CHAPTER VI.

NOTES OF LIFE FROM 1810 TO 1814.

"If I do this, what further can I do?"
"Why, more than ever. Every task thou dost
Brings strength and capability to act.
He who doth climb the difficult mountains
Will the next day outstrip an idler man.
Dip thy young brains in wise men's deep discourse,
In books which, though they freeze thy wit awhile,
Will knit thee in the end with wisdom."

BARRY CORNWALL.

THE choice of life-work which Brewster made was laborious in the extreme, and he might have said, with Wesley, that "Leisure and I have taken leave of each other." Yet it happened with him, as with all active natures, that the more he did the more he found time to do. The dying words, long years afterwards, of his friend M. Arago, might have been taken at this time, as ever after, for the key-note of Brewster's life, "Travaillez, travaillez bien." During these four succeeding years the *Encyclopædia* bulks largest in his daily work, and on till the publication of the last and eighteenth of its bulky volumes in 1830, it continued a most anxious and arduous undertaking. Indeed, its unsatisfactory pecuniary results, and a long and painful lawsuit arising out of it, weighed heavily upon his whole future life, and was not removed till within a few years of its close, when a compromise took place. The work itself commanded great admiration, and still holds its own recog-

nised place, but the extreme irregularity of publication marred greatly its success at the time. This was owing principally to the dilatory conduct of its literary contributors. It was not only that the discomfort and the unpopularity fell heavily upon the editor—himself a man of punctual habits of work,—but also the unavoidable labour necessary to make any way at all against such negligence and delay. Many of his friends promised articles and forgot all about them. Mr. Stuart of Bolton having engaged to write, hired a room in the High Street to be near books of reference, but even after such demonstrations of diligence no article was forthcoming, and the editor was obliged, as usual, to do the work himself. The mere correspondence of the *Encyclopædia* would have been work enough for most men—many of the letters requiring editorial responses being of a trivial and unnecessary kind. He thus writes to Veitch :—

"JESSEFIELD, PORTOBELLO, *Sept.* 6, 1810.

"I would have answered (your letter) long before this had I not been prevented by a load of business. You will easily understand the nature of my situation, when I mention to you that besides the duty of editing the *Encyclopædia,* and writing many of the articles, I have a correspondence to carry on with about an hundred different authors, who are writing for the work, and have often twenty or thirty letters lying by me unanswered. Even this labour, however, would not have prevented me from writing you, had I not, for these two years, been constantly determining to come to Jedburgh to see you. I have been hitherto unable to accomplish this journey, short as it is, though I am not without hopes of seeing you some time this harvest. . . . Your

hygrometer of beechwood is very simple and ingenious; but though it may be used for showing variations of humidity, yet it could scarcely be depended upon for measuring these variations. I am afraid you will find that the wood loses its power of expansion, and will not be so much affected by moisture a few months hence as it is at present. I consider the cold produced by evaporation as the only accurate measure of the degrees, and consequently of the humidity of the atmosphere. I have not yet got my achromatic telescope. There is no better method of polishing lenses than with pitch and flower of putty."

Most painful and harassing of all were the interrupted and broken friendships which were the result of this uncomfortable period, of which it is unnecessary at this lapse of time to say more, than that there were probably faults on both sides,—a commonplace, but true, solution of much that often appears inexplicable. In some instances, at least, the best and oldest of these ties were happily reunited. One bright circumstance shines like a sunbeam through the gloom connected with this literary undertaking. A request from Dr. Brewster to the Rev. Thomas Chalmers of Kilmany, to write the article CHRISTIANITY, turned the mind of the young and careless, though brilliant, divine, to study the truths of which he had then but a superficial knowledge, and ultimately proved the means of leading him to grasp them as a life-reality, with a force and power without which he could not have been the blessing to his country which he proved in after years. This was the beginning of a long and cordial friendship which only terminated with the death of Chalmers in 1847.

