

CHAPTER XVII

CHARACTERISATION, ESPECIALLY BY LETTERS

“His interest was nearly as promptly and vehemently kindled in one subject as in another; he was always boldly tentative, always fresh and vigorous in suggestion, always instant in search.” Morley, *Diderot*, Vol. II, p. 37.

In this final chapter the reader will find printed a selection from the innumerable letters which Francis Galton, during a long life, wrote to his family circle and friends. My aim in the earlier chapters of this biography, after describing Galton's ancestry and childhood, has been to give a full account of his contributions to science, and to reproduce portions of his scientific correspondence. I have not wholly excluded from this chapter letters to scientific friends—failing a complete publication of Galton's letters it must be an “omnibus” appendix—but its main purpose is to paint a side of Galton's nature which I fear has not been adequately emphasised in the earlier chapters. Francis Galton to his scientific colleagues was courteous, generous and marvellously humble. To his relatives and close friends he was sympathetic, helpful and always full of fun. His wonderful patience with an invalid wife, and after her death his splendid loyalty to her memory, can only be lightly touched on here. His limitations were as well known to himself as to others; he had no musical sense, and art, whether in colour, form or verbal expression, was not for him an essential need of his being. I do not think he was fond of animals, nor had he a keen comprehension and love of young things; perhaps they suggested too bitterly what was lacking in his own life; he seemed to be alarmed by children, and did not find the right words to say to them. I doubt whether he could have placed a child on his knee and told it a tale. With young people beginning to think and to take an interest in life's problems he was wholly sympathetic; he respected their views, however callow, and entered with jest and anecdote into all their fun. At “biometric teas” his presence was never over-aweing, indeed it was he who generally started and led the mirth.

The letters which follow will show clearly how deeply he could sympathise with those who failed to appreciate the contributions he was making to the great revolution in human thought which marked the last quarter of the nineteenth century. I have said that he did not understand children, yet he did understand and sympathise with those simple childlike natures which still found comfort, and a crutch for the conduct of life, in the faiths of mankind's infancy. He would endeavour to interpret their conceptions in terms of his own wider aspirations. To those who stood nearer to his own standpoint he made no pretence of reconciling the old with the new—“It

aids them, but it would be of no service to you and me." Thus he would explain to his biographer that sympathy in expression and action which might not unreasonably appear irreconcilable with his own faith. Without being deeply interested in history he had, as every man of culture, an understanding for the past; he realised that each worn-out phase of mankind's mental evolution is not a ruin to serve as a quarry for to-day's uses, but rather a monument to be preserved, even fenced about to protect it from the ravages of the profit-seeker, or indeed from the sacrilege of the scoffer. It is in this spirit that the reader must weigh some of the letters of Galton and some of the statements about him in the following pages. Galton was as strong an agnostic as Darwin or Huxley, but he was not, like the latter, an iconoclast; as I will venture to put it, the stirps of Galton and Darwin had a more generous historical background than that of Huxley, and this even more so in Galton's case. He has spoken in several places of the unconscious working of the mind. There is a conscious family tradition, and again an unconscious one; our mentality is what it is in accordance with the tradition of our stirp, and works unwittingly in the track of the past. The Galton stirp—witness its quakers and its devout catholics—had a deep religious sense—not unbroken by a tendency to wander at times from the current phases of morals and of religion, but it had also a kingly spirit in the best sense of the words—an understanding of the nature and the needs of those dependent upon it. Roll into one the characteristics of the Plantagenet, the Stewart, the Savile, the Sedley and the Darwin stirps, and we can thus, and only thus, fully appreciate the complex nature of Galton's mind. We can trace therein his impulse towards travel, his fallow years, his inventive genius, his sympathy with deeply religious natures, his zeal for knowledge, and his mirthfulness. Width of mind in any individual usually takes its origin in the happy combination of several stirps of strong but diverse intellectual character. A danger arises when intimates, especially relatives, appraise a great and wide-minded man; they are apt to emphasise that side of his character which has appealed most strongly to them, and of which for that very reason he may have sounded the note. In the case of blood relatives that note may be the characteristic of the part of their stirp common to both, or indeed, if they are of the full blood, as brothers, the one may be dominated exclusively by one factor of their common stirp*.

In reading family letters written originally for no other eyes than those of the recipients, we must ever bear this in mind. When a man soars above his fellows to altitudes they have not yet attained, it is only natural that his intercourse with them should remain largely on the old plane familiar to all of them. The letters of Galton show him as son, as brother, as uncle, and as great-uncle—those which might have limned him in his courtship and marriage failed to reach his biographer. Yet the letters which I have seen, apart from their bearing on Galton's own history, cover upwards of a century of family life, and are in themselves witness to the great changes

* Thus in the children of Charles Darwin one marks in isolation factors which were combined in their father and great-grandfathers.

which took place in our national life, both economically and psychically, during the nineteenth century. We see children, born in an age of canal-building and stage-coaches, dying as motor-boats and airplanes come into being. We note men, great and mediocre, passing from the vigour of youth to the weakness of old age and leaving behind them records of actions which will survive for generations, or which have already perished. And we ask why, with a common environment, does one man achieve and another fail to do so? The answer can only be: "Such is the law of inheritance," and that was Galton's answer. But even with his work, supplemented by that of Mendel and the followers of both, we yet fail to solve the riddle of family history—why one man here and there is so markedly differentiated from his stock, noteworthy as that may be.

It will probably aid the reader to have a short account of the environment of Galton during the successive years of his life, taken from the hasty notes written down by his wife or himself on different occasions.

Brief Record of Galton's Travels and Visits, 1853–1883.

Francis Galton was married on August 1, 1853, and toured in Switzerland and Italy, spending the winter in Florence and Rome.

1853 Rome. '54 Chambord. '55 Farnborough, Paris Exhibition. '56 Innsbruck, Vienna, Dresden. '57 Courmayeur, Gressoney, Corniche. '58 English Lakes. '59 Lakes, Bonn.

1860 Richmond, Pyrenees. '61 Zermatt, Monte Moro. '62 Glarus, Pilatus, Champéry, Chamounix. '63 Glion, Stresa, Corniche. '64 St Gall, Haudères, Sepey. '65 Spa, Holland, Birmingham. '66 Cannes, Mentone, English Lakes, Nottingham. '67 Mentone, Sorrento, St Moritz. '68 Auvergne. '69 Heidelberg, Berchtesgaden. '70 Grindelwald, Folkestone. '71 Scarborough, Whitby. '72 Brighton. '73 Ilmenau, Moselle. '74 Lynton, Chettle. '75 Fontainebleau, Mürren. '76 Bavarian Lakes, Venice. '77 Tunbridge Wells, Bournemouth. '78 Vichy, Mont d'Or, Paris Exhibition. '79 Vichy, Black Forest. '80 Dinant. '81 Bournemouth, York, Vichy. '82 Baden, Constance. '83 Devonshire.

Notes on Galton's Visits, Friends and Occupations, 1875–1883.

1875 with Emma and Lucy to Fontainebleau; in June to Seelisberg, to Paris, met Emma. F. G. went to Bristol, British Association and returned to Paris. Russell Gurneys went to Egypt. Twins. Sweet peas. *Phil. Mag.* Law of Error and Ogives.

1876 Sweet peas. Miss Christie. Loan Collection. S. Kensington; Whistler. Jenkinsons at Fawley. Groves at Syston. With Emma and Brodrick to Bavaria, Venice and Italian Lakes. Arthur engaged to be married.

1877 Louisa's bad illness. Tunbridge Wells. Bournemouth. Plymouth British Association. Arthur married. Mr Holland died.

1878 Rheumatic gout in my knee, March. Composite photos. R. Gurney died. Silver wedding year. Vichy, Mont d'Or, Tours, Blois, Paris Exhibition. Folkestone, F. G. back to Paris.

1879 Lady Grove died. Bournemouth (Tower). Vichy with (Roes and Martindales). Gérardmer. Black Forest. Judge Grove at Wakehurst in Sussex. Generic Images.

1880 Vichy. Boulogne (May and Spencer). Swansea, Brit. Assoc. Liphook. Meuse (Dinant). Spa. Brussels Exhibition. Photographed at home.

1881 Home early in October. Easter Leamington. Guy's Hosp., composite photography. Bournemouth. York, British Assoc. Vichy late. Paris. Douglas broke his ankle. Composite phthisis photos.

1882. Easter Claverdon and Leamington. Rhine. Black Forest. Baden Baden. Constance. Axenfels. C. Darwin died. Graef picture. Guy's Hospital photography (Bethlehem and Hanwell). Life Histories. George, Canon of Winchester. Anthropol. Album.

1883. Georgina died. H[enry] Smith died. Bournemouth. New Forest. Spottiswoode died. Jenkinsons. Newton Abbot. Torquay. Southport B.A. Adèle died. Leamington. Home Oct. 1.

The above records, written in a scarcely legible hand, were found in one of Galton's note-books. I give a continuation from Louisa Galton's diaries to 1897, and have then filled in the remaining years to 1911 from my own knowledge. The series will serve as a convenient reference for the later of the following letters.

1884. Early February Brighton one week. Easter Ventnor April 1-17, Rede Lecture at Cambridge on May 27, 4 days. No British Assoc. but were prevented going to S. France by outbreak of cholera. Lakes, Windermere on July 15, Keswick 17th for about a month, Patterdale for a week. At end of August home for a week, then Claverdon and Leamington, home September 24. October 7-11 to Stanmore.

1885. February 7-9 Leamington. Easter family gathering at Harrow, a week at Tunbridge Wells and a week at Ramsgate. End of July Holmbury St Mary for 6 weeks. British Assoc. Aberdeen. Owing to cholera in Italy had a dull week at St Leonards and a visit to Oxford.

1886. February 25 Paris, Hyères, Mentone, Rome, Sorrento, Amalfi, Castellammare, Florence. Easter Vevey. Home May 5. Late in July to Contrexéville 3 weeks, Bussang in Vosges returning by Nancy, Paris and Boulogne. September 1st visited Marianne North at Alderley for 2 weeks, Hills at Newbury, Montagu [Butler] at Gloucester, Claverdon, Leamington; home early in October.

1887. Early March 10 days with Montagu at Trinity. Whitsuntide at Tunbridge Wells. Mid-July Homburg 3 weeks, Freiburg, Constance, Zürich, 6 days' tour to Rhone Glacier, Eggishorn, Rieder [Furka] and Belalp and Brieg to Domo d'Ossola, San Rosso [? M. Rosso, N. of Pallanza] and the Falls of Toce, back to Zürich over Gries. Engelberg a week, by St Gotthard to Locarno, Lugano 9 days, then Basle, Calais and home. Leamington.

1888. Easter Leamington 1 week. In July visited Lethbridges at Clifton and M[arianne] North at Alderley, returning for Montagu's wedding on August 9th. August 10 Brighton 1 week, returned to Alderley. September 1st Vichy 3 weeks, Paris 3 days, home end of September.

Visits: Arthur [Butler], Mr Brodrick, Stanmore (the John Hollonds) and Trinity.

1889. Early March-May 3rd: Cannes, Mentone, Genoa, Milan, Baveno, Cadenabbia, St Gotthard, Paris. July nine days with M. North. August Paris one week (Congress on Heredity), August 12 Carlisle to Corby Castle (Hills) 10 days, and 2 weeks at Wetheral. Alnwick with E. Wheler for 3 days, Newcastle B.A. meeting, staying at Gateshead Sept. 10-18. Saw Durham and York. Leamington for Lucy Wheler's wedding on Sept. 26. Nov. few days at Trinity.

1890. Easter fortnight at Alderley, ending with 2 days in Forest of Dean. July, Switzerland, St Beatenberg, Stoos [? Stoss, near Altstetten], Freudenstadt, Strasburg, Nancy, Paris, home September 8th. Leamington, home end of September.

1891. Easter Leamington 10 days. In May 2 days at Cambridge with the George Darwins. Tunbridge Wells mid-July for a fortnight, returning to London August 10-15 for Congress of Hygiene. Vichy to September 9th, Châtelguyon, Royat, the Lozère, the Gorges of the Tarn (long F. G.'s ambition), Montpellier-le-Vieux, Nîmes, Avignon, home October 9th.

1892. First week of the year with Emma, Leamington. End of March Biarritz 2 weeks, Cambo, home early in May. August 8th to Corby for 10 days, Edinburgh for 2 weeks, Calander. September 9th to the E. Whelers at Alnwick, 23rd-27th to Lady Welby near Grantham; a little time at Peterborough, Leamington. Home early in October.

1893. March 13 Riviera: Hyères, Valescure, Cannes. Home April 20. May 11-15 Trinity. End of July Holyhead, 3 weeks (the Institute under Miss Adeane). Short visit to Lady Stanley at Penrhos, Bettws-y-Coed 3 weeks, tour by coach to Capel Curig, Beddgelert, Aberglaslyn to Port Madoc, toy railway to Festiniog, and next morning through Bettws-y-Coed to Conway and Chester 2 nights, Shrewsbury and Leamington for 2 weeks. Home September 30.

1894. February 27–April 7 Cimiez. In May to Edmond Hills at Darland House. May 12–14 at Merton. June 1 Trinity. June 19 Arthur [Butler] at Oxford. Towards end of July Spa for 2 weeks. Köln, Heidelberg, Bodensee, Landeck, Innsbruck, Berchtesgaden nearly 2 weeks, Salzburg, Ischl, Gmunden Sept. 17–19, Regensburg, Nürnberg, Würzburg, Köln. Home on September 27. Leamington 1 week.

1895. April 9 Leamington for 9 days, then to Mrs McLennan at Hayes for a short visit. May 13–16 Cambridge for D.Sc. In June to Mrs Hodgson at Tanhurst (Leith Hill). July 3 Nauheim, Garmisch for more than a month. August 12 Munich, Nürnberg, Rothenburg 2 nights, Frankfurt, Bonn, home August 27. Fortnight at Tunbridge Wells. September 21–30 Leamington, and then home.

1896. March 13 Hastings. March 25th Eastbourne. April 2 for Easter, Leamington. July 10 Wildbad (treatment for L. G.), Oberstdorf (treatment for F. G.), Lindau, Davos 10 days, Zürich, Freiburg, Strasburg, Rheims, Amiens. Home September 7. Sept. 25 to Oct. 2 Leamington. Oct. 13 Trinity a few days.

1897. March 24 Bournemouth. April 20–23 Leamington. June 5–8 Oxford (Arthur). July 14 Boulogne, 15 Royat. (August 13 Louisa died.) F. G. left Royat Tuesday 17th, home on 18th. Leamington 1 week. Himbleton nearly a week. Corby till Sept. 13. Sept. 25 Boscombe. Weymouth (to Emma). Oct. 16 to G. Brodrick 3 days. Oct. 23 Leamington, to Emma. Dec. 4 to Bessy, and then to the Studdys.

1898. I have but few records of this year. Galton was at Rutland Gate in January, July, and November, and travelled with his wife's nephew, Frank Butler, to Royat and to the Riviera, and then to Italy (Castellammare).

1899. March 21 at sea; 22 Gibraltar; 23 Ronda; 26–April 3 Seville; April 3–5 Cadiz; 5 Tangiers; Morocco, Malaga; 13 Granada; 18–20 Toledo; 20–26 Madrid; Barcelona, Carcassonne, Nîmes, Clermont-Ferrand. July and August Royat for 3 weeks. Switzerland for 2 weeks. Home middle of August. December 15 Luxor; 18–22 Assouan.

1900. January 1 Luxor; to the Petrics for a week. January 22–February 9 Luxor; February 15–March 4 (?) Cairo.

1902. November 12 at home; November 28 Valescure.

1903. January 8– Rome, Naples, Ischia; April –8 Siena, Bologna, Milan (for Easter), Cologne, Brussels; April 20 London. June 10–12 Loxton; 14–16 Cambridge; July 22 Norwich for 2 or 3 days. August–September (?) Norfolk Broads; December Italy–Sicily.

1904. February –2 Girgenti; February 2– Taormina. August –26–Sept. 6– Bibury, Fairford; 15–19 Bovey Tracey; 19–20 London; 20–24 Claverdon. Home early October. November 4–7 Leamington; December –10 Bournemouth.

1905. January at home; February 18–20 Calais; February 20–May 1st Bordighera; May 1st home. July 29–August 1 Claverdon; August 1–5 Lakes; 5–7 or 8 Highhead Castle, near Carlisle; August 17–September 27 The Rectory, Ockham; 27–30 Hindhead; 30 home. November 1 (?) started for Pau; November 10 (?)–December 1 (?) Pau; December 4– Biarritz.

1906. January –10 Biarritz; 10–February 1 (?) St Jean de Luz; February 1–27 Ascain; 27–March 9 Biarritz; March 9–26 San Sebastian. Home April 6. April 21–26 Claverdon; May 15 Cambridge (Trinity); June 3 days at Oxford (Arthur Butler's); 20 (?) Trinity Fellowship. July at home. August 2–29 Bridge End, Ockham; September 1–10 Bovey Tracey; September 16–24 Malthouse, Bibury, then home; October (1 week) Sidmouth; October 19 Edyhead, Bovey Tracey; November 7– The Hoe, Plymouth.

1907. January –30 The Hoc, Plymouth; January 30–March (?) Hoe Park Terrace, Plymouth. July 21 (?)–26 Helmingham Hall, Stowmarket; August 7–September 12 Yaffles, Haslemere; September 12– Quedley, Haslemere.

1908. Quedley, Haslemere to February. August 30 Shirrell House; September 16–23 Claverdon; October 26– Meadow Cottage, Brockham Green, Betchworth.

1909. February 26 Meadow Cottage, Brockham Green, Betchworth; February 26 or 27–April 3 Crown Hotel, Lyndhurst; April 3–21 Forest Park Hotel, Brockenhurst; then home till August 10 (?)–October 4 Fox Holm, Cobham, Surrey; October 4– The Rectory, Haslemere.

1910. March 21 The Rectory, Haslemere; then home till August 16 or 17, then The Court, Grayshott; moved November 15 to Grayshott House, Haslemere.

I shall commence this chapter of Galton's *Life and Letters* with an appreciation of her uncle by his niece, Mrs Lethbridge—Millicent Bunbury—the child of Galton's beloved sister and instructress Adèle. She most kindly prepared it for me on Galton's death, 19 years ago, and it seems best to me to publish it now just as it was written. She is the "Milly" of many of the letters printed below. It is very characteristic of Galton that when his "home" letters ceased on the death in 1904 of his Sister Emma, aged 93, he felt the need of continuing the family correspondence, and selected his niece, Mrs Lethbridge, to exchange letters with him.

Recollections of Francis Galton by Millicent Lethbridge.

I will begin these short "recollections" of my dear uncle, Francis Galton, by repeating the child-stories my mother has told me, but first you must allow me a digression that I may explain the share she had in his early life. My mother spent a dreary childhood and girlhood, seldom leaving the sofa to which she was condemned owing to curvature of the spine. She had little to amuse or interest her in those weary years, until, when she was eleven, my uncle Francis was born. My grandfather took the baby to her, saying: "Here, Adèle, is a baby brother come as a present for you! How do you like him?"—"Like him!" A new life began then and there for my mother. She set feverishly to work, teaching herself Latin, Greek, German, Italian, and I know not what besides, to fit herself for the task of educating the baby. All her interests, thoughts and ambitions were wrapped up in the little creature. It lay by her side on the sofa, and with the enthusiasm and impatience of a child, she lost no time in cramming it with all her miscellaneous, self-acquired knowledge. I believe the baby could read at two, and what it had learnt by the age of four, I do not venture to report! Strange to say, the baby thrived on the system, and delighted as much in learning as his sister in teaching. The two were devoted to each other, and it was a bitter wrench to my mother, when, at eight years old, her darling was sent to a school at Boulogne.

I recollect two or three anecdotes my mother told me of his very early years. My grandfather, anxious to render his boys self-reliant, sent Francis, then about seven years old, to pay a visit to a relative at some distance. The child was to ride his pony, spend the night at a certain inn, and finish the journey next day. A servant was instructed to follow (unknown to the boy) two or three miles behind in case of accidents. When Francis was questioned about his adventures, he related how, on reaching the inn, he had ordered supper and a bedroom, and had then proceeded to empty his purse and hide a shilling under a pillow, a sixpence under a chair and so on, "because then, if a robber came, he might take some of my money, but not all, so that I could still pay my bill!" I am sorry, however, to say that I cannot verify this story, my uncle having entirely forgotten the occurrence.

He had a remarkably sweet temper, and it used to be a joke between his brothers to see if they could not make him angry. Do what they would, they hardly ever succeeded. My mother once said: "Frank, how *can* you keep your temper as you do?" "I don't," he answered, "but I've found out a capital plan. I go to my room as soon as I can get away, and I beat and kick my pillow till I'm tired out, and by the time I've finished, my temper's all gone." In later life my uncle's self-control was really wonderful. I have seen him, on more than one occasion, "keep himself in hand" under the greatest provocation, although I presume the "pillow-recipe" had long been abandoned.

Another child-story is that of his falling off his pony into a ditch, and being dragged out by the legs by his elder brother, the seven or eight year old boy, half-choked with mud, spluttering out Hudibras,

"I am not now in Fortune's power,
He that is down can fall no lower!"

One more story and I have done. A lion had escaped from a menagerie and the child was in terror lest it should suddenly pounce down upon him. His father found him trembling in bed, and said: "Why, Frank, you know the lion has no pocket-money to pay the turnpike, so

of course he can't come through!" "I never thought of that, papa," said the child, as with an immense sigh of relief he turned over and went to sleep.

