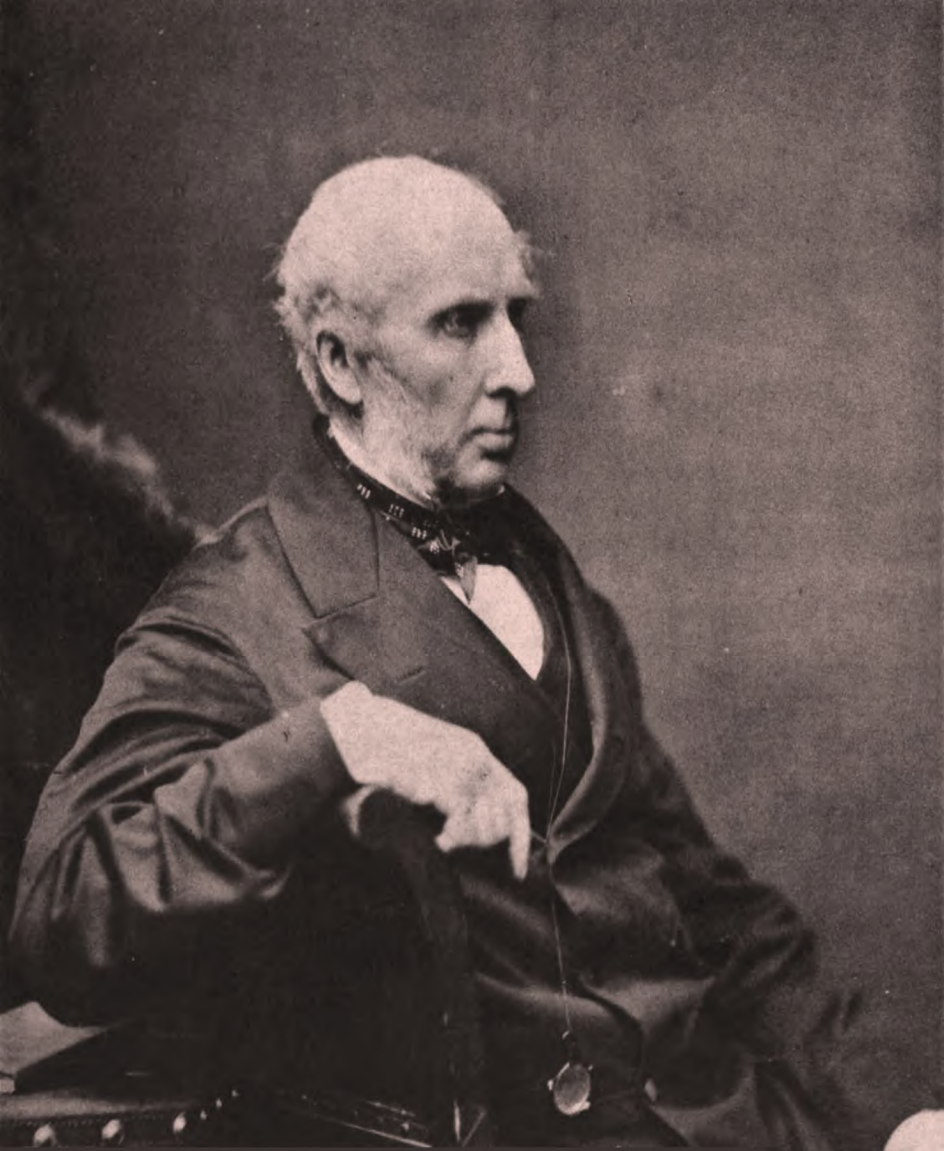


Biographical sketch of David Milne Home, Ll.D., F.R.S.E., F.G.S., etc

G. M. H. (Grace Milne Home)

BIOGRAPHICAL SKETCH

OF

DAVID MILNE-HOME

LL.D., F.R.S.E., F.G.S., ETC.

BY HIS DAUGHTER

G. M. H.

EDINBURGH
DAVID DOUGLAS, CASTLE STREET
1891

CONTENTS.

CHAPTER IV.

CHAPTER V.

CHAPTER VI.

CHAPTER VII.

CHAPTER VIII.

CHAPTER IX.

RELIGIOUS AND CHURCH LIFE.

CHAPTER X.

ABSTRACT OF SCIENTIFIC PAPERS.

APPENDICES.

BIOGRAPHICAL SKETCH

OF

DAVID MILNE HOME.

CHAPTER I.

Early Life.

DAVID MILNE HOME[1] was born at Inveresk, near Edinburgh, January 22, 1805. His father was a Captain in the Royal Navy, and already had gained much distinction in the service. Captain Milne[2] had been at home since 1803, and in 1804 he married Grace, daughter of Sir Alexander Purves, Bart., of Purves Hall, Berwickshire. Grace was beautiful, and a lovable domestic character. The marriage was a very happy one, and the letters which passed between them during any periods of absence, dating from 1805, testify to their deep affection. In these letters there is frequent mention of the children, David, the subject of

[1] Originally only David Milne, but he took the additional name of Home in 1852, when his wife succeeded to the properties of Wedderburn, Billie, and Paxton.

[2] Afterwards Admiral Sir David Milne, G.C.B.

this Memoir, and Alexander, born November 10, 1806. Even at a very early age the dispositions are noted; Alexander was full of life and spirit, David graver; "my thinking Davie," his mother calls him when he was only three years old. Before he was that age the alphabet had been commenced, and regular lessons were carried on from that date with his mother. One of her letters in 1809 was at her "dear David's" earnest entreaty, that she should write to tell his father he had said his lessons well, and he sat by her side, not moving while she wrote, lest he should disturb her. When Captain Milne went to sea in 1811, little David was his mother's constant companion; he would lie awake to talk of his father, wondering what he was about, and when he would come home again. "David told me," Mrs Milne writes to her husband, "I may sometimes forget papa in the daytime, but never at night. I suppose," she adds, "that he dreams of you always." "The boys are very good," was their mother's frequent assurance in her letters, "and they never forgot to ask God in their prayers to take care of dear papa and bring him safe home soon."

Captain and Mrs Milne's greatest friends were Mr George Home of Paxton, and his aunt, Miss Jean Home; so much so, that though no relations, the Milnes called them uncle and aunt.[1] Long visits were paid to Paxton; and, indeed, there was a constant coming and going between the families. The only deed of mischief recorded of David was his bolting himself into

[1] Mrs Milne was a distant relative of the Homes, her mother having been a Miss Home of Burnhall, Coldingham.

Miss Home's dressing-room to amuse himself with her trinkets; and great was the dismay of the whole household when the door could not be opened, and the little fellow, not three years old, had not strength to unbolt it! The only way of extricating him was by one of the men-servants getting access to the room through the window by means of a long ladder, and David in tears assured his mother he never would be bad again.

In the autumn of 1811, after Captain Milne's departure in the *Impetueux* for Flushing, David and his brother were sent to the Grammar School in Musselburgh as day boarders. Their mother writes of their riding down; and whether it be the ride or the school that makes them so anxious to set off, she does not know, but they are always before the hour. "What fine fellows they are, and what affectionate hearts they have, and what should I do without them!" she also says. David was able at that early age to write letters to his father. He had taught himself to write with printed characters before he commenced writing at school, and in one of these letters he tells his father "that Mr Taylor [his master] says that 'I am a very good scholar.'" His mother confirms this, writing: "Mr Taylor gave David a great character, as a good scholar and attentive." She says his progress in reading is wonderful, and that he reads the papers to her in the evenings. She had considerable anxiety about his health the beginning of the winter, and consulted Dr Hamilton from Edinburgh with good result. Indeed, she became rather overpowered with the boys' boisterous spirits, and had to threaten to send David down to

board with Mr Taylor, which was the cause of tears and complete submission. In January 1812 both boys had the measles, David so badly as to be in some danger. The fever ran so high he was insensible. Leeches were applied to his head, and a blister to his neck, after which the fever abated. It was a great disappointment to Mrs Milne and the boys that Captain Milne, instead of being able to come home in the spring of 1812, was ordered to Lisbon. An extract from a letter to his boys may here be given, as it shows how in his busy life he thought of them, and of the "one thing needful," without which there could be no happiness in this world or the next:—

"Both of you must be very good scholars, and I hope you always remember to say your prayers every morning and every night. If you do that, God will be kind to you and keep you in good health, and make you happy; but if you forget to say your prayers, He will not take care of you, and you will not be happy, and nobody will love you, or be kind to you. And you must never tell lies on any account, for none but very bad boys do so; and if you should ever do anything wrong for want of knowing better, always tell the truth, and then nobody will be angry if you do not do so again. And, my dears, you must never take anything that does not belong to you, for that is very bad, and God will always make it be found out, and nobody will ever after speak to you. May God bless you, my dear boys.—Your ever affectionate father, DAVID MILNE."

Captain Milne was recalled from Lisbon in July 1812,

because Lord Melville, before going out of office, wished to give him another ship. He obtained a fortnight's leave to see his wife and children before he joined the *Venerable,* in which ship he commanded the blockading squadron off Cherbourg. Captain Milne was again at home in December, and at Paxton with Mr Home in January, where he left his wife and children when he again returned to his ship.

Mrs Milne writes to him as follows: "How much pleasure it gave me that you thought the boys were so much better behaved than the ——— with all their schools they talk of. Certainly a mother ought to take more interest in her children than a person that is hired to do it, and our boys are of most amiable dispositions, so that there can be no great difficulty in making them what we wish."

On Mrs Milne's return to Inveresk she fell into very delicate health. Complete change was recommended; and Captain Milne being stationed for a time at Portsmouth, she and the boys joined him there, travelling in a post chaise, and stopping at Paxton, Newcastle, etc., and so on by easy stages to London, and they had the escort of Mrs Milne's brother, Patrick, who was going up to join his regiment, the 79th Highlanders. Captain Milne took a house for his wife, first in the Isle of Wight, and then at Fareham, near Portsmouth, where her health in some measure returned. The boys went to a day school; and David, his mother mentions, was very industrious, and getting on well with his Latin. He was fond of music, and very desirous of learning some instrument; but his father thought this might dis-

tract his attention too much from his lessons, so beyond a Jew's harp, or some such toy, this accomplishment was not permitted. Captain Milne also thought too much reading of story-books should not be encouraged; "for," he writes, "such light reading may make him less attentive to the other parts of his education; a little of it will do very well, but I think it should only be at times." It would be well if this good advice with regard to fiction was more regarded at the present day.

It was certainly followed by the subject of our Memoir, for it was only "at times," and often at long intervals, that he ever indulged in story reading.

In January 1814 Captain Milne was appointed to the *Bulwark*, and ordered to proceed to the North American station. The distress at parting with him was the cause of increased ill-health to his poor wife. She went to Plymouth in February, expecting that Captain Milne would have to put in there after leaving Portsmouth. This, however, proved impossible. She and the boys remained at Plymouth till May, and there Mrs Milne's health seriously broke down; and so weak and depressed did she become, that she wrote she could scarcely speak to her boys. Her cough was incessant, and to add to her discomforts, her eyes were so inflamed, she had to be kept in a darkened room.

Dr Neale, an army surgeon, and his wife were in the same lodgings, and they made Mrs Milne's acquaintance. Dr Neale had been quite distressed at the sound of her cough, and offered his advice, along with that of the medical man attending her.

A sea voyage was recommended; and as Dr and Mrs

Neale were going to Bordeaux, where many of the English troops were stationed, it was an inducement to Mrs Milne to go there also. She writes from Bordeaux the following interesting letters to her husband:—

"Bordeaux, *May 27th*, 1814.

". . . . You will be surprised to hear from me from this place, but my friends at Plymouth insisted upon my trying what the air of Bordeaux would do for me. I came out with Sir C. Parker, who has indeed been very kind, as also all his officers. Lady Parker was with us likewise, and also Lady Hope, coming out to see Sir John, who has been wounded, and her brother, Sir D. Wedderburn, accompanied her. Kind Admiral Malcolm came to meet me however. I sent for Dr Neale, who came and took us away, as not a place could any of us get to lay our heads, the town was so crowded. The Neales took me to their lodgings, and gave me their own bed, and had to seek one for themselves. They have at last got me a flat up a dozen pair of stairs, where I and the boys, my maid, and French maid have taken up our quarters. Dr Neale waited on Lord Dalhousie, who commands here, and told him of my arrival. He came full of goodness, and has desired me to apply to him upon all occasions. He has sent me books and papers, and is constantly sending.

"Having such a friend, you may believe, is indeed fortunate for me.

"I recovered every hour I was at sea, and had begun to eat and drink again, and was almost quite well, when

at night, coming ashore, I caught a bad cold, and I am put on bread and fruit again. The climate here is truly beautiful, and I daresay I shall soon get quite strong again. I shall remain at least some months, as everything is more favourable for me than in England, and education is the best for the boys. I intend to have all kinds of masters for them, as the opportunity is so good."

She writes later: "David goes to a school for the day; Dr Neale's son, a fine boy, accompanies him. They go to breakfast, and do not return till six at night. David likes it very well, except the dinners, for the garlic and bouillons he does not admire.

"Many English families reside here, and more are coming. Everybody has been so kind to me. Your name is a passport wherever I go.

"It is impossible for me to express to you the kindness I have received from Lord Dalhousie. Every day he comes and sits with me, and he wished me to come to his house, but that I could not think of.

"The street I am in is very broad, with trees all down, and well aired.

"Opposite lives an English merchant, who has been settled here for twelve years—people of immense fortune, who have been so kind to me, all through Lord Dalhousie. Yesterday Lord Dalhousie brought Sir F. Neale to wait on me, who talked much of you.

"Lady Keith is expected here to-day, of which I am very glad, as she was very kind to me before I left dock."

In June, Mrs Milne writes: "You will be happy to

hear I have recovered wonderfully in health and strength, and am getting better and better every day. The climate is truly delightful, and the air so pure and good. At first, with much difficulty, I could walk upstairs, and now I can take long walks all round the town, which is beautiful. I trust in God I shall get quite well and stout. If you were here, then indeed I should be happy; but, alas! without you everything is a blank."

June 11th she writes: "Lady Keith arrived two days ago, and Lord Keith is returned. She has been taken ill, and Lord Keith wrote me a note to ask me to send Dr Neale, who lodges near this, to her. She is now better, and they and Sir C. Cole, the flag lieutenant, have been with me, and took me out a drive to a family of the name of Johnston, who reside here, but have a place also in the country. The Keiths are to take me with them to-morrow to see some sights; and if I am able, I am to go to the theatre some night with them, as the Duke of Wellington has arrived this morning, and I should like to see him. The 42nd marched into the town yesterday. It was the very first time I ever was happy to hear the bagpipes; and to-day, standing upon my balcony, I had the pleasure of seeing Captain Home, who really would hardly believe, even after shaking hands with me, that it was myself. Macara commands the regiment. How dreadfully have they suffered! He distressed me much with the account of poor Patrick,[1] whom he said he should ever lament, and that the whole brigade mourned for him, he was so much beloved.

[1] Patrick Purves was killed at the battle of Toulouse.

"The 79th are encamped here, and Home is to bring the Colonel of the regiment (Douglass) here to see me."

"*June 26th.*

"I sit down to give you joy on your promotion. May it make you as happy as it has made me. How delighted I was! I first heard of it as I was going to the theatre, and I nearly jumped out of Lady Keith's carriage, and next morning Lord Dalhousie came to inform me of it.

"I trust in heaven that it will bring you home with all speed. I am happy to say I am still wonderfully better. This charming climate agrees so well with me; and as long as the Keiths and Lord Dalhousie are here I am perfectly content, but what a sad blank they will make when they leave!

"The troops are now leaving this fort, and in three weeks' time they will be all gone. I do not know whether to remain here or to return to England. If I could only divine your motions, that would determine me, but I must wait till I hear from you, and I have only had one letter from you.

"You would be delighted to see how well I am looking, and our dear boys are in perfect health, and I hope improving, David particularly in his French.

"I have had the melancholy pleasure of seeing the two colonels of the 79th, who gave me all particulars of poor Patrick, and they really spoke of him with tears, he was so much beloved. I have likewise seen all that remains of the 42nd that we knew, but I am sorry to

say they are very few. I go out a good deal with Lady Keith, making purchases; and I have chosen a good many things for Lord Dalhousie, who is never tired of buying things to send home, and I have likewise chosen for myself, trusting you will admire them. Things here are so beautiful and so cheap, there is no resisting them; but you know I am very discreet. I trust I shall soon have the happiness of hearing from you, and that you will tell me you are coming home."

This was the last letter Captain Milne ever received from his wife. On his return from Bermuda in the *Bulwark*, he was met at Plymouth with the sad intelligence that his wife had died of consumption at Bordeaux on October 4th; and there he went at once to bring home his motherless boys, who had been taken care of by the kind Johnstons, the family of the merchant mentioned by Mrs Milne.

This kindness was never forgotten, as was proved by the following letter, written so many years afterwards:—

"10 York Place, Edinburgh,
"*4th June* 1832.

"My Dear Sir,—I have been solicited by two young friends, to give them a letter of introduction to you. But before introducing them, there is need that I should introduce myself to you.

"The individual who has now the pleasure of addressing you is one of the two persons who, when boys, and bereaved of their poor mother, received such kindness

from your family as they never can forget. We still remember with grateful hearts the kindness which you showed to our mother when dying in a foreign country, and the almost parental affection which you showed to my brother and me when we became orphans in your city. Well do we recollect the hospitality of your house, both in Bordeaux and in the country; and though it would bring back many melancholy associations to see these places and your family again, yet I assure you that nothing would have given me so much pleasure as to have joined my young friends in their tour, and thus have had an opportunity of introducing them as well as myself personally to your family.—I remain, my dear Sir, your faithful and much obliged Servant,

"DAVID MILNE."

CHAPTER II.

Boyhood and Youth.

ADMIRAL MILNE brought his boys home to Inveresk in January 1815, and there they resumed their schooling, and David was, as usual, remarkable for his steady progress. Mr George Home in writing to Admiral Milne says: "I am exceedingly happy to hear David takes so ardently to his studies, of which there can be no better proof than his being generally at the top of his class. I value the circumstance not only as evidence of progress in his studies, but much more as evidence of his being possessed with a spirit of emulation, which may be carried to excess; yet without an ambition to excel, nothing great or good is ever to be expected in any situation in life." And again he writes, "David's talents are evidently of a superior cast, which makes it all the more necessary that he should be under a tutor capable of giving them employment, for employed they must be." This tutor was found in the Rev. Mr Brown, whom Admiral Milne engaged for his boys, and who went with them to sea when he took his boys with him to the North American station. In 1816 Admiral Milne had been appointed to that command, and he hoisted his flag on board the *Leander*. Just, however, as he was on the point of

sailing, the expedition against Algiers was ordered with all speed to be fitted out, and Admiral Milne was appointed second in command, under Lord Exmouth, in that important and memorable armament.

During the passage to Gibraltar, Admiral Milne and his gallant flag captain, Captain Chetham, were indefatigable in training their men to the use of the guns, which were fitted to sights according to an improved plan of Admiral Milne's. Every particular with regard to the efficiency of the ship was most minutely attended to; and, perhaps, no vessel ever went into action in more complete order. At Gibraltar, however, Admiral Milne shifted his flag to the *Impregnable*, and on the 27th August he beheld the fleet off Algiers. The details of the battle of Algiers need not be repeated here, but the important part taken in that glorious day by the *Impregnable* was the main cause of victory. Admiral Milne was despatched to England by Lord Exmouth with an official letter, bearing the most flattering and honourable testimony to his skill and gallantry. Honours nobly earned and too long deferred were now bestowed on him.

He was created a Knight Commander of the Bath, with additional armorial bearings, having reference to the recent victory, to be worn by him and his descendants. He received the thanks of both Houses of Parliament. He was nominated a Knight Commander of the Royal Order of Wilhelm by the King of the Netherlands and he was presented with the insignia of the Order of St Januarius by the King of the two Sicilies. The Corporation of London presented him with the freedom

of the city and a handsome sword worth one hundred guineas; and Lord Exmouth affectionately expressed his regard by sending him a gold snuff-box, with a device expressive of the effects likely to result from the glorious battle in which they had both been engaged, viz., a slave with the chains falling from his hands. In this action Admiral Milne had received a severe contusion from a large round shot; and although for several months he was lame in consequence, he would not allow it even to be mentioned in the casualties.[1]

In 1816, Sir David Milne, accompanied by his boys, whom he placed on the ship's books, proceeded in the *Leander* to the North American station, where they remained either at Halifax or Bermuda till July 1819. Many delicate and intricate questions regarding the fisheries arose between our government and that of the United States; but so wise and just were Sir David's decisions, that the merchants on his leaving presented him with a most complimentary address, recording their esteem and gratitude.

Sir David, on his return home, took as his second wife, Agnes Stephen, who since her early childhood had lived at Paxton. Her parents were great friends of Mr and Mrs Ninian Home in Grenada; and Miss Stephen was brought to this country by the Homes, and educated at Paxton, where she remained as companion to Miss Jean Home; and after Miss Home's death in 1811, Miss Stephen's home was still at Paxton till her marriage to

[1] The above information is taken from a Biographical Sketch of Sir David Milne, drawn up by his eldest son.

Sir David Milne in 1819. She had been a friend of his first wife's even before her marriage, as her affectionate letter to Grace Purves, congratulating Grace on her engagement to Captain Milne, testifies; and the friendship between her and Captain Milne had been of long standing.