Whatever the pressure of work might be from the *Encyclopædia* and the *Edinburgh Journal*, Brewster never stinted or stayed in his own peculiar career. In 1811 he edited a new edition of Ferguson's *Astronomy*, to which he contributed an Introduction and twelve supplementary chapters. In 1812 he wrote the article BURNING-GLASSES for the *Encyclopædia*, containing a description of a polyzonal lens which he had invented the year before, when examining the experiments of Buffon. This lens, the source of much pain to himself, and yet, as many believe, of much blessing to his kind, will be described in another chapter. Veitch writes to him at this time:—

"INCHBONNY, *5th August* 1812.

"You have pointed out some very curious things concerning burning mirrors, and it would be of very great importance to put your devices into practice. I could wish that you would pay a little more attention to the fluid which you showed me, and find the true proportion of the curvatures of the two crown glasses, for I am convinced that it will answer better than the best flint glass that ever was made. I intend to make you a small reflector as a specimen of my workmanship; the tube will be about nine inches long, and two inches and a quarter diameter, or thereabouts.

"As for the comet, I do not know what to say about it; the first sight I got of it was on the 27th August 1811, and it was very nigh the star marked 26 on the shoulder of the Little Lion; if I had lost sight of it three weeks after it had made its appearance, I would have concluded that its angle with the ecliptic would have been so great that it would have passed by the pole-star, for the only motion it had was that of latitude;

but it lost that motion, and had little other motion but in longitude, till near its disappearance on the 25th of December, when it was in the 15th degree of Aquarius, with one degree of south declination; from the observations that I made on it, I was convinced that its path could neither be a straight line nor any regular course. Mr. Playfair told me that the astronomer at Glasgow had found its path corresponded very well with a parabola. It was as easy for him to make its path correspond with that curve, as to make one of Herschel's planetary nebula into a comet, which you will remember he published in the newspaper. On seeing the paper I sought diligently for it, and found it to be the planetary nebula discovered by Herschel on Feb. 1, 1785, vol. 75 of the *Transactions*, page 266.

"I must now remain, your sincere friend,

"JAMES VEITCH.

"The above was written before I received your letter. I am very happy that I have had it in my power to serve you at this time,—I did not make any delay in making the two glasses, as I am always very impatient about anything that I want, I thought you would be the same; they are scarcely so fine as I could have wished them, on account of the want of emery properly prepared, but I hope they will in some measure answer your purpose."

In 1813 Dr. Brewster sent his first paper to the Royal Society of London, on "Some Properties of Light," and in the same year he published a *Treatise on New Philosophical Instruments for various purposes in the Arts and Sciences*,—a subject with which his early Inchbonny days had made him practically, as well as theoretically,

acquainted. His health at last began to give way, or at least seriously required change of scene and complete relaxation. He therefore determined to take his first tour on the Continent. He had resided at Portobello for some time after his marriage, but had now settled in an unpretending "flat" in Duke Street, Edinburgh. His home had become the abode of little children. His eldest son James was born in 1812, and his second son, Charles Macpherson, a child of much love and much sorrow, was born in 1813. Mrs. Brewster could not, therefore, accompany her husband, and we see on this occasion much of the tender and beautiful romance of character which edged many of the dark clouds of his life with a silver light—his warm home affections being a characteristic through life, though often veiled and marred by a certain constitutional reserve, and other causes. He got a miniature portrait of his wife taken, as a travelling companion, and with a sad heart at the separation, set out on his first foreign journey. He writes to his wife, July 17, 1814:—"I was in a very melancholy mood all yesterday, my dearest Juliet, at the prospect of such a long absence from you and my dear children; but the rapid travelling, and the constant succession of new objects, have raised my spirits and habituated me in a slight degree to the first separation in our married life. My imagination, too, has been very kind to me. It has never allowed me to be for a moment absent from the only objects on which it delights to rest. I have seen every hour the scene that has been enlivening your little circle: our dear and intelligent little James kissing his sweet Charles, and their lovely mamma, like their guardian angel, watching her little charge, and teaching them to remember their dear papa.

Send me a lock of your hair, and another of theirs." Dr. Brewster continued a close and minute correspondence with his wife, containing everything that he could think of to amuse and interest her in her quiet life and delicate health, even to a sketch which he entitles, "Form of fashionable bonnet," apparently combining the formation of a helmet and a coal-scuttle! From these familiar letters I extract the following, as interesting notices of the great men of that now past generation, which show the warm appreciation which he ever had of those who had distinguished themselves in any branch of science, and also the pleasant and honest surprise which their recognition of him as a brother and peer caused in his mind:—

"PORTLAND PLACE, *July* 23, 1814.

