, and at meetings he was often rather distrait, but when anything of real importance came up he was of extraordinary use. He was especially good at drafting letters, and over anything that he thought promoted the advancement of the University along the right lines he would take endless trouble?writing and re-writing reports and letters till he got them to his taste. The sort of movements which interested him most were those which connected Cambridge with the outside world. He was especially interested in the Appointments Board. A good many of us constantly sought his advice, and nearly always took it: but, as I say, I do not think he cared much about the 'parish pump,' and was usually worried at long meetings.

Professor Newall has also been good enough to give me his impressions:

His weight in the committees on which I have had personal experience of his influence seems to me to have depended in large measure on his realising very clearly the distinction between the importance of ends to be aimed at and the difficulty of harmonising the personal characteristics of the men who might be involved in the work needed to attain the ends. The ends he always took seriously—the crotchets he of ten took humorously, to the great easement of many situations that are liable to arise on a committee. I can imagine that to those who had corns his direct progress may at times have seemed unsympathetic and hasty. He was ready to take much trouble in formulating statements of business with great precision?a result doubtless of his early legal experiences. I recall how he would say, "If a thing has to be
done, the minute should if possible make some individual responsible for doing it." He would ask, "Who is going to do the work? If a man has to take the responsibility, we must do what we can to help him, and not hamper him by unnecessary restrictions and criticisms." His helpfulness came from his quickness in seizing the important point and his readiness to take endless trouble in the important work of looking into details before and after the meetings. The amount of work that he did in response to the requirements of various Committees was very great, and it was curious to realise in how many cases he seemed to have diffidence as to the value of his contributions.

But on the whole, the work which he was able to carry out, in addition to professional duties and research, was in matters of general importance unconnected with the University. To these we shall return.

In 1884 he became engaged to Miss Maud Du Puy of Philadelphia. She came of an old Huguenot stock, descending from Dr. John Du Puy, who was born in France in 1679, and settled in New York in 1713. They were married on July 22nd, 1884, and this event happily coloured the remainder of George's life. As time went on, and existence became fuller and busier, she was able by her never-failing devotion to shield him from fatigue and anxiety. In this way he was helped and protected in the various semi-public functions in which he took a principal part. Nor was her help valued only on these occasions, for indeed the comfort and happiness of every day was in her charge. There is a charming letter {171} from George's mother, dated April 15th, 1884:

Maud had to put on her wedding-dress in order to say at the Custom-house in America that she had worn it, so we asked her to come down and show it to us. She came down with great simplicity and quietness . . . only really pleased at its being admired and at looking pretty herself, which was strikingly the case. She was a little shy at coming in, and sent in Mrs. Jebb to ask George to come out and see it first and bring her in. It was handsome and simple. I like seeing George so frivolous, so deeply interested in which diamond trinket should be my present, and in her new Paris morning dress, in which he felt quite unfit to walk with her.

Later, probably in June, George's mother wrote {172a} to Miss Du Puy, "Your visit here was a great happiness to me, as something in you (I don't know what) made me feel sure you would always be sweet and kind to George when he is ill and uncomfortable." These simple and touching words may be taken as a true forecast of his happy married life.