For the winter of 1819 and 1820 Sir David took a house in Edinburgh, and sent his boys to the High School—not the building now known by that name, which was not built till 1825, but what is now the City Hospital or Old Infirmary. Sir David was indeed both father and mother to his boys, taking so deep an interest in every detail of their lives, and encouraging them when absent from him to write to him of everything which interested them; and the following letter of good advice, written in March 1820, is a proof of this almost motherly interest:—

"My Dear David,—I am happy you have arranged to write to me on particular days, and your letters will always afford me much happiness, yet I shall not be disappointed if I do not get a letter exactly on the day. Write me whenever you are inclined, and be assured I shall always feel happy to receive your letters. Write everything you have to say; your letters cannot be too long. Those on business cannot be too short, but private letters ought to convey the sentiments of the heart. I do entreat that you pay every attention to your education. Your character is now at stake, and rest assured, it is now the period which will stamp it through life. In all the observations I have made for

many years, I have ever found, that the character a boy had at school, he carried with him into the world ; and whether good, idle, or wicked at school, he was always the same in the world, whatever profession he followed. Your whole time, my dear David, ought to be employed in strictly attending to your education ; every gratification, every pleasure and amusement, ought to be given up for it, as an hour lost at present you never can recover. I have sacrificed enjoyment I might have had in the country, to go to town for yours and your brother's good, and I am endeavouring to give you such an education and accomplishments as cannot be surpassed by the first nobleman in the kingdom. All I want is that you should second my exertions; it is for your good, though it must prove a blessing to me hereafter, and think what it would prove to me were you to act otherwise. Act as you ought to do for my sake, and for the memory of her who is gone, who never left you from the time of your birth till death called her away to a better world. When you think of your mother, I am sure you will act aright."

The following extract from a letter written to Sir David by his son shows how Sir David's strong parental affection was reciprocated by a no less amount of filial respect and affection from his son ; and though of later date, it is appropriate to quote it here :—

"Edinburgh, *Dec. 25th*, 1823.

" . . . I sincerely wish you many happy returns of this season. Since first I was able to express this wish

there has not passed a year when I could not express it personally; but now that I cannot do so, I can only take the less gratifying way of writing to assure you of all that it is possible for a son to wish and feel on such an occasion. The causes that detain me here you know, and I am sure approve of, and I need not say how much pleasure and enjoyment I am obliged to forego for them. The advantages of having done this will, I am sure, appear at the end of the session, when I am ranked among the number of the happy students that have made the greatest proficiency in their respective classes. But I am indeed anxious, and the only anxiety that I have consists in this, that the time should come, when all this knowledge which you have so kindly allowed me to acquire shall be turned to some practical use."

In another letter he writes: "I feel most grateful for all that you have said to me in the way of advice. I assure you that all my time, as well as all my thoughts, are completely and continually occupied with my education. I am fully aware, that the time of life which at present is mine, is very valuable and important, and will afterwards repay with interest the pains that I now bestow on it, nor am I insensible that I enjoy more advantages in my education, than probably falls to the lot of most people." And again he writes: "I have gained here more solid advantage than perhaps in all the former part of my life; and it is not in knowledge only that this advantage consists, it is perhaps as much in the acquirement of good habits and good principles, which I trust will attend and actuate all my future life.

But do not think, my dear father, that I mention this to recount my merits, but to show you how sensible I am of the wisdom which planned, and of the kindness which continued these opportunities, opportunities for the enjoyment of which I can never be too grateful."

After the winter of 1820, David prosecuted his studies with a private tutor till November 1821, when he was boarded with Dr Anderson in George's Square, Edinburgh, and attended the University along with several other young men also under Dr Anderson's care. Three were French from the Island of Mauritius—Geffroy, Dupont, and Faidaille—and the fourth was John Forbes, afterwards Sir John Forbes of Fettercairn, the friendship with whom continued till Sir John's death in 1866. Other members of the family of Forbes were also great friends, especially James Forbes, afterwards Professor of Natural Philosophy in Edinburgh, and in later life Principal of the University of St. Andrews, and also Mr William Forbes of Medwyn, and there are many letters still preserved which had been received from them in those early days.

Sir David had not decided, when his son commenced his College career, what profession the young student should follow. That was left much to his own inclinations. The diplomatic line was the first attraction, and from Mr Milne's varied and cultured tastes, it does seem as if this might have been more congenial than the hard and narrow study of the law. But after consultation with Dr Anderson, the law eventually was his choice; and after the general course of study at the Edinburgh University was over, and he had taken his B.A. degree

in 1824, the study of law was entered into and prosecuted with such diligence, that he passed all the law examinations with great credit, and was called to the Bar in 1826. I have said that Mr Milne's tastes were varied and cultured. During his College course classic literature naturally occupied a large share of his attention; and the carefully written essays on Plato and other Grecian heroes of the olden time testify not only to his industry, but to his love of the classic lore. He won a prize for mathematics, and entered so deeply into the study of astronomy as to compete for the prize offered by Dr Fellowes, LL.D., of Reigate, Surrey, in 1826 for the best essay on Comets, and the gold medal and a sum of fifty pounds were awarded to Mr Milne's essay. He received with them the following gratifying letter from Dr Fellowes:—

"My Dear Sir,—With great pleasure and many thanks, I acknowledge the receipt of your admirable essay on Comets. I have read all the notes and reperused a portion of the essay itself with great and increasing satisfaction. You have shown how it is possible to write on most abstruse questions, so as to make it interesting to a general reader, and to familiarise the most obscure and complicated part of astronomical science to an ordinary understanding. No one can read your essay without being intellectually edified, and I should hope religiously improved.

"In contemplating the sublime theme in the way you have treated it, additional strength must be given to the sentiment of adoration. It manifests those

truths which tend to relax the hold of inferior interests upon the mind, and to lead it to think that in the temple of science it may procure gratifications, which grosser and more sordid pursuits can never give.

"I have much pleasure in forwarding you the gold medal. I wish the skill of the artist had rendered it more worthy of your acceptance; but such as it is, I hope it will be long retained by you, and hereafter operate as an incentive to your son to imitate your diligence, and to aspire to similar pre-eminence in the noble strife of intellectual competition.

"I have very little knowledge, but the little I have teaches me that it was an evil day for man when a separation was made between theology and science. Theology, rightly considered, comprehends all the sciences, for all have a reference to the Deity. In Him they begin, in Him they end, and they all exhibit His agency and manifest His will.—Believe me, dear Sir, very truly yours, ROBERT FELLOWES.

"It will at all times give me pleasure to hear from you when your leisure permits, and it would give me great pleasure to see you if business or amusement should ever bring you to London.

"I have once been in Coldstream, but so many years have since elapsed that I have hardly any recollection of the place beyond that of the bridge and the river. I am not likely ever to travel so far North again, but if I did, I should cheerfully avail myself of your proffered hospitality."

James Forbes wrote when acknowledging receipt of this essay, that he was very grateful to have been so incited by his friend to the study of astronomy, and that, next to the comfort of religion, there was nothing more elevating and soothing in a time of sorrow. And the following interesting letters from James Forbes, showing the depth of their early friendship, may appropriately be given here:—

"Colinton House, *Nov. 28th*, 1828.

"Dear David,—Can you conceive the pleasure I feel, after spending great part of the years of my youth in the pursuit of the noblest of sciences, and during which I never met with one heart which could be touched with feelings which warmed my own,—now to have found in *you* the very man I sought, the friend too of my family, esteemed by all who can estimate solid worth, and esteemed too by *him* (his father, Sir William Forbes) who is now gone, and whose opinion was to us a rule.

"May the mental connection we have formed, far stronger than any tie derived from external circumstances, continue unimpaired till death. A friend is a "*rara avis in terris.*" How very few have I found among my contemporaries, and almost none beyond my own family! You may conceive, therefore, the value I put upon you, whom I have indeed loved with a brother's heart, and meeting with whom I look upon as one of the happy incidents with which a kind Providence has gilded the past period of a life like mine, the even

tenour of which has not been without some darker shades.

"How deeply I feel the force of your exclamation on your much engaged time with your legal studies. You cannot suppose it has escaped me, though my remarks have been secret, your noble sacrifice to the duties of your profession. Do not be discouraged. The power of the expanding mind is irrestrainable, and I do hope I may live to see you in the situation of such ease and leisure as your best friends could wish.

"As a very insignificant member of the scientific world, I thank you for having brought to light your valuable essay on Comets, which will tend to spread a love of astronomy wider and wider along with the fame of its author. I assure you I hear the most flattering commendations of it, without a word on the other side.

"I need not apologise for subscribing myself, in adversity, as in your present well-earned triumph, your faithful friend, JAMES FORBES."

"London, *June 3rd*, 1831.

"My Dear David,—I cannot acquit myself of great neglect in not writing to you sooner, so instead of seeking an apology, I shall try to amend my fault. I have been here the best part of six weeks, and I can now safely say, what I hardly ventured to expect on leaving Edinburgh, that my visit has been productive of pleasure and advantage, far beyond what I could have hoped for. I have been delighted by the affability

of the men of science here, which very speedily put to flight the thousand and one awkward forebodings I had before entering into so new a world.

"The circle of my acquaintance has become very large; and I fervently hope that some of the connections I have formed may ripen into friendships, so much have I had reason to admire the personal as well as literary character of some of the men I have met. I have been at pains to go to all the meetings of Societies, and to make as much of my time as possible.

"It would be vain to attempt giving you any idea of the people who have most interested me—I must leave that, as far as it may interest you—for conversation. I spent a day and night last week with Herschell at Slough; but, unfortunately, the evening proved so unfavourable, that I had hardly a glimpse of the telescopic wonders. I had, however, a pretty good view of Saturn, with a twenty-eight feet reflector, and saw five satellites, which are all it ever shows. The night before last I went to Sir James South's Observatory at Kensington, where a large party was assembled to see the occultation of Jupiter's by the moon. It was rather amusing to see a battery of sober people sitting up till three in the morning, as if they would take the heavens by storm, with every implement from sixteen feet achromatic and eight inches aperture, down to the humble two feet!

"The night proved fine, and a beautiful observation we had. I cannot help still feeling as if *you* had something to do with astronomy; but I should be more in your way were I to tell you of the geologists, with whom I have associated more than any other set. In

fact, their Society is at present by far the best in London. At the last meeting we had Herschell, Babbage, Buckland, Conybeare, Murchison, Lyell, Philipps, and, in short—everybody.

"The discussions on the papers were most animated. But of all the geologists, perhaps both the ablest and most agreeable is Sedgwick, which brings me to mention my visit to Cambridge, the pleasures of which I can describe in no adequate terms. It was probably the happiest week I ever spent in the course of my life. Sedgwick and Whewell are two stars of the first magnitude in every respect, and Airy is a perfect giant of intellect and perseverance. Whewell told me that he doubted whether there was another man in Europe who could or would have made out Airy's new "Solar Equations." But for variety and profundity of attainment, powers of conversation, love of science, disinterestedness and affability, Whewell and Sedgwick stand unrivalled. It was to me quite refreshing to see the noble spirit in which unmercenary science is prosecuted at Cambridge, in a spirit which I see nothing of in Scotland, and little anywhere else.

"I fear that you will think this letter a very dull one, with nothing of what you politicians call news.

"By the by, strange to tell, I have begun to study political economy, in a new form however; it is Ricardo's system reduced to algebra by Whewell.

"Pray write me soon some of your Autobiography.—Believe me, your very sincere friend, JAMES D. FORBES."

Very early in life Mr Milne's turn for geology

showed itself. In 1820, when he was only fifteen, his father sent him from London a box of mineralogical specimens labelled and numbered, that he might compare those he already possessed with the box of specimens, and name his own correctly. And in August of that year David writes to his father of an expedition to the Trossachs, and that he had brought back specimens of mica, with garnets. The study of geology commenced so early was Mr Milne's recreation through life. He had attended the lectures given by Professor Jameson on Natural Philosophy, and there was much correspondence between them in after years on the subject of Geology. What Mr Milne accomplished in this department of science will be mentioned later. But we must now resume the thread of our narrative. Mr Milne commenced his professional duties as advocate in the winter of 1826, and lived alone in lodgings in Great King Street, his first experience of a solitary life. But the sound advice, and the assurance of such hearty sympathy which he received from his kind father, must have been no small support to the young advocate. Sir David wrote: "I am well aware, my dear David, what your feelings must be, when for the first time you are left to yourself; but you have only to persevere as you have hitherto done, and everything will go on well. My opinion has always been, that in Scotland a young man has little chance at the Scottish Bar without strong family connections and political interest, neither of which I have, but talent will always force its way. This you do not want. By what I hear from various quarters, your application, abilities, and

speaking are highly thought of. Put yourself in the way of everything you can, and you will soon bring yourself into notice, and I have no doubt of your success."

Yet too much putting of oneself forward must be deprecated, for at a later date Sir David writes: "You are now entering into the world with a very fair and good character—indeed, I may say brilliant—therefore you have the more need to be careful. The least false step will cost you years, if ever you get the better of it. Avoid with all your power giving way to the attention and flattery of others; rather doubt your own abilities, and let them come out without putting yourself forward, and then the same in your profession, —I mean in speaking publicly in any case you are engaged in, do not hold out to any one the point of defence or attack you mean to make; reserve that to the time, and it will have more effect.

"I wish you had mentioned to me your intention before joining the small club at Mr Boyd's, and given the names of those belonging to it, and who Mr Boyd is! You cannot be too careful in this. You must be very cautious who you associate with. There are only two ranks in society—high and low; if you cannot command the first, on no account join the other, whatever attention or flattery you may receive, but wait and court the opportunity of getting into the first."

In answer to this letter his son wrote:—

"My Dear Father,—I am fully aware how much now depends on my own discretion. I have embarked on

the voyage of life, and I have already found that there are many dangers to be avoided, and many disappointments to be endured. But I have to thank Heaven for having given me a parent who has instilled into my mind the best instructions, and to whose early discipline I am indebted for those unshaken principles of morality which enable me to go forward without harm in this world of corruption. But I am not so presumptuous as to imagine that I can rest securely on my own prudence. There are many difficulties which I expect to meet, and where I must resort to your experienced hand for aid and guidance; and I fervently trust, my dear father, that you may long be spared, as well for your own enjoyment of life as for the happiness of those in whose welfare you are interested.

"The small society I have joined is comprised of seven individuals. It is quite private, and all are animated with the desire of improving themselves in their knowledge of law and facility of speaking. The names of the members are Archibald Boyd, advocate, of Broadmeadows; Richard Trotter, advocate, of Morton Hall; William Forbes, Lord Medwyn's son; and two others, whose names are Riddle and Macdonald, advocates. Lord Medwyn's son asked me to join; and though I have only yet been twice with them, I have no reason to regret it, and I am sure when you know more, you will have none that I have joined them."

Mr Milne undertook his first case in December 1826, and by the following summer he was occupied with several cases, and had as much to do as he had

time to undertake; and "though," he writes, "these cases are not attended with much importance or difficulty, and the celebrity of the advocate may not extend by their means much beyond the precincts of the prison, yet they are calculated to give a facility of speaking and an acquaintance with forms which will prove eminently useful in a higher field of employment."

In September 1827 Mr Milne went on his first circuit to Perth, Inverness, and Aberdeen, and found it a very pleasant tour, both on account of the wildness and beauty of the scenery and the hospitality of friends at Megginch, Calrossie, etc.

Mr Milne had now a comfortable home in Edinburgh, for in July 1827 Sir David bought a house in York Place. Sometimes he resided there himself; but the country had always greater attractions for him than the town, and Sir David made his home chiefly at Milne Graden, which estate on the banks of the Tweed he had purchased in 1821.

It had been the wish of Sir David's father, Mr Milne of Campie, Musselburgh, to purchase for his son an estate larger than the domain of Inveresk; and shortly before his death in 1818 he had corresponded with Mr George Home of Paxton on the subject. He was unable to come to any decision, but it must have been a satisfaction to Sir David to consider, that in purchasing an estate, he was only carrying out his father's intentions. The new property gave him ample scope for occupation. There was no house on the estate save one so poor it had to be pulled down; and after the present mansion

was built, the farmhouse and offices and the cottages on the West Mains were erected, and the land had to be drained, for where the arable fields are now there was then nothing but a swamp. Both the shooting and fishing afforded pleasant recreations for Sir David's sons whenever they had a holiday from their different avocations. The younger son Alexander had entered the navy at the age of thirteen, when he went to the Pacific Station with Captain Basil Hall in the *Conway*. He came home in 1823, and spent the following winter in Edinburgh with his brother to attend classes there.

CHAPTER III.

Lancaster Assizes.

In August 1828 Mr Milne went to the English Northern Assizes at Lancaster. He had been strongly advised to do so by Mr Bell, the Professor of Law in Edinburgh. Mr Milne wrote to his father: "Professor Bell said I would see the whole Jury Court business conducted with a regularity and correctness of which we have no idea in our Jury Court, that I would also be made acquainted with the English manner of pleading, so much superior to ours; and that he would himself give me letters of introduction to Judge Bailey, Henry Brougham, Alderstone, and all the most eminent men in that circuit. He urged me to go with much earnestness and repeated assurances that it would prove of service to me, that had it depended on myself alone I should at once have promised to go. May I therefore request that you will give me your opinion regarding the proposal. Professor Bell also spoke much to me about the English Bar, and told me, in the most affectionate and candid manner, what he thought I should do for my future advancement in the profession. He said that he should very strongly recommend me to qualify myself for practice at the English Bar. Not that I should leave the Scotch Bar by any

means, but only be prepared for any path of preferment which might present itself in a higher and nobler field, and, indeed, on several occasions he has spoken to me on this subject. Sir William M. Bannatyne has tendered to me exactly the same advice, but I have never mentioned these occurrences to you, lest you should think my acquiescence might augur either fickleness of mind or dislike of my present avocation."

But Sir David did not suspect his son of any such motives, and very much approved of his attending the English Assizes, especially with such letters of introduction, without which, however, he said it would have been to little purpose. Mr Milne drew up an account of his tour, possibly with a view to its publication, which, however, does not seem to have been carried out. But its interest, relating to those who attained to such eminence, may be even greater now than could have been the case at the period when it was written.

Rough Notes of a Tour to Lancaster Assizes.

"On the 20th August 1828, I set out from Milne Graden for Lancaster, to see the proceedings in the Jury and Criminal Courts at the Assizes there.

"All legal matters are conducted on so much greater a scale in the English Courts, that both for despatch of business and perfect facility of operation, they afford subject of instruction, to which our Scotch Judicature cannot pretend; and the greatest quantum of

business is generally to be found at Lancaster, comprehending all the mercantile concerns of the west of England. Professor Bell had given me letters of introduction to Judge Bailey, Henry Brougham, and David Dundas; and John Tait had given me letters to James Park and William Brougham. With these passports, and the sum of twenty sovereigns in my pocket, I stepped into the Wellington coach at Coldstream. Long as I had resided in the neighbourhood, I had never seen any part of Northumberland. The face of the country is remarkably different whenever we pass Cornhill. Small round hillocks compose the whole of this district. The road mounts over their tops, or winds around their base in perpetual and amusing succession. The geological features on this account are extremely interesting. I observed that these hillocks, which are so regular as to have much the appearance of artificial mounds, are composed entirely of alluvial soil. Not a vestige of rock anywhere appears. It is for this reason that all the houses shortly after leaving Cornhill are built of brick, and the dykes on farms and sides of the road are constructed of the round stones, picked up from the surface, or extracted from the interior of these hillocks. It is another consequence of these geological peculiarities that the soil is remarkably fertile, as there is no soil more favourable for agricultural purposes than the alluvial. But how have these hillocks of sand, gravel, and clay which extend to the Cheviot hills been formed? They cannot have been produced by the Tweed, which flows at an immense distance off, and at a lower level,

and there is no other river to which these effects could be attributed.

"In travelling along, surrounded by these extraordinary appearances, a theory came across my mind. I will now explain it. There is hardly any part of the world where indications have not been found of the Deluge, and I conceive that no place can afford more striking proofs of its operation than this district of Northumberland.

"It has been demonstrated by Sir James Hall in the seventh volume of the Transactions of the Royal Society of Edinburgh, that the direction in which the diluvial waters flowed in the neighbourhood of Edinburgh was about W.S.W.

"Let us assume some point very near this to have been the direction also for this part of the country; for at this small distance, if there were any difference at all, it could not be much. The Deluge, therefore, must have rushed across the Cheviots, which from their direction must have presented a longitudinal barrier to the force of the waters. It is natural to suppose that the effect of the torrent would be to carry off from the south-western slopes of the hills a large quantity of their looser materials, and these would be transported across the ridge, and there deposited. Imagine, therefore, the northern slopes of these mountains, down as far as the Tweed, covered with the loose alluvial soil which had been transported by the waters. All the rocks, therefore, that might formerly have been visible in the district would be covered up by the aggregation of small stones and boulders, as at present deposited in the

soil. In process of time, the rains would form gutters in this even district, and would easily wear away the alluvial soil, so as to form deep and numerous gullies. The formation of these gullies would, of course, produce corresponding hillocks, which would assume a regular and rounded shape, from being composed of materials which easily yielded to the influence of the waters. Thus we see why the whole of this country is intersected with streamlets, which are perpetually wearing away the soil through which they run. The effect is altogether novel and striking. The surface of the country resembles the ocean when it is swollen by a gale into big and mountainous billows; and if the billows could be conceived to be suddenly converted into earth, this would afford a tolerable picture of the appearance which the country presents between Cornhill and Wooler. I observed in going along that all the faces of the hills which are exposed front the south-west. This circumstance is peculiarly visible in the stage between Wooler and Whittinghame. Some hills on the left hand, called Hepburn Hills, are very striking; but there were various hills beyond Whittinghame whose names I could not learn, which also presented evidence of the same fact. As we ascended the country among the hills, rock gradually became visible. The farmhouses and cottages were no longer built of the red and hideous brick; and yet even in that construction, in their various little appurtenances, they showed their superiority to the Scotch. It is indeed an extraordinary fact that the English are much more neat in their ideas and arrangements of domestic affairs

than we are. Every cottage that we passed had its little garden, with well-kept walks, and ornamented with tall hollyhocks, carefully tied up. Most frequently, too, a plant of honeysuckle or ivy was trained over the door and windows, and the flowers threw a sweet fragrance and lent a cheerful aspect to the spot; and the people are more neatly dressed, are more civil in their demeanour, and wear on their countenances a more contented and kind-hearted smile than is ever witnessed on the north side of the Tweed. But I have now arrived at Newcastle, the great bell of the neighbouring church is striking twelve at night; and as I must start for Carlisle at 6 A.M. to-morrow, I now lay aside my pen and my imagination.

