

CHAPTER XIX.

NOTES OF LIFE FROM 1860 TO 1864.

How much is changed of what I see,
 How much more changed am I,
 And yet how much is left—to me
 How is the distant nigh!

The walks are overgrown and wild,
 The pavement flags are green,
 But I am once again a child,
 I am what I have been.

The sounds that round about me rise
 Are what none other hears,
 I see what meets no other eyes,
 Though mine are dim with tears.

HENRY TAYLOR.

THIS last and uncompleted decade of Brewster's life began with an uprooting from the old ground, which was no easy task for one of his great age. The merely physical discomforts were much increased by an untoward event, with which all, who understand the mysteries of a philosopher's sanctum, will intensely sympathize. Upon finally leaving St. Andrews, he packed his carriage not only with his valuable plate, but with invaluable papers, and the treasured odds and ends of his experiment room. Through the carelessness of officials, it was allowed to drop into the Firth of Forth, in the process of being transferred from the landing to the steamer. Although he received compensation for the damaged plate, yet the injury

to his papers, of which some were destroyed and others much defaced, nothing could compensate. It is seldom that such a complete uprooting so late in life is attended with such a thorough taking root in the new soil,—new, however, it could scarcely be called, and he soon felt the delight growing and increasing of the return, under altered circumstances, to his old University,—the reviving of old friendships,—and the forming of new. The difficulty of finding a house which would be suitable for the double purpose of living and experimenting in, led to a measure which greatly increased the happiness and comfort of his remaining years. He made arrangements to return again to his old home on the banks of the Tweed, which was within two hours by railway of the University. Every winter he moved into Edinburgh, taking a house in the town or neighbourhood for three or four months, but during the rest of the session he attended the meetings of the *Senatus*, or any other connected with his academical duties, going out and in from Melrose generally the same day, with a punctuality and alacrity which was indeed marvellous in a man of his age, a habit which was continued till within a month or two of his death.

After leaving St. Andrews in February, he and Lady Brewster occupied Strathavon Lodge, a pretty marine residence at Trinity, three miles from Edinburgh, kindly lent to them by Sir James Simpson, and they moved to Allergy in September of the same year.

In the end of October 1859, he, as Principal, presided at the first meeting of the General Council of the University of Edinburgh, and had the gratification of declaring his old College friend, Lord Brougham, duly elected as Chancellor, who afterwards appointed Brew-

ster Vice-Chancellor. At Lord Brougham's installation, in the following spring, the Principal was again in the chair. It was an interesting sight to see the two Edinburgh students, as octogenarians, thus standing together on the platform intimately associated in the highest honours of their *alma mater*. Never had my father's pale spiritual face and venerable form shown to more advantage than on that occasion, aided, as feminine admirers did not fail to whisper, by the flowing purple of his new robes of office. When in London in the summer of this year, he made, I believe, his first acquaintance with another of those "circuits," in which he became still more deeply interested—the National Association of Social Science. Sir David became one of the Council, and was afterwards chosen a Vice-President. In September of this year also the British Association met at Glasgow, which he attended; the following extracts refer to these two meetings:—

"ATHENÆUM, July 17, 1860.

"MY DEAREST JEANIE,—Having only half-an-hour at my disposal, I sit down to devote it to you. There is sitting here at present a great International Congress, with deputies from every part of the world, grouped in six or seven sections, and discussing the most important and interesting practical subjects. Prince Albert opened it yesterday with a noble address, which was most enthusiastically received. Lord Brougham presides over the Judicial section, Lord Shaftesbury over the Sanitary one, Van de Weyer, the Belgian ambassador, over another, and so on. I have to read a paper in the sanitary section on my method of illuminating houses in dark and narrow streets. I have been running

through the different sections this forenoon, and have met with many interesting foreigners and old acquaintances."

"129 BATH STREET, GLASGOW,
Sept. 27, 1860.

"I accompany Lord Brougham everywhere, sticking as closely to him as a Vice-Chancellor does to the Chancellor, Sir James Campbell completing the *trio*. His carriage with white horses is known to the Glasgow world, and wherever it is seen crowds follow to see the great man. It was very considerate in you to send me Professor Forbes's letter. It was delivered to me in the carriage with Lord Brougham, and after reading it I handed it to his Lordship, who immediately promised to speak to the Lord Advocate, as suggested in the letter.

"We were on our way to see the great war frigate, 600 feet long, and 6000 tons burthen, which is to carry 50 of the largest guns. It is built of iron, and when we approached the yard the hammering of 1400 men upon iron rivets, joining plates of iron of enormous thickness, was almost deafening. When we entered the ship all the workmen left it, and stationed themselves in the yard in one living mass, cheering Lord Brougham in the most enthusiastic manner, while some hundred boys belonging to the establishment placed themselves on a huge pile of wood, and added their shrill notes to the graver music. The same enthusiasm was shown when we left the ship,—Mr. Napier, the great and wealthy shipbuilder, and his two sons, having accompanied us through the works. . . .

"Two very interesting papers were read to-day, one on the repression of crime, by Mr. Arthur Kinnaird,

and the other on education, by Dr. Tulloch, which was excellent and highly appreciated."

"GLASGOW, Sept. 28, 1860.

"... At eight o'clock we adjourned to the City Hall, where Lord Brougham had to address 4000 or 5000 of the working classes, and where resolutions for their approval were to be proposed.