In March 1885 George acquired by purchase the house Newnham Grange, {172b} which remained his home to the end of his life. It stands at the southern end of the 'Backs,' within a few yards of the river where it bends eastward in flowing from the upper to the lower of the two Newnham water-mills. I remember forebodings as to dampness, but they proved wrong?even the cellars being remarkably dry. The house is built of faded yellowish bricks, with old tiles on the roof, and has a pleasant home-like air. It was formerly the house of the Beales family, {173a} one of the old merchant stocks of Cambridge. This fact accounts for the great barn-like granaries which occupied much of the plot near the high road. These buildings were in part pulled down, thus making room for a lawn tennis court, while what was not demolished made a gallery looking on the court, as well as play-room for the children. At the eastern end of the property a cottage and part of the granaries were converted into a small house of an attractively individual character, for which I think tenants have hitherto been easily found among personal friends. One of the most pleasant features of the Grange was the flower-garden and rockery on the other side of the river, reached by a wooden bridge and called "the Little Island." {173b} The house is conveniently close to the town, yet has a most pleasant outlook, to the north over the Backs while there is the river and the Fen to the south. The children had a den or house in the branches of a large copper beech tree overhanging the river. They were allowed to use the boat, which was known as the Griffin, from the family crest with which it was adorned. None of them were drowned, though accidents were not unknown; in one of these an eminent lady and well-known writer, who was inveigled on to the river by the children, had to wade to shore near Silver Street bridge owing to the boat running aground.

The Darwins had five children, of whom one died an infant: of the others, Charles Galton Darwin has inherited much of his father's mathematical ability, and has been elected to a Mathematical Lectureship at Christ's College. He is now in
George's relations with his family were most happy. His diary never fails to record the dates on which the children came home, or the black days which took them to school. There are constantly recurring entries in his diary of visits to the boys at Marlborough or Winchester, or of the journeys to arrange for the schooling of the girls in England or abroad. The parents took pains that their children should have opportunities of learning conversational French and German.

George's characteristic energy showed itself not only in these ways but also in devising bicycling expeditions and informal picnics for the whole family, to the Fleam Dyke, to Whittlesford, or other pleasant spots near home; and these excursions he enjoyed as much as anyone of the party. As he always wished to have his children with him, one or more generally accompanied him and his wife when they attended congresses or other scientific gatherings abroad.

His house was the scene of many Christmas dinners, the first of which I find any record being in 1886. These meetings were often made an occasion for plays acted by the children; of these the most celebrated was a Cambridge version of *Romeo and Juliet*, in which the hero and heroine were scions of the rival factions of Trinity and St. John's.

Games and Pastimes.

As an undergraduate George played tennis?not the modern out-door game, but that regal pursuit which is sometimes known as the game of kings and otherwise as the king of games. When George came up as an undergraduate there were two tennis courts in Cambridge, one in the East Road, the other being the ancient one that gave its name to Tennis Court Road, and was pulled down to make room for the new buildings of Pembroke. In this way was destroyed the last of the College tennis courts of which we read in Mr. Clark's *History*. I think George must have had pleasure in the obvious development of the tennis court from some primaeval farm-yard in which the pent-house was the roof of a shed, and the grille a real window or half-door. To one brought up on evolution there is also a satisfaction about the French terminology which survives in *e.g.* the *Tambour* and the *Dedans*. George put much thought into acquiring a correct style of play; for in tennis there is a religion of attitude corresponding to that which painfully regulates the life of the golfer. He became a good tennis player as an undergraduate, and was in the running for a place in the inter-University match. The marker at the Pembroke court was Henry Harradine, whom we all sincerely liked and respected, but he was not a good teacher, and it was only when George came under Henry's sons, John and Jim Harradine, at the Trinity and Clare court, that his game began to improve. He continued to play tennis for some years, and only gave it up after a blow from a tennis ball in January 1895 had almost destroyed the sight of his left eye.

In 1910 he took up archery, and zealously set himself to acquire the correct mode of standing, the position of the head and hands, etc. He kept an archery diary in which each day's shooting is carefully analysed and the results given in percentages. In 1911 he shot on 131 days: the last occasion on which he took out his bow was September 13, 1912. I am indebted to Mr. H. Sherlock, who often shot with him at Cambridge, for his impressions. He writes: "I shot a good deal with your brother the year before his death; he was very keen on the sport, methodical and painstaking, and paid great attention to style, and as he had a good natural 'loose,' which is very difficult to acquire, there is little doubt (notwithstanding that he came to archery rather late in life) that had he lived he would have been above the average of the men who shoot fairly regularly at the public meetings." After my brother's death Mr. Sherlock was good enough to look at George's archery note-book. "I then saw," he writes, "that he had analysed them in a way which, so far as I am aware, had never been done before." Mr. Sherlock has given examples of the method in a sympathetic obituary published (p. 273) in *The Archer's Register*. {177} George's point was that the traditional method of scoring is not fair in regard to the areas of the coloured rings of the target. Mr. Sherlock records in his *Notice* that George joined the Royal Toxophilite Society in 1912, and occasionally shot in the Regent's Park. In 1912 he won the Norton Cup and
Medal (144 arrows at 120 yards.)