"*August* 21*st*.—I started this morning at six o'clock. The weather, fortunately, was fine, and our road lay over a very pretty country. When we reached Hexham, the coachman told me that all the land upon the road extending for many miles belongs to Greenwich Hospital. When the Earl of Derwentwater's lands were confiscated and he forfeited his head, this Hospital obtained these lands from the Crown; and judging from their immense extent, as well as high state of cultivation, the revenue must be very great. We followed the course of the Tyne meandering among the hills about ten miles or more beyond Hexham. The scenery at several places was very picturesque; thick forests clothed the slopes of the mountains, and often fringed the banks of the river, down to the very edge of the water. The banks are not in general high, but here and

there the ruins of some ancient castle are seen perched upon a rising eminence to guard the passage of some ford. There is something more solemn and imposing about the ruins of an ancient fortress than belongs to it even in the season of its strength. They give wings to the imagination, and the mind wends its way back to the scenes of bloody exploit of which these ruins have so often been a witness. They remind me of the grey-headed veteran warrior who has reaped the full harvest of glory, and who lives to recount to the rising generation the gallant deeds of his younger days. There is one of these castles about half a mile to the east of Hexham, which belonged to the Earls of Derwentwater, and within whose walls the last Earl was buried. A silly curiosity caused his body to be searched for some years ago, and it was gratified by the discovery of the remains. The stage from Hexham is a very long one. We changed horses at a considerable town which goes by the extraordinary name of Haltwhistle. The origin of the name puzzles me, but there must be some romance connected with it.

"We reached Carlisle at half-past two. I walked into the hotel where the coach stopped, but so execrable an inn I had never beheld. A little girl waited on me at a miserable dinner. She could hardly understand what I said, and when she spoke I could scarcely catch a single word. The peculiarity of the dialect seemed to be to chime all the words together, like a person playing musical notes who does not understand the difference between a quaver and a semiquaver. The house reeked with tobacco, the floors yielded to my feet as I

paced the room, the partitions creaked, and through the chinks of my bedroom wall I could perceive my neighbour's trunks and chattels. In short, I found myself so uncomfortably housed, that instead of remaining in Carlisle all night, I sent to take a place in the mail which passes through Carlisle at 6 P.M. I do not know the name of the inn, or I would record it in order to avoid it should I ever be here again. But it is of no consequence, as I shall not soon forget the house, even without a name!

"LANCASTER, *August 22nd.*—I obtained a seat on the top of the mail from Carlisle; but, unfortunately, experienced all the unpleasantness of a rainy night, and it was impossible to have more than a glimpse of the mountainous and very picturesque country. When we arrived at Penrith, which is about eighteen miles from Carlisle, darkness had set in. It seems to be a very considerable town, and the situation pretty. One stage was now entirely mountainous. We rose for the space of five miles, and then travelled along a level waste of the blackest aspect that can well be imagined. The moon now and then burst through the thick covering of clouds, and disclosed to us a few scanty views of the surrounding country. The cold wind, accompanied as it was by occasional showers, was most uncomfortable; and by the time we had crossed the Shap Fells, which is the ridge of the mountain range, I was terribly benumbed. When we arrived at Lancaster, I got down cheerfully in the hopes of finding a good warm berth; but what was my horror when I found that all the inns were already quite full, and no accommodation to be got! The rain still

continued to pour, and it was half-past ten o'clock, and nobody could be seen in the streets, except the people of the coach, which was again just setting off. I walked up and down, not knowing where to turn, till at length a tall, thin man in a green surtout came up to me and said if I wanted a bed, he would give me one. I thanked him most cordially; and though I had no conception of the place to which he was to conduct me, or the nature of his intentions upon me, totally a stranger, I willingly accepted his proposal. I walked on, and after a variety of turnings and windings he rapped at a door, and we entered a dark passage. There he asked me to wait till he procured a lantern, and I was then marshalled upstairs, and found myself in a small but neatly furnished room. I have slept soundly all night. My host (who turned out to be parish clerk) and his wife are very attentive, and I am quite reconciled to my situation. They have given me an excellent breakfast of muffins, cakes, and shrimps, with tea and coffee, so that I am heartily refreshed, and must now set about my legal business.

"I have fallen in with Mr Dundas at the Court. I made myself known to him, and he received me with great politeness. He explained to me the methods of procedure, and pointed out the different individuals of eminence at the Bar. The Courts are remarkably handsome, not plain, blank rooms, but highly ornamented with sculpture and paintings. The judges take the criminal and civil business alternately, so that Judge Bailey would take the latter at Carlisle, and then perform his duties in the other at Lancaster.

"I had a great treat in hearing Brougham speak for a short time in some unimportant cause. The peculiarity which renders him so great a speaker is his power of fixing the attention. He has the appearance of being completely master of his case, speaking with an easy and confident tone. His countenance also aids much his power of securing attention, for the contour of his features is very uncommon. Of a sallow complexion, long and hollow cheeks with large wrinkles, worn by laborious study, he bears on his front the evidence of genius; and we are inclined to inquire who the individual is, even before he begins to speak. An extraordinary nervous affection also adds considerably to his power of commanding attention; the twitch in his nose and upper lip is perpetually giving to his features a variety of expression, for which we look in vain on the countenance of a man whose muscles are always unmoved. His sentences are sometimes long and complex, in which case he always takes care, for the sake of perspicuity, to repeat the word on which the meaning of his sentence hinges. Sometimes, however, the sentence is so short as to consist of no more than five or six words. He has not much gesture, a favourite but most awkward habit is to place his left hand on his left hip, and in general when he is animated he applies the forefinger of his right hand to the palm of his left. He never takes his eye off the jury when he has once commenced, and never interrupts himself in the course of his address, as we too often do in our Courts, by referring to notes or papers. When he has thus secured attention, he never allows it to wander,

but, like the snake which fascinates by its very look, he continues speaking to the jury with his eye steadily fastened on them. But I shall be able to give a better account of his pleadings and the other business of the Court to-morrow.

"*August* 23*rd.*—This forenoon I repaired to the Civil Court, where I was immediately introduced to a host of barristers. Mr Brougham shook me cordially by the hand, and he then introduced me to Sergeant Williams who was sitting by him. Both of these individuals gave me their briefs to read. These briefs furnish to counsel all the information necessary for them to prepare a case. The matter consists, *first*, of the Declaration, which is the indictment; *secondly*, the Plea, which is the defender's answer; and, *thirdly*, the Rejoinder, or Re-rejoinder, follow. When thus the judicial proceedings are related, the attorney proceeds to give a statement of his case and private instructions to counsel, and the whole is concluded with the depositions of the witnesses. All this is written in a very beautiful and distinct hand, not in the hurried and careless manner in which our Memorials are drawn out.

"Sergeant Williams' fee was marked on the back of his brief, £8, 8s.. and Mr Brougham's fee was £4, 4s. Soon after I had read one of those briefs, the case it related came on for trial. After the plaintiff's case, which was very ably conducted by Sergeant Pollock, was concluded, Brougham rose and commented on the evidence against him. Brougham speaks uniformly in a very slow and articulate tone, pronouncing distinctly every syllable, and not running his sentences one into

the other, as is often the case. His manner is at the same time dignified and impressive, so that the attention of the jury is secured as much by his commanding deportment as by the interest of his discourse. But an advocate, if he is slow in delivery, runs the hazard of being tedious, should he allow the conception of his audience to run before his statement, and anticipate him in what he is going to say. But in Brougham's speeches there is nothing superficial; so that though he moves on slowly, there is a depth in his reasoning which forethought cannot easily fathom, and the conclusions from his remarks are too far removed from common apprehension to be seen before he embodies them in his own language. In his addresses he seeks for no flowers of rhetoric, though he does not despise the arts of sophistry.

"Often he raised difficulties where none in reality existed, in order to throw doubts and obstacles against the evidence of the opposite party, and to-day he used more gestures.

"It is strange that though Brougham has so strong a faculty of seizing on the attention of the jury, yet his eye, to which the countenance is most generally indebted for expression, is exceedingly dull and heavy. There is a thickness and apparent stupidity hanging on the eyelid, which accords little with the animation of his gesture and the eloquence which sits upon his lip. I begin to think that Brougham is a glorious example of what labour and perseverance may effect, rather than that of an original and native genius. For heaviness and languor of the eye is seldom united with the brilliancy

and fire of highly gifted talent, but this appearance is perfectly consistent with an understanding which has been stored with knowledge and acuteness acquired by dint of laborious study; and we know that the efforts of Brougham, when pursuing his studies in Edinburgh, were truly worthy of a Demosthenes. I have been told that he used frequently to spend seventeen hours in the course of the twenty-four in hard study without even touching food, and this has been very much the life he has led since he entered on the active duties of his profession. It is an example worthy of imitation, when we consider the honourable station which he occupies in society, and the vast influence which his talents have conferred on his name. And what compared with Brougham's midnight and morning labours are the studies of some young advocates? An unwilling perusal of Erskine, a partial poring over Hume, a temporary attendance at a debating society, and a frequent attendance at Balliol Theatre!

"I afterwards went into the Criminal Court. The procedure there is very different from ours. First, the indictment is explained to the jury by the clerk of the Court; then the counsel on the side of the Crown, and who is merely the barrister chosen by the injured party, states the case, and calls witnesses to support his allegations. The prisoner's counsel are not allowed to make any defence. They can only examine witnesses and cross-examine the prosecutor's witnesses. The chief peculiarity of the English system is that counsel can make no address to the jury in favour of the prisoner. When the counsel for the Crown, therefore, enters into

particulars, and gives a strong colouring to the facts, manifest injustice is done to the prisoner, who cannot be expected to cope with a learned barrister. It may be said, perhaps, that the judge then advocates the cause of the prisoner. But how much more consistent is it with the character of a judge as it is with us. He animadverts equally on both the prosecution and the defence, and does not enlist himself on the side of either party.

"I am told that a Mr George Lamb has several times attempted to assimilate the English practice in this respect to the Scotch mode of procedure, but the proposal has always been rejected. Mr Justice Bailey observed to me that he thought the English system would answer much better were the address on the part of the Crown to be abolished and merely the evidence allowed to be laid before the jury, with a summing up by the judge; at the same time, he did not deny that the system in Scotland is much superior to the English plan.

"I received a letter from both the judges asking me to dine with them. Justice Bailey is a joking, jovial fellow, and makes a good companion at the dinner table. He tells a good story, and has no objections to allow a joke to be passed at his own expense.

"After dinner we went into the adjoining room, where we found the great Baron Pollock seated by himself. He had just finished dinner, and he nodded to each as he recognised them, and to me when Justice Bailey introduced me. Then he said: 'Well, gentlemen, I presume you have been drinking my health; so here's to you, Mr Milne, Mr Malton,' etc. He then talked

familiarly of the proceedings of the day. I should think Baron Pollock an acute lawyer and a well-bred gentleman. Both judges were very kind to me, and I shall ever be grateful for their attentions."

After the business of the Assizes was concluded at Lancaster, Mr Milne visited Kendal and the English Lakes; and the following description and reflections are of value, as they give a deeper insight into the character of the subject of our Memoir, showing his romantic and poetic turn of mind:—

"Soon after leaving Kendal, hills were seen before us and behind us, and the road was often so steep and rugged that we travelled at a very slow and difficult pace. The country, before beautiful, now became barren. Bare rocks and ugly morasses sickened the sight and made the mind long for a sight of the verdant meadows and cheerful variety of cultivation. At length we came suddenly on the lake of Windermere, and no change could be more sudden or more gratifying. The lake was calm and unruffled, like the peace and happiness of childhood; not a wave was stirring to ruffle its placid surface, and not a cloud rested on its bosom. Its overhanging banks are adorned with thick masses of wood, which skirt the very edge of the water. The bold and rocky outline of the mountains is finely contrasted with the soft and verdant beauty of the sloping banks, and present a picture which is again faithfully portrayed on the glassy surface of the water. A little island here and there is seen on the lake, sometimes consisting of a strip of velvet pasture, and sometimes a tuft of trees. I never beheld so enchanting a picture.

The heart feels sensations of pleasure in viewing such scenes, which can neither be described nor accounted for. I can understand why we love to contemplate the charms of human beauty; but why the soul finds pleasure in the combination of mere natural scenery, I am at a loss to explain. Yet away with all metaphysical lucubrations in describing the enchantments of this lovely spot, and away from our thoughts the recollection of the tameness and coldness of artificial society. When we behold such a scene as this, the mind of man puts off as it were the reserves of civilised life. The statesman for a while forgets his projects of ambition, the soldier thinks no more of drums and pipes and ambuscades, and the lounger throws away his mask of wiles and sophistry to join in the common admiration. You find on this little spot of Great Britain mortals of the most opposite natures of various nations, and following the most different pursuits. Noblemen have purchased little country seats, which with the vain idea of improving the beauties of nature they have laboured to ornament, and succeeded, alas! only in disfiguring. Cambridge students arrive with the avowed intention of reading, but on their departure they find that their time has been more spent in sailing matches than in following the footsteps of syntax.

"And I do not wonder that those whose time and repose are swallowed up in the overwhelming tide of business, or in the more dangerous vortex of worldly pleasure, fly to these quiet, sequestered valleys for the enjoyment of peace and content. I do not wonder that they seek to renovate the vigour and energy of

constitutions exhausted by laborious study, or wasted by the excesses of intemperance, with the healthful breezes of the mountain air. And the invigorating exercise which an admiration of the scenery promotes is equally calculated to strengthen the intellectual powers as to benefit the body; accordingly, it is to these scenes that Brougham invariably resorts when his health requires to be recruited.

"It may be expected that I observed much of the geology of this part of the country. But I confess that my mind was so wholly absorbed in the more magnificent and attractive charms of the scenery, that I turned away occasionally with but little relish to examine the rocks of the district. I could, however, perceive that the rocks were generally primitive in the immediate vicinity of the lakes. The primitive slate is most abundant, and occasionally there appeared a species of granite resembling the sienite. There are large quarries of the slate in various parts, and the rock may be split into fragments so large that they are often employed to make fences by single stones being placed upright and in a line together. The limestone of the coal formation occurs abundantly near Kendal and Penrith; and in these strata may be observed one important circumstance much founded on by the Neptunists, that they seem to be all reposing upon the older formations. The cropping of the strata is uniformly towards the mountains; at least, this phenomena was very manifest during the district between Kendal and Penrith.

"On nearing Keswick we obtained a fine view of

Derwentwater. It did not strike me as being so beautiful as Windermere; but this may have been owing to my own situation at the time, for when I saw the former it was with all the cheerfulness which a morning journey inspires, and under all the excitement which novelty creates; whereas, when I beheld Derwentwater I was broiling on the top of a coach in the heat of a midday sun, and I had no time to remain at Keswick to see any of the curiosities with which I am told the neighbourhood abounds. The drive from Keswick to Penrith is uninteresting and tedious.

"We passed along the foot of Skiddaw and the Saddleback, which rise up to an immense height above the plain eastward of Keswick. The only circumstance of amusement was the artless simplicity of the boy who drove me. He was describing a Druidical circle of stones which the Guidebook denominates as 'Long Meg and her daughters.' These stones form a circle about eighty yards in diameter; they are generally from twelve to fifteen feet in girth, and about ten feet in height, but there is one much larger, which I suppose must be 'Long Meg' herself, which measures eighteen feet in height by fifteen in girth. The boy told me that some years ago there was a church being built in the neighbourhood, and that several of these Druidical stones were taken for the purpose; but when the people returned to their work on the following day, they found to their infinite astonishment that the stones had gone back of themselves to their original abode! And the boy further said that whenever a piece is knocked off any of them, there is the appearance of blood oozing out! This boy

was thirteen years of age—so much for the enlightened condition of the people in Cumberland, for this lad believed every word he told me!

"It is unnecessary to say more regarding my return journey; suffice it to add that I have derived very great pleasure and considerable instruction from my tour. I have seen judicial proceedings carried on in a much abler and more dignified manner than what is customary in our own Courts; I have formed acquaintances which, whether they prove useful to me or not, have extended my knowledge of human character; and I have travelled through a country more beautiful and romantic than any I ever beheld, and which has only excited in my mind the desire of visiting its lakes and mountains again whenever I have time at my command."

CHAPTER IV.

Legal Practice.

In November Mr Milne returned to Edinburgh, and I find the following entries in his notebook:—

"*November 20th,* 1828.—I dined to-day with Lord Medwyn, and met Sir Alexander Wood, his brother-in-law, and Lady Wood. Lord Medwyn's family are uncommonly pleasant, and William Forbes (Lord Medwyn's son) is an intimate companion of mine.

"I admire Lord Medwyn exceedingly. Stern and strict on the Bench, he unbends his brow of judicial gravity when he joins in the domestic circle; and the great Judge, in whose hands is the disposal of so many vast and intricate rights, and before whom the ablest lawyers have to succumb, may be seen at his own fireside with his children, condescending to join in their sports. It was a beautiful picture to behold this tender affection bursting forth, when no longer suppressed by the hard and austere forms of magisterial dignity. He is fond of his family, very fond, and there is on that account a sincere reciprocity of affection.

"*November 21st.*—George Dundas mentioned to me this evening a good anecdote respecting Lord Bannatyne, now Sir William Macleod Bannatyne. On the day when the statue of Duncan Forbes (President Forbes) was erected in the second division of the Court, Sir

William was so absorbed in admiration of the great man on whom this honour was conferred, that he could not avoid continually keeping his eye fixed upon the statue, notwithstanding the business of the Court; and so entirely was he wrapped up in the thoughts of Duncan Forbes, that during the whole forenoon he signed the various papers put before him for signature with the name of Duncan Forbes instead of his own.

"I have made an agreement with George Dundas (afterwards Lord Manor), advocate (son of Dundas, W.S., St Andrew Square), to read law with him every evening, and we have commenced by reading Bell's 'Commentaries.' He comes to me this week, and I shall go to him next week.

"*November 27th.*—I feel much fatigued with the incessant labours that occupy my time. I am so involved in business of various sorts, that I am now scrawling this at the fag end of my daily labours at one in the morning, and yet I have not done all that I ought." This work, however, was not altogether legal, for he writes:—

"*December 5th.*—I feel much depressed. Want of business gives leisure for melancholy reflections, but let me have courage. Lord Corehouse was ten years at the Bar before he paid the price of his gown."

In the winter of 1828, the discovery of the horrible murders by Burke and Hare sent a thrill of horror through all Edinburgh. Several individuals had disappeared; and at last the recognition of a well-known beggar in Dr Knox's dissecting room, the very day after he had been seen in the streets, aroused suspicion.

These suspicions were traced to Burke and his wife, and to Hare, who afterwards turned King's evidence. Burke had applied to the governor of the jail, Captain Rose, to recommend him to counsel. Mr. Milne's name was given, and he was requested by Burke to undertake his case. Mark Napier and Hugh Bruce were the counsel for his wife, and Duncan M'Neill and Patrick Robertson were the counsel for Hare. The young advocates were so horrified with the case, and the intricacies of the plot were so difficult, that they went to the Dean of Faculty, Sir James Moncrieff, to tell him of their horror and perplexity, and he undertook himself to conduct the case. It must indeed be awful experience for a young advocate to be brought into contact with such desperate criminals; and Mr Milne fully realised this, for he wrote in his Journal:—

"*December* 16*th*, 1828.—I have been occupied all day in the jail examining the two *socii* in the case of the Burkes to be tried for murder. I cannot dwell upon the infernal atrocities which were disclosed to me in this examination by relating them here. My mind is too much engrossed with the horrible images which this day's work has presented. My nerves are even agitated, and I fear to go abroad in the streets at night, or even to trust myself in the house in darkness. The image of that monster, who is my client, is for ever flitting before my thoughts, and poisons every source of ordinary enjoyment. In the dreams of the night, I expect my short sleep to be distracted with fearful impressions of the dreadful horrors which are pictured, and which will ever be fixed in my memory."

In Lord Cockburn's *Life* it is stated that though the indictment was for one murder, it was fully believed that in all there had been sixteen!

Mr. Milne writes, December 24th: "I assisted in pointing out to the senior counsel all the contradictions as they appeared in the evidence, and on these chiefly the Dean rested in his most admirable defence of Burke, which lasted two hours and a half. Sir James Moncrieff, though not eloquent, is extremely energetic and impressive. His language and thoughts have not much of the weight of genius and splendid conception, but he throws a fire into them from the enthusiasm with which he is kindled, and this magnifies the importance of all the points which he brings forward in defence; and the solemn, deliberate, and serious manner in which he speaks produces an astonishing effect. The Lord Advocate's (Sir William Rae) address to the jury was very good. Cockburn (afterwards Lord Cockburn) examines witnesses better than Moncrieff. He throws an air of ridicule on all the witnesses' answers when it is his object to throw discredit on the witness, and in this he is almost unrivalled. The evidence was not closed till half-past two A.M. on December 25th.

"Cockburn began his address at five o'clock; and as I had taken my place in the Wellington coach for Coldstream, which starts at half-past five, I could hear but little of his speech.

"After his address the Justice Clerk would probably speak for three hours, so I do not suppose the jury would retire to make up their verdict till ten o'clock. The verdict was 'Guilty' for Burke, but his wife was

acquitted because of there not being sufficient legal evidence."

Mr Milne's legal practice increased in the following years. Mr W. F. Skene has told me that he often heard it said that no young advocate succeeded in making £500 a year in so short a time as David Milne, and by 1832 his income enabled him to marry her who for several years had been the object of his choice, *i.e.* Jean Forman Home of Paxton. Her father, Mr William Forman, had succeeded to the estates of Billie and Paxton on the death of his cousin, Mr George Home, in 1820; and the friendship which had existed between the Milnes and the Homes in Mr George Home's time was continued when Mr Forman (now Mr Home) and his family took possession of Paxton. Mr Home's daughters and Sir David Milne's sons were like brothers and sisters, and between David Milne and Jean Home the fraternal feelings gradually deepened into a warmer attachment, and they became engaged to each other as early as 1829. This engagement met with Sir David's entire approval; his only regret was that, "owing," he writes to his son in 1830, "to an unfortunate speculation in the Spanish bonds which yielded no interest, he could not afford his son an allowance which would have enabled him at once to marry;" but he assures his son that he knows of no young woman more likely to make the marriage state happy than Jean Home, both from her personal appearance, her temper, and accomplishments.