"Such a magnificent sight I never saw, of fine-looking and well-dressed men. The resolutions were in every case seconded by working men, with a power and even eloquence which surprised the gentlemen on the platform. There were three interesting foreigners present, M. Garnier Pages, who was at the head of the Revolutionary Government of France in 1848, M. Desmarets, a celebrated French advocate, and Louis Blanc, who was also one of the Ministers of 1848. The two first made eloquent speeches, Desmarets in English, and Pages in French, every sentence of which was translated by Mr. Arthur Kinnaird. Louis Blanc was not asked to speak, lest he should be indiscreet towards Napoleon. In the other speeches every allusion to the despotism of the Imperial Government was loudly cheered."

In 1861 an event happened which brought a new sunshine into the "old man's home." On the 27th January a little daughter, Constance Marion, was born, on whom he doted with the tenderest affection. Strangely touching it was to see the flaxen hair and wide brow of the little one resting on the silver locks of the venerable head, and as years passed on it was not difficult to discover the promises of an inherited talent, which it was sad to know it was impossible could be watched over and fostered by her distinguished father. In very

early years, however, he gave her lessons in astronomy, in drawing, and in arithmetic,—she was the constant companion of his drives, and recipient of that admiration for the beauties of nature which still in him seemed ever on the increase. This new possession was not, however, one of unmixed joy; some of the unphilosophic tendencies of the philosopher, which we have noticed, came into full operation in everything connected with his little darling. His excessive timidity about illness, infection, and accident, caused him many an anxious hour, and the almost forgotten distresses of colds and “great-coats,” alluded to by Miss Edgeworth in one of her lively letters, came back with a forcible reassertion, which would have been amusing had it not mingled a real suffering with the joy brought by the little sunbeam.

A University deputation took him to London in March, and the British Association to Manchester in September. He wrote:—

“ATHENÆUM, *March 3, 1861.*

“MY DEAREST JEANNIE,— . . . At an interview with Mr. Disraeli yesterday, I was the last of about twenty that came into the room, and having been announced by name, Disraeli walked half-way up his long drawing-room, shook hands with me, and said that it was a long time since he had the pleasure of meeting with me. I had utterly forgotten having ever met him, but I begin to remember that Mr. Lockhart brought him one day to Allerly when he was a very young man, and on a visit to him at Chiefswood.”

“THE POLYGON, MANCHESTER,
Sept. 4, 1861.

“I arrived here last night, and found that my *home*

was to be at Mr. Hilton's, next door to Mr. Fairbairn's, where Sir R. Murchison is also to sleep and breakfast. . . . The party at Mr. Fairbairn's is charming, the Harcourts, Romney Robinsons, Sabines, and Batemans. . . . Dear little Connie and her dear mother are never out of my mind, and in my mind's eye I see her clinching the side of her bath with that charming intelligent smile, which I see as distinctly as if I were beside her.

"Sept. 8.—We had a very interesting evening meeting yesterday after dining with the Fairbairns. Professor Grove gave half-an-hour's lecture on the telegraph, nearly seventy forms of which were displayed at the meeting. Arrangements were made to receive messages and return answers from Balmoral, Petersburg, and Odessa, the telegraph wires being brought into the hall where we were. The Prince asked if the meeting was successful, to which we returned the number of members here. We learned from St. Petersburg, in answer to inquiries about the weather, that the night was fine and the thermometer at 17° Réaumur (70° Fahr.), and we learned from Odessa, round by St. Petersburg, that the night was cold and windy."

In 1860 Sir David Brewster received an honour which he considered one of the most gratifying which he had ever received. He was made an M.D. of the University of Berlin and the intimation was couched in the following terms:—

"Die medicinische Facultät hiesiger Universität hat bei Veranlassung des 50 jährigen Gründungsfestes der Universität Ihnen der grossen Verdienste um die Hülfs-wissenschaften der Medicin halber, welche Sie Sich mit allgemeinsten Anerkennung erworben haben, den Grad

eines Ehren-doctors der Medicin bei der hiesiger Universität zuerkannt, und diess am 16^{ten} in feierlicher Sitzung im Beisein der hohen Staatsbehörden öffentlich erklärt."¹

One practical application of these "auxiliary sciences" was the beneficial suggestions as to the cause and cure of cataract, which were the result of Brewster's optical investigations. He mentions, in a paper "On the Cause and Cure of Cataract,"² that, about the year 1825, he himself had had an incipient threatening of that complaint, which he first became aware of when playing at chess with Sir James Hall, who was "a very slow player." In this situation the active mind occupied itself with experimenting upon the flame of a candle, when he became aware of a luminous and partially coloured halo around the flame, and also, as subsequently seen, around the moon and other centres of radiance. This affection lasted for about eight months, causing him, like the other threatenings of his eyesight, the greatest anxiety. His previous examination of the eyes of animals, especially those of the sheep, the cow, and the horse after death, made him discover the cause of this unpleasant phenomenon, which was a separation of the laminæ of the crystalline lens and a partial drying up of the albuminous fluid. His attention was thenceforward much directed to the study of this subject, which he discussed with many medical men, and he

¹ "The Medical Faculty of the University of this place has, on the occasion of the Half-century University Foundation Festival, awarded to you the degree of Honorary Doctor of Medicine, on account of the great services which you are universally recognised to have rendered to the sciences auxiliary to Medicine, and this has been publicly declared on the 16th instant in a solemn assembly, and in presence of the high officers of Government."