If my uncle derived his genius through his Darwin mother, it is nevertheless certain that the Galton father was most in sympathy with the boy's character. His devotion to his father's memory was most touching, and only a few weeks ago, when the Copley Medal was offered him, he wrote: "People are always very kind to me, but I wish my father were alive. It would have given him real pleasure." His father had then been dead 66 years!

I looked upon my uncle Francis as my special uncle, ever since I was quite a little child, but it was not until after the death of his wife (whom I also loved dearly) in 1897, that I was admitted to a closer friendship, and that I ventured to discuss many things—religious matters especially—with him.

Later still, in 1904, when his beloved Sister, Emma Galton, died, he asked me to correspond regularly with him, just as she had done for many years, so that the custom became established from that time forward until his death, for me to write every Friday, and he every Monday or Tuesday.

I have an amusing recollection of a little trip to Auvergne which he and I took together in the summer of 1904 only a few weeks before he sustained the great sorrow consequent on his Sister, Emma Galton's, death. The heat was terrific, and I felt utterly exhausted, but seeing him perfectly brisk and full of energy in spite of his 82 years, dared not, for very shame, confess to my miserable condition. I recollect one terrible train-journey, when, smothered with dust and panting with heat, I had to bear his reproachful looks for drawing a curtain forward to ward off a little of the blazing sun in which he was revelling. He drew out a small thermometer which registered 94°, observing: "Yes, only 94°. Are you aware that when the temperature of the air exceeds that of blood-heat, it is apt to be trying?" I could quite believe it!—By and by he asked me whether it would not be pleasant to wash our face and hands? I certainly thought so, but did not see how it was to be done. Then, with perfect simplicity and sublime disregard of appearances and of the astounded looks of the other occupants of our compartment, a very much "got-up" Frenchman and two fashionably dressed Frenchwomen, he proceeded to twist his newspaper into the shape of a washhand-basin, produced an infinitesimally small bit of soap, and poured some water out of a medicine bottle, and we performed our ablutions—I fear I was too self-conscious to enjoy the proceeding, but it never seemed to occur to him that he was doing anything unusual!

He had ordered rooms at Royat, insisting that they should have a southern aspect. On arriving at the Hotel it was found that they looked due north. Then, for the first and only time since I had known him, he was guilty of a very forcible and by no means parliamentary ejaculation. A minute or two later he turned round and saw me. He appeared exceedingly uncomfortable, and at last could stand it no longer: "Er—er—did you hear what—er—I said just now?" I could not resist the temptation of declaring myself extremely pained and shocked, but he was so genuinely distressed I had to hasten and assure him I was only talking nonsense.

He half-killed me by his energy at Royat. We used to sally forth at 4 a.m. and take a walk before the heat of the day. That was really enjoyable, but I felt by no means enthusiastic when we started off again when the sun was at its highest, and walked and tramped wheresoever it was hottest. He always chose the sunny side of the road, but occasionally I rebelled and left him to his sun whilst I walked in the shade. He really was a salamander! I can see him now, sitting at his work-table in the window at Royat, with the broiling sun streaming down upon his bald head. Even to think of it is almost enough to give one a sunstroke.

But it was not long after our Royat visit (where he had gone to visit his wife's grave) that his strength gradually began to fail. His sister's death, soon after our return, was a terrible blow to him. I do not know what he would have done, but for his great-niece Eva Biggs, who devoted herself to him as if she had been his daughter. The few remaining years of his life brought him much sorrow—the death of his eldest sister at the age of nearly 98 and of his brother, aged 94, leaving him the only survivor of his family. My Mother—his Sister Adèle—had died many years before. However, with the exception of his deafness, he retained all his faculties to a wonderful extent. His eyesight was extraordinarily good, and he could read the smallest print up to the last. The diaries he kept for many years were not, I suppose, more than 2 or at most 2½ inches square, and his writing in them was necessarily so minute that I could not see to read it. His sense of smell was also singularly acute, and I imagine that of

taste likewise. He enjoyed his food as keenly as a child, although he was a very small eater and most abstemious in every way. He delighted in after-dinner coffee, of which he allowed himself two teaspoonfuls, and that only when I, or some other coffee-drinker, was staying with him to set a bad example!

The *joie de vivre* remained strong in him even after he had lost the power of walking, and when he could not rise from his chair without help, and then only with pain. Still he was as keen and full of zest as ever, and I believe that if a ten, or even a twenty years' extension of life had been offered him he would gladly have accepted it, for his heart was bound up in his beloved "Eugenics" and he would have loved to watch its progress, even at the cost of prolonged pain, weariness and suffering.

Whilst he was still able to move about a little, his indomitable energy prompted him to do extraordinary things. For instance, at a time when he could hardly stand alone, I have known him (by holding on to things) climb out of the staircase window on to a sort of lead roof, where he would spend an hour or so in the open air. It was a perilous proceeding, and on one occasion he had the narrowest possible escape from an accident which, if it had actually occurred, would certainly have killed him.

He was touchingly "grateful for small mercies." I remember his telling me one day that he had had a "glorious time" that afternoon. The "glorious time" was just sitting in a bath-chair, helpless and unable to move, in a garden-shelter watching the trees and sunshine. Any little ingenious contrivance was an absolute delight to him, and I have known him amuse himself for quite a long time with some penny toy such as those hawked about the London streets. I do not think he *could* "do nothing." His brain was always busy even when his hands were idle. It is true that sometimes when I asked him what he had been doing, he would quote from *Punch*: "Sometimes I sits and thinks, and sometimes I only sits"—but I never believed it.

He was fond of reading aloud, and he read better than almost anyone I ever heard. He enjoyed reading Tennyson and Shakespeare to me, but I think he excelled himself in reading the Bible. On one occasion he read the Book of Esther right through, and although I had imagined I knew it well enough already, he convinced me I had never known it at all before then. The whole scene started into life, I was transported into the Oriental surroundings, thousands of years back—the dramatis personae lived and moved, and I felt as if I had dived into another world. If it had all been acted before me, the impression could not have been more vivid.

I think he cared little for fiction unless he was tired or poorly. On those occasions I found *Don Quixote* was oftenest in requisition. In novels he evidently preferred fun to sentiment and last year (1910) he delighted in Countess von Arnim's *Princess Priscilla's Fortnight*, *The Caravanners*, etc. Art to a certain extent, and Music entirely, seem to have been omitted in his composition—an inheritance perhaps (or rather non-inheritance) from his Quaker ancestry. He delighted, however, in the artistic nature of his great-niece, Eva Biggs, as much as she in her turn prided herself in his science. Music, I think, he positively disliked, although he only confessed to "not caring for it." His brothers and sisters were also, one and all, absolutely unmusical. Certainly he was a living refutation of Shakespeare's "The man that hath no music in himself etc."—for never was any man further from "Treasons, stratagems and spoils!"

It would be hard to find anyone with so high an ideal of duty as his, and I do not hesitate to affirm that nothing—not self-interest, praise, blame, or anything else, would have made him swerve a hair's breadth from what he conceived to be right. To that which he believed to be true, he felt bound to give utterance, even though it cost him the disapprobation and even the deep sorrow of some whose love and sympathy he most valued. This was especially the case when his work on *Human Faculty* came out in 1883, with a chapter on prayer, which I rejoice to find is suppressed in a recent edition*. Although the chapter in question only attacked the crudest and most materialistic notion of prayer, and was obviously written under a complete misapprehension of the real Christian position with regard to it, nevertheless a storm of indignation was raised, and some whom he most loved, and whose good opinion was dearest to him, were distressed and scandalised. I always felt that his attitude with regard to Religion was absolutely misunderstood. I have heard him called hard names—"Atheist," "Unbeliever" and so on. My own description of his creed would be that of a Religious Agnostic. Faith was denied him, and, as he has often told me, all *intuitive witness* to the

* At the urgent request of the publishers.

Divine. The question of the reality of this "intuitive witness" in others, however, interested him deeply, and he would have given much to convince himself whether it was real or imaginary, subjective or objective. James's *Varieties of Religious Experience* was a book that occupied his thoughts a great deal, and I have a copy that he gave me. That he had the *will to believe* I am sure, but it was the power that was denied him. If he could not believe however, he could seek, and a more earnest truth-seeker could surely not be found. He has told me that at one time of his life (I imagine when he was very young), the asceticism of the Roman Church appealed to him very strongly. His admiration for the uncompromising monotheism of Mohammedanism was recurrent. I imagine that he was latterly much attracted by Spinoza. But early love and sentiment were all on the side of Quakerism. He would sometimes ask me where such or such a parable or discourse of Our Lord was to be found, and on finding it for him in the New Testament, he would read it aloud, saying, half to himself, as he shut the book "Perfect—*very* perfect."

He was scrupulously careful not to say anything on religious topics that could possibly distress or injure the faith of anyone—especially the young—and I never knew him say anything that was not absolutely reverent. He was apparently incapable of accepting anything he considered unproven. Thus, although a devoted admirer of Tennyson, I never heard him allude to *The Two Voices* without a stamp and "Pshaw!" of impatience. The philosophic discussion being concluded by nothing more convincing than the emotional "Sabbath Morn" and "Church-bells" irritated him beyond endurance. In spite of his much-abused chapter on Prayer in *Human Faculty* I know he used to pray himself, indeed in one of his letters to me he wrote (May 12, 1907): "Did I ever tell you that I have always made it a habit to *pray* before writing anything for publication, that there may be no self-seeking in it, and perfect candour together with respect for the feelings of others."—And in another letter (April 9, 1907): "I think in earnest prayer of you and poor F. for I *can* pray, and *do* pray, conscientiously and fervently, though probably in a different form to that you yourself employ. God help you*."

There were many beautiful traits in my Uncle's character upon which I cannot now expatiate. His old-world courtesy, displayed not only in society, but still more at home, to those with whom he was in daily intercourse, and to his servants (falsifying the saying "that no man is a hero to his valet-de-chambre")—his almost exaggerated dread of appropriating any laurels due to others, which feeling led him to the opposite extreme of magnifying the achievements of others whilst minimising his own—his horror of self-advertisement, coupled though it was with a naive delight in unsought appreciation—all this is familiar to those who had the privilege of knowing him.

I do not think I have more to say. His patience and cheerfulness during the helplessness of the two or three last years was very wonderful, even when his sufferings were aggravated by the constantly recurring attacks of asthma which made every breath a struggle. His devoted nurse and great-niece, Eva Biggs, told me that the last thing he said, when the breathing became very painful and she asked him if he suffered much, was: "One must learn to suffer and not complain."

I could not be with him in his last illness, being ill myself at the time, but he was surrounded with love and affection. Eva Biggs, his valued nephew, Edward Wheler, and his devoted Swiss servant, Gifi, who had been in his service for 40 years, being with him at the last.

Thus ended the earth-phase of a great life.

Selection from the Galton family Letters.

Letter from Adèle Galton to her Sisters, Emma and Bessie.

[1830?]

MY DEAR SISTERS, We have just received a letter from sweet Francis, and I cannot help thinking (at least hoping) from its contents that he still preserves his taste for study but here is the copy:

"MY DEAR PAPA, I hope you have been pretty well lately. It is now the Easter Holidays and I was asked out last Monday and then I saw a review of the National Guards which I liked very much—It has been very warm for some months and I think we shall soon begin to

* See my footnote, pp. 271-2 of Vol. III^A.

bathe in the sea—Thank you for buying me those five shillings of flower seeds—please to thank Emma for taking such care of my Garden and Bessy for my carnations when they return Home—I suppose that almost all the flowers at Home are beginning to blow—I hope that little Herman is better of the Croup—Please to tell me if the Alderney Cow has calved. I can now speak french pretty well. In your next letter please to tell me if Adèle has any german master or mistress as Miss Abick is married.—It will not be more than three Months to the Midsummer Holidays—I have been learning a great deal of Conchology lately—I hope that all at Home are quite well—Have you had any letters from Darwin or Erasmus*. When do you think Erasmus will come home? for it is a long time since he left us—I suppose that Mrs French has a great deal of land to herself as Mr Millington is dead—I have neither begun dancing or fencing. Good bye and believe me your most affectionate Son, F. GALTON.”

Is it not a nice letter? dear little Fellow, I am sure he is not aware what pleasure it gives us all to hear from him else he would write oftener. We all enjoy Leamington much and were it not from a calculation that I have made viz. that I shall lose *thirty-six* hours of practising that is allowing three hours for each day, I should wish *never* to leave it. Lucy has told you almost every thing except that we have seen Mr Jones the Surgeon who alas! did not recognise us. We have just received a letter from Darwin, who still seems to be anxious to enter the Army but has not yet received Papa's letter about advising him to enter the Infantry, instead of the Cavalry. The letter is written in very good French, and he tells us that Uncle Howard is going to make a Tour in the south of France and that Little Robert is growing a Beauty. Uncle Darwin† has also sent us a *very kind* letter, saying that he has had a personal interview with Lord Hill, who has been *most* gracious and condescending with regard to Darwin, and assures him that *his* Nephew requires *no* introduction, and that he will send my Uncle in writing his opinion about what steps ought to be taken, so now I think Darwin is in a fair road for entering the Army. Really I begin to like Uncle Bob after all.—Thank you, dear Bessy, for your letter. How happy you both seem to be. What a kind (or what Francis would call *kindissimo*) Aunt Mrs Gurney is. From your affectionate Sister, M. A. GALTON.

Letters of Adèle and Emma Galton to their Sister Bessie at Duddeston on the death of their Grandfather, Samuel Galton (see Vol. I, p. 40 et seq.).

[1832.]

DEAREST BESSY, I cannot tell you how often I have thought of you and my dear Aunts during this great trial, more especially of you as this being the first time you have witnessed death it must have made such a deep impression on you. I also wish with you that I had been able to see my dear Grandfather's remains. I never shall forget the last time he shook hands with me; I felt as he walked out of the Dining room that I might never see him again and so it has happened. Thank you for telling me he mentioned my name among those of the other members of the family for it did indeed make me very glad to think that he had so kindly remembered me. We all, dear Bessy, feel *very much obliged* to you for writing such nice long letters to us, what a deal of writing you must have had to do and how happy you must feel in being of use to my Aunt. I must own I felt very sorry to hear that Aunt Sophia‡ has fixed

* Francis Galton's elder brothers.

† Dr Robert Darwin, Charles Darwin's father.

‡ Aunt Sophia: see Vol. I, Plate XXXV. The following lines of Tertius Galton on his sister Sophia may be cited here:

A description of Miss Galton of Dudson by S. T. G. 1831 to her amusement.

“My head wears a cap that makes all the world stare,
My face sports a nose of dimensions most rare,
My eyes like two saucers that roll in their sphere,
My waist thin as a lath, my back straight as a spear,
My manners precise, yet my looks full of fun
And tho' rather coquettish, yet grave as a nun;
A very neat seamstress, I make my own frocks;
A very good housewife, knit stockings and socks,
If one farthing is missing I make a great fuss.
My age, upwards of forty—my name it is 'Puss.'”

to live near Birmingham as I could not help hoping that she might live near here; we could see her so much oftener and there are such a many pretty houses of all sizes and descriptions; however wherever she may be I *do* hope we may often be able to be with her for I do love her most affectionately. From your letter I fear Aunt Booth has suffered much, will you give my love to her as well as to my Aunt Sophia. Lucy comes to us to-morrow, we shall as you may suppose be delighted to see her and James. Only think sweet Francis sets off from Boulogne to-day week. Dearest Child, how rejoiced we shall be to kiss again his dear freckled face. A card was left at our door to say that a Mr White from Cambridge is anxious to give lessons to private pupils in Greek, Latin and Mathematics. I have kept the card as it may hereafter be useful either to Francis or myself—Good bye dear Bessy.

Ever believe me your very affectionate Sister, ADELE GALTON.

[1832.]

MY DEAR BESSY, I wish you would tell Aunt Sophia and Aunt Adèle how much I feel for them, and I should have written to tell them so, but knowing how much they have to do and think about, felt that it would only be a trouble to them. Tell Aunt Sophia I wish I could have made myself useful to her, but Papa requires so much attention that I really think it is quite necessary I should be here, as Mama and Adèle are neither of them strong enough to walk up and down stairs much. It will give us such pleasure to see Aunt Sophia here, and I am sure nothing shall be wanting on my part to make her as comfortable as I can, for I can never forget how very kind she and Aunt Adèle have always been to us, indeed they have been more like sisters than aunts. Tell Aunt Booth she *has* promised to come and see us soon and that I am looking forward with such pleasure at the thought of seeing her, and that I think she will be pleased with the pretty views about this place. What a consolation it must be to Aunt Sophia, to consider how materially she has conduced to my poor Grandfather's comfort during his life time and how she has given up the enjoyments of her friends' society that she might be always with him. I am so glad you have been at Dudson, for I think you may be useful to Aunt Sophia. Believe me ever, Your very affectionate Sister, E. S. GALTON.

At Dr Jeune's School.*

[February 12, 1838.]

MY DEAR BESSY, I would have written before, only I have had so little time and that time was spent in writing Valentines as I have bought a Valentine Book and I also am so happy at thinking that the Glorious Conquest of St VINCENT was fought on the 11th, and by the by please send me a list of the days of the month that the principle [*sic*] battles were fought, like your card. To-day we had a poor fellow handcuffed in my presence for trying to commit a grievous assault by means of his fist on the person of.....whereby the said.....was put in extreme bodily fear for he would have been hurt without the said.....had luckily sprung back and avoided the blow (this is his indictment only the worst is I cannot put in—for I have forgotten them) well the fellow kicked at.....and knocked off another boy; we and the person who was with us chased, when he veering to the larboard up Bennet's Hill with about two hundred small craft nearly all Free School boys after in chase till at last we came alongside and captured the prise [*sic*] and then towed him aloft in the Free School where he was ordered to gaol until the petty sessions. I am very happy indeed and am glad I am come here I have only seen P. once and have hardly got time to do anything. X. is a radical, says he hates Wellington and, as he says, his country, and likes the French and Italians more; he does not know what ship Nelson was in when he fought Trafalgar nor that he lost an arm. Is it not shameful? Now I wash from top to toe every morning, head and all. I feel as if I know a great deal more than when I first came here. We fag a great deal, for instance we have to learn 50 lines of Homer and to parse any word and also the derivations in 2 hours only, which is very hard work, but now I begin really to like stewing. I would write a longer letter only I have been

* King Edward's Grammar School, Birmingham. This letter is very difficult to decipher, and the spelling and grammar sufficient to send Dr Jeune, had he seen them, into hysterics!

allowed to sit up after bed time, only for a little time, as I have not 20 minutes to myself at any other time. Good bye and believe me ever your brother, F. GALTON. P.S. I have lately got another hand in writing as I find I can do it much quicker. Give my love to all. I am very well, indeed much better. Mrs Ridges is an odd craft. I like Dr J. very much, we always touch our hats to him. They say that the P.S. is the most important part of a letter, at least it is here for I just want somebody to remember that Monday 16th is my birthday, a little grubbing is very accepttible [*sic*] here.

42, RUTLAND GATE, S.W. June 2, 1906.

MY DEAR LUCY*, The letter, which I return as you wish, is an amusing reminder. I see it was written according to the post mark in 1838, and according to its contents on Feb. 12th, and from Dr Jcune's School. His house, where I and a dozen other boarders lived, was at the Five-Ways, Edgbaston. Its garden (a rather large one) is wedge-shaped and its wall forms the angle of one of the 5 blocks. It was a daily walk of one mile, to and fro from the Free School as it was then called. It is now commonly called King Edward's School. The present buildings did not then exist but the school was held where the Theatre is, in a big room just opposite to Bennet's Hill and in New Street.



I had quite forgotten the incident about X. He was such an ass, and was a butt of ridicule. But he improved as he grew older and when he had married.

The letter testifies to the influence of your Mother over my social and historical creeds. I wonder where I got the nautical language from. Mrs Ridges was the housekeeper, a good and kind-hearted old soul with peculiarities, some of which struck us as funny.

I am getting well of a sharp sort of feverish attack which kept me from going to Claverdon last Monday, and at the last moment. The Doctor was peremptory and I felt myself fit for nothing but bed. So we telegraphed, and to bed I went, and was rather bad for a time. We look forward much to seeing you. Affectionately yours, FRANCIS GALTON.

This pen scratches abominably. Heartiest congratulations on your *embroideries*.

BIRMINGHAM HOSPITAL. August 16, 1839.

DEAR BESSY, Beg pardon, full of 'trition—May go of course—took that for granted before asking—thought you did ditto. Ready on Monday, the 2nd (I think). Hodgson was most amiable—thought it would do me good. Uncommon clever man to have found that 'ere out. Tell the Governor that I have got to be examined before I can enter at Cambridge by a Trinity M.A., but Lea is out, so that won't do. However as there is nothing like two strings to one's bow I have got both Mr Gedge and Dr J. Johnstone, separately and individually, to promise to get me examined at the time of the Association. I should have written before, only I thought that I could have been examined here by any Cambridge M.A., but I was dished. Poor old Mr Corrie died suddenly this morning—Hodgson told me so.

Now then about our travelling. First comes the *Tin*. I propose that you carry the fund, and give me some sum, say £2, every morning, and every evening balance accounts, thus making you the banker and me the paymaster. The route I leave to your "superior judgement." I will come to Leamington on the Saturday before our departure and go with you to Coventry on Monday morning. Please write to me pretty soon about your arrangements.