There was a billiard table at Down, and George learned to play fairly well, though he had no pretension to real proficiency. He used to play at the Athenaeum, and in 1911 we find him playing there in the Billiard Handicap, but a week later he records in his diary that he was "knocked out."

Scientific Committees.

George served for many years on the Solar Physics Committee and on the Meteorological Council. With regard to the latter, Sir Napier Shaw has at my request given me his impressions: {178}

It was in February 1885, upon the retirement of Warren De la Rue, that your brother George, by appointment of the Royal Society, joined the governing body of the Meteorological Office, at that time the Meteorological Council. He remained a member until the end of the Council in 1905, and thereafter, until his death, he was one of the two nominees of the Royal Society upon the Meteorological Committee, the new body which was appointed by the Treasury to take over the control of the administration of the Office. . . .

The Commissioners, collectively known as the Meteorological Council, were a remarkably distinguished body of Fellows of the Royal Society, and when Darwin took the place of De la Rue, the members were men subsequently famous, as Sir Richard Strachey, Sir William Wharton, Sir George Stokes, Sir Francis Galton, Sir George Darwin, with E. J. Stone, a former Astronomer Royal for the Cape. . . .

I do not think that Darwin addressed himself spontaneously to meteorological problems, but he was always ready to help. He was very regular in his attendance at Council, and the minutes show that after Stokes retired, all questions involving physical measurement or mathematical reasoning were referred to him. There is a short and very characteristic report from him on the work of the harmonic analyser, and a considerable number upon researches by Mr. Dines or Sir G. Stokes on anemometers. It is hardly possible to exaggerate his aptitude for work of that kind. He could take a real interest in things that were not his own. He was full of sympathy and appreciation for efforts of all kinds, especially those of young men, and at the same time, using his wide experience, he was perfectly frank and fearless not only in his judgment but also in the expression of it. He gave one the impression of just protecting himself from boredom by habitual loyalty and a finely tempered sense of duty. My earliest recollection of him on the Council is the thrilling production of a new version of the Annual Report of the Council which he had written because the original had become more completely 'scissors and paste' than he could endure.

After the Office came into my charge in 1900, so long as he lived I never thought of taking any serious step without first consulting him, and he was always willing to help by his advice, by his personal influence and by his special knowledge. For the first six years of the time I held a college fellowship, with the peculiar condition of four public lectures in the University each year and no emolument. One year, when I was rather overdone, Darwin took the course for me, and devoted the lectures to Dynamical Meteorology. I believe he got it up for the occasion, for he professed the utmost diffidence about it, but the progress which we have made in recent years in that subject dates from those lectures and the correspondence which arose upon them.

In Council it was the established practice to proceed by agreement and not by voting; he had a wonderful way of bringing a discussion to a head by courageously 'voicing' the conclusion to which it led, and frankly expressing the general opinion without hurting anybody's feelings. . . .
It is not easy to give expression to the powerful influence which he exercised upon all departments of official meteorology without making formal contributions to meteorological literature. He gave me a note on a curious point in the evaluation of the velocity equivalents of the Beaufort Scale, which is published in the Office Memoirs No. 180, and that is all I have to show in print, but he was in and behind everything that was done, and personally, I need hardly add, I owe to him much more than this or any other letter can fully express.