² Printed in the *Transactions of the Royal Society of Edinburgh*, 1865.

stated at the meetings of the British Association of 1836-37, his conviction of the effectual cure of incipient cataract in two ways, which have since, I believe, been frequently acted upon.

“1st, By discharging a portion of the aqueous humour, in the hope that the fresh secretion, by which the loss is repaired, may contain less albumen, and counteract the desiccation of the lens. 2^d, By injecting distilled water into the aqueous chamber to supply the quantity of humour discharged from it.” The first of these methods was suggested to him by the examination of that “case of conical cornea,” and its surgical treatment, which he briefly recorded in Kearsley’s Ledger-Book for 1809—nothing that he ever saw or “examined” being lost on his retentive mind. Another benefit to the Art of Healing which accrued from his studies on Light was his practical application of it to sanitary requirements. The following statements of his views as to the lighting of the poor man’s home are interesting:—

“In treating of the influence of light as a sanitary agent, we enter upon a subject almost entirely new; but admitting the existence of the influence itself, as partially established by analogy and observation, and asserting the vast importance of the subject in its social aspects, we venture to say that science furnishes us with principles and methods by which the light of day may be thrown into apartments which a sunbeam has never reached, and where the poisons and the malaria of darkness have been undermining sound constitutions, and carrying thousands prematurely to the grave. . . . Could we investigate the history of dungeon life, of those noble martyrs whom ecclesiastical or political tyranny have immured in darkness, or of those felons whom law

and justice have driven from society, we should find many examples of the terrible effects which have been engendered by the exclusion of those influences which are necessary for the nutrition and development of the lower animals. . . . If light develops in certain races the perfect type of the adult who has grown under its influence, we can hardly avoid the conclusion drawn by Dr. Edwards, 'that the want of sufficient light must constitute one of the external causes which produce those deviations in form which are observed in children affected with scrofula,'—an opinion supported by the fact that this disease is most prevalent in poor children living in confined and dark streets. . . . The problem which science pretends to solve is to throw into the dark apartments as much light as possible,—all the light, indeed, which is visible from the window, excepting that which is necessarily lost in the process.

“If in a very narrow street or lane, we look out of a window with the eye in the same plane as the outer face of the wall in which the window is placed, we shall see the whole of the sky by which the apartment can be illuminated. If we now withdraw the eye inwards, we shall gradually lose sight of the sky till it wholly disappears, which may take place when the eye is only *six* or *eight* inches from its first position. In such a case the apartment is illuminated only by the light reflected from the opposite wall, or the sides of the stones which form the window; because, if the glass of the window is *six* or *eight* inches within the wall, as it generally is, not a ray of light can fall upon it.

“If we now remove our window, and substitute another in which all the panes of glass are roughly ground on the outside, and flush with the outer wall,

the light from the whole of the visible sky, and from the remotest parts of the opposite wall, will be introduced into the apartment, reflected from the innumerable faces or facets which the rough grinding of the glass has produced. The whole window will appear as if the sky were beyond it, and from every point of this luminous surface light will radiate into all parts of the room. . . . In aid of this method of distributing light, the opposite sides of the street or lane should be kept white-washed with lime, and for the same reason the ceilings and walls of the apartment should be as white as possible, and all the furniture of the lightest colours. Having seen such effects produced by imperfect means, we feel as if we had introduced our poor workman or needle-woman from a dungeon into a summer-house, where the aged can read their Bible,—where the inmates can see each other, and carry on their work in facility and comfort. By pushing out the window we have increased by a few cubic feet the quantity of air to be breathed, and we have enabled the housewife to look into dark corners where there had hitherto nestled all the elements of corruption. To these inmates the winter twilight has been shortened, the sun has risen sooner and set later, and the midnight lamp is no longer lighted when all nature is smiling with the blessed influences of day. . . .

“I cannot conclude these observations without referring to the use which may be made of them in our own city, notorious for the number of its dark and narrow lanes, and for the thousands of unlighted and unventilated dwellings which they contain. The devoted men who venture daily into these abodes of malaria and uncleanness, can alone describe to us the cimmerian

darkness and the tainted atmosphere in which their pallid occupants live, and move, and have their being. They alone can paint the harrowing scenes which disease and destitution present to them in these joyless homes. To what extent evils like these can be remedied, it is a sacred duty to inquire. To what extent they will be remedied by the large and expensive sanitary measures now contemplated, we do not venture to predict; but it is very obvious, that the upper and lower ends of the offensive lanes, which are to be intersected by the new streets, can derive little benefit from them in respect of ventilation, and none whatever in giving additional light to the houses which remain. The only effectual mode of ventilating and lighting a dark and crowded apartment, is to strike out a large opening in the wall for the fresh admission of air, and to construct the window which is to close it, so as to give the most copious entrance to the light of the sky. A process so cheap, so easily executed, and so obviously effectual, ought to be the very first step in any measure of sanitary reform; and it is clearly one which, if not effected by the philanthropy of the public, ought to be enjoined by Act of Parliament upon the house proprietors individually, or upon the citizens at large."

En route from Manchester, he paid a visit which gave him great interest, and which revived many recollections of other days, when he had been intimately acquainted with Sir John Trevelyan of Wallington, and his accomplished and scientific family, while his son, Sir Walter Trevelyan, had been a friend and correspondent for many years. The pleasure which a visit to Wallington always gave him, was on this occasion increased by the presence of some of the members of

the old family circle, and by finding in the third generation fresh and intelligent scientific tastes.