Bye the bye how often on an average daily are we expected to cry over the different affecting places, because it will make a considerable difference in the number of my pocket handkerchiefs. I must however give warning that when I come to Leamington neither Mamma, Emma, nor Stone are in any way to help, alias incommode, me in my packing up—neither are they to inspect nor give their judgement thereupon without, of course, my sovereign will and pleasure. I have got nothing else to say. Bye Bye, loves right and left, FRAS. GALTON.

* Lucy was Mrs Studdy, the daughter of Mrs Wheler (Sister Bessie). She obtained prizes for her very beautiful embroidery.

PLATE XLIII



Dear Emma. This is a hurried sketch
 of my room. I will send you a vignette
 in each of my letters to pay you "in kind"
 for your two water colours. ^{Painting} Cambridge
 has some beautiful college views greatly
 set-off by rows of elm trees. I am truly
 & sketch you home. Francis Galton

Francis Galton's Room at Trinity College, Cambridge, before the "improvement,"
 i.e. the transfer of the sofa to face the fire-place. Cf. Vol. I, Plate LI.

17, NEW STREET, SPRING GARDENS, LONDON. Wednesday, [1839].

MY DEAR BESSY, Bless your innocence! with regard to the postage and envelopes—I enclose this in one of a new pattern which may perhaps be explanatory of the allegorical design of the original; and in case that your understanding should still continue obfuscated, I enclose also some newspaper lines for your edification—The reason why I asked about your painting mishaps was that, in case that you did so, I might coax you to illuminate some letters in my prize folio *Seneca*, but as you have got other things to amuse yourself with, I wouldn't ask you on any account to do it, as first of all it would make you stoop—2ndly when you are at the sea—why, what's the good of going there if you don't make the most of it?—3dly I should like to have a previous consultation with you on the correct colours etc. and 4thly there is no hurry. Therefore I don't want you to do it now. Q. E. D. As to the inelegance of the word "splodge" I confess it to be very great but the fact was, that after the previous night's "excitement" (as Mrs Wititterly would say) all my wits were tending to fly sky-high, and indeed to leave me altogether—As an opposing force I therefore used all the most matter-of-fact expressions, and commonplaces, possible, which two forces, acting conjointly, produced a happy medium in the current of my mind. Indeed the night previous I was so completely "knocked off my legs" by Persiani, Erni, Rubini and Tamburini in Don Giovanni that I awoke up bawling away the air "Là ci darem la mano etc." and only got to sleep again by means of a perpetual singing in my ears of "Batti, batti, bel Masetto etc."

I am sorry poor Lucy* is so poorly and also the children, loves to them, please. I enclose you a bottle of Gold Size and hope it won't break. N.B. I write an answer by return of post, in order to keep up the new character which you have given me of letter-writing. I find the newspaper which contained the verses is burnt, so I write from memory and therefore excuse mistakes.

FRAS. GALTON.

[LONDON, 1839?]

MY DEAR BESSY, As to my last letter, it must have been the very same postman that was in fault before when you sent me the missal, who has lost mine now. I am quite glad that you are so much better but "better" won't do in your accounts of yourself—they must be more medical. Such as: *Jan. 27*. Little sleep at night. Slight shivering on getting up. p.m. Head-ache and nausea. Acid taste in mouth. Occasional numbness in feet with tendency to be hysterical. After dinner—listless and a good deal of gaping. Appetite better.—Now you ought to send me such an account as this—as much longer as you like—of about one day in a week or so.

I called on the Horners the other day. Was shown up—only the Miss Horners there—in extra deep mourning—crape enough on them to furnish Woodhouse and Haddon's shop. I thought that one of the old birds had hopped the twig and was just going to tell them that I was very sorry that I had inadvertently intruded at such a time etc. etc. when one of them said that they had all been at a ball the night before till 2 o'clock. I don't know if mourning is considered here as a sort of fancy costume in character or not. Well, on leaving them I tooled to Charles Darwin, when!!! round the knocker, with the utmost care and precision a grey kid glove was wound—I couldn't make out the knot—he could only have tied it so well by long practice †. This proceeding à la Kenwigs very much astonished me. Of course, I did not call. What am I to do? I have not heard anything about his having a little Perpetuation, but there can be only one way of interpreting the kid glove. Please write me word in your next letter, what you know, and all you know, of the Myners' Family of Weatheroak, near Birmingham, especially as relates to *Miss Myners*. After all neither purse, money nor door key were pick-pocketed, but the Governor has I suppose told you the circumstances.

Give my love to Lucy*, James and Animalculae. How is Mrs Howell? You would very likely have been just as bad as she was if you had not gone to Moor Hall.

I hope you have learnt the tune of "Nix my dolly pals—fake away etc." Darwin would like it of all things. It is quite necessary to know it to get on in the fashionable world. Good Bye etc. FRAS. GALTON.

* Galton's sister Lucy, who married James Moilliet.

† Probably the birth of Charles Darwin's eldest son, William Erasmus Darwin, is referred to.

Letter of Dr Robert Waring Darwin to his sister Violetta Galton.

SALOP. Saturday, August 1, 1840.

MY DEAR SISTER, Susan, who is the only one of my family with me, joins in congratulations on the intended marriage of her cousin* with Miss Phillips. it is a fortunate attachment being so agreeable both to you and to Mr Galton. I trust they will be as happy as you wish them.

You kindly mention my sons; they are both far from well tho' from what I hear better than they have been and improving. Susan while on a visit to her brother Charles had the pleasure of seeing your son Francis of whom I hear a most satisfactory account in every respect. I have not heard of Sir Francis† since he wrote to communicate the marriage of his daughter and as you observe, it is only on such occasions we write. I trust I have the prospect of more letters from him. He did hold out some hope of their coming this summer to see us.

My daughters Marianne and Caroline are both well. Catharine is gone on a visit to some cousins in Pembrokeshire. With our kindest regards to your family circle, ever dear Mrs Galton,

Your affectionate brother, RBT DARWIN.

BEYROUT. 9th, [1846].

MY DEAR GALTON, I was much shocked to hear to-day from Mr Heald of the death of poor Ali‡, and also that you yourself are suffering from this infernal climate. I have been at this place about 8 days; the day we arrived both Delahaut and Fontinillia another Frenchman with whom I am travelling fell ill of the fever, Delahaut very seriously. He is now recovered, and intends to go to France as soon as he can. I expect to be at Damascus in about 10 days or sooner, and from there my movements are quite uncertain. I have been offered a passage in a French brig to Aleppo, (which) it is likely I shall accept after having been at Damascus. We came from Cairo by the short desert, very slowly, for my friends feel the heat very severely. As yet I have been all right, and have not much felt the climate, but all that I have seen of the country coming from Jerusalem here has disgusted me much, for there is really nothing worth seeing. This place is the only pretty thing I have seen.

I hope, my dear fellow, that when I arrive at Damascus I shall find you set up again, and able to continue your travels; what with nursing poor Ali and the climate of Damascus, I am sure you must have had a sorry time of it. I remain, Yours very truly, — —

DAMASCUS. September 30, 1846.

MY DEAR GALTON, What an unfortunate fellow you are to get laid up in such a serious manner for, as you say, a few moments' amusement. I had been told you were unwell at Beyrout, but I had no idea you had been suffering so much. I trust this letter will find you getting stout and well again. I do not start for Bagdad for some little time as yet, and am in doubts whether I shall not prefer going alone to the caravan. Meantime, I am flourishing, installed in my old house and leading an exemplary life studying the "Alf Leyla, we Leyla"|| which I have bought here in two large old volumes. The town is very full and gay by reason of the pilgrims who will start on Sunday, and the departure is to be unusually grand. There is a very nice fellow staying here by name Stobart, who is a great acquisition. I have been in treaty for the purchase of a slave, and have had several Abyssinians brought for show, but none as yet sufficiently pretty. Dr Thompson desires his love and remembrances, and regrets as much as myself your not returning to cheer the solitude of El Sham el Kebira. I am thinking of buying his grey mare. The Han Houris are looking lovelier than ever, the divorced one has been critically examined

* Darwin Galton. I have inserted this letter from Dr Robert Darwin as it refers to the health of his son, Charles Darwin.

† Sir Francis Darwin, son of Dr Erasmus Darwin and his second wife, Mrs Chandos-Pole. He lived at Breadsall Priory, his father's old house: see Vol. I, pp. 22-25, and Plates XVIII, XLIII and Vol. II, Plates XV, XVI.

‡ As to the death of Galton's devoted servant Ali, see *Memories of my Life*, pp. 89, 103.

§ These letters throw some light on the doings of young Englishmen in the near East in those days. The writer was a College friend of Galton, and they may be taken to illustrate the "Fallow Years," for which see *Memories of my Life*, p. 85.

|| *Arabian Nights* in the Arabic.

PLATE XLIV



From Galton's Egyptian Sketchbook. "Bob," aged 10, the lad who was left in charge of the boat on the Nile during the visit in 1846 of Galton and his friends to Khartoum, and Ibrahim their servant. The originals are in water-colour. See Vol. I, p. 201.



From Galton's Syrian Sketchbook. Galton's faithful servant Ali. Original in water-colour.
See Vol. 1, p. 203.

PLATE XLVI



d'Arnaud Bey, a sketch from a photograph.

and pronounced a virgin. We are expecting a large fête and rejoicing in one of the Jewish families, and I hope I shall get invited. I have made acquaintance with Mlle Hanoum of singing celebrity. Don't tell the Colonel. There has been one of the regular Damascus pieces of tittle tattle about the French doctor, who was living here and whom I take to be no great things. I don't know anything about the rights and wrongs of the accusations against him, but you know how the people here must have talked about a little bit of scandal, which is their greatest treat. I staid at Eden some days, and made great friends with all the people there especially your acquaintances the well-whipped Welleds, one of whom offered for sale a cake of chrome yellow that I suspect has been in your paint box before this. I staid too a day or two at the Cedars. I must bring this scrawl to an end, but before so doing I must assure you, my dear fellow, of my best and hearty wishes for all possible health and good luck in all your future peregrinations, whether homeward or outward bound. If you return to England pray give my remembrances to any of my friends you may happen to come across. With the same once more to yourself, believe me to remain, Ever sincerely yours, — — —

There are so few records of the "Fallow Years" that I gladly note here what contributed to their termination.

The d'Arnaud Bey Incident.

Life, Vol. I, p. 200.

"However, we got on very well and made him talk of his travels and tell us of the country ahead, we had then no map and knew nothing hardly. He said: 'Why do you follow the English routine of just going to the 2nd cataract and returning? Cross the desert and go to Khartoum.' That sentence was a division of the ways in my subsequent life."

Memories of my Life, p. 96.

"That chance meeting with Arnaud Bey had important after-results for me by suggesting scientific objects for my future wanderings. I often thought of writing to him in order to bring myself to his remembrance, and to sincerely thank him, but no sufficiently appropriate occasion arose, and it is now too late.

"In the winter of 1900-1901 I visited Egypt again and, calling at the Geographical Society there, learnt how important and honoured a place d'Arnaud Bey had occupied in its history. He had died not many months previously, and I looked at his portrait with regret and kindly remembrance. Being asked to communicate a brief memoir to the Society at its approaching meeting, I selected for my subject a comparison between Egypt then and fifty years previously. I took that opportunity to express my heartfelt gratitude to Arnaud, which posthumous tribute was all I had the power to pay."

March 20, 1900.

DEAR SIR, I am happy to present you hereby M. Bouda's letter with the interesting photograph. Mr Somers Clarke will come with us to-morrow. I send the carriage at 8½ to your Hôtel. Yours sincerely, G. SCHWEINFURTH.

A photograph of d'Arnaud was enclosed and from this our sketch was made.

"Il habitait dans une petite hutte de terre, entourée par une légère palissade de roseaux et que son génie avait transformée en quelque sorte en un sanctuaire de philosophe au milieu d'un pays presque barbare. La distribution artistique de sa petite collection d'instruments scientifiques, livres et curiosités, donnait un air singulièrement recueilli et studieux à cette modeste demeure. J'étais enchanté de sa conversation et des nombreuses anecdotes qu'il nous racontait des pays du sud."

.....

"Je n'ai plus eu l'occasion, depuis lors, de voir ou d'être encore en rapport avec d'Arnaud Bey, mais je l'ai toujours considéré dans mon cœur comme un bienfaiteur, car c'est lui qui m'a donné l'idée des voyages sérieux que j'ai faits plus tard en explorant la terre des Damara dans le sud-ouest de l'Afrique; c'est lui qui a dirigé mon goût et mon énergie vers la géographie et les sciences; j'ai su employer mon temps utilement au lieu de le consacrer à de frivoles amusements."

From Galton's "Souvenirs d'Égypte." *Bulletin de la Société Khédiviale de Géographie*, No. 7, Mai, 1900.

COLRAIN, BONAR BRIDGE, SUTHERLANDSHIRE. August 28, 1848.

DEAREST MOTHER, The grouse won't come just now. All those killed as yet Fazakerly of course disposed of. He may give us some few to send soon; if he does I trust they will arrive safely at Claverdon. He is a capital fellow. I enjoy myself more than I have for a year and a half—everything is so free and open. I stay with him till he goes if I like. His son, Col. Wallington and Paddy Johnson are the party. Louis Napoleon was to have come too but was prevented. We have every variety of field sport,—pitch tents and hack ponies.—Johnson stuck a dog into me to buy (Emma will explain, if I am not intelligible), it has proved a beauty and I with my one dog see more game than my fellow guests with two each. Shouldn't you like to buy him at the end of the grouse season? He would find you hares so well in Paul's Piece and I would part with him to my Mother (mind, only to my Mother) for the money I gave for him (£10). Write me an occasional note and tell me how Lucy is, for I am most anxious to hear.

Ever your affectionate Son, FRANK GALTON.

The heather is beautifully out on the moors—I pulled a piece to send to you as a memento but I have lost it. Lots of fishing and really of everything. It is a most civil thing of Fazakerly asking me.

Letters and note-books are very scant during the years that followed Galton's marriage. Probably like other husbands, he left correspondence to his wife.

Tea Making, My Experiments [1859].

There are among Galton's papers and note-books accounts of various experiments made by him, scarcely with a view to publication, but rather with the purpose of amusing himself and gratifying his insatiable desire to observe and measure. One especially characteristic series of experimental measurements dates from early in 1859, and deals with the

“Flavour, Freshness, Body and Softness” of Tea.

The experiments were made morning and evening, and must have tried severely the patience of Mrs Galton, and not unlikely of the household. Galton begins with the following preliminaries:

“The teapot holds 26 ounces = $3\frac{1}{4}$ breakfast cups. One breakfast cup holds 8 ounces. The teapot requires 3 minutes to become warmed through. It radiates heat at the rate of 2° per minute.”

Then we have the categories to be used:

G = good, B = bad, D = decocted, W = weak, F = flavour,
 C = body, a = best, b = 2nd best, c = 3rd best.

We next proceed:

“To find the capacity for heat of the teapot.

n = number of ounces of water used,

e = excess of its temperature above that of the teapot,

t = additional temperature attained by the pot after the water has been poured in,

C = required capacity,

$$C + ne = (C + n)t, \quad C = n(e - t)/(t - 1).”$$

I will give a few illustrations from the notes which extend through February and March.



Francis Galton Figure

Water-colour Sketch of Francis Galton in the Fallow Years.

Experiments.

Original temp. of pot <i>A</i>	Temp. attained after mixture <i>B</i>	No. of ounces of boiling water <i>n</i>	$e = 212^\circ - A$	$t = \text{additional temp.} = B - A$	$e - t$	$t - 1$	<i>C</i>
75°	170°	6	137°	95°	42°	94°	2.6
91°	183°	9	121°	92°	29°	91°	2.8
119°	187°	10	93°	68°	25°	67°	3.7
58°	158°	6	154°	100°	54°	99°	7*
64°	148°	6½	148°	84°	64°	83°	5
57°	151°	6½	155°	94°	61°	93°	4.3
54°	161°	7	158°	107°	51°	106°	3.4

* N.B. "Carter [presumably the maid] 'frothed up' the water."

"Feb. 13, 1859. Sunday Evening. [Pot] heated to 140°. Put in tea at vi h. 35 m. and water $\frac{192^\circ}{180^\circ}$ at vi h. 46 m. Tea good, but a little too much of a decoction. $\parallel \frac{184^\circ}{174^\circ}$ at vi h. 64 m. Tea weaker but decocted somewhat.

Feb. 15. Tuesday Morning. [Pot] heated to 174°. $\frac{178^\circ}{169^\circ}$ [in] 4 minutes + $\frac{194^\circ}{186^\circ}$ [in] 7 minutes hot and decocted. 2nd cup $\frac{194^\circ}{174^\circ}$ [in] 11 minutes hot and weak.

Feb. 16. Morning. L. G. fecit $\frac{172^\circ}{[?]} 2^m + \frac{192^\circ}{187^\circ} 5^m + \frac{187^\circ}{184^\circ} 3^m$. Black not decoct., fullish body, fresh, hot. 2nd cup $\frac{188^\circ}{170^\circ} 14^m$ fairly good. If more tea had been placed in the pot (4 spoonfuls) I think the brew would have been successful.

5 ozs. of tea to be henceforward used in the morning.

Feb. 16. Evening. $\frac{40^m | 191^\circ}{48^m | 178^\circ}$. Decoct. slight. Louisa says fresh and little body (I have a cold). $\parallel \frac{48^m | ?}{58^m | 160^\circ}$ very good. \parallel 3rd cup 7^m, 142°. No water had been added, good, a little bitter.

Feb. 20. Sunday Morning. $\frac{40^m | 180^\circ}{44^m | 170^\circ}$ (filled up to make it so) + $\frac{44^m | 186^\circ}{45^m | 178^\circ}$ + $\frac{46^m | 184^\circ}{48^m | ?}$ (filled up); very excellent (it is true it had cream). $\parallel \frac{48^m | 189^\circ}{61^m | 168^\circ}$ good, a little flat. 3½ cups altogether."

It is difficult now to determine exactly what the temperatures signify; presumably the fall in temperature of the teapot in the intervening number of minutes; a plus sign seems to denote a filling up or repeated experiment, while || signifies second cup. By the middle of March the record is systematised, but more cabbalistic:

	1st cup				2nd cup			
March 13	$\frac{192^\circ}{180^\circ}$	186°	8	<i>Gb. Db</i>	$\frac{184^\circ}{174^\circ}$	179°	8	<i>Gc. Dc</i>
March 16	172° 2 ^m + 190° 5 ^m + 185° 3 ^m	185°	10	<i>Gb. Cb</i>	?	179°	14	—

About March 27 the experiments appear to have been discontinued, but were started afresh in November of the same year. Presumably the same tea was used throughout. But no conclusions are drawn, and we are left in doubt as to the meaning of the values recorded. We are not left in doubt as to Galton's taste for a very strong cup. "Quite good, I think it would bear strengthening. L. G. says not." "Admirable, strong and fresh and pure (there was plenty of tea put in), excellent." There is evidence that visitors were occasionally present during these experiments, and the mistress of the house must have had some difficulties when the tea was weighed out and the thermometer popped in and out of the teapot.

I have not cited these experiments for any result that flowed, or indeed was likely to flow, from them, but solely to indicate how strong was Galton's passion for measurement, and that, already in 1859, he was giving full play to his statistical tastes. These teapot data are indeed the "Puffing Billy" stage of Galton's statistical career!

CAMBRIDGE. *August 3, 1863.*

MY DEAR GALTON, In consequence of Phillips's* retirement from the Office of General Secretary, which he has held temporarily for the last year, a Committee was recently appointed by the Council of the Brit. Assoc. to recommend a successor to the Office. According to the general rule of the Association there ought, as you are probably aware, to be two General Secretaries, and one paid Assistant Secretary. Now Mr Griffith of Jesus Coll. Oxford, has succeeded Phillips in that office, and during the past year Phillips has nominally held the office of one of the General Secretaries in consequence of my illness last autumn. The purpose at present is to elect a second permanent General Secretary as my coadjutor, Griffith taking the *labouring oar* as Phillips had done before him. Now comes the question—Will you accept the office if offered to you? The Committee are Sir R. Murchison, Sabine, Vernon-Harcourt, Phillips and myself, and I think I may venture to say that in proposing you there will be no dissentient voice. The Office is a very pleasant and gentlemanly one, requiring of course attention and courtesy, without much time or trouble. On account of my absence last year Phillips will act with me at Newcastle *this* year. After that he will retire entirely, but I am now getting pretty *au fait* at the work, and should of course take it as much as might be necessary on myself till my future coadjutor should have gained the requisite experience. I need scarcely say, I hope, how much I should rejoice if you could be installed as my *partner*.

Believe me, Yours very truly, W. HOPKINS †.

* Professor John Phillips, the geologist. He was Assistant Secretary of the British Association, 1832–1859.

† Galton's instructor in mathematics, the famous Cambridge Coach.

The Château in the Heart of the Ardennes.

Poem found among Galton's papers. I do not know when the visit to the Château in the heart of the Ardennes came off, or who wrote the skit; if it was Galton, it was at his own expense. The visit may have been as late as 1879 or 1880, but probably much earlier.

They told me of a château in the heart of the Ardennes,
A pension kept charmingly by two young châtelaines;
They told me of some English people who had summered there,
On next to nothing for the best and most abundant fare;
They could not tell me where it was, or who the châtelaines,
But they knew it was a château in the heart of the Ardennes.