"... When we were about three miles to the north of Slough, I observed in a carriage, which passed us very rapidly, Mr. Watt and his lady, whom I was so anxious to meet in London. The separation of the two carriages was so rapid that I could not make myself heard in attempting to stop the driver. When I reached Slough I learned from Dr. Herschel that Mr. Watt had spent three days with him, and had left him that morning. This was very mortifying to me, as I should otherwise have had the pleasure of meeting these two great men under circumstances of peculiar interest. Dr. Herschel received me with the utmost warmth, and begged that I would stay to dinner. He requested me to present his compliments to La Place when I went to Paris; and when I observed to him that I had only a letter of introduction to M. Prony, and might not have the honour of meeting such a man as La Place, he remarked that this was the same as a letter of introduc-

tion to all the French philosophers; and that if I had no letters at all, my own name would be a sufficient introduction. This was obviously saying too much, but it was pleasant to receive such a compliment from such a great and venerable man as Dr. Herschel."

"PARIS, *August* 13, 1814.

" . . . Biot came to me very early in the forenoon, and repeated along with me the greater part of my experiments, leapt from his chair, clapped his hands, and constantly exclaimed, "*Oh que magnifique! oh que jolie!*" complimenting me in the true French style. I then accompanied Biot to the Library of the National Institute, where I had the good fortune to be introduced to Arago, an able astronomer, who has also made some fine optical discoveries.

"At three o'clock M. Biot and I set off for Arcueil, and on the road he promised to write the article MAGNETISM for the *Encyclopædia*, in which branch of science he has made several discoveries. When we arrived at the château of La Place, we were told by the servant that he was in the garden, and for nearly ten minutes we sought for him in vain among beautiful arbours and alleys of trees. He at last appeared, and gratified my curiosity, which had been wound up to the highest pitch. I was introduced to him by Biot, presented him with copies of my papers, and had a little conversation with him before dinner, in which he spoke of Mr. Playfair with kindness. La Place is a man below the middle size, of a fair complexion, and thin make. He is distant in his manner, speaks very little, and walks with the stiffness of a senator. When he walks in his grounds he carries a coarse stick about two feet higher

than himself, and wears a grey cloth cap resembling a helmet. His hair was tied and powdered in the French style, but in other respects he was dressed like an English gentleman. He was a great favourite of Buonaparte, who loaded him with kindness, and took his son along with him as one of his aides-de-camp. Our party consisted of six, La Place and his son, his son-in-law, M. Biot, and M. Poisson, a most distinguished mathematician, who has recently made some brilliant discoveries in electricity. Our dinner consisted of *soup, fresh eggs, bouilli, roasted veal, mutton-chops, roasted fowl, salad, French beans, honeycomb,* and a *kind of rice potage,* besides a dessert of apricots, pears, cherries, currants, and tarts, most of which dishes were served in succession, and without any order whatever. I was highly amused with the fresh eggs, and every person during the whole of the dinner kept the same knife and fork. After coffee we all set off to the house of the celebrated chemist, M. Berthollet, for the purpose of introducing me to him, and in order that he might see my experiments on mother-of-pearl, which La Place requested me to show him. He appeared, however, at the end of a long vista of trees, accompanied by his wife, on their way to La Place's château. A more homely pair you never saw, and though very rich, they were dressed little better than a decent Scotch farmer and his wife. We then went into La Place's study, where M. Biot explained at great length the different experiments which I made. La Place was highly pleased with them, and was very slow in believing that they were quite correct."

"PARIS, *August* 19, 1814.