On May 6, 1904, the year of the South African meeting, he was elected President of the British Association.

On July 29, 1905, he embarked with his wife and his son Charles, and arrived on August 15 at the Cape, where he gave the first part of his Presidential Address. Here he had the pleasure of finding as Governor, Sir Walter Hely-Hutchinson, whom he had known as a Trinity undergraduate. He was the guest of the late Sir David Gill, who remained a close friend for the rest of his life. George's diary gives his itinerary which shows the trying amount of travel that he went through. A sample may be quoted:

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<th>August</th>
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<td>Arrive at Durban,</td>
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<td>Ladysmith,</td>
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<td>Johannesburg.</td>
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At Johannesburg he gave the second half of his Address. Then on by Bloemfontein, Kimberley, Bulawayo, to the Victoria Falls, where a bridge had to be opened. Then to Portuguese Africa on September 16, 17, where he made speeches in French and English. Finally he arrived at Suez on October 4, and got home October 18.

It was generally agreed that his Presidentship was a conspicuous success. The following appreciation is from the obituary notice in *The Observatory*, January 1913, p. 58:

The Association visited a dozen towns, and at each halt its President addressed an audience partly new, and partly composed of people who had been travelling with him for many weeks. At each place this latter section heard with admiration a treatment of his subject wholly fresh and exactly adapted to the locality.

Such duties are always trying, and it should not be forgotten that tact was necessary in a country which only two years before was still in the throes of war.

In the autumn he received the honour of being made a K.C.B. The distinction was doubly valued as being announced to him by his friend Mr. Balfour, then Prime Minister.

From 1899 to 1900 he was President of the Royal Astronomical Society. One of his last Presidential acts was the presentation of the Society's Medal to his friend M. Poincaré.

He had the unusual distinction of serving twice as President of the Cambridge Philosophical Society, once in 1890-92 and again 1911-12.

In 1891 he gave the Bakerian Lecture of the Royal Society, his subject being "Tidal Prediction." This annual prælection dates from 1775, and the list of lecturers is a distinguished roll of names.

In 1897 he lectured at the Lowell Institute at Boston, and this was the origin of his book on *Tides*, published in the following year. Of this Sir Joseph Larmor says that "it has taken rank with the semi-popular writings of
Helmholtz and Kelvin as a model of what is possible in the exposition of a scientific subject." It has passed through three English editions, and has been translated into many foreign languages.

International Associations.

During the last ten or fifteen years of his life George was much occupied with various International bodies, e.g. the International Geodetic Association, the International Association of Academies, the International Congress of Mathematicians, and the Seismological Congress.

With regard to the last named it was in consequence of George's report to the Royal Society that the British Government joined the Congress. It was however with the Geodetic Association that he was principally connected.

Sir Joseph Larmor (Nature, December 12, 1912) gives the following account of the origin of the Association:

The earliest of topographic surveys, the model which other national surveys adopted and improved upon, was the Ordnance Survey of the United Kingdom. But the great trigonometrical survey of India, started nearly a century ago, and steadily carried on since that time by officers of the Royal Engineers, is still the most important contribution to the science of the figure of the earth, though the vast geodetic operations in the United States are now following it closely. The gravitational and other complexities incident on surveying among the great mountain masses of the Himalayas early demanded the highest mathematical assistance. The problems originally attacked in India by Archdeacon Pratt were afterwards virtually taken over by the Royal Society, and its secretary, Sir George Stokes, of Cambridge, became from 1864 onwards the adviser and referee of the survey as regards its scientific enterprises. On the retirement of Sir George Stokes this position fell very largely to Sir George Darwin, whose relations with the India Office on this and other affairs remained close, and very highly appreciated, throughout the rest of his life.

The results of the Indian survey have been of the highest importance for the general science of geodesy. . . . It came to be felt that closer co-operation between different countries was essential to practical progress and to coordination of the work of overlapping surveys.