The heart of the Ardennes is large, if it be somewhat cold,
And châteaux are in plenty there, the homes of barons bold;
The ruins that were homes in ages past, that is to say,
And not at all like pensions where English people stay;
But all the information that they really could obtain
Was this,—it was a château, in the heart of the Ardennes.

They both were very anxious to be able to make out
The way to reach the château they had heard so much about;
'Twould be so charming, after all the towns where they had been
And after all the gay and noisy places they had seen,
To go and live for nothing, far from all the haunts of men,
At a veritable château in the heart of the Ardennes.

They left. No more they déjeuner'd at healthy Souvenière,
No more they meant to déjeuner at distant Géronstère;
No more abused the Ninth for all the tuneless things they played,
No more encored "La ronde qui passe" in Leopold's arcade.
They left; and I was lonely for a day or two, and then
I went to find the château in the heart of the Ardennes.

There met me, on the way to join the luggage at the gare,
About the most experienced of travellers that are,
The Art himself of Travel; and, though not born yesterday,
I listened to the guileful tale he told me by the way;
For he told me with descriptive tongue, as clever as his pen,
Of what sounded like the château in the heart of the Ardennes.

He told me of the demoiselles who kept a charming place;
Of English people, how they praised its cleanliness and space;
He told me of a brother, too, who helped his sisters dear,
And how for almost nothing they gave most delightful cheer.
It was not called a château by his friend, he said, but then
It really was a pension in the heart of the Ardennes.

A Belgian lady staying in the Britannique hôtel
Had told him. That was where and how my ladies learned as well.
It clearly was the very place. I took the train at one;
Then drove across the bitter moors, and when the day was done
We pulled up in a dirty town amid the drenching rain,
And o'er the door was painted H.—not château—des Ardennes.

A higger-mugger maid appears, with pail and brush in hand,
And makes a sound or two which she perhaps may understand;
And then there comes another, with a wart upon her nose,
And she must be, as I at length unwillingly suppose,
At least the mother of the pair of blooming châtelaines
Who kept the charming château in the heart of the Ardennes.

But if a pair they ever were, the other's not alive,
 And this one is the only one, and she is fifty-five;
 The brother is a page in blouse, who won't do what he's bid,
 The people call him Jacquot, but with Madame he's "stupide"—
 We've thus disposed of brother and of blooming châtelaines;
 But what about the château in the heart of the Ardennes.

I'm ushered in, and there, I find, are fellow victims three,
 Prepared to eat their souper, fixed for sept heures et demie;
 A monsieur with a napkin tucked beneath his double chin,
 A mother, and a giggling girl for ever on the grin.
 Then knives begin to shovel in the meat and beans, and then
 I feel I'm in a pension in the heart of the Ardennes.

The mother tells of glories which have quite possessed her brains,
 The salons of a wealthy fabricant of counterpanes;
 Discusses is it proper for a Vérificateur
 To ask to dance the daughter of a public Inspecteur.
 It sounds perhaps a little insignificant, but then
 We're very near a château in the heart of the Ardennes.

Monsieur gets purple over "non!" and shouts it six times o'er;
 And when he feels affirmative, a dozen "si's" or more;
 Élisabeth nips her mother when I don't take haricots,
 Which smell so strong of onion I'm glad to see them go;
 And this within a yard or two, not more than eight or ten,
 Of a most undoubted château in the heart of the Ardennes.

The morning breaks in beauty, and romantic dreams take flight,
 As through the open window streams the sun's fast growing light,
 Romantic dreams of sylvan courts, and eke of banished dukes,
 And pensive Jaqueses who meditate by sweet meandering brooks.
 I rise and seek the window, feeling sure that there and then
 I shall realise the château in the heart of the Ardennes.

The noises that the pigs are making really pass belief;
 The cocks are louder still,—to shut the window's no relief;
 And ah! for dreams of sylvan glades so sweet and fresh and pure,
 At every door are soaking heaps of excellent manure.
 But what are trifles such as these, when close within my ken
 There stands at last the château in the heart of the Ardennes.

The guide book says ninth century, but carved in stone the date
 Of this remaining morsel is but sixteen twenty eight;
 It's now a shop for carpet-slippers, sweets and boots and wool,
 And Madame takes a room in it when her "hôtel" is full;
 The rest was all "fait sauter," not by Revolution men,
 But to build a new Hôtel de Ville in the heart of the Ardennes.

The meats are very tender, and the bedrooms very good;
 Madame is very pleasant, and there's quite sufficient food;
 The coffee's sometimes perfect, and there seem to be no fleas,
 And it costs you very little by the day at Houffalize;
 But yet I'm not at all inclined to go and see again
 That smelly—not a château, in the heart of the Ardennes.

*Letter of Charles Darwin to his Aunt, Violetta Galton (née Darwin),
 Francis Galton's Mother.*

DOWN, BECKENHAM, KENT. July 12, 1871.

MY DEAR AUNT, I am very much obliged to you for your great kindness in writing to me in your own hand. My sons were no doubt deceived and the picture-seller affixed the name of a celebrated man to the picture for the sake of getting his price.

Your note is a wonderful proof how well some few people in this world can write and express themselves at an advanced age. It is enough to make one not fear so much the advance of age, as I often do, though you must think me quite a youth!

With my best thanks, pray believe me with much respect,

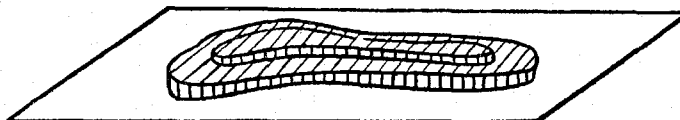
Your affectionate nephew, CHARLES DARWIN.

*Letters to George Darwin, Esq.**

BRITISH ASSOCIATION, BRADFORD. Wednesday, Sept. 24, 1873.

The paper came off yesterday and, as an amusing fact, Carpenter had afterwards to speak about some "current" questions and found the mercator's map of the north parts so inscrutable that he left it and *went to your globe* to point out to the audience what he meant.

The application that most commends itself at present to me, is to have the hexagon-pentagon map on the scale of about a 9 ft. globe, to mount the map on screens, stoutly made (? with *projecting mouldings* to represent the mountain chains, made by pasting a few successive contours



upon it), and to have a couple of stout frames to hang them on, one having a hexagon and the other a pentagon as its middle compartment.

I will take care, and I am sure Strachey will too, that the plan gets properly discussed at the Geographical. Here, in a room full of ladies and no one to understand, it is impossible to do so.

I have often thought of procuring a really artistically made and coloured globe and once had much correspondence about it. Ruskin wrote a very good letter. It seems to me that one might set to work by making a spherical shell, then cutting it up *into convenient parts* like a puzzle-map, and mounting the parts that were temporarily wanted on a convex table for consultation. These could be multiplied by casts, also by electro-type.

With my kindest remembrances to all your party. Ever yours, FRANCIS GALTON.

(I return off and on to London.) 5, BERTIE TERRACE, LEAMINGTON. Oct. 3, 1873.

MY DEAR DARWIN, Mr Geach forwarded your note. I extracted the enclosure and sent it to him. Also I sent for the *Contemporary*, but instead of the August they sent the number of this month with quite another subject of yours; but I will get the August one.

I am most grieved to hear of your Father's recent illness, but I firmly believe in his powerful underlying constitutional powers as sure to assert themselves whenever there is real need.

Do you know or has Dr Clark † heard of that half incredible but uncontradicted assertion made in a long paper at Bradford before a room crowded with physiologists, that albumen mixed with water in a short time becomes undistinguishable from the contents of the lacteals, white corpuscles, etc.!!! (so that you could assimilate it without any stomach at all!) and the very practical conclusion was drawn that if an egg be broken into cold water (just as it is broken into hot water for poaching) and left to stand 12 hours, it becomes opaque,—then if you boil the whole affair slightly, the result is a food that the author asserted to be digestible when nothing else could be digested!

It seems worth trying.

I enclose a printed solution of a problem which I received yesterday and which I think (and hope) may interest you. I sent the question to the *Educational Times* some months ago, when a Mr Carr of Woolwich gave an answer making a frightful mull of it,—a total misconception. Then I asked Watson who got the enclosed very elegant result, but still it is not one of practical applicability. Is it really hopeless to obtain a more manageable solution?

Would you please send me back the paper in a few days as I want to have it put in the *Statistical Society Journal* and I have no other copy.

* Later Sir George Darwin, second son of Charles Darwin.

† Afterwards the well-known consultant, Sir Andrew Clark.

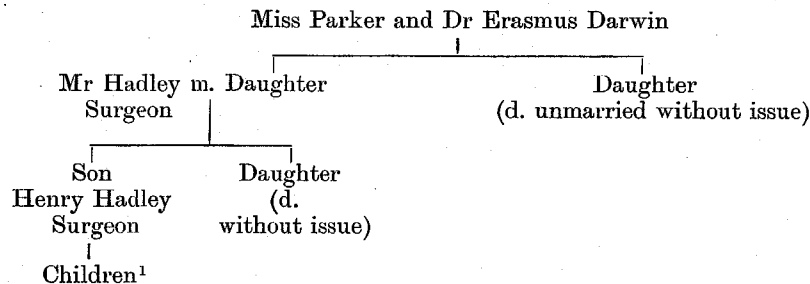
Send me some "cousin" circulars that I may distribute. I heard of them at Bradford. My antecedents of scientific men is fairly in hand. Out of the 186 asked, between 120 and 130 have either sent or promised. I have about 80 in hand now.

Are you quite sure *Hadley* of St John's is a relation. Miss Parker's* eldest daughter married Mr Hadley (there was one other daughter who died unmarried) and had one son, Dr Henry Hadley, and one daughter who died unmarried. Ever very sincerely, FRANCIS GALTON.

To GEORGE DARWIN, ESQ.

*Copy of Genealogical Tree enclosed in letter of October 3
to George Darwin.*

I got this from my Sister Emma.



¹ The Hadleys of St John's are not descendants of this Henry Hadley (?) †.

Miss Parker ultimately married a Mr Day and had two or three children, of whom one daughter turned out very ill.

42, RUTLAND GATE, S.W. Xmas Day, 1874.

MY DEAR GEORGE, I also quite forgot about your maps till just after you went; but Gen. Strachey is the man. He has the thing in his hands and I am only an occasional assessor. It is the framework that gives the difficulty. He had, at last, two great machines constructed down in the Isle of Dogs, by an Engineer who makes bridges and the like for his department. They were both heavy and crooked. I went down with him and we suggested a much amended plan of which he sent me the working drawings but my illness has prevented my seeing him since. The immediate object is to produce two frames, 10 ft. diameter, that can go in a cab or be sent by luggage train and yet be easily mounted in the lecture room. The great point is to have them as *the* regular maps at the British Association at Bristol next year, when Strachey may be counted on as being elected President of the Geography Section. You had better write to him and keep at him periodically, and whenever I see him I also will "nag."

Thanks greatly for your bits of criticism, they are all valuable to me and helpful. I am gratified to hear that your Father is interested in the book.

Henry Parker † is not wholly my fault; the entry in your Father's schedule is "distinguished classic, and good artist and chemist." I quite see now that the last half of the sentence was intended to be amplificatory, merely for my own information, but it happened to chime in with some vague recollection I had of his having occupied himself much with chemistry and I did not inquire further but put in the "chemist" (or whatever the exact phrase was—my book is not at hand).

* Miss Parker was the mother of two natural daughters of Erasmus Darwin: see Vol. I of this *Life*, p. 17 and Plate X. The surgeon with the spurs is Hadley.

† The Hadleys of St John's College, Cambridge were distinguished mathematicians, and the problem was, and remains, whether they were related to the Darwins. Sister Emma's diaries continually refer to the Hadleys. But the pedigree of the Derby Hadleys has not yet been ascertained.

‡ See *English Men of Science*, p. 48.

I was grieved beyond measure at reading of your brother's ill-luck in New Zealand with Venus.

As regards that ogive* of which we were talking, I was stupid and explained myself ill, and boggled. In the ordinary way x is the magnitude and y the frequency. In my plan y is the magnitude and x is the sum of the frequencies,

the frequencies being taken from the $e^{-\frac{x^2}{\sigma^2}}$ tables and the sum of the frequencies from the tables of the integration of it, viz. Tables I and II respectively of the usual publications (? II and III in the *Encycl. Metropolitana*).



What a pleasant man Dr Andrew Clark is! He examined me most thoroughly, pronounced it a concurrence of irregular gout and influenza and that my heart was weak. I mend, but not over-fast. Best Xmas greetings to you all. Ever yours, FRANCIS GALTON.

*Extract from a Review by Francis Galton in
"The Academy," Jan. 30, 1875.*

"Heredity; a Psychological Study of its Phenomena, Laws, Causes and Consequences." From the French of Th. Ribot, author of "Contemporary English Psychology." (Henry S. King & Co., 1875.)

"It may be affirmed with much truth that if we wish to learn what pursuit ranks highest in public opinion, we shall find it in the career of those men to whom statues are erected by public subscriptions. It happened that the writer of these lines not long since revisited Cambridge, where, as he walked admiringly among the many new improvements, his eyes fell upon a recently erected bronze statue. It was the only out of door statue in the whole town; it occupied a commanding position in the market-place, hard by the University Church, and only a few steps from being in full sight of the Senate House. He walked reverently up to it, pondering as he went as to the manner of the man whose memory it so proudly perpetuated, and lo! it was Mr Jonas Webb of Babraham, the famous breeder of Southdown sheep. The erection of this statue by the agriculturists of a county in whose capital a great university happens to be located, is worthy of note. It expresses their genuine appreciation of the practical application of the laws of heredity to all descriptions of farm produce, and it may be accepted as an omen that the time is near when the study of those laws and of their logical consequences shall permeate the philosophy of the university. It must do so, because there is no branch of science which refers to bodily structure or to mental aptitudes, neither is there any theological doctrine in which the theory of heredity, either directly or as one of the principal agents in evolution, can hereafter be left out of consideration.

"In the course of formation of every science there has always been an embryonic or pre-scientific period. Nothing then existed but detached pieces of evidence, of an unsatisfactory kind, laxly discussed and explained by wild hypotheses. But, at length, the methods of science succeeded in catching with a firm grip some of the loose materials, then more were seized, and so, with an ever-increasing rapidity of conquest, the whole of them became gathered together within the pale of law. Heredity has, at the present time, developed into a science; much is definitely established, and many questions seem to require for their solution little more than direct experiment or the simple but careful collection of statistical facts. There is consequently some need of a work that shall concisely and clearly set forth what is already known, and what are the undecided questions which most urgently call for solution and might at the same time be solved by any person who chose to devote a fair amount of intelligent and steady work to the purpose."

The remainder of the Review deals with Ribot's book, emphasising its inadequacy.

* Galton's "Ogive Curves," giving the deviations at the percentiles, etc. See our Vol. II, pp. 387-390.

June 4, 1875.

DEAR MRS HERTZ*, Fechner's *Elemente der Psychophysik*, Leipsic, 1860 (Breitkopf und Härtel) is a 2 vol. 8° containing in the aggregate 1000 pages, not very closely printed. It is a thoroughly standard work and lays the foundations of a new science which is beginning to attract serious attention in Belgium, France, America and England. In Belgium, Delboeuf's memoir upon it in the *Acad. Roy.* last (?) year (reprinted in a separate pamphlet by F. Hayez, Brussels) shows the primary importance of the work, though Delboeuf criticises and pushes the investigation a step further. In France, Ribot has lately been an exponent of Fechner's, or rather of Delboeuf's, views in a slight article in the *Revue Scientifique*. In America, Nipher (or one of his set) has recently been referring to him in *Nature* † and in England Sully in his papers in the *Fortnightly*, recently republished as a separate volume on "Intuition" (? exact title), renders full justice to Fechner. A mass of work by Arago, Herschel, and various astronomers, falls in as a part of the wide generalisations of Fechner, and much criticism and recognition of him will be found in Helmholtz. Therefore though the work dates as far back as 1860, it must rank practically as a new book, and the reading world is only now prepared to recognise its merits. Its object is, in a few words, to show that one fundamental law connects the amount of *sensation* (in the widest sense of the word) with the magnitude of the *exciting cause*. The generalisations are exceedingly curious and the experiments upon which the law is founded are most delicate and ingenious. The very science of such experiments, suitable for other applications, is laid down in the book and is one of the valuable parts of it. Fechner modestly ascribes the discovery of the law to his old master, Wagner, but it is Fechner who, by the admission of all who know about the matter, is practically the founder, exponent and establisher of the law. I should be heartily glad if an English publisher were to bring his work out in translation, believing that it would interest many scientific men and introduce a new and much needed branch of scientific investigation into England.

Very faithfully yours, FRANCIS GALTON.

42, RUTLAND GATE, S.W. November 18, 1875.

MY DEAR BESSY, Overleaf is the prescription and description. I heartily hope it may also succeed with you. The merits of this, compared with what I have had before, lie principally in the opium and in the absence of spirits of wine, etc. Those dulled the ear and disagreed with it; this does not, but is bland. After putting it in, of course the hearing becomes more defective as the wax is softened and plugs the ear effectively; but when the time comes for syringing the wax is all driven away quite easily. No forcible syringing is wanted but *you can't do it properly yourself*, you must have a gentle surgeon. Heroic surgeons (like Pritchard) assassinate the ear. Mem. Hamlet's uncle murdered his brother by dropping hellebore into his ear; I protest against being hung, if any ill effects follow my prescribing opium to be dropped into my sister's ear.

What a happy and moist time Edward ‡ is having in Devonshire. Many loves.

Affectionately yours, FRANCIS GALTON.

Galton was very fond of prescribing on the basis of his early medical experience.

TO GEORGE DARWIN, ESQ., TRINITY COLLEGE, CAMBRIDGE. May 2, 1876.

[Post-card] What a very interesting memoir you have sent me. It does one good to read about such large subjects. I wonder if the conditions of a nebula shedding a satellite could be illustrated by a whirling drop spluttering off, as shown and analysed by that curious method by which (in the last but one (?) number of the *Proceedings of the Royal Society*) the successive shapes assumed by a drop of water splashing down on a plate were investigated.

My wife is going on quite comfortably, and gaining strength, but Sir J. Paget, who saw her last Saturday, confirms all that Dr Chepmell has said. Sufficient for the day is the evil thereof! FRANCIS GALTON. 42, RUTLAND GATE.

* Mrs Hertz was a lady, who established a "scientific salon," and it flourished from 1865 onwards. On her death letters to her from Huxley, Galton, Clifford, etc. were sold to booksellers, the above and others being purchased by the Galton Laboratory.

† See May 20, 1875.

‡ Galton's nephew, sister Bessy's son, Edward Wheler.

June 4, 1875.

DEAR MRS HERTZ*, Fechner's *Elemente der Psychophysik*, Leipsic, 1860 (Breitkopf und Härtel) is a 2 vol. 8° containing in the aggregate 1000 pages, not very closely printed. It is a thoroughly standard work and lays the foundations of a new science which is beginning to attract serious attention in Belgium, France, America and England. In Belgium, Delboeuf's memoir upon it in the *Acad. Roy.* last (?) year (reprinted in a separate pamphlet by F. Hayez, Brussels) shows the primary importance of the work, though Delboeuf criticises and pushes the investigation a step further. In France, Ribot has lately been an exponent of Fechner's, or rather of Delboeuf's, views in a slight article in the *Revue Scientifique*. In America, Nipher (or one of his set) has recently been referring to him in *Nature* † and in England Sully in his papers in the *Fortnightly*, recently republished as a separate volume on "Intuition" (? exact title), renders full justice to Fechner. A mass of work by Arago, Herschel, and various astronomers, falls in as a part of the wide generalisations of Fechner, and much criticism and recognition of him will be found in Helmholtz. Therefore though the work dates as far back as 1860, it must rank practically as a new book, and the reading world is only now prepared to recognise its merits. Its object is, in a few words, to show that one fundamental law connects the amount of *sensation* (in the widest sense of the word) with the magnitude of the *exciting cause*. The generalisations are exceedingly curious and the experiments upon which the law is founded are most delicate and ingenious. The very science of such experiments, suitable for other applications, is laid down in the book and is one of the valuable parts of it. Fechner modestly ascribes the discovery of the law to his old master, Wagner, but it is Fechner who, by the admission of all who know about the matter, is practically the founder, exponent and establisher of the law. I should be heartily glad if an English publisher were to bring his work out in translation, believing that it would interest many scientific men and introduce a new and much needed branch of scientific investigation into England.

Very faithfully yours, FRANCIS GALTON.

42, RUTLAND GATE, S.W. November 18, 1875.

MY DEAR BESSY, Overleaf is the prescription and description. I heartily hope it may also succeed with you. The merits of this, compared with what I have had before, lie principally in the opium and in the absence of spirits of wine, etc. Those dulled the ear and disagreed with it; this does not, but is bland. After putting it in, of course the hearing becomes more defective as the wax is softened and plugs the ear effectively; but when the time comes for syringing the wax is all driven away quite easily. No forcible syringing is wanted but *you can't do it properly yourself*, you must have a gentle surgeon. Heroic surgeons (like Pritchard) assassinate the ear. Mem. Hamlet's uncle murdered his brother by dropping hellebore into his ear; I protest against being hung, if any ill effects follow my prescribing opium to be dropped into my sister's ear.

What a happy and moist time Edward ‡ is having in Devonshire. Many loves.

Affectionately yours, FRANCIS GALTON.

Galton was very fond of prescribing on the basis of his early medical experience.