And again, Sir David writes from Paxton in 1831, when his future daughter-in-law lay dangerously ill from the rupture of a blood-vessel: "I never saw one behave so

sweetly, her only anxiety seems to be for others; in short, I cannot express my admiration of the suffering angel."

Mr Home was equally satisfied with his daughter's choice, but he had succeeded to estates heavily burdened under trust, which quite precluded him from making any settlement on his daughter.

How often are marriages hastily contracted with little knowledge on either side of the real character, and the ideal formed is sometimes rudely shattered; and, as a rule, it is but after a few weeks' or months' acquaintance that the knot for life is tied. But David Milne and Jean Home had never known a time since her infancy when they were not attached. Their knowledge of each other's character must have been complete; and when the 30th July 1832 dawned, a bright vista must indeed have opened out before them, and a goodlier couple could not have been seen than the two who pledged their troth that day. All who knew Jean Home said she was beautiful, and her husband from childhood was remarkable for his personal appearance. He resembled his mother, who often spoke of his infantile beauty; and in one of his father's letters, as he was entering into manhood, Sir David said one of the gifts in his favour was his personal appearance. But there is no perfect happiness allotted to us here, else our hearts would rest in the earthly home. Jean Home had never been strong; and the rupture of a blood-vessel in 1831 had so increased her delicacy, that weak health was her portion through life, and she had often very serious illnesses. Mr Milne was not robust, and the close

application to law business was a great strain. His children came to hate the sight of the weary law papers, knowing well that such budgets were the cause of papa's frequent and severe headaches. He was appointed Depute Advocate in 1835, but on account of change of ministry it was only for a few months, and again in 1841, and he then held that office till 1845. That year he had the great sorrow of his father's death. Sir David had been appointed Commander-in-Chief at Devonport in 1842, and towards the close of his command the infirmities of his advanced age pressed heavily on him. In the spring of 1843 he was so seriously ill Mr Milne was sent for; but he rallied and held out manfully to the last. It had been for some time his conviction that the close of his professional career would be also the close of his life, and after leaving Plymouth in 1845, he was taken dangerously ill in London.

He longed to die at home, and the doctors thought, though a land journey was out of the question, yet a sea voyage might be possible. Sir David, with Lady Milne and his second son, who had been his Flag Captain at Devonport, embarked in the steamer for Granton, May 1845. Mr Milne was there awaiting them; but on the arrival of the steamer he had to receive the melancholy intelligence that his father had passed away the day before, water on the chest having suffused the lungs. The loss was keenly felt, and well it might be, when the companionship and intercourse of so many years was broken; for many days never elapsed without letters passing between father and son upon every subject that interested either of them.

CHAPTER V.

Scientific Life.

After the death of Sir David Milne, when Mr Milne succeeded to the estate of Milne Graden, he retired almost altogether from the legal profession, though for a short period he was again Depute Advocate in 1852, but he resigned that appointment soon after the death of Mr Home of Paxton, which took place that year. He then devoted himself chiefly to county business, and to those scientific pursuits, which for him had always possessed the greatest attraction. His duties as factor to his father-in-law on the Billie estates had caused him to give much time and attention to agriculture, which to be prosecuted successfully enlists the aid of various other sciences, as he wrote: "Several of the abstract sciences have now been brought in to bear upon agriculture, and are in different degrees contributing to its advancement. Geology has come in to explain the origin and general composition of soils, botany and vegetable physiology to unfold the germination, growth, and propagation of healthy plants, and the nature of blights and mildews. Chemistry, to analyse and determine not only the various elements of soils, but the internal structure and composition of plants and animals, and the relations which the nature and composi-

tion of their food bear to the healthy growth of each."—*From letter to Lord Kinnaird.*

Meteorology, though perhaps not so essential, is also in many ways a useful handmaid to the other sciences. Mr Milne relates in his Journal a conversation with Sir David Brewster on this subject: "Sir David suggested to me, as very important in improving the operations of the farmer, that his attention should be more drawn to meteorology. For instance, he said it had been ascertained what was the hour of the day when the wind blew strongest and weakest. If in the spreading of lime, or sowing of corn, or winnowing of hay, the wind has effect, it would be useful to know the above fact; for though, no doubt, the rule may very often not prevail, still the chances are that it will, and the rule ought to be kept in view. So also in regard to temperature similar information is useful. The months of the year in which the greatest quantity of rain falls, in which particular winds blow, distinguishing them by their moisture and dryness, their cold and warmth, should also be taken into consideration."

Chemistry came to be considered so important, that an Association was formed to promote the knowledge of that department of it which relates to agriculture, which has been called agricultural chemistry; and an agricultural chemist in connection with this Association was appointed chiefly, I believe, owing to my father's influence, his views having been stated in a letter to Lord Kinnaird, which Lord Kinnaird published and circulated with a commendatory letter of his own.

Elementary books of instruction were issued, and the village schoolmasters were encouraged to add the study of agricultural chemistry to that of the three Rs. Lectures on the subject were given throughout the country on the subject by Mr Johnston, the Association's Agricultural Chemist, and Professor of Chemistry in the Edinburgh University, and examinations were instituted to test the proficiency of the young students.

Mr Milne specially promoted this branch of education, and he had much correspondence with Professor Johnston on the subject. Indeed, he seemed now to consider this furtherance of agricultural interests to be like a professional duty, to which all else was subsidiary. He had a farm in his own hands, on which he tried many experiments; and he mentions in his Journal that at a meeting in Duns, after a lecture from Professor Johnston, the thanks of the meeting were awarded to him for the valuable aids he had rendered to agricultural knowledge. Wherever he was, he lost no opportunity of improving himself by acquiring information, either from books, or from personal observation.

He was the mainspring in originating the East of Berwickshire Farmers' Club, of which he became President, and of which many, both landlords and tenants, were members. They held meetings for discussion at Berwick; and when the Club was started, it was kept entirely independent of all political principles, so that both Whig and Tory could without scruple belong to it; but an attempt on the part of

some members to introduce politics frightened others, and the Club speedily came to an end in consequence. Mr Milne had not approved of this attempt; it was his wish it should have been entirely independent.[1]

We must now speak of the work that he effected on other scientific lines. Sir David, though himself of a scientific turn of mind, and a member of the Royal Society, of which Mr Milne also had been a member since the year 1826, had warned his son that as he had chosen the law for his profession, he ought to give up his scientific pursuits and devote his whole attention to the law, else he could not succeed; and Mr Milne did resolve, soon after the publication of his essay on Comets, implicitly to follow his father's advice. He then received the following touching letter from his friend James Forbes, to whom he had intimated this intention:—

"Oh, if anything I can say or write could have a grain's weight in your determination, you may command volumes from me! To lose your sympathy in my occupations, and to be afraid to touch on subjects which have hitherto rendered your house a favourite resort, would indeed be pain. I had looked upon the essay on Comets as a forerunner of a more voluminous work, and a still more important donation to science. The very thought of your forgetting all that in youth has charmed, has given you a character, has soothed the contemplation of more painful objects, and has

[1] This information has been kindly given me by Mr Wilson of Wellnage, Duns, who, I regret, has died while this was in the Press.—*May 5th*, 1891.

gradually unfolded your noble intellectual powers in the direction in which they were created to excel, literally draws tears from my eyes. I conjure you not thus to sacrifice your peace of mind, and the happiness of a life, to devote yourself exclusively to a profession which, with a peculiar kind of fame, and a certain degree of reward, offers these by a 'withering' of all other powers of mind. I conjure you not to embrace as your sole object a profession which in the experience you have already had of it has filled you with toil and vexation. The relaxations of a literary life are requisite to your happiness, alike to your peace of mind and enjoyment of health, the two most valuable belongings which God has given."

Whether it was owing to the influence of his friend, or merely that it was quite impossible for Mr Milne to withstand the whole bias of his nature, the result was that scientific pursuits were not abandoned.

In 1834 he wrote a paper on the Geology of Berwickshire, which he read at the meeting of the British Association in Edinburgh, and of which he thus wrote to his father: "I read my paper to-day in the Geological Section. It was much more praised than its merits deserved, though I was greatly gratified by its affording me the means of an immediate introduction to Sedgwick, Murchison, Lyell, and others who came up to me afterwards to congratulate me on the accuracy of my views."

This paper was afterwards expanded and published in the Transactions of the Highland and Agricultural Society.

So highly did the Society approve of it, that they awarded to Mr Milne the prize of £50, and presented him with a piece of silver plate bearing the following inscription: "Presented by the Royal Highland and Agricultural Society to David Milne, Advocate, for the best Geological Survey, accompanied with Maps and Sections from actual observation, and given by him to the Society in 1835, which Survey was of the county of Berwick."

In 1838 he wrote a very interesting paper for the Royal Society, giving an account of the extraordinary phenomena of the sudden drying up for several hours of parts of the rivers Teviot, Nith, and Clyde on November 27, 1838. At Maxwellheugh, near the confluence of the Teviot with the Tweed, and as far up as Hawick and Roxburgh, the millwheels stopped for want of water. On the Clyde, a mile below Lanark, the stones of the river were so ~~full~~ bare, one might cross the river without wetting the feet. The same thing occurred on the Nith and on the Ettrick; and the waters of the Tay, though not to so great an extent, were considerably lowered.

Mr Milne believed this phenomena to have been occasioned by the combination of a very strong gale from the east, with a sharp frost. He found that in previous years such phenomena had occasionally been observed; and he records the extraordinary facts that in the year 1110 the Trent was dry at Nottingham for a whole day, and the Thames was dry at London in 1158. He quotes this from Professor Phillips' article on Geology in the *Encyclopædia Britannica*, and says

Professor Phillips believed it to have been owing to the volcanic agency, and such no doubt sometimes may have been the cause of such depletion; but in November 1838 there were no signs of such agency, no earthquake shocks having been observed in connection with that date.

Earthquakes were also the subject of Mr Milne's investigations, his interest having been excited by the shocks at Comrie, Perthshire, in 1839, and he corresponded as follows with Dr Daubeny and Charles Darwin on the subject:—

"10 York Place, Edinburgh,
"19*th March* 1840.

"Dear Sir,—I avail myself, at the suggestion of Professor Forbes, of my very slight acquaintance with you, formed at the meetings of the British Association in Edinburgh and in Newcastle, to communicate to you some information regarding smoke and flame which has been seen during the past winter in Perthshire. You have probably heard of the shocks of earthquake which since the beginning of October last have emanated from the hills near Comrie village in that county. A very severe shock on the 23rd October wrecked the walls of a number of houses, and occasioned tremors as well as an undulation of the earth's surface, which were felt distinctly at the distance of from sixty to eighty miles. These shocks have, though with less force, continued all the winter. On the 16th November, smoke or steam was observed to issue from a hill about four miles N.N.E. of

Comrie, and on the 15th of January a flame made its appearance near the same spot. On inquiry, I find that this flame has been observed before, though not constantly.

"It shows itself chiefly in the winter time. Its colour is blue or purple. The place from which it issues is rocky and precipitous. I have no doubt that this flame arises from the combustion of some gas, which rises from subterranean parts, and reaches the surface by means of crevices or fissures. The rocks consist of clay and mica slate, judging from the specimens sent to me. We have made many inquiries after any phenomenon analogous, and can find none. Perhaps the flame at Pietra Mala, between Florence and Bologna, comes nearest to it.

"On page 294 of your work on Volcanoes you attribute the origin of this flame to the slow distillation of bituminous matters. Whether this can be the cause of the Glen Almond flame is more than doubtful, considering the primitive character of its rocks. I am engaged at present in drawing up an account of our Scotch earthquakes; and, of course, eruptions of flame and smoke form an important part of the phenomena. I have not yet been able to go to the spot from which they come, but Professor Forbes and I contemplate a visit to it in the course of a few weeks.

"In the meanwhile, I am very anxious to obtain your opinion as to the origin of this flame, and would be very much obliged by your giving me any suggestion as to the way in which the real nature of the gas (if such were the cause of the flame) can be ascertained. The accounts would seem to indicate that it burns spontaneously. I

believe that phosphuretted hydrogen burns, but I do not find that this is common, or has been observed in volcanic districts. I hope you will excuse me for the liberty I take in addressing you, but I know of no higher authority, and Professor Forbes assures me you will take an interest in the subject, relating as it does to questions with which you are familiar.—Your obedient servant, DAVID MILNE."

"Oxford, *March 25th*, 1840.

"Dear Sir,—I feel much indebted to you for your interesting communication, and am glad to find that Professor Forbes and yourself intend to investigate the true nature of the phenomenon on the spot. I consider it a fortunate circumstance that a case of the kind should have occurred so near home; for the localities in which the evolution of flame from the earth is stated to occur are for the most part inconveniently situated for exact experiments. Thus we are still ignorant whether the gas which issues from the earth at Behn on the Caspian, and on the calcareous mountains in Albania, is spontaneously inflammable. I have detected the cause of the mistake which has prevailed with respect to the gas of the Pietra Mala on the Apennines, and also to that at Grenoble. In both cases, if the flame was blown out, it rekindled, but this was owing to the incandescent state of the surrounding rocks; for I find that when the latter had been cooled down, by throwing pailfuls of water upon it, the gas was permanently

extinguished. It appeared, indeed, in both cases to consist of carburetted hydrogen, yielding by its combustion carbonic acid and water.

"Notwithstanding the curious facts you mention, which would seem to connect the flame of Glen Almond with earthquakes, and through them with volcanoes, I suspect it will turn out to be a pseudo-volcanic phenomenon; at least, I do not believe that carburetted, and still less that phosphuretted, hydrogen is found anywhere as a volcanic product. Pseudo-volcanic processes sometimes, when on a great scale, almost simulate those of volcanoes, as at the Island of Tamsen in the Crimea; and I perceive that Mr Lyell considers this latter as a true case of volcanic action, but I am disposed to differ from him on this point. Nevertheless, I do not see why processes which cause the construction of large volumes of gases, even though not of a volcanic nature, might not produce such a derangement or undermining of the rocks round about Comrie, as may account for the earthquakes to which that spot is liable. Why should earthquakes be necessarily connected with volcanoes? Is it not more probable that those, for example, that are so frequent in the county of Sussex should be connected with some local cause of that kind; such, for example, as in the neighbouring county of Dorset has produced the landslip near Lyme, accompanied, as it is said, with shocks of the same description. These are loose thoughts written without much consideration on my part, and will, I hope, be taken by you as such.

"I assume, of course, throughout that the gas will turn out to be some form of carburetted hydrogen, which

having become kindled by accident goes on burning till extinguished. Should it turn out to be phosphuretted hydrogen, it would indeed be an addition to our knowledge. I shall be really glad to hear the result of your examination, and am glad the inquiry is in such good hands. I beg to be remembered to Professor Forbes; and am, dear Sir, yours truly, CHARLES DAUBENY."

"12 Upper Gower Street, London,
"*March* 20*th*, 1840.

"Sir,—I much regret that I am unable to give you any information of the kind you desire. You must have misunderstood Mr. Lyell concerning the object of my paper. It is an account of the shock of February 1835 in Chili, which is particularly interesting, as it ties most closely together volcanic eruptions and continental elevation. In that paper I notice a very remarkable coincidence in volcanic eruptions in South America at very distant places. I have also drawn up some short tables showing, as it appears to me, that there are periods of unusually great volcanic activity, affecting large portions of South America. I have no record of any coincidence between shocks there and in Europe. Humboldt by his table seems to consider the elevation of Sabrina off the Azores as connected with South American subterranean activity. The connection appears to me exceedingly vague. I have, during the past year, seen it stated that a severe shock in the north parts of South America coincided with one in

Kamtschatka. Believing, then, that such coincidences were purely accidental, I neglected to take a note for reference, but I believe the statement was made in *L'Institut* for 1839.

"I was myself anxious to see the list of the 1200 shocks alluded to by you, but I have not been able to find out that the list has been published. With respect to any coincidences you may discover between shocks in South America and Europe, let me venture to suggest to you that it is probably a quite accurate statement, that scarcely one hour in the year elapses in South America without an accompanying shock in some part of that large continent. There are many regions in which earthquakes take place every three or four days, and after the severer shocks the ground trembles almost for months. If, therefore, you had a list of the earthquakes of two or three of these districts, it is almost certain some of them would coincide with those in Scotland without any other connection than mere chance.

"My paper will be published immediately in the Geological Transactions, and I will do myself the pleasure of sending you a copy in the course of—as I hope—a week or ten days. A large part of it is theoretical, and will be of little interest to you, but the account of the Conception shock of 1835 will, I think, be worth your perusal.

"I have understood from Mr Lyell that you believe in some connection between the state of the weather and earthquakes. Under the very peculiar climate of Northern Chili, the belief of the inhabitants in such

connection can hardly, in my opinion, be founded in error. It might possibly be worth your while to turn to page 430 to 433 in my 'Journal of Researches during the Voyage of the *Beagle*,' where I have stated this circumstance. On the hypothesis of the crust of the earth resting on fluid matter, would the influence of the moon, as indexed by the tides, affect the periods of the shocks when the force which causes them is just balanced by the resistance of the solid crust? The fact you mention of the coincidence between the earthquake of Calabria and Scotland appears most curious. Your paper will possess a high degree of interest to all geologists.

"I fancied that such uniformity of action, as seems here indicated, was probably confined to large continents such as the Americas. How interesting a record of volcanic phenomena in Iceland would be, now that you are collecting accounts of every slight trembling in Scotland. I am astonished at their frequency in that quiet country, as any one would have called it.

"I wish it had been in my power to have contributed in any way to your researches on this most interesting subject.—Begging you will excuse the length with which I have ventured to address you, believe me, with much respect, yours faithfully, CHAS. DARWIN."

"10 York Place, Edinburgh,
"28*th March* 1840.

"Sir,—I have been so much occupied professionally till within the last few days, that I have not been able

to read and duly study your paper on South American volcanic action to enable me to acknowledge it. I assure you that it is appreciated by me most highly, and I have perused it a *second* time with increasing benefit. There are views in it as well as facts most interesting to the subject of my own inquiries. There is one passage in your paper on which I would venture to offer a remark. On page 618 you observe that the disturbance appears to emanate *not* from one point, but from many points, ranged in a band, otherwise the fact of the linear and unequal extension of earthquakes would be unintelligible. The Scotch earthquakes are felt over a greater extent of country in a N.E. or S.W. direction than in any other direction. They all emanate from one point, which I have ascertained to be N.W. of Comrie village in Perthshire. Fraserburgh, in the N.E. point of Aberdeenshire, is about 150 miles from Comrie, and the shocks were more sensibly felt there than at Stirling, which is about 25 miles S.S.E. from Comrie. The reason of this, I consider to be, that a chain of hills runs across the country through Comrie to Fraserburgh, consisting chiefly of gneiss, granite, and mica slate; whilst between Comrie and Stirling there are various secondary formations. The former transmits the vibration with tenfold more facility than the latter.

"Is it not possible that the linear and irregular extension of the shocks in South America may be owing to a similar cause? Von Hoff makes a similar remark with regard to the earthquakes of Germany, which follow the line of the basaltic hills that stretch across

the country. In your most interesting volume, which forms part of the notes on the *Beagle's* voyage, you speak of the connection subsisting between earthquakes and the atmospheric disturbances which *follow*, and you express your belief in *these*. But I am somewhat inclined to go further. I think there are strong reasons for suspecting a connection between earthquakes and meteoric change *preceding* them. One of these may be the diminished atmospheric pressure as noticed by you, and in support of my view I have some very remarkable proofs drawn from our own country. But another of these influences I suspect to be *water*, a circumstance which I see from your book is matter of belief also in South America.

"I am much obliged to you for warning me against too ready a belief in the connection between earthquakes felt on opposite sides of the equator, especially when the interjacent countries evince no indication of them; and on this account I am beginning to be sceptical as to any connection between our Scotch earthquakes and those in Italy, for both in Calabria and in Savoy the volcanic fires were raging when Perthshire was excited.

"Another phenomenon has lately come to my knowledge, which I am anxious to make known to you. On the 16th November jets of smoke or steam were observed to issue from the side of a hill in Glen Almond, eight miles north-east from the focus of the Comrie shocks, and stones were by these jets raised out of their beds. On the 15th January last, about 200 yards from the same place, a flame was seen by a different

person, who had not heard of the former eruption, which alarmed him so—he was within 150 yards of it—that he ran away for two miles without stopping. I have caused precognition, to use a Scotch lawyer's phrase, to be taken regarding this matter. The result is, that such a flame has been seen occasionally for the last twenty or thirty years arising from the same spot.

"Do you know of any analogous cases where flames rise from the ground not connected with craters or any volcanic disturbance? The formation is clay or mica slate; the latter, I rather think.

"I wrote to Dr Daubeny about it. He thinks it must be carburetted hydrogen, but can suggest no cause for it, or any instance precisely similar. However, he speaks of flames issuing from the calcareous mountains of Albania; and the rocks of Pietra Mala in Italy are also calcareous. These gases may arise from bituminous matter, but of which none can exist in Glen Almond. I should feel very much obliged if you could suggest to me any case analogous to this, and any points which should be specially attended to in my investigations.—I am, dear Sir, yours very truly, DAVID MILNE."

Between the years 1841 and 1843 Mr Milne wrote a series of papers for the *Edinburgh New Philosophical Journal*. They were an exhaustive statistical account of earthquakes known in Great Britain since the beginning of historic times, and chiefly those observed at Comrie; but noticing also the most remarkable earthquakes recorded in foreign countries. Several copies of these papers still remained in the printer's hands so lately as

in 1887, when it was an interest to my father to have them bound, and he wrote a little preface for the volumes, which he distributed among his friends.

One of his most important scientific papers was the account of the coalfields of East Lothian and Midlothian, written for the Royal Society in 1839, read at two successive meetings, and published in their Transactions. But as several gentlemen considered the papers likely to be of general use, because they contained so much valuable information not to be found elsewhere, permission was obtained from the Royal Society to publish the papers as a separate memoir for general circulation, and this was accordingly done, with the addition of a supplement.