My father's return to Allerly was a very happy event for him, in reviving his old love for that pretty spot, and giving him healthful occupation in the open air ; he was constantly out directing the improvements of which the place, now overgrown with the trees which he himself had planted, stood much in need, and he never tired of the beautiful views which he thus opened up of the valley he loved so well. He also earnestly desired to promote the welfare of his neighbours of the working classes, with whom he never sought popularity, though he was ever a favourite. He presided on at least one occasion at a little evening gathering in the picturesque village of Gattonside, for the benefit of its school, although such an office was not congenial to his tastes and habits. The vicinity of Allerly to his birth-place gave it a special charm to him, and a day's expedition to Jedburgh, and from thence up the Jed past the Allerly well and beyond Inchbonny, became one of his greatest pleasures, which he loved to share with his chosen friends and near relatives. Professor Fraser kindly sends me the following reminiscences :—

“ 20 CHESTER STREET, EDINBURGH,
June 12, 1869.

“ DEAR MRS. GORDON,—I fear that any incidents which I can now recall of the charming day my wife and I, with our eldest boy, spent with Sir David and Lady Brewster at Jedburgh, in June 1861, are almost too slight to be of service to you. Yet I recollect the history of those bright summer hours as containing some of the most pleasing experience in my life. Your father met us at Melrose, when we arrived there by the early

train from Edinburgh, and after taking us over the Abbey we drove to Allerly to breakfast. I remember some interesting talk with him as we sauntered in the garden after breakfast,—about Locke, and Newton, and Berkeley. There was a remarkable portrait of Berkeley at Allerly, and he gave me some account of the way it came into his possession. We also spoke about some of the writings and history of my revered friend Mr. Isaac Taylor, whom I was then on my way to visit at his beautiful cottage at Stanford Rivers. In the forenoon we all drove to Jedburgh, by St. Boswells and Ancrum Moor, when, with eager interest, he recalled the local history and literary associations of the places we passed. Then, perambulating Jedburgh, we explored the Abbey and the Castle. He took us to see the house in which he was born. I recollect that he pointed to a pane in an upper window of the house, optical phenomena in which, observed in boyhood, had, he said, set agoing the train of researches with which his name is now associated. Later in the day we drove up the Jed to a spot in a wood two or three miles above the town, where, after some rambles, we dined. All this is vivid in my recollection, as well as the juvenile enthusiasm with which he threw himself into the life of that day, and also brought us to live with him in the past of his own early years. I have never seen the sanguine vivacity of youth better blended with the beautiful wisdom and matured experience of age. The incidents of his early life which he recalled were perhaps impressive from their number and minuteness, rather than of a kind to admit of selection here. The power of local association and interest was at any rate strongly marked.

“In August of the following year we had, I remember, a delightful excursion with your father to Dryburgh and the grave of Scott. My family were, as usual, passing the autumn in Yarrow. My wife and I, with Lord Amberley, who was then visiting us there, went to enjoy a day at Allerly. In the afternoon we all drove to Dryburgh. Much of the conversation was naturally about Sir Walter. I remember your father told us that he was in the habit of dining twice a week at Abbotsford, when its gay scenes and brilliant society were at their best,—Allerly being at that time his home. He gave us some interesting anecdotes of Scott and Lockhart. I know that we all returned to Yarrow, towards midnight, charmed by the intercourse and scenes of the day.

“It was in the following month, I think, that he and Lady Brewster spent a day with us at Yarrow. In the afternoon we took them to Tibbie Shiels’, where we had tea, and where Sir David, in cordially greeting our venerable hostess, said that his last visit to the Cottage was in the autumn of 1818, forty-five years before, in company with the late Lord Napier. She distinctly remembered the visit, and reminded him of some incidental circumstances connected with it. We had talk about Christopher North, the Ettrick Shepherd, Scott, and Wordsworth, who have made classical the little Cottage, and lone St. Mary’s Lake, with green and silent Yarrow. I remember too that your father happened that day to be much interested in a remarkable trial for murder, in Sandyford Place, Glasgow, of which the newspapers were full. As I was not less interested, we had a long discussion about the bearing of some of the evidence, in which I was much struck by his logical ingenuity. . . .

“When in February last year I saw his body laid beside the old Abbey, and beneath the shadow of the Eildon hills, in the picturesque valley where his early manhood and old age were spent, I felt the separation as a personal sorrow, and mourned not less, that I should see his face and be cheered by his cordial friendship no more, than for the loss to the University of so illustrious a representative, and to Christian faith and philanthropy of one so humble and true. . . .—I am, dear Mrs. Gordon, sincerely yours,
A. C. FRASER.”