To GEORGE DARWIN, Esq., TRINITY COLLEGE, CAMBRIDGE. May 2, 1876.

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† See May 20, 1875.

‡ Galton's nephew, sister Bessy's son, Edward Wheler.

42, RUTLAND GATE, S.W. August 1, 1876.

MY DEAR GEORGE, Mrs Jebb's account of the twins and the way she puts it, is most striking. How one wishes one could have such a case under close examination. A single instance verified in a large number of particulars would carry such immense weight. Thanks very many for sending it to me.

What a pleasant Autumn you have before you. We shall not meet first, as we leave Town to-day week (Aug. 8) to stay with Judge Grove and thence on Aug. 24 we go abroad to the Tyrol.

I am rejoiced at the fair promise of all your earth axis work and especially at the fact that you can do so much without being upset by it. What laborious work it must have been.

I have just left Hooker at the Club, very matrimonial-looking, studying the Bravo case*.

Ever yours, FRANCIS GALTON.

To GEORGE DARWIN, Esq.

42, RUTLAND GATE, S.W. January 5, 1877.

MY DEAR GEORGE, How wonderfully inventive you are. I am most anxious to learn your plan about the curve-drawing.

May I venture to trouble you with a request, not a great one? It is to look through a short, clearly written (orthographically, I mean) memoir on "Typical Laws of Descent" which I propose sending to the Royal Society and which would occupy four to five pages of the *Proceedings*, and tell me if it is sufficiently intelligible.

You did me real good service in burking my memoir of last year. This is certainly very much better than that, but tell me—is it good enough? I will send it at once, if you will have it. Affectionately yours, FRANCIS GALTON.

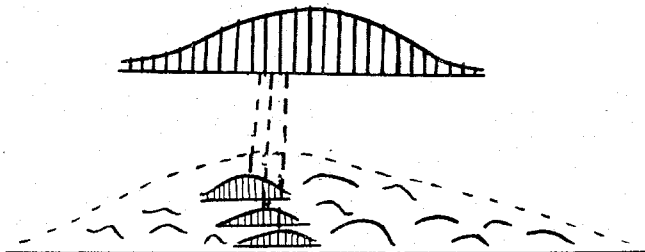
P.S. Pencil anything you like on it. If possible I want to send it in *soon* to the Royal Society so as to be read before my February 9 lecture.

To GEORGE DARWIN, Esq.

42, RUTLAND GATE, S.W. January 12, 1877.

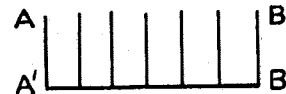
MY DEAR GEORGE, How can I thank you sufficiently. I am aghast at the trouble my unlucky memoir gives, and at the great pains you have taken to put clearness into it. I will certainly adopt your suggestions generally and rewrite the thing.

Let me mention an illustration of one of the principles (Family Variation), which I think may interest you. You recollect that apparatus of mine with the shot;—well, suppose I want to show by a modification of it, how it comes to pass that when the ordinates of an exponic†



mountain subside, each of them, into an exponic hillock, as in the sketch, the sum of the hillocks is an exponic curve of larger modulus.

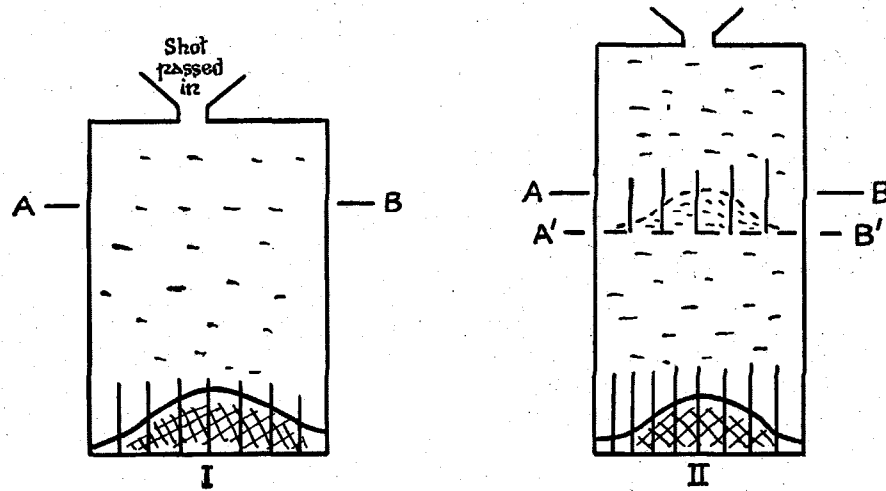
In I (see p. 466), I pour shot, and it makes an exponic heap at the bottom. In II, I have cut the apparatus across at *AB*, and have interposed a row of vertical compartments with trap door bottoms that I can pull out and in to form a temporary landing for the shot, when I so desire. If these are open, the shot falls through and of course makes an exponic mountain at the bottom of II, exactly as it did in I. But if they are closed, they intercept the shot and an exponic mountain (of less



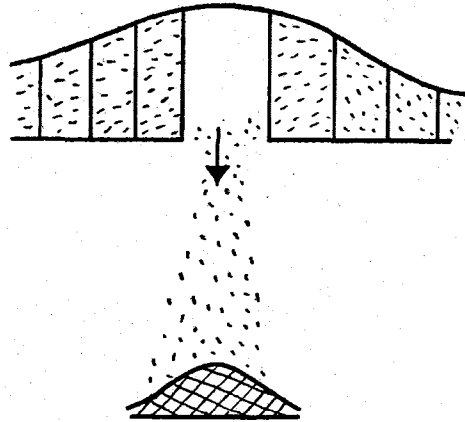
* A famous trial of that day; Mrs Bravo was tried for poisoning her husband.

† I do not remember Galton using this word elsewhere as an abbreviation for "exponential." It seems itself slightly "out of place."

modulus) is formed on $A'B'$. Now I open the trap doors, successively; the shot in each vertical compartment rushes down and forms its own exponic hillock, and we have already seen what



the sum of them will be. The ratio of the moduli of these heaps is self-evident (they vary as the square root of the indices which vary directly as the length of passage of the shot). For



my Royal Institute lecture, I shall simply go into generalities to show what Reversion, etc., mean and how a law is possible, and shall hang up the formulae, but not speak a word about them. Affectionately yours, FRANCIS GALTON.

To GEORGE DARWIN, Esq.

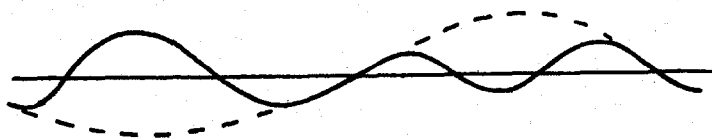
The substance of this letter appears in Galton's R. I. Lecture of Feb. 9, 1877: see Vol. III^A, pp. 6-11.

42, RUTLAND GATE, S.W. July 14, 1877.

DEAR STOKES*, With reference to our land meteorology, would you kindly consider and advise on the following point (which notwithstanding first appearances really falls within that branch). It is, what form of mechanical indication or registration would best convey "sea-disturbance"? I presume what is wanted the most is some idea of the ship-wrecking or

* Later Sir George G. Stokes.

even sea-sick-making power of the sea. Now what element or elements should be measured in order to show this? Am I right in supposing that the two measurements of maximum height



during the past (say) 5 minutes *and* the sum of the heights during the same or some other uniform period would give this? The first, alone, would distinguish between big waves and little waves, the last would make the further distinction between an abrupt tumultuous sea and simple regular waves. Do not trouble about the mechanics part as yet. These and many other elements can easily (I think) be measured and I can readily explain and show drawings. What I merely want to know is *what would* (for the purposes of those who read our weather reports and of ship insurers who dispute claims for wrecks on our coasts, on the ground that the weather was not really bad, and who apply to our office for evidence) be the *best elements to measure*.

Pray look at the July number of the *Philosophical Magazine*, at a paper by George Darwin on interpolation. It may greatly improve our office calculating. I had begged him to examine and investigate the subject, especially with a view of interpolating in three dimensions (latitude, longitude and time), as he has shown how to do in the latter part of the paper. I have asked him to send you a copy of it. Very faithfully yours, FRANCIS GALTON.

42, RUTLAND GATE, S.W. October 8, 1877.

MY DEAR PROFESSOR*, We are now not only nearly but quite "in focus," I think. (1) The fiducial marks:—a scale is cheaply cut. We can try the "web" and if it confuses the picture we can ultimately adopt a simpler plan. (2) Weight, or spiral spring?—whichever the instrument maker prefers—(One can't do the equivalent *easily* with a spring, of *lifting up* the counterpoise). (3) Zenith adjustment:—your plan is the simplest and best. (4) Azimuth:—Allah forbid, that I should propose to carry a theodolite about with each instrument, for the sole purpose of laying down rough azimuth. I was merely thinking of Kew and of fixing in the ground there two or more permanent slabs with fiducial marks, and as there is a meridian line laid down, and a theodolite at Kew, I thought it might be just as well to use them—(It is more important to sight one instrument from the other than to get an exact azimuth). (5) Single or double camera:—I quite agree to beginning with a single one, though when the clouds are low and drift rapidly, I doubt whether it would be possible to work with a single one. The expense of the box, single or double, will be trifling. Our first attempt is sure to be not over good, and whether we have fitted one or two lenses to our first camera, they will serve again. Neither need we buy a lens on purpose for trial—we could easily borrow one—I could lend one, but perhaps it would be better to get one of a large angular field of view. I would meet you at the Athenaeum on Wednesday if you are disposed and will send me a post-card to say about when.

Very faithfully, F. GALTON.

42, RUTLAND GATE, S.W. December 10, 1877.

MY DEAR PROFESSOR*, I went yesterday to Maudsley's place at Clapham Junction, saw him, and ordered three dozen plates and accompanying gear (solutions and dropping bottles)—total cost £1/8/0 or thereabouts. Also, I have written to Kew and find that Whipple the Superintendent understands our proposed photographic requirements. There will be trouble about the theodolite, I find, as none that they have there will admit, he says, of viewing an object placed vertically below the telescope. (There may prove to be some simple way of lengthening the axis for the occasion, or rather for performing some equivalent process.)

Thanks for your letter. Uniformity of wind velocity and direction at all altitudes can never I fear be expected, as all balloon ascents have shown the contrary. There will probably be some curious effects when the pictures are viewed stereoscopically—as, if the clouds move in opposite directions at different levels, the plates which must be disposed *left* and *right* to

* Professor G. G. Stokes.

give a stereoscopic image of the lower clouds must be disposed *right* and *left* to give one of the upper clouds.

I fear that our real difficulty will relate to time of exposure. I should propose to begin by taking four or five consecutive pictures at somewhat different degrees of exposure, and seeing what can be learnt from them in every way, including various stereoscopic combinations—and will certainly follow your suggestion of making the first trial on a suitable cloudy day, as well as the other suggestion in your letter. Sincerely yours, FRANCIS GALTON.

42, RUTLAND GATE, S.W. *October 23, 1879.*

MY DEAR PROFESSOR*, About MacAlister's paper; it might be well to look at the marked passages in the enclosed letters from him, sent to me a few days back. Do not return them.

The principal people who have used the law of error for vital statistics, since Quételet, are the compilers of the War Department Statistics of the N. American Forces after the war between the N. and S. States. And again, curiously enough, Fechner himself in his *Psychophysik* (I, 108) introduces a long mathematical investigation by his mathematical colleague (I have lent the book and forget his name) wherein a series of law of error tables, "Methoden der richtigen und falschen Fälle," are formed to help him in his own investigations. In short, he ignores his own law! He uses tables on the Arithmetic Mean principle to discuss results of observations on phenomena that have the Geometric Mean condition. So the question treated in the paper is really one of importance to statisticians.

Very sincerely yours, FRANCIS GALTON.

42, RUTLAND GATE, S.W. *October 14, 1879.*

DEAR SPOTTISWOODE†, I venture to enclose some suggestions for increasing the interest—negatively if not positively—of the meetings of the Royal Society. If they seem reasonable to you, perhaps the Council would in due time take them into consideration. The recognition of the fact that very dull papers do not need to be read at all, and that difficult papers should not be discussed after only one simple reading of them, would I think be a boon. I fancy, too, that under the proposed plan the experimental part would gradually develop and the discussions ought certainly to improve. I have talked the matter over with a few persons and thus far with a favourable result, but I leave the matter to your much better judgment.

Ever sincerely yours, FRANCIS GALTON.

Suggested procedure for the Meetings of the Royal Society.

The first publication of a memoir by the Royal Society to be not as at present by reading it to the meeting, but by laying revised copies of it, printed in sheet with paper cover, title and date—in fact, the author's copies—on the table and reading the title only.

The subsequent issue of the memoir in the ordinary publications of the Society to take place exactly as it does at present.

The subjects advertised for such meeting should generally be memoirs that had previously been published. The authors or their deputies should give explanations of them, illustrated as far as may be by experiments and drawings, and followed by discussions. The President to have full power as at present to select the subjects for the meeting and the order of taking them. For the most part they would come before the Society in one or two weeks after their publication. Some however would never be brought forward at all, and others would perhaps be most advantageously discussed on the same day as their publication.

42, RUTLAND GATE, S.W. *October 23, 1879.*

MY DEAR MISS HERTZ‡, Please accept by letter, as you were out when we called and I could not verbally give, our very warmest congratulations and best wishes for many years of future happiness. I can assure you that I think your intended ought to consider himself

* Professor G. G. Stokes. The letter refers to Donald MacAlister's paper on the Law of the Geometric Mean: see our Vol. II, pp. 227–8.

† President of the Royal Society 1878 to 1883.

‡ Daughter of Mrs Hertz (see p. 464 above).

a very fortunate man indeed, and have not the slightest doubt but that is his frame of mind. It will give us great pleasure to make Mr Macdonell's acquaintance, and I hope you will soon give us the opportunity of doing so. What a great deal of new happiness and new life you have before you, and what a break-up of Harley St life will be the result. Once more with our united kindest wishes, believe me, very sincerely yours, FRANCIS GALTON.

Thanks about the Generic Images paper. I have sent to-day a copy to Professor Osear Liebreich and will gladly send you a few—for friends—in a day or two.

42, RUTLAND GATE, S.W. October 28, 1879.

MY DEAR MISS HERTZ, On coming back last night from the country I found your book of readings awaiting me. Thank you so much for it. I have been reading ever so much of it already. What a true idea of yours that is, in the preface, about aesthetic training not being a step by step affair, like that of science, which has to make each foothold sure before venturing another pace. But I suppose the same is true of morale—conduct—and much else besides. Even language; though when this is taught classically it *is* a step by step affair. I find as I write that the subject enlarges and there is evidently much to be said about the two ways of teaching; in fact it seems to open out the whole education question. *Requiescat in pace.*

That "galloping" poem of Browning's is certainly wonderful rhythm. I wonder if a great artist could write a poem in a rhythm that should bore one most insufferably:—a sort of "Ancient Mariner" from whom there was no escape, who bewitched and made one half mad at one and the same time? Very sincerely yours, FRANCIS GALTON.

What a deal of kind, good educational work you must have done by your readings.

42, RUTLAND GATE, S.W. March 6, 1880.

MY DEAR GEORGE, About those visualised numerals—of which by the way I have now collected much information—can you easily answer me this question? I want to know whether the graduation belonging to any number, say 10, does really occupy very exactly the same position at all times in reference to the axis of vision and the horizontal plane passing through it. In short—if you look at a ship on the horizon and think of 10, does that number always appear in the same altitude and azimuth reckoning from the ship and horizon?



I suspect that in many cases it does so with considerable accuracy, and that these visualised numerals are the strongest case known of "topical" recollection, which implies some system of *division of labour* in the brain elements. In short, that the 10 always occupies a spot corresponding to a speck that would be seen if a certain part of the retina were injured, and also to a spot that would be produced if the part of the brain in physiological connection with that spot on the retina were injured. If this be true of each of the numbers, then it seems to follow that a particular part of the brain is charged with the care, so to speak, of one particular number. It is quite extraordinary how in the great majority of cases (not yours) the want of coincidence between the names and the values of the numbers betrays itself in the numerical forms. There is almost always a hitch and a bother at 12 and at the teens, which repeats itself at 120 and the series hardly ever runs regularly except between 20 and 100, 120 and 200, etc. Children are puzzled and the puzzle continues throughout life as shown by the persistence of the misshapen form.

I wish you had been in Town and that I could have persuaded you to come next Tuesday to a paper of mine about these numerals at the Anthropological. I have got at least 6 "seers" of these things to dine with me and then to go to the Society and stoutly maintain their veracity there: viz. Bidder, G. Henslow, Schuster (wave length), Woodd Smith and Col. Yule—besides Mrs Haweis and (I have no doubt) Roget. My collection exceeds 60 forms, curiously diverse in some respects but almost all alike in fixity, extremely early origin, and in the 12 difficulty—and I have got returns from schools. It seems that about 1 man in 30 has the tendency, and twice as many women. Many other odd things come out. A left-handed twist of the forms is about as common as a right-handed one, etc.

We heard two days ago from Mrs McLennan's* sister, who says that she (Mrs McL.) has been nearly dying but that she is now somewhat better. They are preparing for leaving Davos, and are inquiring for a good place to go to. I am sorry to hear that your visit of charity did little good to your own self. It was very good of you to go. Ever yours, FRANCIS GALTON.

August 12, 1880.

Excuse bad paper, ink, etc., our house is in the plasterers' hands.

DEAR GEORGE, The enclosed was sent to me asking me to read it and forward it to you. The writer, Walter Smith, was a bracketted 2nd Wrangler some few years back and of Trinity College—you would know all about him. I knew his people well, especially his father, Archy Smith.

Did I tell you that during a happy day I spent among the idiots at Earlswood I learnt from the very intelligent medical director, Dr Grahame, that his inquiries about the parents of the idiots quite confirmed your conclusion about cousin-marriages, and that he had said so in print?

I suggested to W. Smith that if he wished to work up the subject *de novo* he should get an old Burke's "Peerage" and "County Families" and pick out the first hundred or so cousin-marriages, also of ordinary marriages that he came across, and partly by the help of more recent editions but chiefly by that of gossips about the aristocracy compare the results. If the difference was not a notable one he might be at rest as to harm done by not forbidding the banns. I wonder if he has a personal interest in the inquiry. What a charming episode in a novel—the conscientious young Scientist collecting laborious statistics before he ventured to propose.

We go to McLennan's to-day, to stay till Saturday afternoon at Hayes Common.

Ever yours, FRANCIS GALTON.

P.S. Thanks for grouse.

42, RUTLAND GATE, S.W. December 11, 1881.

MY DEAR GEORGE, Here are the three sets I circulated of Mental Imagery questions. They were usually followed up by correspondence.

What a wonderful application of your earth-history theory is this big tide in early geological times! I want particularly to read your account of the matter when it appears, and to have your own views thereupon. It is a *grand* idea indeed—the grandest since the *Origin of Species*. Have you thought over the corresponding air tidal-wave? Now, in the tropics, the diurnal barometric range is (...? say $\frac{1}{8}$ inch), what will it have been in those times? And what would be the corresponding wind force? I can't understand how any thing could live on dry land under such blasts. Talk of catastrophes, why, that time must have been a continual series of catastrophes. Dante's Hell is nothing to it. But I had rather have the *facts* from you than through the Astronomer Royal of Ireland. Don't of course bother to answer this, but I hope we shall soon read a short article from you in *Nature* or somewhere on this extraordinary revolution in old ideas.

Have you too (I ask not for an answer) talked over or thought about the air flying off from the earth, and notably from the moon, to somewhere else? I mean what we were talking about. Lord Rayleigh seemed to think it worth considering and within range of calculation. Just now I suppose you are busy up to the eyes with Tripes preparations. We look every morning in the column of births in the *Times* for news from Horace†. Ever yours, FRANCIS GALTON.

THE ATHENAEUM. December 11, 1881.

What frightful nonsense I have just despatched in a letter to you about air-tides. There was conversation—I had two ideas in my head and they blundered together as in a dream, the letter went and I could not correct it.

In sober sense I should have written: Supposing height of air-tide in an imaginary homogeneous atmosphere to be the same height as water-tide (Herschel says so), say 8 feet, then the corresponding barom. pressure due to air-tide would be 0.008 inch. Under the supposed ancient condition of a 216-fold height of tide this would become $216 \times 0.008 = 1.728$ inches, so that the barometer would go up and down $1\frac{3}{4}$ inches in every 12 hours, which implies a constant state of hurricane. F. G.

* The wife of Donald McLennan, the writer of *The Patriarchal Theory*.

† Horace Darwin, Charles Darwin's fifth son.

PLATE XLVIII



Francis Galton's Niece Milly—Mrs J. C. Baron Lethbridge.
Compare Plate XIV, Vol. I.

INGLEWOOD, BEDFORD PARK, TURNHAM GREEN. *April 27, 1882.*

MY DEAR MR GALTON, I thank you heartily for your note. And I so fear to trespass upon the profound sorrow that fills the home at Bromley that I cannot venture to obtrude directly even an expression of the gratitude I feel that my name should have been remembered in giving out invitations to the funeral. It was, indeed, with deep satisfaction that I learned that our Minister, Mr Lowell, was to be a pall-bearer, and his countrymen will regard it as a most happy circumstance that they were represented, on such an occasion, by no mere politician but by a man so worthy to bear the pall of Charles Darwin. I see also that the venerable Robert C. Winthrop was present, the President of the Massachusetts Historical Society and in many ways a representative American.