In the winter of 1842 and 1843 Mr Milne read his papers on the Geology of Roxburghshire at the Royal Society, which were also published in their Transactions. He was a member of the Geological Society of London, and his geological researches led him to become personally acquainted with all the leading geologists of the day—Philips, Buckland, Charles Darwin, Lyell, Murchison, Sedgwick, and Griffith, etc., with all of whom he corresponded, and the following letters show how they appreciated his geological knowledge:—

"*August 29th*, 1835.

"My Dear Sir,—I regret very much that you were not at leisure to enjoy the Dublin meeting of the Association, which was very successful, and really serviceable to science. In particular, the sectional business was of great value. Did I tell you, when in

your hospitable house, of my intention of constructing a general geological map of the British Isles? If not, you will know that I am engaged in it by the following petition. I want you to send me on the Useful Knowledge Map of Scotland (as being very convenient in size), the boundaries of the greywacke and sandstone countries in the south-east of Scotland, particularly in the drainage of the Tweed, which is so intimately known to you. The Trap hills also should be marked. On the same map, I hope to persuade Lord Greenock to colour the formations of the coal, mountain limestone, red sandstone, trap, and greywacke on the north side of the Lammermuirs. I shall be able to satisfy myself on the subject of the Scotch part of my map. The English and Irish parts are done, or nearly so. Did you receive a small parcel containing my Guide-book, and some other small matters for assisting your memory of one who is much obliged by your kindness, and will gladly find occasion to testify his thankfulness? I did not like to give you an elementary book, so my sister accordingly begged to present it to Mrs Milne as a Yorkshire production, in return for those agreeable Scottish products which we received through your bounty. Pray present to Mrs Milne our united kind regards and good wishes, and accept the same yourself.—From yours ever and truly, JOHN PHILLIPS."

"York, *October* 21*st*, 1841.

"My Dear Sir,—I am on my way to Cambridge, and while waiting for the next train, I will endeavour to

hold a professional consultation with you on one or two points of the geology of Scotland. In the paper (published many years since) by Murchison and myself on the Island of Arran, we gave a section containing the following ascending series: (1) Old Red Sandstone and Conglomerates; (2) Mountain Limestone, Sandstone, and Coal Shales; (3) Upper Conglomerate and Sandstones, occupying all the southern part of the Island. The first and second group we identified, and I think correctly, with the formations of the same name in England. The third group, from its position, we considered to represent the lower portion of the New Red Sandstone series. But I had always some misgivings about the exact parallels of the upper parts of the Arran section, and in one of my anniversary addresses I stated that the coast of Ayrshire ought to be examined with reference to this point. In 1830 I made a partial examination of the carboniferous series in the basin of the Tweed, and of the red sandstones and conglomerates near St. Abb's Head, and I saw the great difficulty of separating the old red from the lower carboniferous group. There are, however, decided old red sandstones and conglomerates overlaid by subjacent beds, passing upwards into the true carboniferous series, with coal plants and mountain limestone fossils, etc., in abundance. For example, on the coast from the old red conglomerate of St. Abb's Head to Dunbar, Mr M'Culloch gets rid of the difficulty by embracing the whole series as Old Red, which can by no means be admitted by any English geologist, nor indeed by any one who has examined the north of Scotland. The mountain limestone and old

red sandstone are two great independent formations, which can never be merged in one colour by any classification, which is to hold good for the whole of Great Britain. In 1834, after the Edinburgh meeting of the British Association, I examined the section from Dunbar to St. Abb's head, but in a very superficial manner; and I came away from Scotland, convinced that a considerable part of the Great Caledonian trough, from the Firth of Forth to that of the Clyde, contained a coal deposit older than the rich coal deposits of England, and probably of the age of the coal basins of the Tweed. I am not sure whether I have ever published these views, but we have often discussed them in the Geological Society of London. The great abundance of red sandstone in the carboniferous series of Scotland also made me doubt more than ever the correctness of our views in referring the southern rocks of Arran to the new red sandstone. I wished Lyell to look to this point, but he does not much like field work, and I have longed for years back to have a run along the coast of Ayr. My eyes have sadly failed me, but I do hope some day to have a run with you through a part of the country, in the basin of the Tweed you know so well. I trust that before long you will publish your investigations, of which you gave so excellent a foretaste at Newcastle.

"I think you told me, that in a part of the basin of the Tweed, you were able to separate the old red sandstone from the carboniferous series by help of fossils, especially the fish scales of special characteristics of the old red. Would you have the kindness to point

out to me, in a rough way, the boundary of the old red in this part of the section, especially the boundary which separates it from the overlying carboniferous series? M'Culloch has made no attempt to represent this; and I think I told you during our short walk that the carboniferous series, in the part of Scotland I had just examined, rather puzzles me as to its upper limits. Between the Galloway chain and the Clyde there are clearly three distinct groups: (1) Old Red Sandstone and Conglomerate; (2) Lower Carboniferous Series, with beds of mountain limestone, coal, etc.; (3) Upper Carboniferous Series, with the best beds of coal. Where would you place the upper coal beds of the basin of the Clyde? Are they on the parallel of the English millstone grit, or are they higher? I think they can hardly be lower! (Mr Milne has here interlined, Why not?) But my examination of these points has been most rapid and superficial, and I should be most thankful for information on these points from one so well acquainted as you are with this part of the geology of North Britain. After I saw you I had a hasty run along the north shore of the Solway Firth. Towards the western extremity of the secondary rocks, M'Culloch's map is right, and we found a very fine development of the old red conglomerate passing upwards into ambiguous beds, forming the base of the carboniferous series. But all the other parts of the map are detestable. The red rock near Dumfries is undoubtable new red, and I have traced it fairly into Cumberland. It overlies a very fine carboniferous series full of fossils. This red rock contains impressions of footsteps, like the red sandstone

of Corncockle Muir. The Corncockle Muir rock is also undoubted new red, though not seen in contact with the lower rocks. This patch is very ill defined in the map of Scotland, and has a wrong colour.

"I am writing in a great hurry without a single map or memorandum book."

"London, *October 22nd.*

"I was interrupted yesterday, and did not finish in time, so I brought the letter here, and I have only time for a word more. If I remember right, Maclaren adopts Bald's view, and considers one part of the coalfields as unconformable with the other part. Is this so? (Mr Milne interlines "No.") If it be, it is contrary to all the analogy of England. What does he mean by the Roslin sandstone?—a term he says he adopts from Murchison.

"You told me that you differed from him about the relation of certain sandstones. Were these the flat sandstones on the Esk, which he seems to regard as the lower members of the new red of England.

"I don't at present believe in any new red in the Great Caledonian trough, *i.e.* between the greywacke chain in the south and the Grampians on the north; at least, I never saw any.

"What are your views respecting the Pentland Hill conglomerate? Are they old red? Are Maclaren's sections of the Pentlands good? Surely they are not so regularly stratified!

"Pray excuse this long rigmarole, and believe me ever most truly yours, A. SEDGWICK."

"10 York Place, Edinburgh,
19*th November* 1841.

"My Dear Sir,—I owe many apologies to you for having delayed so long to acknowledge your letter, received some weeks ago. Since then my professional engagements, aggravated also by domestic distress, have been such that I was obliged to defer to a more convenient season my acknowledgment to you, as well as to various other friends.

"It gave both to Sir Charles Fergusson and myself sincere pleasure to meet you, as we did in Ayrshire; but allow me to warn you, and excuse the great liberty I take in doing so, not to geologise again on the Sabbath, at least in Scotland, for you have no idea of the feeling which was excited in the parish of Dailly by the discovery that *you* had been doing so. I know that in saying this much I expose myself to the risk of offending you; but I do it from sincere regard, and a wish to save you from reflection, which would be equally injurious and painful to you; and Sir Charles Fergusson himself enjoined on me the necessity of warning you as to our Presbyterian strictness, in case of your coming again to Scotland.

"I quite concur with you in thinking that in Berwickshire, East Lothian, Lanarkshire, Ayrshire, and Dumfriesshire, there are to be found, well separated, or at least very distinguishable, the three formations, (1) of old red sandstone; (2) of carboniferous limestone; and (3) of a newer formation. In order fully to trace the connection between the English formations and the

Scotch coalfields, it is necessary to look first at the Northumberland limestone and coal strata. These, as you know, all rise towards the north and north-west, rising from under the great Newcastle coalfield. They crop out at Hawick, and run up towards Tynehead and Alston Moor; and the district between Hawick and the Tweed is occupied with mere undulations of inferior members of the same formation. There some members may be traced across even the top or ridge of the Cheviot Hills. In several parts, and particularly along that part of their range west of the Carter Fell, in Liddesdale, they dip in an opposite direction, viz. towards the north and west. In Liddesdale also, where the greywacke hills appear, the old red sandstone resting on its conglomerate may be seen immediately on the greywacke strata, and in some places the carboniferous rocks may be seen lying over, though not in absolute contact. You ask me to give you the line of demarcation between these two formations. I cannot do so accurately by letter; but if you send me a map, I shall be happy to draw that line for you in Berwickshire and Roxburghshire, as well as in the east of Midlothian. At Cockburn, near Dunse, and at two places eight miles west of Jedburgh, the fish scales which characterise the old red sandstones of Perthshire occur abundantly. In regard to a formation newer than the carboniferous limestone, there are three localities where I thought it existed, viz. in Dumfriesshire, Roxburghshire, and Berwickshire. Most of the rocks in Roxburghshire, which I had ascribed to new red sandstone, I find now belong to the old red. But I

still think that in Berwickshire there are patches of the new red, as I have explained in a paper, published in the Highland Society's Transactions five or six years ago. You ask me regarding the strata in Midlothian, which Mr Maclaren considers newer than others in the same field. The 'flat seams' and the roof are particularised as such. I entirely differ from him, and you will find my reasons for this explained in a work on the Midlothian Coalfields, of which I sent a copy to the Geological Society of London. This publication was an extension of a paper on the same subject, published in the Transactions of the Royal Society of Edinburgh, but I think it was in the separate work that the subject was most fully treated. I have not a copy of it by me to refer to. I find that my views as to the Roslin sandstones are confirmed by Dr Buckland.

"Lord Greenock, to whom I purposely showed your letter, writes me on returning it that Dr Buckland purposely visited the locality with Dr Hibbert in 1839, to clear up this point, which he did entirely to his satisfaction.

"By the way, I may add that the views I entertain on all the points mentioned in this letter are concurred in by Lord Greenock. I have sometimes thought there was a still closer resemblance between the Berwick or Hawick coalfield and the Scotch coalfields, than that exhibited by their relative position—I mean their relation to the old red and greywacke groups. In Northumberland there are coal seams both above and below the great body of limestone. So also in Scotland there are coal seams both above and below workable

beds of limestone. I found also in both districts remains of fish, belonging apparently to the same genus, and even species, whatever these may be. In regard to the views of Pentland strata given by Maclaren, they are, as you suppose, much too regular. I have not examined them with a view to their determination, but I have a strong impression that they are silurian. I have now, I think, answered at least the most essential of your queries, and in conclusion, allow me to express the pleasure I have in corresponding with you on this, or any other subject. I only regret that my professional engagements and my private fortunes are such as to preclude me from bestowing but very little time in the prosecution of geology, a science I am passionately fond of.

"On looking over what I have written about your Sunday excursion, I am astonished at my own presumption, and fear much that I may have incurred your displeasure.—Yours very truly, DAVID MILNE."

"Cambridge, *November 27th*, 1841.

"My Dear Sir,—Many thanks for your letter, which has just reached me. I am very busy lecturing six days a week; and I have, since my return, read two papers before the Geological Society of London, and one before the Cambridge Philosophical Society, and my eyes have given way and refused more work. About the end of this week I retire to Norwich, where I must remain on duty nearly three months. I shall not be able to look

for the maps, I fear, before I start, but in the spring I hope to trouble you with some. I was induced to look at the red sandstones on the north shore of the Solway Firth more carefully than I had intended, in consequence of my conversation with you. I supposed that you regarded the Dumfries and Corncockle Muir red sandstone as *old*, and not *new* red. If so, Murchison and I had been misled in 1827. Perhaps I misunderstood you! At any rate, I think I can prove that the red sandstone of both places is new red. Between the old red and coal measures I am still puzzled about the demarcation. The fish scales, I fear, do not settle the point, as scales of the Holoptychius (I think Holop. Agassazian) occur in both the old red and in the carboniferous limestone. Fish beds, however, generally give us base lines.

"Many thanks also for your hint about Sunday's work. I can assure you I never, during the whole season, whether in Ireland or Scotland, travelled on a Sunday more than one stage, and that generally late in the evening. From Girvan we started sooner, not wishing to be benighted on cross roads. Leaving the carriage, and walking down to the river side, where I met you, was *my* proposal, supposing from some obscure memoranda, derived from I know not what quarter, that the old red conglomerate was there. Had we not met with you, we should, in five or ten minutes, have been back with our carriage, and then have driven to Dalmellington. Under the circumstances, do you think our walk to the old castle, and through the wood to the place where we parted, was sinful?

"I cannot think so. Our walk was more robust than I expected, and we caused some confusion by losing our way; but this, of course, we did not anticipate.

"I do, however, think it sinful to offend the religious feelings of men, even in matters indifferent in themselves.

"I cannot agree in principle with those who reject forms on one side, and most formally Judaize on the other. But while men act on principle they must be respected for it, for about the greater part of men hardly ever act on principle. They are the creatures of impulse and passion. But enough of this.—Believe me, my dear Sir, very truly yours,

"A. SEDGWICK."

"Kinnardy, Kirriemuir,
"*August* 20*th*, 1839.

"My Dear Milne,—It is impossible to estimate too highly the good which the Highland Society has done to the progress of geology by offering premiums; for it is not only the essays approved of, but the much greater number of inquiries made by the unsuccessful aspirants, which forward our science, and this has been the case in the county of Fife. I must get your paper on the Stoppage of the Rivers, and I wish every man of name would publish separately, and not in Transactions, as besides the delay, one has to buy a whole volume for a paper. I am setting off for the Birmingham meeting of the British Association, and should be glad to find you there."

September 11th.

"You will be glad to hear that, in spite of the untoward circumstances which preceded our Birmingham meeting, the principal sections were well supported, and that of geology so crowded, that several days we were said to have turned away as many as we admitted. Eight hundred members dined together in their splendid Town Hall, and there never was more perfect harmony in the council and leading members of the Institution, which you will be glad to hear, as, like all influential bodies, we have those who studiously misrepresent us. We voted away for scientific purposes about £2500, as much as formerly, though we received less than usual. The Glasgow meeting is fixed for the middle of September, which I hope will suit you."

"Kinnardy, *October 17th*, 1840.

"Dear Milne,—When Dr Buckland arrived two hours after your departure, I was vexed that you had gone. Since then I have shown to Dr Buckland those deposits of Till, and contorted strata of gravel, which I have attributed to the action of ice; and he has convinced me that the views of Agassiz of their having been due to glaciers, and not icebergs, as I had supposed, are correct. Since the Bucklands went away, I have been to Loch Esk and other points of the Aberdeenshire watershed; and have explored Glen Clova and Glen Prosen, and am prepared to maintain that we have everywhere magnifi-

cent, lateral, medial, and terminal moraines of glaciers in all the Highland glens, and in Strathmore. I am writing a paper on it, to be read at the Geological Society. Accept our thanks, and my brother's, for your kind and hospitable invitation, and I hope to see you in town soon.—Believe me, ever yours truly,

"CHAS. LYELL."

"Edinburgh, *October* 10*th*, 1842.

"My Dear Dr Buckland,—I received this afternoon from Marchmont your geological bag and appendages, which Sir Hugh Campbell wrote me you had left there. I hope that you have not, from want of them, passed unheeded any scratches. The sight of these relics has recalled agreeable recollections of the days in which I saw you using them. I shall long remember with pleasure the excursion we had lately together, and will not forget the sort of prospect which you held out of visiting the granite district of Loch Doune along with me, some time next summer. A geological tour with you is, as it were, an oasis in the wilderness of a lawyer's profession, which is sufficiently dull and dreary.

"I have been looking at the article by Agassiz in Jameson's Journal on the Glaciers. The points not cleared up to my mind are the following: (1) How could a glacier by pushing forward the detritus of any valley form it into a ridge seventy and eighty feet high, and about two hundred feet wide at the base? Would the material not be more spread out? (2) How could

a glacier deposit the detritus so pushed out into beds of sand and gravel separate and distinct from each other? The theory of a subsequent lake, which washed the inner side of the moraine, seems to me insufficient to account for these deposits, seeing they are so frequent and so extensive. (3) How could a glacier form the boulder clay or Till of Scotland? This clay covers whole counties, and in many places it is known to be at least one hundred and twenty feet deep. At Glasgow, where it was examined by yourself and Agassiz, the boulders, according to the glacial theory, should have come from the eastward, as the Clyde has always flowed from that quarter. But it has been proved that the boulders in that Glasgow clay have come from the N.W. These are difficulties which I should like to be explained, though, on the whole, it certainly seems to me that the glacial theory has fewer difficulties to contend with than any other."

This last sentence contradicts what was my father's conviction in later days, to which, therefore, he must have been brought by very strong evidence, or he would not so have changed his opinion. The answer to this letter, I am sorry, is not to be found. The next letter to Dr Buckland is as follows:—

"My Dear Dr Buckland,—I wrote to Sir David Brewster, in order to get for you information where the paper, which I supposed he had written on Fairy Stones, was published, and I enclose his reply. Surely his theory is quite erroneous, and is framed in utter

ignorance of the various forms of concretions formed by chemical action. I am writing a paper on the white spots in the sandstone. Since I left you, I have found a great number of them, with little peas of black oxide of iron in the very centre. These peas have drawn to them the rest of the iron within a certain range. Your view was that the iron arranged itself in concentric circles, and drew towards the circumference of the spots. In my paper I shall possibly notice the fairy stones, unless you have any intention of doing so, which has occurred to me. In that case, I will leave the matter in your hands.—I am, yours very truly, DAVID MILNE."

Sir David Brewster had written: "I have not printed anything on the subject of the fairy stones; but finding that Sir Walter Scott took a great interest in the subject, I was led to make a collection of specimens from the Fairy Dean, as it is called, on Elland Water, near Melrose. My theory is, that they are the droppings of mud, consisting of clay, sand, and sometimes, if I recollect rightly, a little lime. Hence their perfectly circular form, and hence also those remarkable specimens like a pair of spectacles, in which the drops fall from two points."

Dr Buckland wrote: "I return you Sir David Brewster's letter. His theory of the formation of fairy stones will not hold water. They are concretions or kernels formed in very minutely laminated clay, chiefly by the attraction of carbonate of lime to certain centres,

in strata where the quantity of lime was not sufficient to consolidate the entire mass. The septaria in the London clay, lias, etc., are formed on the same principle. But a further question is, What formation does the clay belong to in which the fairy stones are concreted? I must reply that I believe this clay, mixed as it is with gravel, and bearing in its very minute laminæ evidence of the action of water, to have been a sedimentary deposit, in a local temporary pond on the margin of the glacier, that descended the valley of the Elland Water. A pond such as Agassiz describes on the margin of existing glaciers of short duration, which modifies and stratifies the sand, mud, and gravel in its area, and on a change of the state of the glacier, vanishes to appear no more. This Fairy Dean glacier pond must have been within the area of the melting region of the lower end of the Elland glacier, and this region of two or three hundred acres is now marked by high cones, fairy tables, and ridges of gravel, transverse to the Elland valley, and on one of which transverse ridges stands the old mansion of Lord Somerville, on a terminal moraine.

"As to your white spots in sandstone with peas of black oxide of iron, I admit all you say fully, and I beg you to admit also the occurrence of an outward movement of iron in other cases, forming the eagle stone of the old writers, and often producing concentric thin cases, or concentric hollow shells of hard oxide of iron interlaid with loose white sand, from which the iron has been wholly abstracted.—I am, yours very truly,

"H. BUCKLAND."

"16 Belgrave Square, *Nov. 27th*, 1840.

"My Dear Sir,—On calling upon Lyell a day or two ago, he showed me some specimens from Roxburghshire which you had sent up, and which you very correctly suggested to be 'old red.' There is not the slightest doubt on the point, for the beds in question contain the same genus Coccosteus and Holoptychius which characterise the formation in Scotland and Russia; in short, your specimens might be taken for some which I have brought from the eastern ends of Europe. Agassiz will confirm the dictum, and give you the correct names. I presume, however, that my old friend of Clashhennie is the characteristic form. Why I write to you is not merely on account of my having a more extended interest in old red history than perhaps any other living geologist, but because I have since the Glasgow Meeting been directing my attention to the strata which I had before described in the north of Scotland, and also to other masses of the same age south of the Grampians; and again to what, before I heard of your discovery, I pronounced and also proved to be 'old red,' viz. the strata east and west of Floors or Kelso. In coming southwards Mrs Murchison and I passed two or three days with the Duke and Duchess of Roxburgh, during which I made an excursion to the east and west; and knowing that the country had been referred to as *new red*, I found it impossible to reconcile that supposition with the natural sections. In the first place, the sandstone quarries (with some plants), which have been opened out to build the additions to the palace of *Floors* (as

their Graces will spell it), seemed to me unequivocally to overlie the bands of grey, brown, red, and green marl with gypsum, which constitute the river banks, till they come into contact with, and are thrown off by the trap of Makerston. The first walk induced me to think that these gypsum beds, like those of similar aspect in Russia, might after all prove to be old red. Again, in going eastward, I found the light and yellowish sandstone of Sprouston quite unlike any new red of the English series, but not unlike much of the yellow old red of Scotland. But the point which struck me most was the fine limestone-like mixture of Kerchesters S.S.E. of Sprouston; and, unfortunately, I only reached these quarries as it was becoming dark, though not too much so to enable me to collect some of the curious silician flint concretions and breccia. I left strict orders with the workmen to hunt for fishes, and to take them to Floors, where the Duke promised to house them.