For the further history of George's connection with the Association, I am indebted to the Secretary, Dr. van d. Sande Bakhuyzen.

On the proposal of the Royal Society the British Government, after having consulted the Director of the Ordnance Survey, in 1898, resolved upon the adhesion of Great Britain to the International Geodetic Association, and appointed as its delegate, G. H. Darwin. By his former researches and by his high scientific character, he, more than any other, was entitled to this position, which would afford him an excellent opportunity of furthering, by his recommendations, the study of theoretical geodesy. . . . We cannot relate in detail his valuable co-operation as a member of the Council in the various transactions of the Association, for instance, on the junction of the Russian and Indian triangulations through Pamir, but we must gratefully remember his great service to the Association when, at his invitation, the delegates met in 1909 for the 16th General Conference in London and Cambridge.

With the utmost care he prepared everything to render the Conference as interesting and agreeable as possible, and he fully succeeded. Through his courtesy the foreign delegates had the opportunity of making the personal acquaintance of several members of the Geodetic staff of England and its colonies, and of other scientific men, who were invited to take part in the Conference; and when after four meetings in London the delegates went to Cambridge to continue their work, they enjoyed the most cordial hospitality from Sir George and Lady Darwin, who, with her husband, procured them in
Newnham Grange happy leisure hours between their scientific labours.

At this conference Darwin delivered various reports, and at the discussion on Hecker's determination of the variation of the vertical by the attraction of the moon and sun, he gave an interesting account of the researches on the same subject made by him and his brother Horace more than 20 years ago, which unfortunately failed from the bad conditions of the places of observation.

In 1912 Sir George, though already over-fatigued by the preparations for the Mathematical Congress in Cambridge, and the exertions entailed by it, nevertheless prepared the different reports on the geodetic work in the British Empire, but, alas, his illness prevented him from assisting at the conference at Hamburg, where they were presented by other British delegates. The conference thanked him, and sent him its best wishes, but at the end of the year the Association had to deplore the loss of the man who in theoretical geodesy as well as in other branches of mathematics and astronomy stood in the first rank, and who for his noble character was respected and beloved by all his colleagues in the International Geodetic Association.

Sir Joseph Larmor writes: {186}

Sir George Darwin's last public appearance was as president of the fifth International Congress of Mathematicians, which met at Cambridge on August 22-28, 1912. The time for England to receive the congress having obviously arrived, a movement was initiated at Cambridge, with the concurrence of Oxford mathematicians, to send an invitation to the fourth congress held at Rome in 1908. The proposal was cordially accepted, and Sir George Darwin, as doyen of the mathematical school at Cambridge, became chairman of the organising committee, and was subsequently elected by the congress to be their president. Though obviously unwell during part of the meeting, he managed to discharge the delicate duties of the chair with conspicuous success, and guided with great verve the deliberations of the final assembly of what turned out to be a most successful meeting of that important body.

Personal Characteristics.

His daughter, Madame Raverat, writes:

I think most people might not realise that the sense of adventure and romance was the most important thing in my father's life, except his love of work. He thought about all life romantically, and his own life in particular; one could feel it in the quality of everything he said about himself. Everything in the world was interesting and wonderful to him, and he had the power of making other people feel it. He had a passion for going everywhere and seeing everything; learning every language, knowing the technicalities of every trade; and all this emphatically not from the scientific or collector's point of view, but from a deep sense of the romance and interest of everything. It was splendid to travel with him; he always learned as much as possible of the language, and talked to everyone; we had to see simply everything there was to be seen, and it was all interesting, like an adventure. For instance, at Vienna I remember being taken to a most improper music hall, and at Schönbrunn hearing from an old forester the whole secret history of the old Emperor's son. My father would tell us the stories of the places we went to with an incomparable conviction and sense of the reality and dramaticness of the events. It is absurd, of course, but in that respect he always seemed to me a little like Sir Walter Scott. {187}
The books he used to read to us when we were quite small, and which we adored, were Percy's *Reliques* and the *Prologue to the Canterbury Tales*. He used often to read Shakespeare to himself, I think generally the historical plays; also Chaucer, *Don Quixote* in Spanish, and all kind of books like Joinville's *Life of St. Louis* in the old French.