" . . . Went with M. Biot to a sitting of the National

Institute, and had an opportunity of seeing almost all the distinguished philosophers in Paris. There were many strangers there, and several Englishmen of eminence, all of whom were seated at the backs of the members, who were arranged round an oblong circular table. When the business commenced, M. Biot desired me to follow him, and I was confounded when I saw that he was taking me from the rest of the visitors into the very centre of the circular table, where three chairs were placed beside the President. I was then introduced to the President, M. Lefevre Gineau, and ordered to take my seat in that conspicuous situation. In a short time M. Biot left the hall, and I was left alone in that solitary spot, wondering, along with all the other visitors, why I had been placed there. For a person of my nerves this was sufficiently trying, but it did not overpower me. . . . On Thursday I went to see M. Arago, and the Observatory, which contains many curious instruments, but few very good ones. Arago is a very interesting young man. He was employed by the French Government in making astronomical observations in Spain, and was thrown into prison and cruelly treated. He afterwards escaped to Africa, where he travelled with a long beard as a Mussulman, and through many hazards reached his native country. He has a lovely wife, and a son. Being the particular friend of the celebrated traveller, Baron Humboldt, the Prussian Ambassador, he introduced me to him after we had seen the Observatory. I was very kindly received by Humboldt, who was acquainted with my experiments on Light, and I hope to see him frequently before I leave Paris. He is a plain, frank man, and speaks English, French, Spanish, and German with

equal fluency. I believe I have not mentioned to you that my book has been long known on the Continent by means of a most extensive analysis of it inserted in four successive numbers of the *Bibliothèque Britannique*, a work published at Geneva, and circulated in every part of Europe."

Besides correspondence, Brewster found time to keep a most minute and particular journal, which he seems to have had some thoughts of publishing, and for which his friend Williams, the eminent water-colour painter, drew six beautiful little sketches, which are now at Belleville. This journal, although now quite out of date, is extremely interesting, as showing the minute observation which was one of his characteristics even at that time, and probably one of the secrets of his success. Nothing escaped his quick eyes, which seemed to photograph on his mind every stone and crevice, every light and shadow, every window of a house, every colour of a landscape, every line or curve in pictures and statues. His journal is far more than a diary; it goes to the accuracy of hours and minutes. I shall only extract enough to show this characteristic minuteness and observation, and also some further interesting notices of French *savans*.

Dr. Brewster's appearance at this time was extremely prepossessing, although he had neither striking features nor commanding figure. His clusters of brown curling hair were often remarked, and the open, intellectual expression of his pale face, with the exceeding sweetness of his eyes. Although thirty-three, he was very youthful-looking, so much so that, along with his extremely unassuming manners, the French philosophers

were quite puzzled, and it was probably at the very meeting of the Institute described on another page that they are recorded to have said, "What! is that *boy* the great Brewster?" The constitutional nervousness from which he had long suffered showed itself principally at this time in a degree of timidity which he made considerable efforts to overcome, thus alluded to amusingly in one of his home letters:—"I am trying as hard as possible to get impudent. I began this new career by calling upon Mr. Sylvester, the chemist, at Derby. I tried it a second time at Oxford, and introduced myself to Dr. Robertson, Savilian Professor of Astronomy, and I hope to have soon some other opportunities of showing off my new acquirements in this way."

EXTRACTS FROM DIARY.

"PARIS, *Tuesday, August* 16, 1814.

"M. Biot and M. Cauchoix called upon me at two o'clock, and showed me the ingenious instrument called a Spherometer, invented by the latter, for measuring the thickness of very thin plates.

"About half-past two o'clock I accompanied M. Biot to the Institute, the ordinary meetings of which are held in one of the apartments of the Library, in the Palais des Beaux Arts. The business transacted at this meeting consisted in a report by M. Poisson, on some inventions that had been laid before the Institute by one Muret; a proposal by M. Legendre to alter the law relative to the annual prize; a communication by M. Rossel; an explanation of an improved circle, probably by the inventor; and a long paper on iodine, by M. Gay-Lussac.

"As this meeting was well attended, I had an oppor-

tunity of seeing many of the most distinguished men in Paris; the principal members were—

"*Carnot.*—He resembled very much the picture of him which I have, but appears to be dissatisfied and discontented, and in bad health.

"*Legendre.*—A very tall and very thin man, with an expressive and intelligent countenance, white powdered hair, tied and curled above the ears.

"*Desmarets.*—An old, reverend-looking man. One of the old chemists.

"*Poisson.*—A young and active little man, with a sweet and expressive countenance.

"*Arago.*—Young (28), good-looking, dark, very pleasant and intelligent.