"Again, in travelling to Coldstream, I was much pleased with a section of what seemed to me one of the very lowest limestone shales with plants and small bivalve-modiola, which bear a strong resemblance to forms I have seen elsewhere. In stating these facts, I am probably merely troubling you to read of things which you know much better than myself; but as I perceive that you have got hold of the beds, which leave no doubt of the age of much of the old red sandstone of that tract, I hope you will put this region into order, and that you will favour me with your opinions when formed.

"Cannot you give us a memoir for our 'Transactions'?

We ought to bear your name in our best type. For my own part, I had no intention of writing a word upon the south of Scotland, though I feel that a summer could be most advantageously given to the grouping correctly into older rocks, from the Mull of Galloway to St Abb's Head. But Russia and distant fields will probably call me away again on the same scent.—Believe me always, my dear Sir, most sincerely yours,

"RODERICK I. MURCHISON.

"*P.S.*—I perceive that Mr Bowman of Manchester, one of our Association men, is converting all your terraces round the Eildon Hills into moraines. Of course the *Floors* is part of this ice-plaster theory, the extension of which is, I humbly think, *most wild.*"

"10 York Place, 30*th November* 1840.

"My Dear Sir,—I was very much obliged to you for your letter of the 27th regarding the red sandstones of Roxburghshire. The formation has all the mineralogical appearance of the new red, and has none of the geological characters which would have been expected of it, considering the way in which the coal strata are inclined and fissured. But none of these ambiguous red strata occur near Kelso. They are not found to the east of a line running through Mertoun House and Springwood Park, about two miles west of Floors Castle running south-east. The strata at the confluence of the Tweed and Teviot are carboniferous, as proved by the plants occurring in them. The gypsum beds are also consider-

ably below these carboniferous strata; and I was much struck by the fact mentioned by you at Glasgow, that an analogous arrangement occurs in Russia. Though, of course, now satisfied that there are old red sandstones in Roxburghshire, I have not *quite* renounced the opinion that there are some new red sandstone strata also. I observe two kinds of red sandstones in Roxburghshire, as well as in Berwickshire. The fish strata have a considerable dip, generally to the south. They are coarse in texture, and are marked with white or buff blotches, most frequently circular. The others are perfectly horizontal, and are very fine in texture, and entirely free from the rents and fissures which characterise the coal measures, which adjoin them to the south. These are my grounds for still hesitating about the character of some of the red sandstones of Roxburghshire. The flints in the sandstone strata of Kerchesters are very interesting. They are engendered by the heat of the enormous masses of porphyry which lie over them.

"How I wish that I had known of your having been in the district, which I have so often traversed! The limestone nodules are in my opinion produced by the same cause. There are four or five localities in the Merse where these phenomena are developed. I do not know what to think of the glacial theory. I have read in the Mining Journal an abstract of it. On the opposite side of the greywacke ridge, we have in Liddesdale similar terraces often gradually sloping in opposite directions, and at about the same level. These facts no doubt are better explained by the glacial

theory than by any other as yet known, but who will say that it is the *vera causa?*

"I have not seen or heard of Mr Bowman's researches, and should be much obliged by your informing me where I can find any account of them. It is very possible that I may offer to the London Geological Society an account of Roxburghshire. But being much occupied with my profession, it is only during vacation that I can take my hammer, or think of geology. If I should put together any materials, I should like much to send the result to you in the first instance, that you may exclude what ought not to be there. I may in the Christmas holidays be able to work up my account.—Yours very truly, DAVID MILNE."

My father, in conjunction with Dr Buckland, drew up a series of reports on earthquakes for the British Association in 1842 and 1843, and there was much correspondence between them on that subject.

In later years he had no opportunity of continuing his intercourse with Phillips and Buckland, but with Murchison, Sedgwick, and Griffith, the intercourse was continued, and was only terminated by their death.

Of Professor Sedgwick my father thus wrote after a visit from him at Milne Graden in 1848: "Professor Sedgwick, who has been staying here for a few days, is a most agreeable and talented man, and his conversation is most instructive and entertaining. He tells a number of Irish stories, picked up in his geological

travels, and having caught the Irish accent, he can give an appearance of reality to them. He went with me to Bergham to see the gypsum, and also to the Lennel Dyke. Another day I went up with him to Duns to see Cockburn Mill, and I took him also to Dogden Moss. He was clearly and decidedly of opinion that the Kaims were not formed by a glacier, but probably by a rush of waters, when the land rose. I wish I could record here any of the stories Sedgwick told about the dog that saved the life of Mr Bowstead, afterwards Bishop of Lichfield; about Mrs Goodwood, who lived near Cambridge, and was for nine days under the snow, and taken out alive. He also told me many stories of Coleridge and Wordsworth, of whom he is a friend, and he told me much about Buckland, Murchison, and Babbage. He is about sixty years of age, and I am afraid that years are telling on him. He appeared to be tired after a walk of five or six miles, and his sight is failing him."

Professor Sedgwick was however spared for many years to carry on his geological work. He gave his fifty-second course of lectures in 1872, and did not die till the following year, at the advanced age of eighty-eight.

Professor Sedgwick was again at Milne Graden in 1855, and he alludes to those visits in touching words in the following letters to me:—

"Whitsunday, 1863.

"You say that you are afraid I may have forgotten you. My memory never was a good one, and it

certainly is not improved by the wear and tear of full seventy-eight years; but it is not yet such a blank, that I have at last forgotten the friends whom I loved, and such happy days as I have spent, and such bright faces as I have seen at Milne Graden.

"May the God of love, who at this season sent down His Holy Spirit to help His infant flock to found His holy Church, shower down precious blessings on every member of your house. Old men are always pleased by the kind remembrance of those who are in the bright and hopeful days of early life, for it makes them think that they are still good for something; and the evening of life would indeed be dark and gloomy if old people could not enjoy a happy retrospect, and feel a hearty sympathy with the joys and pleasures of the young.

"I try to keep alive such feelings, and when I succeed, I try to thank God for it."

And again he wrote in 1869: "Milne Graden was a Paradise, and all the banks of the Tweed I have seen are very charming, and your country is also full of historic interest. It seems like yesterday since I first saw Milne Graden in 1848.

"I should rejoice very much to visit you again, and make an excursion with your dear father, but I fear that pleasure will not be given me; for not to mention the feebleness of old age, I have an organic disease of the heart, which shuts me out from all robust exercise."

From what has been written, it will be seen that Mr Milne possessed a considerable knowledge of geology in all its departments from mineralogy to palæontology,

and this was the case with all the geologists of that date. But as the knowledge of geology, and the knowledge also of all the other sciences, increases, it is found impossible for one human mind to grasp the whole. Sir Richard Griffith explained this to me when he, for the last time, attended the British Association in Edinburgh in 1871. He said that few whom he met there had as much general knowledge of the whole science of geology as he had, though each would know a great deal more of his own special department—one of the coal formations, another of the chalk, etc. And my father had realised the force of this; for after his paper on the Geology of Roxburghshire, he devoted himself almost entirely to the boulder and drift deposits with ice scratches. In 1847 his geological work[1] was to investigate the gravel terraces in the Lochaber district round Glens Roy, Spean, Collarig, etc., called the Parallel Roads of Glen Roy. These terraces had already attracted much attention, and in 1817 Dr Maculloch had written an elaborate treatise describing them. He, Sir Thomas Dick Lauder, and others supposed them to have been left by lakes which had been drained by volcanic convulsions. The next investigator had been Charles Darwin; and he, Robert Chambers, Lyell, and others supposed these terraces to have been ancient sea beaches. This was not an unnatural surmise, as it is well known that the sea has stood at higher levels, and there are various remains of old beaches to be still seen round the coasts of Scotland. But when Mr Milne

[1] In 1847 he also wrote a paper for the *Edinburgh New Philosophical Journal* on the Striated Rocks of Arthur Seat and its neighbourhood.

came to examine these terraces, he did not think they could have been formed by the sea, because of their perfect horizontality. When the sea goes up into a narrow arm, the beach rises always towards the head of the arm. It is fifty feet higher at the head of the Bristol Channel, twelve feet higher at Blackwall than at Yarmouth, eighteen inches higher at Perth than at Newburgh, etc.

Mr Darwin wrote to Dr Hooker that Mr Milne's adverse views to his theory had distressed him so much as to make him quite ill, which, however, was very strange, as he said he did not consider his own theory in any way disturbed by Mr Milne's investigations. Why, then, did he take it so to heart? He writes as follows to Mr Milne:—

"Down Farnborough, Kent,
"20*th September* 1847.

"Dear Sir,—I am much obliged for your note. I returned from London on Saturday and found your Memoir. I have read your paper with the greatest interest, and have been much struck with the novelty and importance of many of your facts. I beg to thank you for the courteous manner in which you combat me, and I plead quite guilty to your rebuke about demonstration. You have misunderstood my paper in a few points, but I do not doubt that it is owing to its being badly and tediously written. You will, I fear, think me very obstinate when I say that I am not in the least convinced about the barriers; they remain to me as improbable as ever. But the oddest result of your

paper on me (and, I assure you, as far as I know myself it is not perversity) is that I am very much staggered in favour of the ice-lake theory of Agassiz and Buckland. Until I read your important discovery of the outlet in Glen Glastig, I never thought of this theory as at all tenable. Now it appears to me that a very good case can be made in its favour.

"I am not, however, as yet a believer in the ice-lake theory, but I tremble for the result. I have had a good deal of talk with Mr Lyell on the subject, and from his advice I am going to send a letter to the *Scotsman*, in which I give briefly my present impression (though there is not space to argue with you on such points as I think I could argue), and indicate which points strike me as requiring further investigation with respect chiefly to the ice-lake theory, so that *you* will not care about it.—With best thanks for your valuable and most interesting Memoir, I beg to remain, dear Sir, yours sincerely, C. DARWIN.

"*P.S.*—Some facts mentioned in my Geology of South America, page 24, with regard to the shoaling of the deep fiords of Terra del Fuego near their mouths, and which I have remarked would tend with a little elevation to convert such fiords into lakes, with a great mound-like barrier of detritus at their mouths, might possibly have been of use to you with regard to the lakes of Glen Roy."

Another theory held by Agassiz, Buckland, and Lyell, who gave up the marine theory, was that the valleys had been the basins of fresh-water lakes, which

had been dammed up by a glacier, and as the glacier retreated the lakes sank from one terrace to another. But the contour of the country is such that one glacier on Ben Nevis, the highest mountain, could not have accounted for this; there would need to have been, at least, two other glaciers at lower levels, and this presupposes a tremendous change of climate. Mr Milne's theory was that when the land rose out of the ocean it was covered with layers of sand and gravel. The valleys would contain lakes, and the streams issuing from them would gradually wear away the blockages of sand and gravel in the narrow passages dividing the valleys, till so much was removed as to cause the lake to sink to a lower level, and so on till the whole was drained. Fresh-water diatom cases have been found in one of the valleys, which confirms the theory of fresh-water lakes. Then the deposits of sand and gravel show some signs of stratification, which is not the case with glacier moraines. There are scratches on the rocks which many consider to have been produced by glaciers; but Mr Milne thought these scratches might have been produced by icebergs holding large boulders and grating along the rocks when the land was under the sea, and as icebergs to this day are seen in the Atlantic at as southern a degree of latitude, this might naturally be the case, without the great change of climate demanded for the glacier agency.

My father revisited these valleys in 1876 and 1877, and saw no reason to change his theory. He wrote two papers for the Royal Society, giving what he thought to be further convincing proofs of it.

He seems to have been singular in his views, as most observers now, including Archibald and James Geikie, and Mr Jolly, late of Inverness, still uphold the glacier theory.[1]

No one can authoritatively say which of these theories is correct, but they have afforded matter for interesting speculation to many philosophers, and will probably continue to do so till this world and its imperfect knowledge shall have passed away.

[1] Sir William Dawson, however, Principal of Montreal University, and one of the most eminent of modern geologists, wrote to my father, "I am glad to learn you are still carrying on the war against the extreme glacialists."

CHAPTER VI.

Foreign Tour.

AFTER 1847 my father for several years devoted himself so much to county business and to agricultural pursuits, that he had little time left for geology, though occasionally he delivered popular lectures on the subject. His summer tours were, on account of his own or his wife's health, to some watering-place, either Harrogate or Buxton in this country, or to Homburg or Aix-la-Chapelle abroad. He much enjoyed an expedition to Switzerland and its glaciers with his son, and he wrote an account of "The Ancient Glaciers of Chamounix and its Neighbourhood." During these years also he wrote many other pamphlets on such practical questions as "Social Reforms for Scotland," on Education, on Poor-houses, etc. etc.

In the winter of 1869 my father, with two daughters, visited his brother, Admiral Sir Alexander Milne, who was Naval Commander-in-Chief at Malta, and they travelled through Italy and Sicily, visiting all the places of greatest interest which my father since youth had longed to see. Wherever he went he interested himself, not only in the present condition of the place and people, but in obtaining all the information he could regarding their past history, taking copious notes of all he learned.

But only a few extracts from letters or journals can be given here:—

"Genoa, *Dec. 4th*, 1869.

". . . The history of Genoa is full of interest. It is surprising to see the vestiges of former grandeur, when Genoa was a Republic and elected its own sovereign. Venice and Genoa were then the two greatest maritime ports of Europe, and the merchants were really princes, not only by blood and riches, but in industry, intelligence, taste, and patriotism.

"One of the churches we visited yesterday, the most beautiful, in my estimation, of all we saw, was begun to be erected by an individual merchant who lived five hundred years ago, and it was finished by his descendants. There is behind the altar a marble slab recording his work of piety, and declaring that the patronage of the church is reserved to him and his heirs. I cannot understand how these churches are kept up in such gorgeous decoration. Immense expense must be incurred in cleaning and gilding. Where does the money all come from? But I am sure that great good is done by decorating churches, by cherishing feelings of reverence, respect, and solemnity, and I wish that we could have more of it at home. Even a Protestant entering these churches here cannot but be impressed by the beauty of the place and the sacredness of the subjects. If we, however, in Presbyterian Scotland are able to maintain religious feelings without the help of such externals, so much stronger must be our religion.

Nevertheless, I often think with regret of the plain and bare walls of our churches both outside and inside, which might be made much more suitable to their object.

"The church bells begin to ring here at 5 A.M., and continue ringing till 5.45, when they cease, as in these churches service begins at 6 A.M. in winter, to allow and enable the working classes to attend the service for an hour before the business of the day begins.

"There are other churches where the services apparently begin at a later hour, probably for persons who do not begin their work so early. I do not know, and I cannot find out, whether these early services are well attended. Even if they are not, I cannot help thinking that good is done by the 'Call to Prayer,' being heard, as it must be, by the whole inhabitants of the town.

"Many of the palaces here have ceased to belong to princes in any sense of the word. I am told that their owners live in the attics, and are steeped in poverty, yet they are not ashamed to live among the remains of grandeur which belonged to their ancestors. I can understand the pangs with which they would part with their inheritance; but it seems to me that when the owners are too poor to maintain these palaces and use them as such, they should be sold, and that there should be a law to that effect. Time would fail me to tell you of the numbers of these ancient palaces, with splendid marble staircases and capacious apartments, decorated in the most gorgeous way. The paintings are in most exquisite style, and many are of immense value. One was pointed out to me containing a figure of St. Sebastian by Guido, for which an English gentle-

man offered £10,000, but the owner would not sell it. No wonder that Genoa had acquired for itself the title of 'La Superba!' But this wealth had its drawbacks, for it excited the cupidity of adjoining states, and the consequence was, it was frequently attacked. To defend itself against these attacks, immense fortifications were constructed in three lines round the city at intervals of more than a mile. One consequence of these fortifications was that, as the population increased, difficulty was experienced in finding sites for their dwellings. The only thing the people could do was to build vertically and not laterally, and I saw whole streets of houses with eight or ten stories, as many as there used to be in Edinburgh, and from the same cause. Moreover, most of the streets in the town are no wider than footpaths, and the roofs of the houses project so much they almost touch, but there is great advantage in this for a climate where, in winter, the cold is extreme, and in summer the heat is overpowering."

"Venice, *Dec. 8th*, 1869.

"We entered this famous city in a snowstorm. I am glad to have seen a town so famous in history and so peculiar in its construction, but it much disappoints me. The churches we have visited are curious for their antique style, but do not present the same beautiful decorations we have seen elsewhere, and the monuments in them are mostly in honour of families in whom strangers can take no interest. Most of the houses

have a neglected look, and I can see no repairs going on, and no new houses building. The place is evidently fast hastening to decay. I confess I have had a depression and weight on my heart during the three days spent in Venice, looking at the dismal vestiges of former grandeur, patriotism, and genius, and enterprise, and to see now the solitude, the dreariness, the dulness which prevails. Everything seems to have been going backwards for the last three hundred years.

"In such a place I could not live, and I wonder how anybody could live here without a fit of blue devils every morning when he looked out! I declare I would rather live in the backwoods of America, where a new city was being founded, and youth, energy, and vigour prevailed, than in an old city like Venice, where everything is in a state of decrepitude and decay!"

Milan, Florence, and Pisa were next visited, but I need not repeat what is said of cathedrals and picture galleries. With regard to the latter, my father at last confessed that he had seen too much, and that they, and even the churches, did not afford him so much pleasure as when he had commenced sight-seeing at Genoa. No wonder he was surfeited, as he says he and his daughters had visited every remarkable picture gallery and every remarkable church mentioned in Murray's hand-book, and all in so short a time. It was a most unfortunate season for their tour on account of weather. My father wrote that "the whole flat country between Florence and Pisa was inundated, and in some places as far as the eye could reach there was nothing to be seen but water; even the rails in some places were covered.

In Pisa we saw a church into which the river had entered a few days before, leaving a deposit of mud on the floor about an inch thick. I walked along the principal street, and saw on the walls the stains left by the muddy water. I measured the height on the outside walls, and it was thirteen feet above the foot pavement. In that same street a nobleman lived who was fond of horse-racing, and he had ten valuable horses in his stable. The flood came in, and he had to take out his horses, and he brought them into his own mansion, and made the horses go up the handsome marble staircase, and he put them into his drawing-room, and kept them there till the flood subsided.

"I went into several of the shops and houses, and was distressed to see the destruction of property caused by the mud left on everything." The change with regard to the sea margin was a thing which naturally much interested my father. He wrote: "The river Serchio at one time discharged itself into the sea close to Pisa; now the sea is five miles distant. Part of the chain which was across the mouth of the harbour is still shown in the 'Campo Santo' (cemetery) at Pisa. This shows the enormous mass of sediment brought down by the rivers in Northern Italy. In further proof of this I saw a tower now 300 or 400 yards from the sea at Leghorn, and I met a gentleman there who told me that when a boy he remembered that this tower was surrounded by the sea, and that it was considered a feat to swim round it."

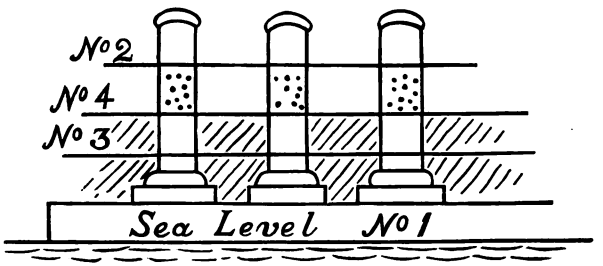
From Leghorn a long day's journey took them to Rome, and there the objects exciting chief interest are

noted. First, the Arch of Titus, erected to celebrate the capture of Jerusalem, as recorded by Josephus, and on it the representation in sculpture of the most precious articles taken from the Temple—the Golden Table, the Golden Candelabra, with its seven branches, the Silver Trumpets, etc.; and the Arch of Constantine, the first Christian Emperor, and the first who put a stop to the persecutions of the Christians, which fact is recorded on his Arch; the Colisseum, the Forum, the Vatican, etc., are all described in course as data for a popular lecture, which Mr Milne Home gave on his return home, but the Arches of Titus and Constantine are by him first named, showing that for him, with their sacred associations, they held the chief place.

From Naples my father wrote: "My first visit was to old Mrs Somerville, a native of Roxburghshire, and who has acquired so much reputation for her mathematical knowledge and publications. I called on her on 24th December, and had nearly an hour's chat with her. She said she used to live in Rome, but there were too many English people there who came and interrupted her, so she came on to Naples, which she thought more healthy, and where she had a view of the sea and Vesuvius. She told me that next day she would enter her ninetieth year, but that she was thankful to say she still preserved all her faculties, and that she was then engaged in writing a new edition of her last mathematical work on Molecular Structure."

From Naples my father visited Pompeii, and also Pozzuoli, and of the latter he thus wrote: "I went to Pozzuoli in company with Professor Allman of the

Edinburgh University, who travelled with us in the same train from Rome, and he was as anxious as I was to see the famous pillars of a Roman temple which was erected by the Emperor Augustus. About the year 1100 it slowly sank under the sea with much of the adjoining coast, and after remaining under the sea about 350 years, it rose up again into the position which it now holds. When first erected, its position by the sea level is shown by the line No. 1 in following diagram :—



An eruption of a volcano then took place about three miles distant, which covered the temple and all the town adjoining with ashes up to line No. 4. The whole land shortly afterwards sank, so that the sea reached up to No. 2, viz. about nine feet above the level of the ashes. Whilst the pillars were in the sea, the shell fish made use of them by boring into them, so that between the lines 2 and 4 the pillars are all eaten into, round and round, and made like a honeycomb. Small oysters also stuck to many parts of the temple. The pillars were not thus attacked lower down, because the thick compact bed of volcanic ashes protected them. About the year 1400 there was a great volcanic action in the same part

of Italy, insomuch that about two miles from Pozzuoli a mountain about five hundred feet high was raised up in one night. This mountain still retains the name of Monte Nuovo. The pillars also rose a little, so that the sea now stands at line No. 3. Altogether it is estimated that these pillars sank twenty-three feet, and rose up about nineteen feet.