Daily drives in an open carriage were most beneficial to my father's health, and to be his companion in these Roxburghshire excursions was indeed a privilege of no ordinary interest. The vivid freshness of his memory and his love of the legendary history of the vale of the Tweed, which has just been mentioned, was displayed in every drive, and not only excited by an extra occasion. He used to tell with peculiar interest that “Sorrowless Field” was so named because in 1513 it was the only valley in Scotland where there was “no sorrow”—its every inhabitant, young and old, matron, maid, and infant, going forth to the death at Flodden. He delighted in pointing out the short solitary grave on the narrow tongue of uncultivated land stretching into the meadows where was fought the battle of Ancrum Moor in 1545, still called Lilliard's Edge, in commemoration of “fair maiden Lilliard,” who fought beside her lover against the English invaders, and earned the dubious fame of being a feminine Withrington. The “Eildon Tree Stone,” where tradition declares that “true Thomas” of Ercildoune met the Queen of Faery Land,—the “Rhymer's Glen,”—the Field of Flodden seen in the

blue distances,—the beauties of Bemersyde, with its ancient and well-known prophetic rhyme,¹—the Cowdenknowes with its “bonnie, bonnie broom,”—the beautiful scenery of the Yair,—the towers of Smailholm and Darnick,—Ashiestiel, Chiefswood, and Abbotsford,—and the “Fairy Dean,” with its three ruined “peels,”—are but a few of the localities which gave him the vivid pleasure and interest which he never failed to reproduce in others. He read a paper at the Royal Society of Edinburgh in 1865, upon small but very interesting mineralogical formations found in the last-named beautiful valley, of which he gave the following interesting description :—

“On the banks of the Elwand Water, which runs into the Tweed about two miles above Melrose, there is a picturesque glen called the Fairy Dean, which has become a favourite place of resort, from its association with the incidents in *The Monastery* by Sir Walter Scott. It has acquired an interest of a different kind from certain mineral concretions which have received the name of *Fairy Stones*, from their being found in that part of the rivulet which runs through the Fairy Dean.

“When the Waverley Novels were not acknowledged by their author, facts or incidents to which they referred, were always welcome subjects of conversation at Abbotsford; and on one occasion when I happened to mention that singular stones were found in the Fairy Dean, Sir Walter Scott expressed a desire to see them, and to know how they were formed. I accord-

¹ “Betide, betide, whate'er betide,
Haig shall be Haig o' Bemersyde.”

Thomas the Rhymer.

ingly sent some young persons to search for them in the bed of the rivulet, and I was fortunate in thus obtaining several specimens of great variety, and singular shape, and showing, very clearly, the manner in which they were formed.

"It did not then occur to me that a description of these stones would excite any other than a local interest; but, some years ago, when in company with our distinguished countryman Mr. Robert Brown, the *Botanicorum facile princeps* of Humboldt, he asked me to accompany him to his museum, to see some remarkable mineral productions which had been sent to him, and which he had not seen before. These minerals were exactly the same as the Fairy Stones from Roxburghshire, but none of them were so remarkable, either in their shape or their mode of formation, as those which I now present to the Society.

"It is obvious, from the inspection of the specimens on the table, that the fairy stones are formed by the dropping of water containing the matter of which they are composed. . . . According to a rough analysis, which Dr. Dalzell has been so good as to make for me, the specific gravity of the fairy stones is 2.65, and their odour, when breathed upon, argillaceous. They effervesce with mineral acids, and contain the following ingredients proportionally in the order in which they are written:—*alumina, silica, lime, magnesia, oxide of iron,* and a trace of *manganese*. The black coating on many of these stones, which is too minute for analysis, and which may be easily removed, is very remarkable. If it is not carbonaceous it must be an aluminous deposit, when the particles of the aluminous solution have become so small as to be unable to reflect light."

In 1861 my father's portrait was introduced into a large and popular picture, under circumstances which he thought it necessary to take notice of; and he accordingly sent the following letter to the artist:—

“ ALLERLY, MELROSE, *June 27, 1861.*

“ SIR,—I have only this moment seen, in the *Times* of Monday, an advertisement of your picture entitled the *Intellect and Valour of England*, in which I am represented as announcing the discovery of the Stereoscope. I think it right to state to you that I am not the discoverer of the Stereoscope. I am only the inventor of the Lenticular Stereoscope now in universal use.—I am, Sir, yours most truly,

DAVID BREWSTER.

“ TO THOMAS JONES BARKER, Esq.”

A copy of this letter my father carried about with him constantly in a small brown purse, from whence he took it to show his daughter-in-law, Mrs. Macpherson, though without mentioning his reason for thus carefully preserving it. The history of the Stereoscope is curious, and was given to the public in a popular treatise on the subject, which he published in 1856. The word itself is derived from two Greek words, *στερεός*, *solid*, *σκοπεῖν*, *to see*; and the instrument “represents in apparent relief and solidity all natural objects, and all groups or combinations of objects, by uniting into one image two plane representations of these objects or groups as seen by each eye separately.” Binocular vision, or the fact that “the pictures of bodies seen by both eyes are formed by the union of two dissimilar pictures formed by each,” is no modern discovery. Euclid the mathematician, Galen the celebrated physician, Baptista