"*Monge.*—Below the middle size, stoops, has a full face, and white curled hair.

"*Lamarck.*—A good-looking old man, with a light coat and an embroidered waistcoat, little, and rather crooked.

"*Portal.*—A fine, reverend-looking old man, with a small face.

"*Gay-Lussac.*—A slender young man, a little marked on the face with the small-pox. Apparently a great enthusiast in chemistry.

"*Rossel.*—A little, thick, and active man.

"*Charles.*—An old man, intelligent face.

"*Burckhardt.*—A thin, pale, and slender young man.

"*Delambre.*—A little, oldish man, very yellow; a little marked with the small-pox.

"*Cuvier.*—Has rather the appearance of being self-sufficient; is a little man, with a projecting brow and chin.

"*Huissard.*—A stout, and rather corpulent man. He

sat on the left hand of the President; spectacles, and sallow. V.-President.

"*Prony.*—Not handsome; large nose, intelligent and active.

"*Lefevre Gineau.*—Like Prony, so much. so, that I took the one for the other. He is President of the class."

"PARIS, *Tuesday, August* 22, 1814.

"I went this morning to call upon M. Rochon, formerly the Abbé Rochon, a venerable and intelligent old man of seventy-three, who is well known to philosophers by his scientific works and inventions. He showed me his prismatic micrometer, a small instrument, with a level for measuring the inclination of lines to the horizon by the coincidence of two images, and his method of doubling the double refraction of Iceland crystal by extinguishing two of the images, and employing the two that are most remote. In the shop of the optician who works for him, he showed me a huge plate of glass, 6 feet in diameter, and 3 inches thick, which had been melted at the Gobelins in the time of Louis XVI., for the purpose of making a burning lens. He expects that it will soon be ground, the operation being already begun. The instrument mentioned above for measuring the inclination of lines to the horizon was first suggested and described in my *Treatise on Instruments*, the only difference between the two being in the way of forming the double images. M. Arago having mentioned to me that M. Rochon had discovered before me the double dispersive power of calcarean spar, I replied that he had given merely the two *dispersions*, not the two *dispersive powers* of that crystal. M. Arago assured me that this was not the case, and I of course

applied for information to M. Rochon himself. He showed me the table containing the results of his experiments, which was exactly what is given in Cavallo's *Natural Philosophy,* to which I have alluded in my book. I explained to M. Rochon that his results were merely the dispersions, and he admitted that I was perfectly correct. The slightest examination of his table, indeed, is a sufficient proof that this is the case."

Brewster and his travelling party left Paris *en voiture* on August 28th. He stayed three days only at Geneva, where, however, he made acquaintances so agreeable and so congenial that they were never forgotten in after life, Professor Prevost, M. Pictet and his family, amongst the number. Sir Humphrey and Lady Davy he also met frequently. An expedition to Ferney interested him much; in Voltaire's bedroom he saw an engraving of Newton, which he long afterwards described. The short tour through France and Switzerland was concluded by their arrival in England on September 28th, the journal being continued by hour and minute. Thus we have—

"*Sept.* 10, *Sat.* 9.25.—Cross the wooden bridge of St. Pelissier, which is now very good and safe, and from which there is a fine view of the Arve, Mont Blanc towering above it. We then ascend a most dreadful road over unbroken masses of rock. I observed several fine examples of the scoops and grooves which Sir James Hall observed upon Corstorphine Hill. They stretch in the direction of S.E., which is the direction of the valley. . . .

"9.45.—Most beautiful scoops on the right hand,

and ruts in the rock; many of the hollows are finely smoothed out.

"9.48.—The ruts and scoops are here most distinct, and more perfect than any of those seen at Corstorphine Hill.

"9.50.—Enter the Valley of Chamounix, and observe scoops below the road near the Arve.

"9.58.—A fine hollow on the right, where the mountains retire, in which is situated the village of Chavan, on the banks of a brook; the *aiguilles* of Mont Blanc are now seen. . . .

"10.50.—Enormous blocks of stone, not rounded, appear here; a little wheat is grown in this quarter.