"There were many other objects of geological interest which Professor Allman and I would like to have visited. But the rain poured during the whole expedition, and we looked only at one other thing, viz. an ancient amphitheatre, which was erected for the amusement of the inhabitants of Pozzuoli. Their first and chief amusement was to put wild beasts, such as wolves, tigers, and wild boars, into the middle, and see fights between them, and occasionally dogs were introduced to add to the fun. Latterly, when wild beasts became scarce they put slaves, and also Christians, into the amphitheatre, for the purpose of seeing them devoured by dogs. One of the people thus cruelly murdered was Januarius, a Christian, and afterwards a church was erected to his memory in Naples, which now forms the cathedral of the town, and an Order, or Honour of St. Januarius, was created by the State, which was bestowed occasionally on persons who distinguished themselves. My father had this Honour bestowed on him after the battle of Algiers, and the badge is hanging up in the cabinet at Milne Graden.

"I have been much interested with the abundance of prickly pear bushes which grow all over Italy. The American aloes are also very numerous. Professor

Allman told me yesterday that these plants are not natives of Italy; they all come from South America, and yet they are to be seen everywhere, as if they belonged to the country."

The ascent of Vesuvius was delayed till the return journey, but there is the following account of the expedition to Etna, which, considering the inclement season, must have required some courage: "I went up Etna as far as I could for the snow, viz. about 3100 feet. The whole country between Catania and Etna is like a blacksmith's shop, being covered with ashes and scoriæ, some black, some red, as one sees occasionally too at a brick or lime kiln. I got up to the crater, out of which a lava stream about ten miles long and four wide had poured out, and flowed through half of the town of Catania, and filled up much of the harbour, insomuch that the fort which formerly was close to the sea and defended the port is now half-a-mile from it. We went yesterday morning to the wall of the city, which had been sixty feet high, over which the lava stream had poured, and by which it entered the west half of the town. Of course, the stream, which was then red-hot and viscous, is now a hard rock, and the inhabitants have rebuilt their houses on the top of the lava stream. It was curious to see how indifferent and reckless the people are in the immediate neighbourhood of the crater; for villages and hamlets have sprung up around it, and I saw the people planting vines and orange trees in the black ashes, which, though very sterile in appearance, is really most fertile. At the village of Nicolosi, about two miles from the crater, there is a small museum of

curiosities, kept by a Dr Gemmellaro, who is called on by all English people, and Sir Charles Lyell mentions him in his account of Etna."

He continues: "From Catania we took passage in a steamer for Malta, touching at Syracuse, where we spent a few hours, and it is full of places of interest. I went ashore with an English artillery officer on his way to Malta, and we visited the cathedral, once a temple, dedicated to Minerva, and the pillars of the old temple form part of the present cathedral. Here also was the fountain of Arethusa, and a grotto dedicated to Diana.

"We started from Syracuse about 10 P.M., not without forebodings of a stormy passage. Even the captain was doubtful whether he should venture, and proposed to telegraph to Malta to ascertain whether he should start; for when the wind blows heavily from the east, the sea at the mouth of Malta Harbour is so heavy that ships sometimes cannot enter. He imparted his doubts to the passengers, and told us all to go to our cabins, and so be out of the way of any confusion.

"I did not quite like this prospect; but there was, however, one comfort, viz. that the Italian captains are too cowardly ever to go to sea if there is any danger, and besides, the captain knew well the vessel he commanded and the sea he had to cross, so I resolved to follow his advice.

"Before leaving Scotland I had gone to Duncan and Flockhart's, Edinburgh, and asked them if they knew of any medicine which would ward of sea-sickness. They said they had a specific recommended to them by a

medical man who had made several voyages to China, and who had always been sick till he adopted the medicine which they talked of. It consisted of capsules holding each five drops of chloroform. I had provided myself with a dozen of these capsules, and having been told to take one on lying down, and to repeat the dose every hour, I did so. When we got out to the open sea the captain's apprehensions were fully verified. We jumped about like a cork on the water, rolling and pitching and surging in the most frantic manner. The chairs and forms and loose articles in the dining saloon were flying about in all directions, and this went on almost all night. At daybreak there was a lull. I had taken three of my capsules, and with complete success. When I got up I was so excited at being told that Malta was in sight, that all feelings of sickness disappeared. We arrived December 31st, about 8 A.M., and had the great happiness of finding my brother awaiting our arrival, our approach to the Island having been discovered by the signalman on the top of the Admiralty House two hours previously."

"Malta, *Jan.* 31*st*, 1870.

"I have spent a month here, and with much enjoyment, everything being so entirely new to me—climate, population, country, habits of life, and the vestiges of former generations. The name 'Malta' is a Greek word. Some say it is derived from the quantity of honey abounding on the island (melitos being the genitive of the Greek meli, honey), and there is no doubt that it still abounds;

and no wonder, for even in the winter season there are quantities of beautiful flowers, insomuch that the island goes by the name of 'Fior del Mondo' (Flower of the World). Some people, however, derive the name from a person called Melitæon, who lived in the island, and seems to have been a prince.

"At an earlier period it was known as 'Hyperia.' It is so named by Homer, who wrote more than fourteen hundred years before our Saviour, so that we have records of the island for more than three thousand years.

"To what division of the globe Malta belongs is more than I can tell, for it seems to be halfway between Europe and Africa. At one time it must have been at the bottom of the sea, for close under the surface of the land are found only the denizens of the ocean, such as seashells, teeth of sharks, etc. Yet there must have been a previous period when it was dry land, for beneath those marine fossils are found the remains of land animals which implied extensive vegetation, and even large rivers, for there are both elephant and hippopotamus bones, and the hippopotamus, or river-horse, lives only in large rivers, and they still exist in Africa.

"This is one reason for thinking that at one period Malta formed part of a great continent, comprehending Sicily, and the same fossils exist in Sicily, Malta, and Northern Africa. The Island has been successively occupied by people of different countries and languages —the Phoceans, the Phenicians, the Greeks, Romans, Archians, and lastly, modern Europeans, and remains of all these different peoples still exist in old temples,

tombs, statues, and coins. It is quite impossible to describe all the objects that are interesting in the Island. I can but name a few of them. One is the site of St Paul's shipwreck. St Paul says the ship was driven out of its course and wrecked on the Island of Melita. The question is, 'Where is this island, as there was an island called Meleda in the Adriatic Gulf?' This doubt arose because the name is nearly the same, and because St Paul, or rather St Luke, who is the narrator, speaks of the voyage being in Adria. But it appears that the Romans called the whole Mediterranean Sea the Sea of Adria, and they called the branch of it in which the island of Meleda is situated the Gulf of Adria. But the thing which conclusively settles the point is, the wind by which the ship was driven from the Island of Crete, the Euroclydon. Now this was a wind well known to the ancient navigators, from its prevalence and its boisterous character. I verily believe we had a touch of it, and a pretty strong touch, the night we went from Sicily to Malta. It is described by ancient authors as blowing from E.N.E. and towards W.S.W. Now this is the exact bearing of Malta from Crete; and as St Luke mentions the number of days that the ship was driven before it was wrecked, these two tests show clearly that Malta was the island on which the wreck took place. It is a strong confirmation of this inference that there are numerous traditions in the Island on the subject which it is hardly possible to ascribe to fiction. There is a bay on the east side of the Island, which from time immemorial has been known as St Paul's Bay, and

the physical features of the bay are in exact correspondence with the account given by St Luke. My friend the late James Smith of Jordan Hill investigated the matter very fully, and gave a chart of the whole course of the ship from Crete to Malta, including St Paul's Bay.

"I visited this bay, and saw the perfect accuracy of the chart. This bay opens to the E.N.E., and it has a sandy creek in it, where it was proposed to let the ship go ashore. There was also a place described in our English translation of the Acts as a place 'where two seas met.' Whilst in the Island, I had some talk on this point with an ecclesiastical scholar, and he told me that the Italian translation is somewhat different. It is 'a place with the sea on each side.' Now in this bay there is such a place, a projecting point of land, with two islands beyond called Salmone, where there is a narrow passage, in which there is only ten or twelve feet of water. This is evidently correctly described by either of the translations.

"Not far from St Paul's Bay is a town which originally was the chief town of the Island, and it was here that Publius, the Roman governor, is supposed to have resided, with whom St Paul stayed for three months, and whom he converted to Christianity. There is a Cathedral here dedicated to St Paul, and in it one of the objects preserved with the greatest care and veneration is a very rude picture of the Virgin, said to have been painted by St Luke. This picture was shown to me on January 25th, St Paul's Day, consecrated in the Roman Catholic Church to the conversion of St Paul.

"A great service was being performed that day in the Cathedral. When I went in, I found five hundred people listening to a sermon from a young preacher, who was speaking in that peculiar dialect of Italian understood by the Maltese. The sermon lasted nearly an hour, and commanded the close attention of the congregation. My two daughters could follow the preacher a little, and were much interested. I did not understand a word, except that I now and then caught St Paolo! But my attention also was arrested by the earnest manner and powerful rhetorical action of the preacher. I felt that an eloquent man had, independently of the ideas he expressed, some animal magnetism, some power of influencing the minds and senses of others.

"Afterwards I had some conversation with the Roman Catholic Bishop, who is at the head of the Cathedral, and I told him how much impressed I had been by the sermon, though I had not been able to understand it, and I asked whether he was their most eloquent preacher. He said 'No,' but that they never allowed any of their students or Divinity probationers to become preachers unless they underwent instruction in the art of public speaking, and that it was only those who acquitted themselves well in that way before a select committee of ecclesiastics who were allowed to preach. I thought how good it would be, were it possible, for us to adopt that rule both in England and in Scotland."

My father was very much interested in the Orders of Templars and Knights of St John, and wrote down

all the information he could obtain regarding their history, to form the basis of a lecture to Good Templars at home; and in case any who take up this little book may not know their origin, the following short extract may interest them:—

"There were originally two Orders. The Templars taking their name from their residing in a large building near where the Temple of Jerusalem stood, and the Knights of St John who occupied a hospital dedicated to St John, and they were sometimes therefore called Hospitallers. Their object was to assist the Crusaders, and especially such as were wounded in battle. The Grand Master lived in what is now the Governor's Palace at Malta as a sovereign prince, and he maintained both an army and navy. He was indeed more powerful than any sovereign, and acknowledged no one as above him except the Pope of Rome. Originally the headquarters of the Order had been at Jerusalem, and when expelled from the Holy Land they took refuge in the island of Rhodes for two hundred years; and when driven out of that by the Turks A.D. 1500, they took possession of Malta and held it for three hundred years. Napoleon Buonaparte on his way to Egypt in 1807 blockaded Malta, and, partly however by bribery, forced the Knights to surrender the Island. The French held it for but one year, and after that it was ceded to Great Britain.

The Orders of Knights Templars and of St John extended all through Europe, for every one approved of the object for which they were originally banded together.

"Most of the reigning sovereigns, princes, and nobles bestowed on them endowments consisting of lands. In the year 1100 they were in great favour both in England and Scotland. In Scotland the Templars and Knights of St John held property in every county, and almost in every burgh and parish. In Midlothian the Templars had large possessions. It was from the extent of these that the parish of Temple took its name. I see it stated in the statistical account of Whitsome parish in Berwickshire that there are about forty acres of land there known as the Temple lands, and a wall adjoining called Temple Wall.

"In Coldingham parish a property is still called by the name of Temple Hall. The whole revenues of the Templars from all parts of Europe was about six millions of pounds sterling! This excited great jealousy, especially on the parts of the clergy, as they paid no tithes or taxes of any kind. And about the year 1300, the Order of Templars was suppressed by Pope Clement V. and Philip of France. There is no doubt that about this time the Templars had become dissolute, and were guilty of scandalous excesses, which drew down on them general contempt, so much so that '*Bibere Templerite*,' to drink like a Templar, was a term applied to all who were given to drunkenness. In consequence of this, in all parts of Europe laws were enacted against the Templars, suppressing the Order, and handing over their property to the Knights of St John, and this was the case in Scotland as well as in England.

"But at the time of the Reformation all these lands were taken from the Order, and this was accomplished

by Sir James Sandilands, who was the Grand Prior in Scotland. He was very intimate with John Knox, who induced him to renounce the Roman Catholic religion. He resigned the whole lands into the hands of the Crown, on understanding that the Crown would redispone them to him in absolute property for a certain consideration. The consideration was that he should pay 10,000 crowns to Government, and pay a yearly annuity of 500 merks."

The fact that Sir David Milne had been Grand Master of the Freemasons or Templars in Scotland, which are in some ways a kind of revival of the old Order, may have been the cause why his son took so much interest in the ancient history of the Templars.

One of the drawbacks to a residence in Malta is the great aridity of the climate, and its variability from the cold occasioned by the strong north-east winds in winter to the extreme heat of summer, from which there is no shelter. Save a few small corubas, no trees grow on the Island; there were no plantations, and no large trees of any kind. My father felt convinced that both the amenities of the Island and the actual salubrity of its climate might be much ameliorated by plantations of trees, and he wrote a pamphlet fully stating his reasons for this opinion. The Governor, Sir Patrick Grant, and the municipal authorities were so much influenced by his arguments as to appoint a commission to consider how Mr Milne Home's views could be carried out. The result was that several hundred pounds were voted to be laid out on young trees, and on the excavation of cisterns near the planta-

tions to hold water to be available not only for irrigation, but which in times of drought might be a great resource to the inhabitants.

Sir Patrick Grant wrote from Inverness in March 1873: "The trees referred to in enclosed report were every one of them planted long before I left Malta. The nursery in the marine ditch had also been started. Tanks for watering the young trees had also been completed at a great expense. The whole was in a flourishing condition when I started. My successor is interesting himself in the matter, and I have heard from him two or three times that all continues to go on favourably. The expense, however, of tree cultivation in Malta is enormous, and that will always be *the* difficulty. Save with the consent of the elected members of Council, who absolutely hold the purse strings, money cannot be voted for any purpose. I hope that more may yet be done, but I am not sanguine. The Island revenue is small, and every shilling that can be scraped together will be absorbed for many years to come in carrying out a comprehensive system of sewerage and drainage, which is perfectly indispensable for the preservation of health."

Mr Milne Home's pamphlet was so highly thought of as to be translated into German for a Vienna meteorological magazine, as it was thought his suggestions as to tree-planting might be applicable to the islands and coast of Dalmatia.

CHAPTER VII.

Further Scientific Life.

After Mr Milne Home's return from Malta in the spring of 1870, he received the honour of the degree of Doctor of Laws from the University of Edinburgh, of which he had been appointed one of the curators in 1868; and it was to him a great gratification that the Chancellor of the University, whose office it was to confer the degree, was his old friend John Inglis, Lord President of the Court of Session.

That year, however, he was able to do little scientific work, being for some time in very poor health, having barely escaped Roman fever. He was very unwell on his homeward journey through Italy, and nearly altogether laid up at Turin. But after this year health and strength improved; and in 1871, when the British Association was in Edinburgh, he was able to attend its meetings, and that year he published his book on the "Estuary of the Forth and Adjoining Districts viewed geologically." It was in 1871 that, chiefly owing to my father's influence, the Royal Society appointed a committee for obtaining information regarding all the most remarkable boulders in Scotland. Of this committee he was the convener, and its most indefatigable working member.

From this year till the close of the committee in 1884, year after year did he, besides corresponding with every parish in Scotland, himself prosecute his researches in different parts of the country, till scarcely one such transported stone can have been left unknown to him. How much he enjoyed these boulder-hunting expeditions! Perhaps not solely on account of the scientific interest, but because of the exhilaration of the mountain air and the sea breezes, and the beautiful scenery through which his researches took him. The whole of Inverness-shire was familiar to him, and he travelled through Aberdeenshire and the other eastern counties, but he spent most time on the western seaboard, as there chiefly boulders abound. Oban was frequently his headquarters, and no part of the whole of the west of Scotland, even including the Hebrides, was by him unvisited.

In these expeditions he was generally accompanied by one or more members of his family; but on one occasion, when he had been alone, he wrote as follows from Inverness: "I arrived here after having had a very fatiguing walk among the wonderful terraces of Auchnasheen. Professor Nicol, who describes them in his 'Geology of Scotland,' is, in my opinion, entirely wrong in his explanation of them. I believe they were formed while the country was under the sea. He says they are only river haughs. I took several sketches of them, and of a similar terrace on the seashore at Loch Carron. Those sea lochs on the west coast of the Highlands are very wonderful. If you open your hands and separate your fingers, you will have an idea

of them, each finger being a tongue of land, and the space between, the sea. The Glasgow steamers now go up these lochs, and in most of them there are comfortable hotels close to the sea; and sometimes, as at Oban and at Strome-ferry, with a good pier, alongside of which the steamer comes, so that there is really no difficulty even for delicate people. If I am spared to live another year in health and strength, I should like nothing better than to come to some of these places next summer, with as many of my children as can accompany me, and go from one place to another. When one comes, as I on this occasion have come, not on business, but for enjoyment, this enjoyment is greatly enhanced by having the companionship of those we love."

My father received valuable aid in his investigations from Professor Heddle of St Andrew's University; Professor Duns, New College, Edinburgh; Mr Jolly, Inspector of Schools, and many others too numerous to mention.

The following letter from Professor Heddle shows the value to be attached to such researches:—

"St Andrews, *7th April* 1879.

"My Dear Sir,—Very willingly do I agree to your proposal that my name should be on your Boulder Committee. I could not undertake to do anything *special* in searching for boulders, but I may be able to aid you in a desultory manner in my ramblings. I regard it a most important work in which you are engaged, though the importance is not, and perhaps

cannot be, seen now. I confess to have been blind to it for many years of my wanderings, blinded greatly by a remark of Professor Forbes, 'Oh! a boulder! It may have come from *anywhere!*' The mineralogist has to find the immediate where of the things he seeks after. I learned my lesson from a shrewd quarryman, one of two whom Mr Dudgeon and I took to Shetland to do the heavy work for us. My fellow was ever turning aside at the enclosures, and slowly examining the dykes. I avoided them, as being largely made up of the homeless boulders. On calling to the fellow to come on, as he was wasting time over the uncertainties, he replied, 'Noo, Doctor, ye dinna ken onything about the waste awa; thae dicks are the grandest places in natur' for geologeezin' in.' A year after I told this to Professor Nicol as a good joke, when he turned upon me with impressive earnestness, and said, 'I quite agree with him; I always do the first part of my work in a new district by examining the dykes.' And I now do much of my preliminary searching along the roadsides, and I have learned much and been aided far more by 'thae dicks.'—I am, very truly yours,

"W. FORSTER HEDDLE."

And Professor Duns has kindly given me the following letter for insertion here:—

"*June 24th*, 1880.

"Dear Professor Duns,—I am glad to learn you are to be for two months in a very interesting geological district. I hope that you will examine the boulders

which cover the slopes of Ben Nevis, and endeavour from the way in which the best covered slopes lie, and also from the position of the boulders on these slopes, to infer from what quarter the boulders have come. By following the ordinary path up to the lake on the west side of Ben Nevis, you will find on that slope an enormous number of granite boulders, many of large size. Were I able for such work (which I am now not), I could not select a more interesting locality for study of the boulder question than the district where you now are, not only on Ben Nevis, but on many of the hills not far off there are large boulders perched at great heights, and almost certainly in the positions to which they were originally brought. Boulders at low levels are less interesting because of the possibility that they may have rolled down from higher ground.

"That there were local glaciers in Scotland is hardly disputable, but the difficulty is to distinguish what is attributable to them and what to other agencies. The conclusion to which you have come, as indicated at the close of your notes, seems to me that which is correct. —I am, yours very truly,

"DAVID MILNE HOME."

So keen has been the enthusiasm of some in their boulder researches, they have risked their lives in the pursuit.

Professor Heddle has met with serious accidents in his mineralogical and boulder expeditions, and the late lamented Dr Bryce did lose his life near the fall of Foyers in Inverness-shire on a steep acclivity where there

were many boulders, and which it is supposed he loosened in his ascent in 1876.

It must indeed have been a powerful agency which carried those stones, some weighing seven and eight hundred tons, so far away from the parent rock as, in some instances, fifty or sixty miles.

And here, for the sake of those who may be interested in the subject, and who may not have been able themselves to study it, I may be permitted to state in a few words what the different theories are to account for this wonderful transportation. All agree that ice alone could have been the agency; but some geologists, as Mr Prestwich, Mr Archibald Geikie, and Professor James Geikie, think that the transporting agency was glaciers and enormous sheets of land ice, such ice as is only seen now in Greenland, and which Mr Prestwich said must in Scotland have 'attained a thickness of between three and four thousand feet!'

My father, both from his own observations and those of his friends, believed that there had been glaciers in Scotland which would transport boulders down the valleys, but he did not see evidence for the existence of such an enormous ice-sheet. He thought that the boulders found at a high elevation, as well as those on plains distant from any mountain, must have been transported there from a distance by icebergs, when the whole country of Scotland was under the sea, and when, as it rose out of the ocean, great currents from the west might prevail. Of this fact that the country during the period of the boulder-and-drift formation was under the sea there is abundant evidence.

In the Appendix to the Boulder Report of 1883 it is stated: "In Scotland, seashells, and generally of an Arctic type, have been found in clay or gravel beds up to a height of about 520 feet above sea level, also in beds of drift containing boulders. In most of the cases referred to, in the beds of drift some of the shells have been crushed, whilst others are entire and unhurt. What more probable explanation can be given of these facts than that masses of ice floating on a sea current would, on touching the sea bottom, discharge their cargoes of rocks and rubbish, and at the same time plough through the sea bottom, pushing forward boulders, and crushing shell fish?"

There is a romantic interest attached to these weather-worn boulders as one thinks of the great changes that have passed over the earth's surface, of which they are to us the witnesses.

The dry statistics of science become clothed with a graceful drapery as the scenes of the bygone ages pass before the mind's eye, and the words of the poet are recalled:—

"There rolls the deep where grew the tree.
O earth, what changes hast thou seen!
There, where the long street roars, hath been
The stillness of the central sea.

"The hills are shadows, and they flow
From form to form, and nothing stands;
They melt like mists, the solid lands,
Like clouds they shape themselves and go."

TENNYSON'S *In Memoriam.*

The further evidence of such changes of land and

sea level was the subject of Mr Milne Home's book in "Traces in Scotland of Ancient Water Lines," which he published in 1882.