I remember the story of the death of Gordon told so that we all cried, I think; and Gladstone could hardly be mentioned in consequence. All kinds of wars and battles interested him, and I think he liked archery more because it was romantic than because it was a game.

During his last illness his interest in the Balkan war never failed. Three weeks before his death he was so ill that the doctor thought him dying. Suddenly he rallied from the half-unconscious state in which he had been lying for many hours, and the first words he spoke on opening his eyes were, "Have they got to Constantinople yet?" This was very characteristic. I often wish he was alive now, because his understanding and appreciation of the glory and tragedy of this war would be like no one else's.

His daughter Margaret writes:

He was absolutely unselfconscious, and it never seemed to occur to him to wonder what impression he was making on others. I think it was this simplicity which made him so good with children. He seemed to understand their point of view, and to enjoy with them in a way that is not common with grown-up people. I shall never forget how when our dog had to be killed he seemed to feel the horror of it just as I did, and how this sense of his really sharing my grief made him able to comfort me as nobody else could.

He took a transparent pleasure in the honours that came to him, especially in his membership of foreign Academies, in which he and Sir David Gill had a friendly rivalry or "race," as they called it. I think this simplicity was one of his chief characteristics, though most important of all was the great warmth and width of his affections. He would take endless trouble about his friends, especially in going to see them if they were lonely or ill; and he was absolutely faithful and generous in his love.

After his mother came to live in Cambridge I believe he hardly ever missed a day in going to see her, even though he might only be able to stay a few minutes. She lived at some distance off, and he was often both busy and tired. This constancy was very characteristic. It was shown once more in his many visits to Jim Harradine, the marker at the tennis court, on what proved to be his death-bed.

His energy and his kindness of heart were shown in many cases of distress. For instance, a guard on the Great Northern Railway was robbed of his savings by an absconding solicitor, and George succeeded in collecting some £300 for him. In later years, when his friend the guard became bedridden, George often went to see him. Another man whom he befriended was a one-legged man at Balsham, whom he happened to notice in bicycling past. He took the trouble to see the village authorities, and succeeded in sending the man to London to be fitted with an artificial leg.

In these and similar cases there was always the touch of personal sympathy. For instance, he pensioned the widow of his gardener, and he often made the payment of her weekly allowance the excuse for a visit.

In another sort of charity he was equally kindhearted, viz., in answering the people who wrote foolish letters to him on scientific subjects?and here as in many points he resembled his father.

His sister, Mrs. Litchfield, has truly said {190} of George, that he inherited his father's power of work and much of his "cordiality and warmth of nature, with a characteristic power of helping others." He resembled his father in another quality, that of modesty. His friend and pupil, Professor E. W. Brown, writes:
He was always modest about the importance of his researches. He would often wonder whether the
cresults were worth the labour they had cost him, and whether he would have been better employed in
some other way.

His nephew Bernard, speaking of George's way of taking pains to be friendly and forthcoming to anyone with whom
he came in contact, says:

He was ready to take other people's pleasantness and politeness at its apparent value and not to
discount it. If they seemed glad to see him, he believed that they were glad. If he liked somebody, he
believed that the somebody liked him, and did not worry himself by wondering whether they really did
like him.

Of his energy we have evidence in the amount of material contained in his collected works. There was nothing dilatory
about him, and here he again resembled his father, who had markedly the power of doing things at the right moment,
and thus avoiding waste of time and discomfort to others. George had none of a characteristic which was defined in the
case of Henry Bradshaw, as "always doing something else." After an interruption he could instantly reabsorb himself in
his work, so that his study was not kept as a place sacred to peace and quiet.