Porta, a Neapolitan writer upon optics in 1593, Leonardo da Vinci, Francis Aguilonius, a learned Jesuit, who wrote in 1613, and several other more modern writers, have, either by inference or direct statement, showed their knowledge of this important optical law. Mr. Elliot, a teacher of mathematics in Edinburgh, had turned his attention to the subject in 1823, and in 1834 he projected an instrument for uniting two dissimilar pictures. He did not, however, actually construct it till 1839, when he exhibited it in Liverpool. This was a very simple instrument, without mirrors or lenses, and the eyes alone being the agents, it is called the ocular stereoscope; two pictures taken on the binocular principle were placed at the end of a box, and represented a single landscape in relief. Mr. Elliot was unaware at the time, and for years after he exhibited his discovery, that Professor Wheatstone in 1838 exhibited a stereoscope of far higher construction,—the first Reflecting Stereoscope,—an instrument fitted up with mirrors, by which the binocular pictures were made to coincide. I well remember the arrival of one of these somewhat cumbrous but very interesting instruments, and the delight with which my father watched and studied its wonderful cubes, steps, and pyramids. Having found in the formation and size of this instrument various defects which unfitted it for general use, the idea struck him of uniting the dissimilar pictures by lenses; and it was speedily put into practice. Mr. Loudon, an optician in Dundee, executed several “lenticular stereoscopes,” while the application of photography to its beautiful uses was the next and easy step. This form of stereoscope was exhibited by its inventor to the British Association in 1849, but was not then

taken up in England. In 1850 my father took to Paris one of the Dundee stereoscopes, with photographic portraits, landscapes, sculptures, and buildings. M. Soleil and M. Duboscq, the eminent Parisian opticians, saw at once the value of this popular adaptation, and their beautiful lenticular stereoscopes, along with binocular photographic slides of all descriptions, caused a great sensation, and crowds flocked to see them. It was not till the Exhibition of 1851, when M. Duboscq sent one, amongst other philosophical instruments, that they became known in England. The French stereoscope attracted the attention of the Queen, and M. Duboscq manufactured one, which Sir David Brewster presented to Her Majesty in the name of the maker. On the other hand, the reflecting stereoscope has been so thoroughly supplanted by the other more attractive and portable form, which has thus "*vulgarisé*"—to use the untranslatable French term—the instrument all over the world, and has indeed been so little seen, except by the scientific, that to speak of my father as the inventor of *the* stereoscope became a very common error. When any of his friends or family fell into it, he used to correct us, saying, "You mean the inventor of *this* form," or "of the lenticular stereoscope."

In connection with this subject I may mention casually the rather celebrated Chimenti controversy, which excited much discussion in the photographic world. Dr. John Brown and his brother, Dr. Crum Brown, noticed in 1859, in a museum at Lille, two curious drawings of a man sitting on a low stool, with a compass in one hand and a string in the other. They appeared to be similar, and were placed together as if intended for the stereoscope. They were designed by Jacopo Chimenti da

Empoli, a painter of the Florentine school, who was born in 1554, and who died in 1640, thus living and working within the period that Baptista Porta's optical writings were known in Italy. Dr. Brown thought, on closer inspection, that he could discover certain slight differences, indicating that the pictures must have been taken from slightly different positions of the eyes, and even that he could succeed in uniting the two so as to produce a decided stereoscopic effect, an experiment which he communicated to Sir David Brewster. With great difficulty photographs of these drawings were obtained.¹ The usual process of a controversy went on : some saw no difference in the two pictures—others saw very minute difference, which might be accidentally produced—although they could not solve the mystery of two commonplace drawings so nearly alike being thus placed side by side. Others again saw discrepancies so decided as could only be rationally accounted for by scientific intention. Sir David held the latter view strongly ; and Professor Tait, in the volume referred to below, gives his own opinion as follows :—

“I have very carefully considered the Chimenti sketches, and I have concluded that they *must* have been drawn *with the intention* of making pictures of the same object from SLIGHTLY different points of view, in other words, for a stereoscopic effect. From this it would appear impossible to think otherwise than that some form of the stereoscope, or (as is more probable) some equivalent form of squinting, was known to the artist. Several competent authorities, whom I have consulted, entirely agree with me on this point.”

¹ Copies of which are in the bound volume of the *Photographic Journal* for 1862-64.

In 1862 the Inventors' Institute chose Sir David Brewster as their first President. Himself an inventor of no ordinary success in the higher sense, and of no ordinary want of success in the lower and commercial meaning of the word, he threw himself with ardour into all the purposes and efforts of this noble Institute, and sent frequent literary contributions to its organ, *The Scientific Review*. An article on "Scientific Education in our schools," which appeared in it after his death, was sent to the editor but a few days before, with these words, "I am glad to see that the *Review* is prospering. I wish I could do something to help you, but I am very unwell, and not able to write."

In 1863 Sir David was again in London, in the midst of an amount of business and occupation of all kinds which it is astonishing to recall. He came to meet us at St. Leonard's, to greet us after a lengthened residence abroad, and enjoyed much the beautiful scenery around Hastings. When with him in town afterwards, we were amazed and alarmed by the long distances he walked, the constant fatigue, and his long periods of abstinence from proper food.

He was exceedingly interested in Professor Pepper's beautiful scientific experiments of the "Ghost," and its various manifestations, and he had much interesting conversation and correspondence with the Professor, who had a series of entertainments, called "Half-hours with Sir David Brewster;" the whole thing being in accordance with the "natural magic" which he ever delighted to observe. He had himself been instrumental in raising and naming a spectre, having been the first to observe how, by a simple photographic process, a good representation of an aerial figure might be effected,

which was thenceforward sold in the shops in the form of a *carte de visite*, as "Sir David Brewster's Ghost!"