The experience you speak of, in connection with the generalisation worked out by your great relative, corresponds with the experiences of others who were watching by night when the glory of this new star shone around them. A few years ago when, through that considerateness of a heart which could hold a world and at the same time not overlook the smallest opportunity for kindness in it, I was invited to Down, and when I was walking with him in his garden, I felt as if I would fain clasp his feet and try to tell him what he had been to me. At night I well remember lying sleepless for some hours tracking the steps of my pilgrimage which had begun in an Egypt of Darkness and been able to clear Wildernesses by his aid. This spiritual effect of a pure scientific generalisation, as I have known it in myself and in many other minds, is the most significant phenomenon of this age. It is a thing to be pondered on by those who consider what is to be the God-spell or glad tidings of the coming time.

On Sunday last I had a very large audience to attend our memorial service and discourse in honour of Darwin. I am now engaged in preparing a sort of memoir which I shall probably deliver before the American Assoc. for Advancement of Science at their meeting in August. It occurs this year at Montreal, and Steny Hunt has tempted me to cross the ocean merely to remain one month. (I wish I could tempt you to go also.) I shall aim, in what I am writing, to give the facts of Darwin's personal life, so far as I can obtain them; the dates of his works, etc. I shall also try to trace carefully the history of the doctrine of evolution—tracing it from the empirical suggestions of Newton, and then Buffon, to Erasmus Darwin, then to Lamarck, Oken, Goethe, Geoffroy St Hilaire, and Darwin. (And by the way, do you know that more than forty years ago Ralph Waldo Emerson was basing his entire idealistic philosophy on evolution?—in his first book, 1836, writing—

“And striving to be man, the worm
Mounts through all the spires of form.”

As for this matter of a memoir concerning Darwin, I should hope to consult you about it at some time.

I send you an American paper with a little Essay of mine written last year. I sent it to Mr Darwin in January. It is not much, but may interest you and Mrs Galton.

Ever yours, MONCURE D. CONWAY.

HARLECH HOUSE, BOURNEMOUTH. *March 26, 1883.*

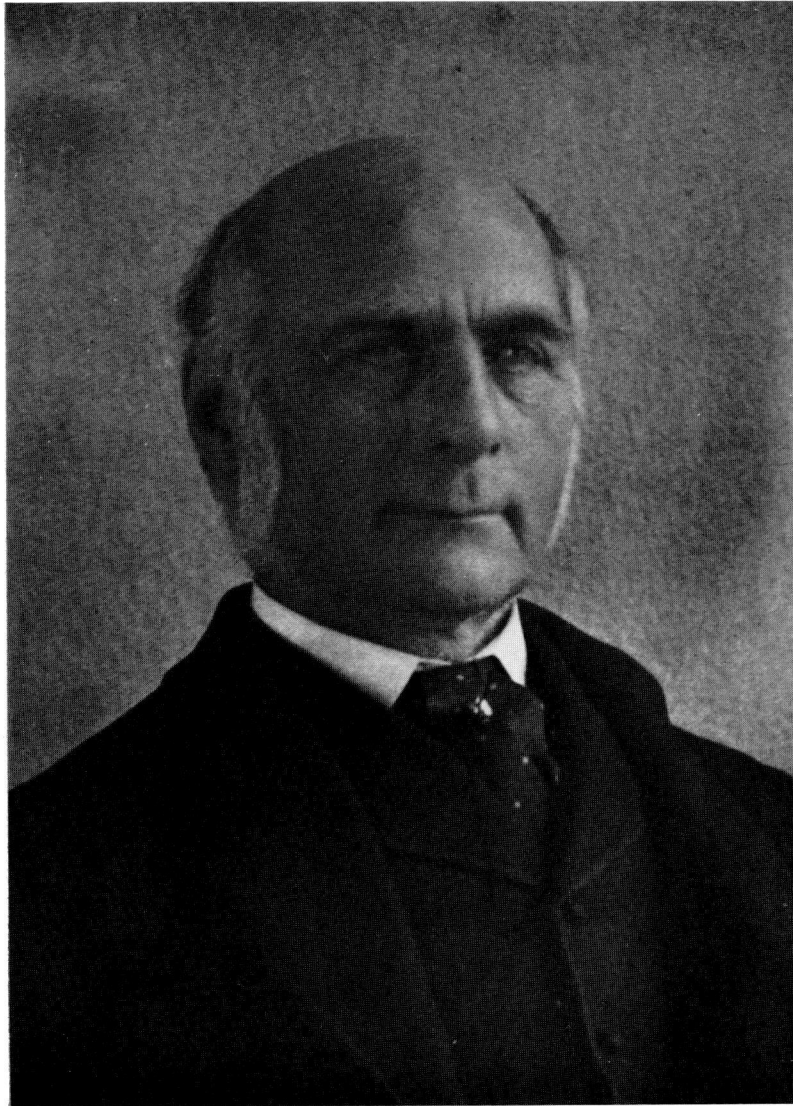
MY DEAR PROFESSOR*, Thank you much for your pretty cloud problem. I have been on the look out for an opportunity of experimenting with it, but have not hitherto had a chance. It has however suggested to me a plan which I enclose, and which I have tried, that really looks as though it might be regularly employed in many stations where there are cliffs or neighbouring hills, and which might even give good results for clouds up to 2000 or so feet. I experimented by using the Kew Pagoda to serve as the AC in the enclosed. The sea here is bare of ships, but I have tried the method this morning upon one that happened to be passing and it seemed very convenient. Very sincerely yours, FRANCIS GALTON.

5, BERTIE TERRACE, LEAMINGTON. *September 27, 1883.*

MY DEAR MILLY†, From your very liberal standpoint, the arguments in the Chapter on Prayer have necessarily little value. They are directed to those who either (1) like the great

* Professor G. G. Stokes.

† Mrs Millicent Lethbridge, daughter of Galton's Sister Adèle, Mrs Bunbury. Galton is referring to the section on Prayer in his *Inquiries into Human Faculty*: see our Vol. II, pp. 100-101, 115-117, 258-261.



Francis Galton, the Meteorologist, when about 65 years of age.

PLATE L



The Medallion of Erasmus Darwin by Fassie, from the copy
in the Galton Laboratory.

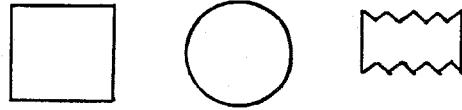
majority of Puritans and theological writers assign a magical—(? right word) power to prayer, or (2) whose ideas are habitually confused as to what they believe, what they doubt about, and what they disbelieve. I fear that everyone belongs in some degree to the last category and that it is most important for reasonable beings to extricate themselves as far as may be out of it. If there is a lingering tendency to believe in the magical (?) objectivity of prayer, which would not be avowed if the question were put in a straightforward way, then I should say try and eradicate that tendency. Let your thoughts and the outward expression of them be conformable. I am sure that the average clerical mind is in hopeless disaccord with its outward expressions, and that was one reason why I wished to discuss a class of views that appear to me (and to most of those who consider them plainly) to be untenable—those which refer to what I call the objective efficacy of prayer.

Your "Einverständnis" view seems to be undoubtedly that which deserves investigation. Is it a reality or is it a fancy? I have endeavoured in the book to show that the solution is by no means so easy as religionists say, because very much of what are commonly taken as evidences of it, innate feelings, aspirations, etc., are demonstrably of very little weight indeed. I want to knock away all fictitious supports, and to get the evidence *pro* and *con* that we possess clearly before us and to look at it fearlessly. Men lead happy, useful and honest lives under so many forms of belief that I cannot suppose the precise form of belief to be of much importance. But it is of course cheering to the heart and ennobling to the mind if the belief be that of being a missionary, as it were, in a high cause affecting humanity. Beyond that I suspect there is little, and that each man puts a great deal of his own self into the ideal that he sets before him.

How infinitely little we know! I like to look at a mongrel cur sitting on the doorstep of the house he belongs to, looking as if he were the master of the situation and as though creation presented no difficulties whatever. He is so like most men in this.

Thank you much for the letter, which I will keep and read again when, if ever, I write on the topic a second time. People are often so crude and unreasonable that I get quite savage and then it does me a world of good to read such letters as yours, which tend to lift the discussion to a higher level.

About the numerals and teaching: have you thought of writing the declensions, etc. not only in different coloured inks but in different *shapes*, even differently shaped borders would be something? If you could somehow associate the shape (or colour) with the matter taught in a *reasonable* or even in a suggestive way, it would be a help. For my part, I think I should recollect best by *gesture* and in a kindergarten kind of way—thus if I learnt one thing with my right arm waving like a Salvationist's and another while beating a tattoo on the table, I should find the association easy. Some people associate with sound very readily. Thus one declension might be sung to one tune, another to another. Even a high-pitched or low-pitched tone would go some way. But the associations should not be haphazard, they should in some way be natural, whether by a reasonable, a long since acquired, or by a punning connection....



Ever affectionately, FRANCIS GALTON.

42, RUTLAND GATE, S.W. October 1, 1883.

MY DEAR PROFESSOR*, I am just back in London and ready at any time for a Council at the Meteorological, and have written to Scott to say so. We must proceed cautiously but firmly in this self-recording observatory matter. One plan would be to draw up a brief and cold-blooded statement of the reasons *pro* and *con* as we understand them, and ask the memorialists whether in their opinion they cover the ground; after receiving their replies, to reconsider and decide. However eminent the men may be, they cannot see the matter in the same light as if they had administered the affairs of the Office and knew details.

I left Southport on Saturday morning and never attended the Committee. Indeed, as I said, it did not seem to me quite the right way of proceeding on the part of the objectors. They might more properly have first sent in a memorial; *then*, if that produced no effect, they might use pressure if they liked; but should not I think have begun with external pressure.

* Professor G. G. Stokes.

For my own part, one strong reason for suppressing the observatories and diverting the money saved to more pressing inquiries lies in the belief that hereafter it may become possible to note a *greater variety of data*—such as upper air currents, total humidity of a vertical column of air, some electrical facts, possibly by the captive balloon, and generally, data from the wide field of the now unknown. What we *have* recorded during these past years is such a very little bit of what we want to know before we can understand the weather, that it seems a pity to prolong unnecessarily the present system—we might probably recommence 20 years hence on a much more favourable basis. Very sincerely yours, FRANCIS GALTON.

In 1884 Galton gave the Rede Lecture in the Senate House at Cambridge. Some account of this will be found in our Vol. II, pp. 268–271. The impression formed on the mind of a competent critic is conveyed by the following post-card headed in Galton's handwriting:

“My Rede Lecture. Note by the Rev. G. F. Browne.”

You will have heard that you were admirably audible; I only hope I didn't overwork you. It was beyond measure (!) interesting and several of us have vowed that the thing shall be set going for undergraduates. G. F. B.

42, RUTLAND GATE, S.W. September 25, 1884.

DEAREST EMMA, The news of the pencil fills my heart with rejoicing. I dreamt an eventful dream last night of which the climax was that it was discovered in the pocket of my dressing-gown, and awoke rejoicing to tell Louisa;—and lo! it was a dream. I must never again wear it together with your door key. The two do not agree in the same pocket. The pencil case is flipped out by its great cuckoo half-brother, which hangs from the end of the watch-chain and is also stowed in the pocket of the waistcoat. This is the second time it has occurred; I have been watchful since the first time, but now I look on the reconciliation of key and pencil case as impossible, and will hereafter carefully separate them lest they quarrel on the sly.

I went to the British Museum to-day with my earthenware god *Bess*. Another, but I am happy to learn a smaller one of the same god, has just been discovered by Flinders Petrie in his excavations in the Delta. I have given mine to the British Museum. They are to give me three casts of it: one to bow down to in my own house as heretofore, the others for the archaeological collections of Oxford and Cambridge respectively. Then I produced the E. Darwin medallion, which was discussed in the medal room just as Lucy's coins were. They say it was by a Scotchman called Fassie, who made many fair medallion portraits about the end of last century in a paste of his own composition. There will not be the least difficulty in making plaster casts of it. They will make a mould and turn out as many as are wanted. I have ordered a batch and you and Bessy shall each have one; also Mrs Oldenshaw (to whom I have sent a line) and Emma Wilmot. When the medallion comes back to me, I will take it both to S. Kensington and to Scharf at the National Portrait Gallery, to see if they also know anything about it. To-day has been a considerable scurry. Louisa will, I am sure, tell you about herself and Chepmell. She discussed six raw Whitstable “Natives” at dinner with considerable gusto (she was told by Chepmell to try oysters), but I fear the pain is not sparing her just at this moment (indeed it is not).

I cannot sufficiently tell you, and it is needless for me to try to express what you know, how much we feel the sense of your affectionate kindness to us both. It comes so much as a matter of course and is received so much at the time in that way, that it looks as though we were not really half as conscious of it as we should be, but we *are*, and I am sure you know it.

Milly is in a way about Eddy's* future, naturally enough. She has written such nice letters in answer to those we sent her; Baron † clings to Edward's being sent to a private tutor and thence to Oxford, while she wants differently. Cyril will have been there by now and I am very curious to learn the result. Best loves to Bessy and the Moilliets ‡. I wrote a paragraph at the Meteorological Office to-day about the little inquiry I had made there in reference to Edward's foggy voyage. I dare say it may get quoted in some newspaper in a few days.

Ever affectionately, F. GALTON.

* Edward Galton Baron Lethbridge, now of Tregear.

† Mr J. C. Baron Lethbridge, Millicent Galton Lethbridge's husband.

‡ Francis Galton's second sister, Lucy Harriot Galton, married Mr James Moilliet.

42, RUTLAND GATE, LONDON. *October 4, 1885.*

MY DEAR SIR, Excuse delay in reply, as though I date from town I am still in the country.

Let me first cordially thank you for your kind letter and the many interesting remarks it contains.

(1) I have written to the Secretary of the Anthropological to tell you exactly what the annual cost of the journal is, I think it is £1, viz. 4 parts at 5/- each. Also I told him to send for your acceptance from me, a recent number in which there is an exceedingly good paper about the Jews, illustrated by some rather successful "composite" photographs of Jews by myself, which it may amuse you to look at.

(2) I have ordered both the books you speak of: thank you very much for telling me of the latter especially, I mean that about the sex of the child.

(3) You were so kind as to send me some time ago your investigation into the colour of hair, and I feel myself open to blame for not having drawn attention to it already at the Anthropological or elsewhere, but the fact is that I wanted to work up my own data, and to give both results at the same time. My data are now worked up, but there still remains something to be done, so that there will be a little further delay.

Did you ever consider the physiology of *clear green eyes*—bright green I mean, such as Dante says Beatrice had? The common often repeated statement that blue eyes are merely the effect of seeing pigment through a semi-transparent medium, and that there is only one sort of pigment, cannot possibly explain the existence of blue and green eyes, both equally translucent. There must be a green pigment somewhere. I have asked all our best physiologists, and have looked through many German and French memoirs, thus far in vain, for a rationale.

I am assured that the pigment particles are not so minute as to affect the light by any *iridescent* effect. In short, that the blue and green cannot be due to such causes as those that make the waters of the Rhone, blue, and that of some of the Tyrolese rivers, green.

Believe me, Very faithfully yours, FRANCIS GALTON.

This letter is a reply to that of Alphonse de Candolle, published in our Vol. II, p. 210.

HOTEL VICTORIA, SORRENTO. *March 24, 1886.*

DEAR GEORGE, At last we are in the promised land, most comfortable, and all most beautiful. It was a disagreeable journey, so far as railway went, to Genoa. Genoa most Italian, and yet quite fresh and full of bustle. Then we tried Nervi but it is cramped. I got a biggish, Ste Agnès*, sort of a walk in the afternoon and we left for Pisa next morning. Pisa glorious. I felt there was more in man than I was wont to think looking at the artistic triumphs there. Next day to Rome (Hôtel d'Italie—very recommendable for sunshine, and good generally); Saturday, Sunday and Monday we saw old scenes. We had a very social afternoon with Mrs Grey and Miss Shirreff; also I looked up an Anthropologist (G. Sergi) and saw his studio, and learnt at the Vatican Manufactory much about mosaics, as affording good standards of reference for anthropologists, tints of skin, etc. Left Rome yesterday, Tuesday, morning and got to Sorrento at 8. Slept at another hotel, but rooms not sunny enough so changed here this morning. Vesuvius smokes famously. Yesterday the air was saturated and clouds lay here and there among the hills at all levels. The steam from Vesuvius mixed with the clouds and occasionally showed itself distinctly as *growing in volume* as it left the cone. I strongly suspect the sulphur in it formed centres of deposition for the fresh cloud. The effect was rather striking. We shall, I expect, settle here for a full fortnight.

Tell us how you are going on, and what has taken place at Mentone since we left. Any good excursions? Louisa sends her kindest remembrances,

Ever affectionately yours, FRANCIS GALTON.

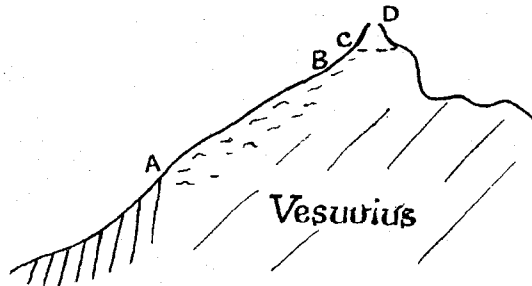
To GEORGE DARWIN, Esq.

April 9, [1886]. In a dull railway carriage, all alone.

MY DEAR GEORGE, You will be in England I suppose now, so I write there and to the Meteorological Office. Both your letters came safely. The first reached me just after I wrote,

* Presumably the well-known excursion from Mentone.

so this is my second letter only. I never have enjoyed a holiday so much and daren't trust myself to look towards its close. We have been three nights at Quisitana*, and I write this in a railway carriage *en route* to Paestum for the day, whither I make a solitary journey of a total of ten hours' travelling and detention in order to get a two hours' view of the ruins, twelve hours



altogether. Yesterday I *did* Vesuvius, with George Butler, a lady-like chaperone, a pretty daughter, and also a Newnham young lady. We got on admirably by being pulled up the ashes on the side *AB* and then up the much more difficult ashes on the cone, *CD*, and I feel this morning as though I had been all night at a ball held on the sandy seashore, dancing reels and not missing one. It gave one a vivid idea of the muscular effort required to fly; that is, to support oneself in a yielding medium. The sulphur colours were glorious, the "lapilli" came up in occasional volleys and fell about us dull-red-hot. It was a grand sight looking into the crater at the steam with its glowing foundation;—then we scuttled down, to get out of the way of the next shower of lapilli. The flames were beautiful last night and reached above the cone at times, to a height equal to the height of the cone. To-night they reach to three times its height. Sorrento was the acme of felicity. Amalfi was a falling off and, to our taste, Quisitana is a further descent. We turn northwards in three days to or towards the Italian lakes, thence to the Lake of Geneva, to stay a few days with my niece Milly Lethbridge, and then home, where I am pledged to be by May 11 at latest and probably a *few* days earlier. My Wife has thoroughly enjoyed herself, but of course is not up to the longer excursions, and is beginning to feel the climate. Josephine Butler† joined her husband at Quisitana last night.—Well, well! one can't talk to her about her favourite topics, holding as I do most diametrically opposite views in nearly every particular of faith, morals, and justifiable courses of action; but for all that she is, or was, very charming and keenly alive and sympathetic.

I was very glad to hear your own satisfactory home news and trust that your American letters show that all is going on well and happily there, and also that your Mother is fairly if not wholly well again. We have not been fortunate in meeting many pleasant people. One agreeable acquaintance was an American, Mr Andrew White, once president of, and now a history professor in Cornell University, and for some years U.S. minister in Berlin‡. He knows both Oxford and Cambridge pretty well. I dare say you may have met him and his wife.

I wonder whether you have been able to strike out important ideas about our procedure of weather predictions, I am sure you will strike out some new ones, and it is high time that original ones should be struck out.

Will you kindly give the enclosed card, or post it, to Scott? You will see what it says. If it should prove quite convenient to fix the first *May* Meteorological Meeting during the second and not the first week, all the better for me.

Ever affectionately yours, FRANCIS GALTON.

To GEORGE DARWIN, Esq.

* I have failed to find any such place. It is possibly a very obscurely written Positano, which is S.E. of Sorrento.

† See our Vol. II, p. 130.

‡ During the biographer's student-days there, 1879–1880; he most courteously invited to his house English as well as American postgraduates.

From Louisa Galton : 42, RUTLAND GATE, S.W. November 4, [1886]. Private.

(It's not private at all. F. G.)

DEAREST EMMA, See the Telegram just come, quite unexpected but not the less welcome. I am so glad. Frank works on so patiently and quietly, there is less to bring him to the front than with many who do less. He is very pleased but do not talk about it for a few days, as the President of the Royal Society puts "private" till confirmed by the Queen (a mere farce). It is given for his Statistical inquiries and investigations in Biology. You will be pleased, I know, more than anyone next to ourselves. I write in bed having been sick half the night, but hope the attack has passed its worst, still I cannot write much. The encomiums on Montagu* are delightful and not too great. I long to hear we shall soon see him. Friends are so hearty and pleased; we were none of us satisfied with his Deanery from the first and very dissatisfied with Gladstone. I am so thankful he has this rather than a bishopric, but he will sadly need a wife. I am grieved your Cookery has been troubled by Miss Ellis's illness, and that so much has devolved on you. We shall anxiously await tidings, how all goes on, including Miss E.