His wife is my authority for saying that although he got so much done, it was not by working long hours. Moreover, the
days that he was away from home made large gaps in his opportunities for steady application. His diaries show in
another way that his researches by no means took all his time. He made a note of the books he read, and these make a
considerable record. Although he read much good literature with honest enjoyment, he had not a delicate or subtle
literary judgment. Nor did he care for music. He was interested in travels, history, and biography, and as he could
remember what he read or heard, his knowledge was wide in many directions. His linguistic power was characteristic.
He read many European languages. I remember his translating a long Swedish paper for my father. And he took
pleasure in the Platt Deutsch stories of Fritz Reuter.

The discomfort from which he suffered during the meeting at Cambridge of the International Congress of
Mathematicians in August 1912 was, in fact, the beginning of his last illness. An exploratory operation showed that he
was suffering from malignant disease. Happily he was spared the pain that gives its terror to this malady. His nature
was, as we have seen, simple and direct, with a pleasant residue of the innocence and eagerness of childhood. In the
manner of his death these qualities were ennobled by an admirable and most unselfish courage. As his vitality ebbed
away his affection only showed the stronger. He wished to live, and he felt that his power of work and his enjoyment of
life were as strong as ever, but his resignation to the sudden end was complete and beautiful. He died on December 7,
1912, and was buried at Trumpington.

HONOURS, MEDALS, DEGREES, SOCIETIES, ETC.

Order. K.C.B. 1905.

Medals. {192a}

1883. Telford Medal of the Institution of Civil Engineers.

1884. Royal Medal. {192b}


1911. Copley Medal of the Royal Society.


Offices
Fellow of Trinity College, Cambridge, and Plumian Professor in the University.

Vice-President of the International Geodetic Association, Lowell Lecturer at Boston U.S. (1897).

Member of the Meteorological and Solar Physics Committees.


Doctorates, etc., of Universities.

Oxford, Dublin, Glasgow, Pennsylvania, Padua (Socio onorario), Göttingen, Christiania, Cape of Good Hope, Moscow (honorary member).

Foreign or Honorary Membership of Academies, etc.

Amsterdam (Netherlands Academy), Boston (American Academy), Brussels (Royal Society), Calcutta (Math. Soc.), Dublin (Royal Irish Academy), Edinburgh (Royal Society), Halle (K. Leop.-Carol. Acad.), Kharkov (Math. Soc.), Mexico (Soc. "Antonio Alzate"), Moscow (Imperial Society of the Friends of Science), New York, Padua, Philadelphia (Philosophical Society), Rome (Lincei), Stockholm (Swedish Academy), Toronto (Physical Society), Washington (National Academy), Wellington (New Zealand Inst.).

Correspondent of Academies, etc., at

Acireale (Zelanti), Berlin (Prussian Academy), Buda Pest (Hungarian Academy), Frankfort (Senckenberg. Natur. Gesell.), Göttingen (Royal Society), Paris, St. Petersburg, Turin, Istuto Veneto, Vienna.

NOTES:

{152a} Reprinted, with corrections (by the kind permission of the Syndics of the University Press), from Vol. v. of Sir G. Darwin's Scientific Papers. The biographical sketch of my brother is reproduced in a somewhat abbreviated version and does not contain Prof. E. W. Brown's contribution.

{152b} The third of those who survived childhood.

{152c} At Maer, the Staffordshire home of his mother.


{157} Afterwards Savilian Professor of Astronomy at Oxford. Born 1808, died 1893.

{158a} The late Mr. Routh was the most celebrated mathematical "Coach" of his day.

{158b} Compare Charles Darwin's words: "George has not slaved himself, which makes his success the more satisfactory" (More Letters of C. Darwin, Vol. II., p. 287).


{161} He was called in 1874 but did not practise.