In the spring of 1864, while residing in Rutland Street, Edinburgh, my father was attacked with one of the now too frequent seizures of prostrating illness of an apparently indefinite character; his mind was on this occasion in a peculiarly bright and placid state, and he spoke much of the happiness which his faith in the work of His Saviour gave him when feeling so near death. On one occasion I was afraid he was over fatigued, and begged him not to speak for a little; he complied, but added, "It delights me to speak of these things." In a neighbouring house, during his own severe illness, lay, apparently also drawing nigh unto death, his beloved daughter-in-law, Mrs. James Brewster, and his sympathy and affections were much drawn out to her, many messages passing between the two apparent deathbeds. My father, however, as was his wont, rallied completely, shaking off, at least for the time, all appearance of illness.

In the University of Edinburgh there was always a full share of interesting and exciting topics, in which my father ever took a most active part. He was especially interested in a professorial contest of a peculiarly animated nature, which took place a year later, and the result was very gratifying to him, being the election of Professor Oakley to the Chair of Music. Prince Alfred's prolonged visit to Edinburgh in 1863-64 was an object of interest to Sir David, who was much interested in him, partly for the sake of his father, whose memory was dear to all men of science, and partly from the intelligence which he perceived in the young prince.

The following extracts are from letters written during different visits to London :—

“ATHENÆUM, April 29, 1863.

“MY DEAREST JEANIE,—Dr. Lyon Playfair and I waited in the reading-room till Mr. Gladstone came to take us to the *levée* in his carriage. There are to be no fewer than 183 presentations to-day, and as Mr. Gladstone had to attend a meeting of the Cabinet, he wrote to General Knollys to ask him to make our reception early. He made it the first, and gave us the *entrée* by the private door by which the Royal party entered. After leaving the Athenæum, we encountered the row of carriages which were drawn up in Pall Mall, so that parties might be admitted in the order of their arrival. We were therefore in a difficulty, but Mr. Gladstone having told the police that we were to be admitted early at a private door, they succeeded, with much difficulty, in forcing us past the innumerable obstacles by which the street was blocked up. We were shown into General Knollys's private room, where we found Lord Elcho and one or two officers, who had received the same permission that we had got. There we waited nearly a quarter of an hour. We were then summoned to the door of the reception room, where we waited nearly another quarter. Mr. Gladstone was then called in alone, I presume from the awkwardness of keeping a Cabinet Minister waiting in the passage. Some time elapsed before we were admitted. The attendants of the Prince and Princess were not numerous. Mr. Gladstone presented Dr. Playfair and me to the Prince and Princess. I placed in the Prince's hands the address, saying that it was from the Senatus of the University of Edinburgh.

Mr. Gladstone, as Rector, presented the address from the students, and we retired with the usual formal obeisances, during which I found my back once or twice in the wrong direction. The Princess is truly beautiful and most intellectual-looking; but I was told she varied very considerably, and this accounts for the different characters of her photographs."

"ATHENÆUM, *May 1, 1863.*

"I went to the Polytechnic last night to see the ghost, which is wonderful. I introduced myself to the lecturer, Professor Pepper, after the lecture, when he took me behind the scenes and showed me how the wonderful effect was produced. It is the invention of a Mr. Dircks, a civil engineer, who communicated the secret to me four years ago, and sent me a model apparatus for showing it by means of the dressed little figures I gave to Connie, and which I wish carefully preserved. I went again to the ghost to-day with Mr. Hayward, who was astonished and delighted with it. . . .

"I am to dine with Kinglake and Hayward to-day. You will see in the *North British Review* an article on Kinglake's book by Mr. Hayward, which will excite great notice."

"ATHENÆUM, *June 5, 1862.*

"I have just received from Professor Becquerel, from Paris, a copy of the Solar Spectrum, taken photographically upon plated copper. It shows all the colours, and it is now probable, being certainly possible, that we shall have in our photographs the colour of the landscape, and the tints of the human face."

"ATHENÆUM, *June 6, 1864.*

"I begin this letter at mid-day, lest I should be pre-

vented by business from getting back here in time for the post. I am to meet Mr. Marsden Latham, the Secretary, and Mr. Richardson, the Vice-President, of the Inventors' Institute, on my Lighthouse affair, at three o'clock, and may be detained there. After an early dinner, I walked last night to the Polytechnic, to see the improved ghost, which is charming. The scene is laid at the bottom of the sea, on the stage, the upper surface of the water being represented by thin and narrow folds of the finest gauze. The ghosts of fish and mermaids swim about with great activity, and dance and frolic with a real man, who goes down among them in a diving-bell.

"Professor Pepper took me down to see all the apparatus by which the ghost scenes and dissolving views are produced, and I was introduced to the originals of the fish, mermaids, and other ghosts, that are so amusing to the public. The house was crowded, and I am told it is so every night. . . . To-morrow at twelve o'clock, as President of the Inventors' Institute, I am obliged to give evidence, before a committee of the House of Commons, on the subject of a building for the Museum of Patents,—a duty which I dislike very much."

"June 19, 1864, Sunday.

"Although I wrote to you yesterday, and have therefore nothing to tell you, I cannot help sitting down and putting myself *en rapport* with you and Connie. . . . The day has been so sultry that I went to the nearest church, St. James's Chapel, close to Jermyn Street, and heard a very nice sermon by the Rev. Mr. Oakley, on 'Ye are the light of the world,' in which he compared the properties of natural with spiritual light."

“ATHENÆUM, June 20, 1864.