"11.—Descend and walk to the Glacier de Boisson, which is very fine; the peaks of ice are extremely grand, and have a fine blue colour in the crevices; at the side of the glacier numerous trees are crushed to pieces; large blocks of granite are suspended on the flanks of Mont Blanc, and the earth is turned up in such a manner as if some great convulsion had taken place. The plateau of the glacier is in no respect remarkable; huge blocks of granite are lying upon the ice, by the descent of which they are transported to a lower level. . . .

"3.25.—Reach the summit of Montanvert, and rest in the house erected by M. Felix Deporte, once the French resident at Geneva, for this purpose. There was a fine wooden fire blazing, and we were supplied with bread, milk, and cheese. The names of De la Saussure, Dolomier, La Lande, and Pictet are painted on the walls.

"4.3.—Set out to see the glaciers, and descend a hill till we reach the Mer de Glace. It is like the waves of the sea, as if they had been fixed by sudden con-

gelation. Where the ice is most perfect, which is on the sides of the deep crevices, the colour is a fine blue. There is an appearance of a vertical stratification in the icy masses stretching in the direction of the valley in which the glacier lies. We passed a huge granite block, about 25 feet high, resting upon the ice. It descends continually. The noise of the waters rushing below is very fine, and the sound of large stones or masses of ice tumbling into the crevices continually remind the spectator that his situation upon the summit of the frozen waves is not exempt from danger. Towards the edge of the Mer de Glace the ice is covered with pounded granite, and huge masses of that stone mark the boundary between the ice and the mountains. In these places where the ice is covered with sand, it has the appearance of being perfectly black, like the darkest Cairngorm, while in other places the perfect ice is green. Upon breaking this apparently black ice it is perfectly transparent, and remarkably pure and hard.

"The surface of the glaciers exhibits also the appearance of veins exactly like rocks of stone. . . .

"4.56.—When we had reached the bottom we were accosted in English by an old man, who was one of the two Cretins described by Saussure, and exhibited in England. I recollected having seen him in Jedburgh many years ago along with his brother. He is very poor, and draws a small subsistence from the generosity of the English. . . .

"*Sept.* 12, 4.15.—Reach Vevay, where we stop for the night. It is a large town, with many excellent houses, but the streets are narrow, and without footpaths. In the evening I walked along the banks of the lake in a fine mall of trees, from which there was

a charming view of the sun setting behind the ridge of Jura. He had just descended below the horizon, and left a fine glow of purely yellow light along the whole of the western sky. Above was a warm glow of red, and the whole extent of the lake towards the west was of a lovely purple colour. As the sun descended the yellow gradually deepened into orange, and the purple glow upon the lake became more faint. This lovely scene formed a grand contrast with the dark gloom which was thrown over the Eastern Alps, and the blackness of the part of the lake which intervened. . . .

"*Sept.* 15, 11.27.—Passed some cottages; the country beautiful, and wooded. After passing through a very pretty country we reach the village of Lechelin, with a church, and many thatched houses with roofs extremely steep. The women most extraordinarily dressed, with a circle of wrought horse-hair like gauze sticking up over their heads, and their hair in two large plaits behind, with strings tied to it, and reaching to their feet. . . .

"*Sept.* 16, 4.25.—Reach the Lutschine, a large and rapid river formed by the Black Lutschine, which runs through Grindelwald, and the White Lutschine, which flows through Lauterbrunnen. The rocks on the right are so high that they are covered with snow. On the left is a lofty mount, with singular convolutions on the strata.

"4.55.—Most extraordinary rock on the right, with trees on its perpendicular face like men walking up. These are called the rocks of Eisenflue; they are 900 feet high, and have a village of the same name on the top.

"5.25.—Most extraordinary convolutions on the left

towards the root of the rock; they are really double convolutions included in a single one. . . .

"6.35.—Turn back to the inn; the valley and its precipitous flanks were almost wholly in total darkness, while the red twilight shed a bright hue over the Jungfrau, the Breithorn, and the Lauterhorn. The whole appeared as if we were looking out of a dark room into a higher region. This appearance was still more striking at a later hour, when Saturn was seen over the Jungfrau, and when the lights in the cottages appeared like so many stars in the dark declivities of the valley. The blue and white streaks on the calcareous rock had a very singular appearance."