{162} As a boy he had energetically collected Lepidoptera during the years 1858?61; the first vague indications of a le
anuising towards physical science may perhaps be found in his joining the Sicilian eclipse expedition, December, 1870?January, 1871. It appears from *Nature*, December 1, 1870, that George was told off to make sketches of the Corona.

{163c} Not published.
{164b} Probably he heard informally at the end of October what was not formally determined till November.
{165b} *Nature*, December 12, 1912.
{165c} It was in 1907 that the Syndics of the Cambridge University Press asked George to prepare a reprint of his scientific papers, which were published in five volumes. George was deeply gratified at an honour that placed him in the same class as Lord Kelvin, Stokes, Cayley, Adams, Clerk Maxwell, Lord Rayleigh, and other men of distinction.

{166} Thus in 1872 he was in Homburg, 1873 in Cannes, 1874 in Holland, Belgium, Switzerland and Malta, 1876 in Italy and Sicily.

{167} The voting at University elections is in theory strictly confidential, but in practice this is unfortunately not always the case. George records in his diary the names of the five who voted for him and of the four who supported another candidate. None of the electors are now living. The election occurred in January, and in June he had the great pleasure and honour of being re-elected to a Trinity Fellowship. His daughter, Madame Raverat, writes: "Once, when I was walking with my father on the road to Madingley village, he told me how he had walked there on the first Sunday he ever was at Cambridge with two or three other freshmen; and how, when they were about opposite the old chalk pit, one of them betted him £20 that he (my father) would never be a professor of Cambridge University: 'and' said my father, with great indignation, 'he never paid me.'"

{168} In the second part of the Preface to the fifth volume of *Sir G. H. Darwin's Scientific Papers*, 1916.
{172b} At that time it was known simply as Newnham, but as this is the name of the College, and was also in use for a growing region of houses, the Darwins christened it Newnham Grange. The name Newnham is now officially applied to the region extending from Silver Street Bridge to the Barton Road.

{173a} The following account of Newnham Grange is taken from C. H. Cooper's *Memorials of Cambridge*, 1866, Vol. III., p. 262 (note): "The site of the hermitage was leased by the Corporation to Oliver Grene, 20 September, 31 Eliz. (1589). It was in 1790 leased for a long term to Patrick Beales, from whom it came to his brother, S. P. Beales, Esq., who erected thereon a substantial mansion and mercantile premises now occupied by his son, Patrick Beales, Esq., alderman, who purchased the reversion from the Corporation in 1839." Silver Street was formerly known as Little Bridges Street, and the bridges which gave it this name were in charge of a hermit, hence the above reference to the hermitage.

{173b} This was to distinguish it from the "Big Island," both being leased from the town. Later George acquired in the
same way the small oblong kitchen garden on the river bank, and bought the freehold of the Lammas land on the opposite bank of the river.


{178} As here given they are abbreviated.

{182a} See Prof Brown's Memoir, p. xlix.

{182b} Nature, 1912. See also Prof. Brown's Memoir, p. I.

{186} Nature, December 12, 1912.

{187} Compare Mr. Chesterton's Twelve Types, (1903), p. 190. He speaks of Scott's critic in the Edinburgh Review: "The only thing to be said about that critic is that he had never been a little boy. He foolishly imagined that Scott valued the plume and dagger of Marmion for Marmion's sake. Not being himself romantic, he could not understand that Scott valued the plume because it was a plume, and the dagger because it was a dagger."


{192a} Sir George's medals are deposited in the Library of Trinity College, Cambridge.

{192b} Given by the Sovereign on the nomination of the Royal Society.

{193} Re-elected in 1912.

{194} The above list is principally taken from that compiled by Sir George for the Year-Book of the Royal Society, 1912, and may not be quite complete. It should be added that he especially valued the honour conferred on him in the publication of his collected papers by the Syndics of the University Press.

(The end)

Francis Darwin's essay: Sir George Darwin

By Francis Darwin