November 5. DEAREST EMMA, I finish the letter as Louisa is arranging with cook. We are very sorry indeed about Miss Ellis and your troubles in consequence. The full-sized design for the Lichfield memorial is ready to be seen and sent down, and I shall go to the Sculptor this morning, but being rather busy afterwards at distant Committees will not be able to send an account of it to-day. I was so pleased last night about the Royal Medal. Stokes, the President, wrote to me this morning to say it is for my "statistical inquiries into biological phenomena." These things don't get into the papers, certainly not for a couple of weeks, as the names of the Royal medallists have to be submitted to the Queen, because she gives the medals. But this is a pure form. The medal contains some £50 worth of gold. George Darwin got one as you will recollect, two years ago, for his most elaborate researches into the early planetary history. Two Royal medals are given each year. There are also two others usually given to foreigners, the "Rumford" and the "Davy," but by no means always; beside the great medal of all, the "Copley." Tell Bessy with thanks that the book covers have returned safely.

Ever affectionately, FRANCIS GALTON.

42, RUTLAND GATE, S.W. November 15, 1886.

DEAR MRS HERTZ†, Best thanks for "Vain Discourse" which I have thoroughly enjoyed and return.

I stole an "umberella" from your house yesterday, taking it by mistake for my own—really by mistake, and it is a better one, which I know throws doubt on my honesty. If you can tell me who the owner is, I will penitently return it. Yet my own had merits. It was of real silk, very light, and I bought it *new* from an itinerant dealer in Lombard St for 4/6. I could have got one of inferior silk for 4/-. The "umberella" deserved study; it was made up of clippings of silk. It certainly acted and looked handsome and I took it abroad. The one I stole probably cost a guinea or more. Very faithfully, FRANCIS GALTON.

The "Ascidian flippant in an infinite azure" as heraldic bearing for the Darwinians is charming. Can't you get someone to draw it?

Letter to Alphonse de Candolle.

42, RUTLAND GATE, LONDON. May 26, 1887.

MY DEAR SIR, It gave me great pleasure to receive the "Extrait" from the *Revue d'Anthropologie* of May 15 containing your article on the relative healthfulness of the brown and blond types. You had told me of the suspicion you then had of the accuracy of the American references and I had long wished to see your article. Their statistics are clearly imperfect

* Henry Montagu Butler, Galton's brother-in-law, appointed Master of Trinity College, Cambridge, in 1886.

† See my footnote p. 464 above. I have a letter of Huxley to her from the year 1870, expressing great sympathy with the Prussians.

from neglecting important data. No doubt, however, you have remarked that the soldiers—the accepted men—of German birth are usually ranked high for their physique in Baxter's Statistics (see Vol. I, p. 169 and again pp. 182, 215, on the one side, and pp. 199, 206, 227, on the other). I cannot find in my English statistics any sign of the dark race supplanting the fair. The persistence of the proportions during four generations between them (see Diagram on p. 405, *Royal Soc. Proceed.*, 1887*)—I send the memoir "Hereditary Eye-Colour" for your acceptance) is very remarkable. Neither do my data show that either is more prolific or less healthy than the other. The data are but scanty; still I imagine that the English climate and surroundings may be equally suited to the two types. Moreover the Scandinavian contingent to our population, contributing largely to the blond type in Eastern England and Scotland, seems the most vigorous though least aesthetic of all our stocks. I have failed in obtaining trustworthy results from my data concerning sexual predilection for, or aversion from, concolour marriages; there are too many interfering causes of importance on which I am insufficiently informed. It is, as you most justly say, among the irregular *liaisons* that data are most preferably to be sought. Together with the "Hereditary Eye-Colour" I send "Hereditary Stature" which will I fear hardly interest you being very mathematical in its reasoning, but as the Eye-colour inquiry depends on formulæ derived from it I may as well send it also. It also describes my data. Thirdly I send a recent Presidential address, the last part of which beginning at p. 394 may be worth while glancing at.

When I had the great pleasure of making your personal acquaintance a little more than a year ago, you were in domestic anxiety. If you should ever again favour me with a letter, I should be very glad to learn that that anxiety was lessened.

Believe me, my dear Sir, Very faithfully yours, FRANCIS GALTON.

GENÈVE. 20 avril, 1888.

MON CHER MONSIEUR, Il y a longtemps que j'aurais dû vous donner signe de vie en réponse à votre lettre obligeante du 26 mai dernier, mais l'âge m'a rendu très lent et m'empêche de faire des recherches d'aucun genre. J'aimerais pourtant bien savoir si vous avancez dans vos utiles publications, auxquelles je porterai toujours de l'intérêt.

Un de mes derniers efforts a été de rédiger pour la *Société de Psychologie physiologique* fondée à Paris, une série de questions à poser sur l'hérédité. J'ai su, par M. Taine, que la Société a reçu des réponses et qu'on s'occupe de les utiliser. Reste à savoir comment les personnes questionnées ont été à la hauteur d'impartialité et de jugement nécessaire. La lecture de la correspondance de votre célèbre cousin Charles Darwin m'a causé beaucoup de plaisir. J'aurais bien aimé connaître les questions qu'il agitait avec Sir Joseph Hooker, en 1852-54, lorsque je m'occupais moi-même de l'origine des espèces au point de vue géographique, ce qui me conduisit en 1855 à constater l'ancienneté géologique des causes de la distribution actuelle. D'un autre côté cela m'aurait retardé dans les recherches et je n'aurais publié ma *Géographie botanique raisonnée* que plus tard, après peut-être l'ouvrage classique de Darwin (1859). Il y a dans ses lettres des phrases caractéristiques et admirables sur les principes et les méthodes dans les sciences d'observation. Je veux relire les trois volumes pour les extraire. Quelle remarquable exposition des idées successives de l'auteur! On ne trouve rien de pareil dans Montaigne, Gibbon, Rousseau et autres qui ont écrit sur eux-mêmes trop tard et avec une impartialité souvent douteuse.

L'hiver a causé des désastres en Suisse comme ailleurs. Ici ce sont surtout des avalanches. Malgré cela nos lacs et nos Alpes auront toujours de l'attrait. Ne viendrez vous pas les visiter de nouveau cet été? Ce serait fort agréable pour votre très dévoué

ALPH. DE CANDOLLE.

Letter to Alphonse de Candolle.

42, RUTLAND GATE, LONDON. May 6, 1888.

MY DEAR SIR, It gave me very great pleasure to hear from you about a fortnight ago, and I should have replied at once only I thought the enclosed scrap (which might have been printed a week earlier) would interest you and I delayed till I got it. Dr Venn's memoir will not appear

* Reproduced in Vol. III^A, p. 35 of this work.

till November. He is the author of a most thoughtful book called the *Logic of Chance* which young statisticians ought to read, for it explains what statistics cannot as well as can do, in a very masterly way. The third edition is just out. If you happened to think of any logically disposed reviewer it would be worth while suggesting this book to him as well deserving notice.

I was very pleased to read how much Charles Darwin valued and profited by your labours and views—What an immensity of work in science has been performed in the last 50 years! It must be an endless pleasure to yourself to look back upon your own large contribution to it. It will be very curious to watch the results obtained from your questions circulated by the *Société de Psychologie physiologique*, and the way in which the veracity of the answers may be tested. I have myself lately had a batch of rather disappointing replies to questions circulated among teachers in schools of all grades, concerning the signs and warnings of mental fatigue. There was great absence of skilful self-analysis and of suggestion, and not a few transparent indications of exaggeration here and of suppression there. I was hearing the other day from a particularly trustworthy source, a list of unveracities of one of our own men of science, formerly one of the leaders of science, but whom I must not indicate further. The general facts and many particulars I had long known, but was surprised to learn how much more there was that I had not known. It is strange that a man who had so little care for truth could succeed in science at all. It is a most painful case of psychological interest and made me think how painfully it would have interested you when writing that paragraph on the general veracity of men of science in your *XIXme Siècle*.

I had a pleasant summer last year in Eastern Switzerland, etc., but in the autumn fell suddenly ill with a most severe gastric attack at Lugano and was got home somehow in a wagon-lit. Then I fell ill again in another way with violent catarrh, then again in a third way with inflammation of the cæcum, and lastly in a fourth way with severe bronchitis. In short I had four separate severe illnesses within five months. I suspect there was some microbic poison at the bottom of it. However I am clear of all illness just now.

I was grieved to see the black-edged paper of your letter, and beg of you to accept my sympathy. I shall deem myself very fortunate if the next time that I pass through Geneva I shall have the great pleasure of finding you at home and inclined for a half hour's conversation.

Very faithfully yours, FRANCIS GALTON.

GENÈVE. 28 mai, 1888.

MON CHER MONSIEUR, Je regrette d'apprendre par votre lettre du 8 mai que vous avez été si longtemps malade, mais heureusement vous ajoutez que maintenant votre santé est rétablie. Quant à moi les fatigues et le chagrin causés par la maladie et la mort de ma femme ont singulièrement affaibli mes facultés morales pendant que l'ouïe, la vue et la mémoire diminuaient par un effet naturel de l'âge. J'ai perdu mon ancienne activité et ma confiance dans le résultat possible des recherches. Il faut prendre mon parti de la retraite et me souvenir qu'ayant commencé à publier en 1824, ma carrière scientifique n'a pas duré moins de 64 ans. Mon ancien goût pour la statistique persiste encore, au moins lorsqu'il s'agit de suivre de bons travaux faits par d'autres.

C'est donc avec plaisir que j'ai lu votre analyse des recherches du Dr Venn sur la tête des étudiants de Cambridge. Il y a bien des comparaisons probantes à faire sur des jeunes gens de mêmes conditions, âges, etc., qui se conduisent diversement à l'université. Par exemple, comparez les fumeurs intrépides, fumeurs médiocres et non fumeurs, au double point de vue des succès intellectuels et des succès dans les exercices du corps. L'antagonisme entre les aptitudes intellectuelles et corporelles, si bien connu des Anciens, ressortirait sans doute d'une comparaison statistique dans les écoles.

À propos d'exercices, je vous recommande un volume qui vient de paraître dans la collection internationale d'Alcan (autrefois Algrave) à Paris. C'est *Dr F. Lagrange: Physiologie des exercices du corps*. 1 vol. in 8°, Paris, 1888. Prix 6 fr. L'auteur traite la physiologie des muscles, nerfs etc., d'une manière très savante et vraie, à ce qu'il me paraît, et j'ai remarqué une définition dont on ne parle pas encore, c'est que certains exercices fatiguent à la fois la tête et le corps tandis que d'autres reposent le cerveau tout en employant les muscles. Par conséquent les premiers (escrime par exemple) contribuent au surmenage dont on se plaint dans les écoles, tandis que les autres (la marche par exemple) n'ont aucun inconvénient et offrent beaucoup d'avantages physiques. Il faut recommander les exercices qui exigent une tension d'esprit aux

oisifs, et les exercices bêtes aux étudiants qui veulent travailler aux commis, employés, etc., dont la tête est fatiguée.

J'ai connu deux savants distingués qui n'étaient pas bien véridiques, mais je dois dire qu'ils ne mentaient pas sur des affaires scientifiques, comme leurs expériences ou observations. C'était plutôt pour rendre service à un ami ou pour nuire à quelqu'un qu'ils n'aimaient pas. Tous deux aimaient la vie politique. Les hommes de science manquent parfois de force morale et il en résulte une disposition à cacher certaines opinions plutôt qu'à mentir. En général cependant j'estime que l'habitude des recherches rend véridique.

Si vous passez à Genève cet été je serai très heureux de vous voir. Dans le moment des grandes chaleurs j'irai peut-être dans les montagnes, mais ce ne serait ni loin ni pour longtemps.

Recevez, mon cher Monsieur, l'assurance de mes sentiments les plus dévoués.

ALPH. DE CANDOLLE.

P.S. Je demanderai l'ouvrage de Dr Venn. S'il est trop mathématique pour moi je le communiquerai à quelque calculateur de mes amis.

42, RUTLAND GATE, S.W. December 16, 1888.

DEAR DR WARD, Thank you very much indeed for your valuable letter, which will be of considerable guidance in devising and varying the experiments. It shows me that difficulties which I had not seen so clearly before must be evaded. All, for example, that are connected with mistaking an incapacity to make out the "Bulgarian's cat," with imperfection of seeing power. And I think I see how; but will not bother you with details.

By the way, I once made some experiments on the above, intending to bring them into a lecture I had to give at the Royal Institution, but the examples selected seemed rather melodramatic and I had not much time, so I wholly left them out. I used two Magic Lanterns; in one slide was a picture of a number of dots and splashes; in the other slide a selection of these was made that spelt the words Blood and Murder and there was a hand pointing. When the light was faint in slide 2, nothing of the Blood and Murder was seen, but as it increased they began to catch the attention and soon became prominent. On reducing the light again, the level at which the image disappeared was much lower than that at which it first appeared. The curious thing was its *sudden* disappearance. I tested this latter point in many ways with the same result*.

Thank you very much for the reference to "Urbanschicht" which I have already looked up in *Nature*. I had read it at the time, and was greatly struck by it, but had wholly forgotten the name and wanted to refer to it. I shall get the paper in *Pflüger* to-morrow. As regards Kussmaul, I have made less progress in reading his very able and exhaustive work than I had hoped, and must I fear content myself with what little I have already done, which bears on the question in hand, as I am very busy and get through work slowly. The book shall be sent back to-morrow. It should have gone earlier but I delayed a little, partly in hope of hearing from you and partly because I had not your address at hand and did not like to trouble you by sending it to Trinity. Very sincerely yours, FRANCIS GALTON.

GENÈVE. 15 sept. 1889.

MON CHER MONSIEUR, Je viens de lire dans le *Times* vos observations sur les examens du Civil Service et j'ai lu également des articles dans le *Nineteenth Century* sur le même sujet, qui m'intéresse particulièrement. Voici pourquoi: J'ai un petit-fils, né en Angleterre, sorti avec honneur du collège de Rugby, et qui se fatigue depuis 18 mois à préparer un examen du Civil Service, qui (hélas!) n'est jamais annoncé et sera peut-être encore renvoyé longtemps. Je n'ignore pas qu'on veut réduire le nombre des places et qu'on ajourne les examens à cause de cela. Mais il serait pourtant équitable d'avoir égard aux jeunes gens qui se préparent. Ce serait *fair play*. En France il y a des examens pour l'entrée dans les écoles polytechnique, militaire, etc., et ces examens ont lieu à des époques fixes chaque année. Ainsi au bout de quelques mois un jeune homme sait s'il est admis ou s'il doit viser à une autre carrière.

* The two slides still exist in the *Galtoniana* and, before seeing this letter, I was much puzzled to discover their purpose. K. P.

Vos réflexions sur les conditions physiques à stipuler dans les examens sont de toute justesse quand il s'agit du service militaire ou du service Indien, et je crois que dans ces cas on a déjà pris des mesures convenables. Quant au Civil Service proprement dit, je remarque un défaut capital. On exige les mêmes connaissances pour des services d'une nature très différente. Ainsi, pour des occupations sédentaires ou actives, pour des services d'ingénieur, de calculateur, etc., qui demandent des mathématiques, ou des services diplomatiques ou littéraires, qui demandent des connaissances de langues vivantes et d'histoire, on oblige les candidats à se bourrer la tête également de grec, latin, mathématiques, histoire, économie politique, etc., etc. La moitié des objets ne servira à rien dans chaque carrière. C'est le système Chinois, dans lequel chaque lettré est supposé apte à tout et utile dans toute carrière. Une première réforme désirable serait d'avoir deux catégories d'examens pour les jeunes gens de la division dite supérieure. Pour les uns on exigerait des connaissances spécialement littéraires et pour les autres spécialement mathématiques. Les conditions physiques ne sont pas du même importance dans tous les cas. Pour inspecteur des travaux publics une certaine force musculaire, une taille élevée, une bonne vue, sont des avantages. Mais pour les métiers sédentaires de la poste, de divers bureaux d'administration et dans la diplomatie, c'est assez indifférent. Les gens un peu faibles et sédentaires par nature valent mieux dans un bureau que ceux passionnés de sports. Le plus habile diplomate du XIX^e siècle a été Talleyrand, qui était boiteux et myope. Le vrai principe devrait être d'obtenir des hommes spéciaux : "the right man in the right place." On s'en éloigne dans le système actuel anglais du Civil Service. C'est peut-être la conséquence des idées fausses de la démocratie actuelle qui juge tous les hommes égaux et propres à tout, ce qui conduit à une médiocrité générale.

Je pense avec plaisir à la continuation de vos recherches. Votre persévérance sera récompensée et déjà on sait à quel point elle est méritoire. Recevez, mon cher Monsieur, l'assurance de mes sentiments très dévoués. ALPH. DE CANDOLLE, Cour St Pierre, 3, à Genève.

P.S. Si vous connaissez un emploi dans lequel il soit avantageux de parler et écrire également bien le français et l'anglais, de savoir assez l'allemand et d'avoir des connaissances étendues dans les sciences historiques, je pourrai vous recommander mon petit-fils, âgé de 21 ans. Il rentre dans vos conditions de familles intellectuelles, par trois générations du côté paternel et autant du côté maternel.

Letter to Alphonse de Candolle.

42, RUTLAND GATE, LONDON. *November 13, 1889.*

MY DEAR SIR, The long delay of two months in replying to your very kind letter has been wholly due to the hope that I might have something to say that you would like to hear. The particular scheme about which you wrote, of our introducing marks in our competitive examinations for physical efficiency, has not yet publicly resulted in anything, but from private information I learn officially, though *confidentially*, that the question will almost certainly be examined into by a very favourably disposed committee of one of our great public Departments, among whose officials the need of high physical efficiency is great.

Also several of our public schools are, I believe, making experiments in marking for it, and in seeing how far the examiners agree between themselves and with the general verdict of those masters who know the boys thoroughly in the cricket field, at football, and in other games.

I venture to send you the paper in full that I read at the British Association (of which the last part was published with good illustrations in *Nature*, Oct. 31).

On looking at the second page where I have marked a paragraph, you will see how careful I was not to commit the fault you feared in your letter, of supposing that high bodily efficiency is of universal importance. I only speak of professions in which it is.

I was very sorry to hear of the inconvenience to which your grandson has been put, by an absence of an opportunity of competition on which he had reckoned. Probably the expected vacancies did not occur. I do not at all profess to defend the action of our Civil Service Commissioners either in giving a notice of expected examinations which was not fulfilled, or in exacting much the same knowledge from candidates for widely different offices. But they have a very difficult task in fulfilling as far as may be two conflicting wishes. One is not to disturb the regular course of education, so that a youth may be educated at any great school without

going to a special "crammer" up to nearly the last moment, and the other is to require a sufficiency of special knowledge.

This is accomplished in some cases by two examinations, the one at a comparatively early age, to qualify for entering; the second one which is special, and not so severe, but that every lad who passed the first might be expected to succeed in the second. Then if he failed in the first, he would be in the same position as other boys who looked forward to any one of a multiplicity of possible careers. No one however seems satisfied with what is now done either in the Government examinations or in the public school teaching; but no one here has yet had the wit to suggest a course that commends itself to the general judgment as an improvement. The question is apparently a *most* involved one; so many interests and prospects being seriously affected by any change of system.

As regards the particular question you put, as to any satisfactory employment for a person having the high qualifications you mention, clearly they must exist in abundance, but personally I have not any one of them distinctly in view at present. I should have thought that a private secretaryship to some political person would be eminently a post to try for, or that to some person in the higher branches of commerce or manufacture, who has varied foreign connections. All such posts give a young man excellent opportunities for afterwards succeeding by his own efforts, and adequately educated candidates for them are hardly equal in number to the demand.

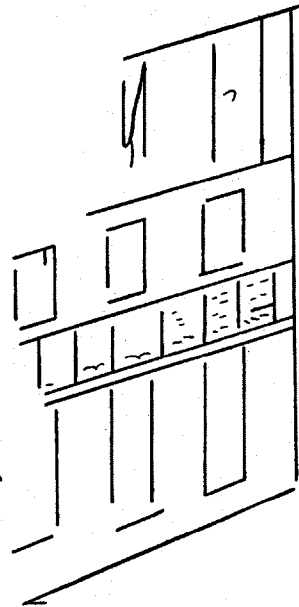
In concluding let me express the great pleasure that it gave me to receive your kind letter, for there are now few persons whose sympathy I prize more than your own on those many subjects in which we feel a common interest. You say nothing of your health but I trust and believe that it is maintained more fully by far than in the great majority of your contemporaries. Believe me, very faithfully yours, FRANCIS GALTON.

42, RUTLAND GATE, S.W. *January 25, 1890.*

DEAREST EMMA, I have hardly anything to tell, owing to being so shut up and seeing and hearing nothing. I *am* glad that at least one of the three brothers, Erasmus, is well again. There is ever so much spasmodic asthma with me, it comes on so oddly and violently and then goes. I wish it would say "good bye" finally.

I am trying to get a grand display of weather information stuck on to the balcony of our office in Victoria St. I have long wanted to show, as soon as it arrives, the weather on the coasts near to London. It does not get into the newspapers until five hours after we receive it. My colleagues agree, and it is now a question of detail. I carpentered a board in the proposed way, and painted the lettering thus [see figure below] and we had it up for inspection on Wednesday. Literally on passing the turn to Victoria Station I could see the glimmer of the board all that distance off!!—a good $\frac{1}{2}$ mile. I propose to give the facts for Yarmouth, Dover, the Needles, Scilly, Valencia, Holyhead; all the ways of changing the slips are worked out and feasible, but there are still some details to be fixed and the written permission of the landlord to be obtained. The slips would be changed at 8.30 a.m., 3 p.m., and in summer at 8 p.m. It would make much difference to many persons to know this: for instance, if doubting whether to cross by Dover or Harwich or Newhaven. I am sorry that you think Tertius* not well. I do hope that Bessy and you continue all right. It is grievous about Temple's† eyes. How depressing eye ailments are. Ever affectionately, FRANCIS GALTON.