“I observe in to-day's *Times* that Captain Palliser's invention of chilling cannon balls by melting them or rather pouring the cast-iron into cold iron moulds, has been most successful; and that his other invention of utilizing old guns by lining them with rifled tubes, is highly appreciated by the military authorities. This news will delight the Fairholmes. This fine day, and the sight of green trees from the Club windows, make me pine for Allerly, and our visits to Parkhill and Belleville.”

Shortly after the last date, a neglected cold fell heavily upon the aged frame; his state rapidly became so alarming that Lady Brewster was telegraphed for, and he was for some time under the kind medical superintendence of Dr. Sieveking, who pronounced that there was, and must have been for many years, organic disease of the heart, causing most probably much of the prostration of strength from which he had so often suffered. After some time of the most tender and careful nursing, he again recruited sufficiently to return to his own home. During this visit to London, at the request of his friend and physician, he consented to take the chair at a meeting of Edinburgh graduates, held at Dr. Sieveking's house, for the purpose of planning some bond of union between them. That meeting led to the formation of the Edinburgh University Club in London, of which Sir David Brewster was the first President, and in which he ever took a warm interest. It is essentially a social institution, the members dining together four times a year; but its influence is practical and important, helping the development

of fellowships in their *Alma Mater*, and urging on the question of University representation. The club has gone on and prospered, numbering now about three hundred members, which include the majority of Edinburgh graduates scattered throughout the United Kingdom, as well as those settled in London, and a few residents in foreign countries, many of them eminent in the medical and other professions. The Duke of Argyll is now President of the society. My father was held in much affectionate esteem by the members of this club, and after his death they addressed to Lady Brewster a vote of cordial sympathy and regret for his loss.

Later in the same summer he was able to undertake the further journeys northward to visit his son and daughter in their Inverness-shire and Aberdeenshire homes, which he made with his wife and little girl every year, and which were a source of much health and enjoyment to him. The recollection of his genial happiness in his visits to Parkhill is so vivid that I cannot but allude to it. And as I shall not return to the subject, I may mention that, in looking back, it is difficult to separate one yearly visit from another, so invariable was his cheerfulness and enjoyment of the northern summer and scenery.

“Coleridge says, that every man should include all his former selves in his present; as a tree has its former year's growth inside its last; so Dr. Chalmers bore along with him his childhood, his youth, his early and full manhood into his mature old age. This gave himself, we doubt not, infinite delight—multiplied his joys, strengthened and matured his whole nature, and kept his heart young and tender; it enabled him to sympathize, to have a fellow-feeling with all, of whatever

age.”¹ These observations were never better exemplified than in Sir David Brewster, who was still a child in heart; his enjoyment of every excursion, every pleasant acquaintance, and his active share in every social amusement were as childlike as ever. On the croquet ground he showed the early determination to excel which so characterized his youth. It was a mode of taking air and exercise which particularly suited the feeble state of his limbs, which now prevented him from going to any distance without the possibility of frequent rests; and he accordingly gave himself to the game with a whole-hearted energy which many will recollect; his mortification at a bad hit, his reasons for the failure, and his determination “to do better next time,” were identical with the adventures of the volunteer ground and the Highland moors, while the strength of his expressions called forth many a smile, as he declared with all seriousness that “to croquet a neighbour’s ball was a most immoral action.” The first season that he was unable to play his quiet game, which was not till 1867, gave a pang to his watchers that those who despise the game could scarcely understand.

During his later visits to Parkhill his attention, like that of Newton of old, was much engrossed by the examination of the soap-bubble—an employment which was a constant delight and surprise to children and young people, who evidently thought that the philosopher was “playing himself” as well as amusing them, while the demands on housemaid and storeroom for various kinds of soap excited surprise in other regions. The table at which he sat, with his little

¹ Dr. John Brown in *Horæ Subsecivæ*.

wire cups, cubes, and variously-shaped vessels, whence he suspended or sent up the lovely filmy forms, was always a centre of attraction, while his clear quiet explanations of the beautiful phenomena were intelligible to all.

A great love of pictures of all kinds was a strong element in my father's mind—he purchased them far beyond his means, and surrounded himself with them as with familiar friends; this was, of course, combined with an intense delight in the arrangement of them, and many were the changes of position which took place in his own large collection,—a better light, a new harmony of colour, being an ever new excuse for arranging his favourites anew. A collection of family portraits at Parkhill having been taken down to be re-varnished, presented an irresistible opportunity for gratifying this taste; the re-hanging of these pictures was therefore confided entirely to him, and his happiness in doing so, and the constancy of the low whistle of satisfaction were pleasant to see and hear. The best lights were chosen, and the proper harmonies of size and frame were carefully attended to, without due investigation of relationships. When it was afterwards pointed out that the wrong husbands and wives were occasionally grouped, his son-in-law refused to have any change made, so much did he value the handiwork of those pleasant “hanging-days,” which could return no more.

“A day at Banchory” was one of the pleasant elements of all his Aberdeenshire visits. There was much that was congenial, and indeed very similar, between the characters of David Brewster and Alexander Thomson of Banchory, and a warm mutual affection existed

between them. There were the same scientific tastes, the same genial humility, the same versatile knowledge, the same power of communicating it, latterly the same political sentiments, and above all the same Christian hope. The hours of the bright summer day spent in library and museum over book, microscope, shell, and prism were all too short, the only shadow being the fear of exciting and overwearying the friend who, though so much younger than my father, was in far more fragile health :—the elder one entered into his rest but three months before the other.