VALENCIA
NE
FRESH BREEZE
SEA MODERATE
Overcast



* Galton's nephew, Tertius Galton Moilliet, son of his sister Lucy Harriot Galton, wife of James Moilliet of Cheney Court, co. Hereford.

† A maid of Emma Galton, who had been many years in her service.

*Letter to Michael Foster, with a memoir entitled:
"Decrease of Mortality by Smallpox, 1838-1887."*

42, RUTLAND GATE, S.W. *March 19, 1890.*

DEAR FOSTER, I have gone through the paper, corrected and added. I am ashamed of having sent it in so slovenly a way. Look at the addition to the bottom of p. 9. As the previous part stands by itself it might lead to a misapprehension. I have confiscated the lithographed map (of which doubtless you have plenty of copies) by marking it and attaching it to the paper. It is wanted to explain. If you should find it desirable to put the paper as it now stands into the evidence, I have no objection. Very sincerely yours, FRANCIS GALTON.

The paper to which this letter refers deals with vaccination statistics. The data are divided into three periods: (i) 1838-1853, vaccination optional; (ii) 1854-1871, vaccination obligatory, but not efficiently enforced; (iii) 1872-1887, vaccination obligatory, but more efficiently enforced by the vaccination officers. The treatment of the data is rendered difficult by (a) the absence of records for 1843-1846 inclusive, (b) by very severe epidemics in 1838 and 1871, and by lesser epidemics in intervening years, i.e. the graph of the mortality rate is very jagged. Galton deals only with *crude* death rates, he had no incidence rates. He could not therefore test the effects of (i) any change in the age distribution of the population, (ii) how far the lower mortality rate was due to better nursing, nor did he (iii) endeavour to allow for any hygienic improvement. The statistical methods he adopts are quite simple, but adequate for his purpose, and his final conclusion is stated in guarded terms: "For the whole period under review the maximum reasonable decrease in the mortality rate is 500 per million and the minimum reasonable decrease is 150 per million." He makes no statement as to what the source or sources of this reduction may be. A discussion of the data brought up to date on Galton's lines would be of interest. I am unaware if the memoir was ever presented to the Royal Commission on Vaccination (1889-1890), or printed elsewhere. Together with the letters of Galton, it was apparently sold by the executors of Sir Michael Foster, and was purchased by me from a Cambridge bookseller on May 9, 1914. This was the first occasion on which I had information that Galton had ever dealt with the statistics of smallpox. He never referred to that topic in conversation with me, although several memoirs dealing with smallpox were issued in *Biometrika*.

*The Philosophy of Snoring. Notes found in Francis Galton's
Handwriting.*

The philosophy of SNORING. Married ladies have remarked that husbands past the age of 50 or 60 are apt to snore. I have enough reason to believe in the correctness of this generalisation to assume it to be true and more generally to ask the reason of it. What is the cause of snoring? I have not found this interesting and domestically important topic treated anywhere in a scientific manner. I write for information. I have only a few ideas and observations of my own of the scantiest, and mention them merely to elicit those of others. First I have been surprised at the silent sleep of men in bivouac. The breathing of some 30 or 40 men, mostly savages, though old men, of whom I had many months' experience in travel, was inaudible. Conversely hot bedrooms stimulate snoring. Again a deep sleep is more accompanied by snoring than a light one. The uvula droops more. It is analogous to the fallen jaw of death.

Lastly the mucus of the throat becomes more tenacious and more copious as life advances, consequently bronchitis then begins to be dangerous.

I suppose that snoring is generally due to the concurrence of two causes, to the drooping of the soft palate and to the presence of much mucus and that of a tenacious kind.

Causes: Mucus in old age; Drooping of the soft palate in hot bedrooms, also in deep sleep.

GENÈVE. 23 juin, 1890.

MON CHER MONSIEUR, Je ne vous ai pas encore remercié des informations que vous avez bien voulu me donner au sujet du Civil Service et des examens renvoyés indéfiniment. Mon petit-fils a dû n'y plus penser, après avoir perdu 18 mois à s'y préparer. Il est allé en Allemagne apprendre le droit.

Ne pouvant plus travailler pour la Science, je m'amuse à observer le déclin de mes facultés, et j'ai cru un moment pouvoir ajouter quelque chose à vos recherches sur l'influence relative de "Nature and Nurture." Je me disais: Les facultés qui se maintiennent le mieux chez moi, à 84 ans, sont-elles de naissance (nature) ou le résultat d'un exercice fréquent? Il se trouve qu'elles sont à la fois un effet de naissance et d'un usage continu. Inversement les facultés devenues très faibles étaient faibles à l'origine et n'ont guère été cultivées pendant ma vie. Ainsi, j'ai conservé la faculté de marcher mieux que beaucoup de vieillards. Or, mon père avait été un grand marcheur dans sa jeunesse et j'ai toujours aimé la marche; j'ai fait autrefois de fortes marches dans les montagnes, c'est le seul exercice que j'ai cultivé.

J'ai hérité de ma mère une mémoire faible. Maintenant elle est très faible. Or, j'ai eu toujours de la répugnance à apprendre par cœur et j'ai cherché toujours à remplacer la mémoire par des notes.

Ma conclusion est que la plupart des hommes font les choses auxquelles ils se sentent naturellement propres, et négligent celles pour lesquelles ils ne sont pas bien doués. L'usage résulte d'une disposition naturelle et le non-usage d'une faiblesse aussi de nature. Voilà qui est bien contraire à ce que pensent les instituteurs, les professeurs et beaucoup de parents. Ils veulent forcer les jeunes gens et les jeunes filles à faire ce qu'ils n'aiment pas, tandis que la jeunesse aimerait faire ça pour quoi chacun se sent bien doué! Il y a ainsi beaucoup de temps et de force perdus; mais la jeunesse échappe bientôt à la contrainte, et alors on voit les jeunes gens qui ne sont pas calculateurs abandonner les mathématiques, les jeunes demoiselles qui ne sont pas naturellement musiciennes fermer leurs pianos, etc. Les pédagogues veulent faire tous les individus semblables et les individus voudraient être dissemblables, ce qui serait un grand avantage pour la société en général.

Avez-vous été informé que les naturalistes ont fait depuis deux ou trois ans de grands progrès sur le procédé de la fécondation dans les deux règnes? Ce n'est plus le protoplasme qui joue le principal rôle mais les noyaux (nuclei) mâles et femelles. Ces noyaux s'accouplent. Ils renferment des filaments, en nombre déterminé, dont les positions changent d'une manière curieuse. Vous pourriez juger de ces découvertes en regardant les planches d'un mémoire de M. Guignard, dans la *Bulletin de la Société Botanique de France* de 1899, qui se trouve aussi dans les *Actes du Congrès de Botanique* à Paris en 1889. Les zoologistes ont observé les mêmes faits.

Recevez, je vous prie, mon cher Monsieur, l'assurance de mes sentiments les plus dévoués.

ALPH. DE CANDOLLE.

Letters of W. F. R. Weldon dealing for the first time with the Correlation of Characters in Organisms other than Man.

1, HOE VILLAS, ELLIOT STREET, PLYMOUTH. May 14, 1890.

DEAR MR GALTON, Forgive the long delay in the preparation of the correlation curves. The measures are practically finished—1000 Plymouth, 400 Southport, 380 Sheerness. Unless you feel anxious to see the results very quickly I will not do arithmetic by daylight, because I want very much to do some anatomical work. By the help of Crelle* the arithmetic will not take many evenings.

* Crelle's Multiplication Tables, 1000 × 1000. At that date Weldon did not possess any arithmometer.

I want to ask you about a possible experiment with the *Illustraria*—of which I am allowed to rear another set. You remember that though the ratio between the races is the same whether the creatures are reared by Miss Pridham, by Mr Merrifield, or by myself, yet the *absolute size* of each race varies. Call the mean size of Mr Merrifield's *A* race = A_m . I receive eggs whose inherited tendency should be to vary about A_m as a Median. The resultant moths vary about something else = A_w as a Median. It appears that the offspring of my moths, reared at Brighton, vary again about A_m . Therefore the increase of size causing the median value of the race to rise from A_m to A_w was not inherited. This seems a very typical instance of an "acquired" character. Would it be worth while to devote a few spare pairs of one set to the foundation of a race which should live for *several* generations here in Plymouth, and should then be returned to Brighton—in order to see through how many generations the external conditions can act without producing an inherited change?

I shall be here till the end of this year, = 2 generations, and I can easily find someone at the Laboratory who will deal with the following generations.

Yours very truly, W. F. R. WELDON.

I believe I have not yet thanked you for your kind congratulations on the action of the Royal Society.

30A, WIMPOLE STREET, W. October 29, 1891.

DEAR MR GALTON, I hope to send you, in a little while, detailed tables of the correlations of which I spoke to you this morning in the Senate House. The organs are the four which I had previously used in the Shrimp: and the rough figures for the relation *a* to *b* or *b* to *a* are at present

Plymouth race	(1000)	0.84
Roscoff (Finistère)	(500)	0.88
Southport.....	(400)	0.83
Sheerness	(380)	0.85

The values obtained for each deviation clustered about the line $r=0.85$ so well that I thought it worth while to determine the second place of decimals by taking the arithmetic mean of all observed ratios in each case. Between character *b* and "*telson length*" the ratio is

Plymouth	0.25
Roscoff	0.29
Southport	0.30

All the other values are, in the Plymouth race, so small that I have not thought it worth while to determine them in the other races at present, because of the small number of individuals in each sample. But I have just obtained, and nearly measured, 400 additional Shrimps from Southport: so that I hope soon to have a set of 800 measures of this race, which will give a fair basis of comparison with the 1000 from Plymouth. When these preliminary determinations are finished, I hope to determine a reasonably numerous set of constants for homologous organs in one or two species. An enthusiastic student, to whom I have preached you, has already undertaken to measure 20 organs in each of 1000 Prawns.

Yours very truly, W. F. R. WELDON.

*Selection of Galton's Letters to Mr Howard Collins dealing with
Finger-Print Data*.*

HÔTEL CHERBOURG, VICHY, ALLIER, FRANCE. August 19, 1891.

DEAR MR COLLINS, You must have thought me very forgetful of your most kind offer to help in some of the matters over which I bother myself, and in which I am making far too slow progress. But in truth I have been very far from forgetful, and have delayed only through difficulty in seeing the direction in which I could reasonably ask your help. And the difficulty is not yet overcome, because as a rule my work is in no respects straightforward, but I have to plan as I proceed, and am consequently much bewildered between theory and detail. There is



* These letters, with a considerable amount of Galton's unpublished material on finger-prints, were purchased by his biographer from a Birmingham bookseller.

however one matter which it is just possible you might care for, that does not fall quite into this category, and which if you cared to undertake it for publication as a joint work with myself, would I think repay the trouble well, both from a scientific and a popular point of view. It is to undertake the analysis of a large and growing collection of finger-prints from the *racial* and the *hereditary* point of view. Thus, I have the impression of the three first fingers of the right hand of rather more than 1000 Jewish children, and those of more than 1000 ordinary English ones. My assistant is at this moment engaged with purely Welsh children. Orders are sent by Sir G. Goldie, with the needful materials, to the Niger regions, to procure me the prints of at least five distinct races of Africans, in abundance. Professor Haddon has taken steps to procure me those of natives of N. Australia and on to the Solomon Island groups, and when I come back in the autumn I propose to set much more agoing. My impediment has been to find someone with a genius for classification and power of work. I myself can do but little. As regards families, my collection as yet is small, but I propose to make an effort, and a sustained one, in that direction. The classification is, of course, laborious on account of the numbers, but it is not at all difficult *after* the right way of setting to work is well explained, and those specimens have been examined which are to be accepted as transitional cases between the classes. There would be great difficulty in doing this satisfactorily by written or printed description. Nearly but not quite as much as I can do in this way appears in the last number of the *Royal Society Proceedings* and is hinted at in an article by me in the *Nineteenth Century* of this month. I am sure the inquiry is a promising one. I find, for example, a distinct statistical difference between the finger markings of the Hebrew and the Anglo-Saxon*. I also find them to be as strongly hereditary as anything else. As they are independent of age, and cannot be falsified, they form a solid basis for work. Should you be inclined, when I come back in October, to work at these conjointly with me, you doing the analysis and I advising, but doing little more? The object would be to produce joint papers (1) on racial differences; (2) on the measure of hereditary tendency; I should add a third, or a previous one perhaps, based on other material that is already in hand, viz. (3) on the measure of the tendency to symmetry. I shall be at the above address for nearly three weeks, and a letter to 42, Rutland Gate will always reach me in time. Very faithfully yours, FRANCIS GALTON.

42, RUTLAND GATE, S.W. October 22, 1891.

DEAR MR COLLINS, The beautifully neat packet and roll reached me three hours ago with your letter, since which I have carefully gone through the first 59 and purposely cease there, that my pencilling may not interfere with your revision of the rest. I return them both. You clearly are *on the threshold* of doing it quite right, but the threshold is just the place at which people are apt to stumble when entering a house. Your chief difficulty is with the Whorls, not taking a bold enough view of them. You will see what I mean, by looking at my pencillings. Another minor common fault is interpreting an ordinary loop as though it had an eye in it thus



These Jewesses are deficient in eyes of this kind (however well they may be endowed with real ones). In the Primaries† it is better not to make outlines thus  , but thus .

I think it will be a useful guidance if I send you, as I do herewith, a packet of thumb-prints (Nos. 3000-3164) which have been carefully outlined and measured; these are all *rolled* prints, so the nature of the patterns, especially of the Whorls, is much more easily understood than in the finger-prints. They will teach confidence in outlining by inference. (Please let me ultimately have these back again.)

Will you then again go over the Jewesses, and finish the 60-100 by the light of what is now sent, and let me see them when complete and before you take the trouble of making a fresh table? There is a little difficulty about some few imperfect prints. It would not do to

* Galton was much less certain about this later: see Vol. III, pp. 193-4.

† Galton's original name for Arches.

replace them by new ones *taken at hazard*, because these imperfect prints are all Whorls and owe their imperfection to their bigness. They must be made the best of.

If anything in this letter, etc., is insufficiently explained, pray write to me at once.

Very faithfully yours, FRANCIS GALTON.

A Mr T. V. Hodgson, a microscopist of Mason Science College, who writes from 52, Francis Road, Edgbaston, has sent me *beautiful* finger-prints to see, and offers to take further prints. I suggested that he should make your acquaintance and show you what I had written to him as an introduction.

42, RUTLAND GATE, S.W. *November 12, 1891.*

DEAR MR COLLINS, I am sure that I appreciate the general principles that easy writing makes hard reading and that what has to be said ought to be logically put. Alas, for one's incompetence to do what is right! But I can assure you that I will *well* go over all your suggestions and will re-write the chapter.

Let me wait a while, before speaking of the next chapters, as I have had quite a bother about the best plan of the index which has rendered much of what was written nugatory and introduces much modification in already drawn-up tables, so I am behindhand.

Did I tell you that I have another batch of negro prints?

Very faithfully yours, FRANCIS GALTON.

Letters of Galton to Dr W. F. Sheppard.*

"CARDRONA," BERKHAMSTED, HERTS. *May 17, 1926.*

DEAR PEARSON, Would you care to look at the letters I had from Galton between 1891 and 1907? There is not much of interest to the general public in them: they are rather of interest in showing the amount of trouble he was prepared to take in helping other people on. Indeed, looking at the letters now, I seem to have caused him an unjustifiable amount of trouble! His criticisms of my successive efforts were of great value to me. On the whole I think my mathematical work has been fairly lucid; what there is of lucidity in it I really owe to Galton's criticisms. Yours sincerely, W. F. SHEPPARD.

42, RUTLAND GATE, S.W. *December 3, 1891.*

DEAR SIR, Hearty thanks for your full and very interesting account of your Number-forms. They have clearly grown in your case, together with the years, and seem to have done so automatically with possibly a little conscious assistance on your part. The wonder is *why* a particular "form" is so congenial to each several mind. What is the relation between the form and the peculiarities of *association*, in the working of the mind? If you can trace any such relation in your own modes of thought I should be exceedingly glad to hear of it. I fancy I have some slight clue to a relation, but it is very slight, and when I last thought on the matter, I did not find out any good way of putting the notion to the test. With renewed thanks,

Faithfully yours, FRANCIS GALTON.

42, RUTLAND GATE, S.W. *October 24, 1892.*

DEAR MR SHEPPARD, Am I right in supposing that it was you who were Senior Wrangler in 1884? It is needless to say how highly, under those conditions, I value your mathematical remarks. They shall be carefully considered. In the meantime I have read them somewhat cursorily. I wholly agree with you that the book would have been made much better, by giving a brief *résumé* of the mathematical results. It is obscure and confused as it stands, largely owing to misgivings as to how far the basis of the whole would be accepted as established. I think now this might be assumed. What is greatly wanted is a clean elegant *résumé* of all the theoretical work concerned in the social and biographical problems to which the exponential law has been applied. I believe the time is ripe for any competent mathematician to do this with much credit to himself. I am *not* competent and know it. Edgeworth has his own work and interests, and fails in sustained clearness of expression. He is moreover somewhat over fond of using higher and more mathematics than is always necessary. Watson is over busy

* For further letters to Howard Collins, see pp. 488 *et seq.* I hesitated to break too seriously the chronological sequence of letters and papers in this Chapter.

and I think too fastidious and timid. I have often considered what seems wanted and been very desirous of discovering someone who was disposed to throw himself into so useful and such high-class work. He might practically *found* a science, the material for which is now too chaotic.

Faithfully yours, FRANCIS GALTON.

42, RUTLAND GATE, S.W. *June 9, 1895.*

DEAR SIR, Would you give me the pleasure of your company at dinner at the Royal Society Club next Thursday. The enclosed card gives all needful particulars except that it is *not* the custom to dress. You can get away easily by 8½. There are many topics I should like to have the opportunity of talking over. Might I venture in the interim to send you a brief MS. on a new point of very wide application? I propose to send it to the Royal Society if I can persuade some mathematician to communicate a brief supplement to it, much as MacAlister did to one of my papers, H. Watson to another, and Dickson to a third. I can work out the problem in definite cases but it wants generalising. If your occupations preclude the chance of your being able to do this, of course you will tell me; otherwise I fancy that a pretty little stroke of work might be the result. Faithfully yours, FRANCIS GALTON.

Karl Pearson and Burbury are I know both full of "law of frequency" work, so I do not like to trouble either of them with the problem.

42, RUTLAND GATE, S.W. *June 29, 1895.*

DEAR MR SHEPPARD, I am rejoiced at your success in arriving at such wide generalisation of the problem. It will be far better that you should write the paper wholly by yourself, and I feel no doubt that it would be a very acceptable one to the Royal Society. After the recess we shall I hope discuss this. For the present, there is no need. During the vacation you may find time to do what you propose about the table. I am quite indifferent as to the fate of my preamble, the real object with me being to get the problem properly solved. The passage on my p. 12 was indeed most bunglingly as well as inaccurately expressed. What I meant is written in the enclosed (to which 12*a* is put for the page). I should like to keep your MS. for a few days longer, being extremely busy just now. Then, before going abroad, I will return all the papers,—mine, partly for possible convenience to you in future reference and more especially with some curiosity to learn hereafter how far my little tables prove correct.

Very faithfully yours, FRANCIS GALTON.

We leave town on Wednesday.

42, RUTLAND GATE, S.W. *July 6, 1896.*

DEAR MR SHEPPARD, So far as I can judge, you seem to have boiled down the original very judiciously, but I am much below par and not able to read it carefully, only to look through it. The question is,—whether in its present form it is suitable for publication? I should say decidedly so, in the pages of any mathematical serial other than the Royal Society. Whether or no it be suitable for the *Transactions* of the Royal Society, Forsyth would be the judge; but, for the *Proceedings* of the Royal Society, I think decidedly that under the new Regulations, the part you have sent me is not suitable. On the other hand, the Introduction of which you speak ought to be the very thing for the *Proceedings*, and would serve as the "Abstract" if the complete paper were offered for the *Transactions*. I would therefore urge that particular pains should be taken with the Introduction, the business of which is to explain to members of the Royal Society generally, *what the paper is about, and wherein its novelty consists*. Imagine that it has been just read to any small representative body of those men,—such as John Venn, Frank Darwin, Inglis Palgrave, who are all statisticians but not especially mathematical. The test would be that they should severally be able afterwards to give a lucid and consistent account, though probably a very imperfect one, of what you desired to show. It was to that end that I suggested the introduction of a few interesting types of problems that your methods enable statisticians to deal with, which otherwise would be very difficult problems. Of course the Introduction would contain your tables, or adequate samples of them. If the Introduction fulfilled the end proposed, it would certainly be translated into French and German, and reprinted in America, and your labours would become widely known and set many persons thinking. It ought to be a work of art—simple, clear of unnecessary detail and readable. I think you have a great opportunity of becoming an exponent of modern theories of statistics and should be delighted if you would rise to the occasion. Very faithfully yours, FRANCIS GALTON.