This work was the result of many years of observation; his mind was continually dwelling on the subject; and he was glad to enlist the aid of any members of his family who might be in different parts of the country, for the discovery of boulders and terraces, as will be seen from the following letter, written to me when I was staying on the borders of Westmoreland and Yorkshire:—

"I am glad you saw the Shap granite as you passed in the train. I see Mr Jukes in his book says of the Shap granite that it has large crystals of felspar in it, so if you find any boulders or pebbles look for the pink felspar. Also, when you go to the lakes, look for any traces of horizontal lines above the levels of the water, especially in wild places, where the markings of Nature have not been obliterated by cultivation. Even the small streams exhibit now to my practised eye the traces of former high levels of their channels. In short, I now feel satisfied that all the lakes, all the rivers, and even the wee burnies, and the great sea itself, have been at a higher level, and that we are now only beginning to read the signs of this universal sinking."

He did not think, however, that there was any evidence of such changes going on at the present time. He was very much interested in the discovery of the monument at the end of the Roman Wall at Bridgeness on the Frith of Forth, which was almost close to high-

water mark. The monument had been thrown down, and was covered with rubbish, and close to where it was found "there were a number of squared stones. Many of these bore the marks of the mason's tools, and the impression is that they had previously formed part of a wall or building of which they were the ruins, and in which wall the tablet had been fixed." Before the discovery of this monument, it was thought by several geologists—Sir Charles Lyell, Archibald Geikie, Professor Ramsay, etc.—that the upheaval of the land twenty-five feet had been since the time of the Romans. My father from his observations did not think so, and he was much delighted when this discovery of the monument confirmed his views. There was some correspondence between him and Sir Charles Lyell on the subject; and Sir Charles Lyell, in consequence of my father's demonstrations, altered his views, and in the fourth edition of his "Antiquity of Man" stated "that the theory that there had been a rise of twenty-five feet since the time of the Romans is no longer tenable." The monument for its own sake is a very interesting piece of antiquity. It is covered with figures of men and horses and an inscription, all as clearly defined as the day they were carved. It is preserved in the Edinburgh Antiquarian Museum, and is well worth a visit. My father wrote a paper about it for the Royal Society in 1873.

In 1872 Mr Milne Home was elected Vice-President of the Edinburgh Geological Society, and he delivered the inaugural address, as the President, Professor Geikie, was unavoidably absent.

He took occasion then to explain the need there was for such a separate Society; and as this question may arise still, it seems worth while to repeat the argument: "Perhaps it may be thought that there is little need for a separate Society devoted to geological science in this city, where there are already two Societies—the Royal Society and the Royal Physical Society—both of which embrace geology in the catalogue of sciences, which they seek to promote. But that view, if entertained, is founded on ignorance of the requirements of science. When the Royal Society and Physical Society were founded, it was about a century ago, when science was in its infancy. So small was the amount of scientific knowledge in almost any department, that a scientific Society, to provide work for its members, had to draw on all the sciences. But the case is very different now. Almost every science has become so expanded that each science requires a separate Society for itself, that an opportunity may be given for reporting all the researches made in that science. Hence, in most of our large towns, we have Societies devoted exclusively to chemistry, botany, arboriculture, horticulture, and meteorology, which encourage extended and minute research, and ensure the co-operation of persons capable of judging of the value of the researches made. In defining more particularly the objects and operations of our Society, I need hardly observe that our aim is not to give instruction in the principles of geology, but to advance the science by discoveries. The business of teaching what is known in geology and in other sciences belongs

to universities and schools. It is what is not yet known which we seek, facts not hitherto observed, laws or processes not hitherto understood, are the things which interest and occupy us, and which, when discovered, we explain at our sessional meetings, and submit to our colleagues for examination and discussion, so that, if approved of, they may be published to the world, to aid others in their researches."

The practical benefit to be derived from a knowledge of geology is exemplified by the following narrative of Sir Richard Griffith, who was Honorary Fellow of the Edinburgh Geological Society, and which is taken from the "Obituary Notice by David Milne Home, November 1878, in his Inaugural Address as President," to which office he had been elected to succeed Professor Geikie in 1876. After speaking of Sir Richard's eminence as a geologist and his great works in Ireland, he goes on to say: "Another proof of Sir Richard's knowledge and sound judgment in geological matters may be given. He informed me that, having some years ago gone to Bohemia to visit a relative, he was struck with the proofs, which the rocks near his relative's residence afforded, of the existence of valuable coal seams at no great depth, though unworked, and apparently unknown. He thereupon purchased a small tract of land for his son as a speculation, which he was sure would contain valuable coal seams. Having completed the purchase, he employed persons to sink a pit. The people employed suggested that he should first ascertain by boring if there were any coal there, and at what depth. On his refusing to do so,

they thought him crazed, or exceedingly foolish, in at once incurring the expense of a working pit. Sir Richard told me the depth of the pit which was sunk. I forget the number of fathoms, but a thick and rich coal seam was reached, as he expected, and at a depth only ten fathoms different from his own previous calculations; and he told me that a good return for the capital expended was obtained from the workings."

My father took a great interest in the Edinburgh Geological Society, and contributed several papers to it. Whenever it was possible he made a point of attending the meetings, and he was anxious that the number of fellows should be increased.

In the inaugural address to the Society in November 1890 is an obituary notice of its late President; and the graceful terms in which he is spoken of by Mr Richardson, now Vice-President, are very gratifying.

In one of my father's addresses as President, he thus concludes: "I have to express a hope that during the present session we may have an abundance of interesting papers. We are fortunate in having a secretary who, being energetic and popular, and also a good geologist, will no doubt know where he can seek for interesting materials to lay before us." It is pleasant that he who was thus esteemed by my father should have been the one to give to the Society this sketch of his life and work.

Next to geology, meteorology was my father's favourite science. I do not know when he first began its study, but he wrote a paper on Storms for the Royal Society in 1840. The pamphlet on Meteorology in the first volume of Chambers' *Information for the People* was by him;

and the following account of the Makerston Observatory, belonging to Sir Thomas Brisbane, written to his father in 1844, shows how much interested he was in the subject :—

"Jedburgh, *April 24th*, 1844.

"My Dear Father,—I arrived here yesterday morning, and we have been engaged with circuit business for two days, and I take advantage of half an hour's interval to write you a few lines. I came out to Makerston on Monday, and spent the afternoon in examining the Observatory which Sir Thomas Brisbane has erected there, and I wish to tell you particularly about that part of it devoted to magnetic observations. There are three magnets in it, each eighteen inches long; one of them is for observing the variation only, which is constantly in motion. Its general amount, you know, is 24° or 25° to the west; but it oscillates daily over an arc of from 10′ to 15′, which varies with the seasons and the time of the day most regularly.

"The other two magnets are for ascertaining, not the *direction* but the *force* of the magnetism at Makerston, the one for measuring the horizontal, and the other the vertical force; and these also vary in the same manner as the direction of the force. These instruments, as indeed all the others, are (including barometer, thermometer, hygrometer, anemometer, etc.) observed every hour, both night and day. Moreover, on a certain day every month they are all observed every *minute* during twenty-four hours. On this same day the instruments at Greenwich, and at six or seven other Observatories in

different parts of the world, are also observed, but only every five minutes.

"At these other Observatories the instruments are observed at other times only every *two* hours. At Makerston, therefore, the observations are more frequent than in any other part of the world. Some very curious results have already been obtained, though the system of simultaneous observations has been going on now for only two or three years. There turns out to be a sympathy between all the magnets in different parts of the earth. That is, when one is much disturbed in its oscillations, the others are also disturbed. Every means are taken to exclude currents of air and change of temperature, which you used to think might often explain the disturbances observed. Sir Thomas Brisbane's assistant agrees with you in this opinion, and considers the Greenwich observations incorrect, because no account is then taken of, or correction made for, temperature, as at Makerston.

"Sir Thomas was himself confined to the sofa. He had burst the calf of his right leg, and broken some of the muscles and blood-vessels in it by making a violent spring to escape a plank which would have fallen on him from the top of his house. Dr Stuart of Kelso who attends him says that he will be confined many weeks before he recovers."

As my father had shown such an interest in meteorological science, it was not surprising that he should hail with great satisfaction the proposal to found a Society to promote investigations which might reveal the laws

of this recondite science, and that he should be one of the first appealed to for aid in the matter.

To understand in however small a degree the principles of the laws of any part of nature must always be an object of great interest, whether it have any direct practical bearing on daily life or not, yet when this latter aim is added no doubt the interest is increased. And the origin of the Meteorological Society was on account of its practical relation to life and health, as is proved by the following sketch of its history drawn up in 1875:—

"It was part of the duty of the Registrar-General of Scotland, Mr Pitt Dundas, to ascertain the cause of deaths; and as in many cases health and mortality are affected by weather, the Registrar resolved to procure information of a Meteorological character, and with that view he applied to Dr Stark, who by his publications on Meteorology had shown considerable knowledge of the subject. The thought occurred to them of obtaining for this object the assistance of some Scotch landed proprietors. The late Sir John Forbes of Pitsligo, who had estates in several northern counties, and Mr Milne Home, as a proprietor connected with the south-east of Scotland, were applied to. They agreed to do what they could to organise an Association for the purpose of establishing stations for observations, with the requisite instruments. In the first place, they applied to the Dukes of Buccleuch, Sutherland, the Marquis of Breadalbane, Sir James Mathieson, and other influential Scotch proprietors; and having obtained their approval and liberty to use their names, they

next applied to the Royal Highland and Agricultural Society for aid and approval. Both were given at once, and a subscription of £5, afterwards raised to £20, was granted. Application was next made to the British Association, meeting at Glasgow in 1855, under the Presidency of the Duke of Argyll. The Association heartily approved of the formation of such a Society, and agreed to verify instruments at Kew Observatory. The Society was accordingly organised without delay, the Duke of Argyll being President, Sir John Forbes Convener of the Council, and Dr Stark the Secretary. Clergy, schoolmasters, factors, and gardeners were requested to take observations, to be forwarded to the Registrar-General, and the landed proprietors supplied most of the instruments.

"A Quarterly Journal was issued, and valuable papers on the Science of Meteorology were contributed by the Marquis of Tweeddale, Sir John Forbes, Mr Milne Home (a member of the Council), Dr A. Mitchell,[1] Dr Stark, and others. It was soon found that, notwithstanding the subscriptions received from the members of the Society, the funds could not cover all the expenses, and that if the Society was to be continued, extraneous help must be obtained. The Registrar-General expressed much regret at the idea of the Association being given up, and advised application to Government. Accordingly, a deputation, consisting of the Marquis of Tweeddale, Sir John Forbes, and Mr Milne Home went up to London, and had an interview with Mr Henley, and subsequently with Lord

[1] Now Sir Arthur Mitchell, K.C.B.

Derby. Lord Derby was most favourable to the deputation, and said he would confer with the Board of Trade and Admiral Fitzroy, President of the English Meteorological Society, on the subject. The result of all this was that the Government, besides agreeing to continue to the Council of the Meteorological Society the use of the types set up for printing the Registrar-General's tables, promised a grant of £150 yearly to the Astronomer-Royal for his examination and reduction of the observations received from the Society's fifty-five stations. Government also agreed to supply sets of instruments for the stations. Affairs went smoothly for some years; but with the increase of observers and stations, difficulties again arose as to finances, and moreover, the number of observations were more than the Astronomer-Royal could undertake. Application was again made to Government. First, they aided them with the gift of rooms in the General Post Office, which, though too small, served the purpose for a time; and when still more aid was needed, the Government recommended the Council to apply to the London Royal Society's Committee for a share of the annual grant of £10,000 for meteorological purposes. The negotiations, however, with this London Royal Society's Committee were altogether unsuccessful.

"But in 1875 a Royal Commission was appointed to consider how funds for scientific purposes should be apportioned; and Mr Milne Home, who was now, since the resignation of Sir John Forbes in 1858, Convener of the Meteorological Council, was requested to be one of its members. The Commission held its sittings for two

years, until 1877, and the urgent requests for aid for the Scotch Meteorological Society were now not altogether in vain, though compared with the large sum voted by Government, which had even increased from £10,000 to £15,000, the sum granted was indeed a very small portion! £1000 was given as a reward for past services; and Mr Buchan, the Secretary of the Meteorological Society, was appointed by the London Meteorological Society their inspector and agent for Scotland, with a salary of £150 a year."

Mr Buchan had been Secretary since 1860, and by his indefatigable labours had well deserved this appointment. He is now also a member of the English Meteorological Council, attending their meetings in London every month.

After the conclusion of the Royal Commission, Mr Milne Home turned his attention to the project of a high-level meteorological station. He had heard much of such stations in foreign countries, and specially of the one established by the United States Government at Pike's Peak, upwards of 14,000 feet above the sea, and he was vexed that this country should be behind any other in the march of science. Mr Thomas Stevenson the engineer had started the proposal in 1875, and showed the feasibility of the scheme, but Mr Milne Home was its chief promoter. Being anxious to judge for himself of the site on which he believed an Observatory might be erected, he ascended Ben Nevis in October 1878, when a considerable amount of snow had already fallen, and even at any season it was indeed an arduous undertaking for one of his advanced years.

A temporary Observatory, merely to protect the instruments, was erected in 1880; and Mr Clement Wragge daily, for three years, during the summer months, ascended the mountain and recorded the observations of the barometer, the thermometer, and anemometer.

In the meantime, subscriptions from Societies and individuals were being solicited by Mr Milne Home and his friends, and in a very short space of time the required sum was made up, and a permanent Observatory for the instruments, as well as their observers, was erected and opened in the autumn of 1883. Since then hourly observations have been recorded, and now simultaneous observations are carried on in an Observatory at the sea level at Fort William, additional help having been obtained from Government, as well as from other quarters. The Edinburgh International Exhibition Committee of 1886 granted £1000.

In Mr Milne Home's address to the General Meeting in 1877, he said that "the practical utility and surpassing interest of this work (of the Meteorological Society) cannot be overestimated. Is it not of consequence to discover what are the conditions and the composition of the air most conducive to health, to trace the courses and causes of the hurricanes and storms, which frequently cause wreck and ruin on sea and land, and to discover so much of the laws of the atmosphere as will help to a knowledge of the coming weather? Why are there not yet in Great Britain weather prophets whose predictions can be relied on. The difficulties of supplying such predictions are great,

but they are not insurmountable. The elements which form our British weather are mostly generated at places at present beyond the range of our immediate observation. For example, the cyclones which occasionally sweep over our islands are formed far away in or near the equatorial regions of the Atlantic; and following the course of the Gulf Stream, many reach our coasts as the Gulf Stream itself does. If there were a meteorological station at Bermuda, and a telegraph wire to that Island, we might obtain warning of cyclones, before they strike on our shores. So also cold weather, with a northerly wind, from which we often suffer in this country, might with proper arrangements be foretold and guarded against. Mr Buchan, our Secretary, has shown that these cold periods are indicated by an unusually high barometer in Iceland and Scandinavia, and an unusually low barometer here—a sign that there is a great accumulation of air in the Arctic regions, which requires to flow to the south to restore the equilibrium.

"These examples show, that for successful predictions of the weather it is necessary that we know the state of the atmosphere hundreds or thousands of miles distant. But perhaps the best proof of this is furnished by the success of the predictions by American meteorologists, and by the reason of that success. General Meyer, the Director of the United States Meteorological Department, has a network of stations covering a very large portion of the earth's surface. His stations in a north and south direction extend from the West Indies to Canada, a distance of about eight thousand miles, and from the Atlantic seaboard to the Pacific, a distance

of fifteen hundred miles. One of his stations is at Mount Washington, at a height of six thousand feet, and another in Colorado State, at a height of fourteen thousand feet above sea level. Three times daily, by telegrams, intelligence reaches General Meyer's office from one hundred and fifty-one stations, explaining exactly the condition of the atmosphere at all these stations. The intelligence is put down on great maps, in such a manner as to be made visible to the eye of the experienced meteorologist; so that in comparing these maps, the existence of an atmospheric disturbance anywhere on the wide continent of North America is at once detected, and it can at once be seen over what districts it is likely to pass. The predictions of weather now issued in America have obtained so much of public confidence, that ships seldom leave the harbours of the country till the nearest meteorological office has been consulted. Farmers in many districts do not sow their crops, or reap them, till they have seen a bulletin of the coming weather. Even tradespeople in towns and villages, where it is the practice to expose goods in the open air for sales, generally send first to inquire whether the weather that day is to be fair or stormy. In our comparatively small country we have not the same area for immediate meteorological intelligence; therefore, we ought to make the most of the area within our power, and establish stations at the extreme south and north points of our islands, as well as along the west and east coasts, and what is more, we ought to have stations in Bermuda and in Newfoundland, for two-thirds of the

disturbance in our British atmosphere come from these two quarters."

Whether in this variable zone of the earth's surface such a knowledge of meteorology will ever be attained to as that the weather may be confidently predicted, it is impossible to say; but surely it is not only the privilege, but the duty of God's intelligent creatures, to endeavour, as far as possible, to learn the laws by which He acts. In this respect it may indeed be said of those who so exerted themselves in the cause, both of those who planned, and especially of those brave men who have encountered the winter storms on Ben Nevis and other still more inaccessible mountains, that 'they have done what they could.'"

The next object of scientific interest which occupied Mr Milne Home's attention was the establishment in 1884 of a Marine Station at Granton, under the supervision of the Meteorological Society, and of a committee consisting of Professor Dickson, Professor Chiene, and of Mr Murray of the "Challenger" expedition, and the local superintendence of Mr J. T. Cunningham, F.R.S.E., which was instituted not only for the purpose of taking observations of sea temperature, but which was furnished with a dredging steamer whereby to investigate the nature and habits of the creatures inhabiting the estuary of the Forth; and not only the Forth, but also of the Clyde, as for part of the year the little steamer is taken round to Millport to carry on similar investigations there. Mr Milne Home solicited subscriptions for this Marine Station, and several times he visited it at Granton during the first

year of its establishment. Many interesting discoveries have been made by the researches carried on there, and the specimens shown are well worth a visit from all those who are interested in natural history.

In addition to the Societies already mentioned, my father took a great interest in the Berwickshire Naturalists' Club. He became a member of it in the year 1836, and was elected President of the Club in 1861. He contributed to it several scientific papers, and was a regular attender of its meetings, enjoying the summer excursions to places of geological and antiquarian interest, and giving the annual address as President wherever it was possible for him to do so.

He was also a Fellow of the Society of Antiquaries of Scotland; and though to it he only contributed two papers on the remains of very ancient dwellings in Berwickshire, yet anything of an antiquarian research was always to him an object of great interest, and he never neglected to attend the meetings of the Antiquarian Society when he was in Edinburgh till the year 1885. In July of that year he, as one of the Vice-Presidents of the Royal Society, was asked to give the concluding address of the session. In that address he had fourteen obituary notices to give; and though they had to be brief, the labour of research they had entailed was very great.

Three days after this address was delivered he was attacked by the serious illness of a blocked vein in the head, from which he never altogether recovered.

On turning over the pages of the many pamphlets,

whether connected with science or with other objects of public interest, written by my father, one is forcibly impressed with the evidence of the vast amount of labour bestowed upon each subject. No pains had been spared, no investigation of any fact bearing on it had been neglected.

That anything which might further the end in view could be considered too much trouble was a thought never for a moment entertained by him. "What is worth doing at all, is worth doing well," was his motto throughout life. What was said of his friend James Forbes might have been equally well said of him; and I cannot better conclude this account of my father's scientific life than in giving these words of Principal Shairp's from his "Life of Principal Forbes," page 452, as they seem so applicable to the subject of this Memoir:—

"It did not seem possible for him to do anything slightly, or carelessly, or by halves. Akin to this was his definiteness and exactness of thought, which is a special form of the love of truth. Springing from this fundamental root were three qualities which specially distinguished him—method, perseverance, and conscientiousness. In the manner in which he thought out any subject, in which he carried on any work, in which he wrote, arranged his materials, and preserved them afterwards; in short, in the orderliness of his whole life method was so conspicuous that it could not further go. Then, whatever may have been his natural endowments, their power was doubled by his perseverance. As long as health and strength lasted, his tenacity of purpose

was carried to an extent that must have severely taxed his bodily frame. And when health failed, and the body could no longer second the mind's requirements, this power of active perseverance was turned into its passive form of silent endurance."

CHAPTER VIII.

County Business.

GREAT as was my father's interest in all the Edinburgh Scientific Meetings, yet county business and country life had still greater attractions. After the estate of Milne Graden had been purchased, the happiest time of year was that which he could spend there. He longed for the vacations, and wrote to his brother, who, when on leave from sea, could spend most of his time at Milne Graden, that he quite envied his enjoyment of the banks of the Tweed, while he had still to pace the dusty streets. His first official connection with the county of Berwickshire was his being appointed by Lord Home, Lord Lieutenant of the county, to be a Deputy Lieutenant. He got his commission in the Duns troop of Yeomanry in 1825, and for many years he joined in the annual drill, though after 1828 it was with the Midlothian corps and the Musselburgh troop.

He had been enrolled in the Royal Company of Archers in 1822, on the occasion of King George IV.'s visit to Edinburgh, and was again out with them when the Queen visited the Scotch metropolis in 1842. Lord Elcho then commanded them, and Mr Milne wrote to his father that they mustered as strong as they did on the occasion of George IV.'s visit. Of the

Queen's visit there is the following short notice in another letter: "The Queen's visit here has done a great deal of good. It has done good also to Government, as, in spite of what *one* newspaper says, everybody else allows that Sir Robert Peel was well received. Their departure for London in a private steamer, discarding the *Royal George*, and Lord Adolphus Fitz Clarence has, however, given great annoyance to the Navy, and to Lord Adolphus Fitz Clarence in particular; but it was quite advisable to prefer the *Trident*, when Her Majesty found she could get back in thirty hours by her, when she would have taken nearly four days by the *Royal George*. I hear it is proposed to build a Royal steam yacht for her."

Mr Milne Home took a great interest in all military Volunteer services; and though in later life he did not join the Volunteers, yet he exerted himself very much in their behalf, getting up subscriptions in the county for new uniforms and other expenses attending their drill.

Sir David Milne had taken a great interest in all county business, and he initiated his son into the same at an early age; for Mr Milne became both a Justice of the Peace and a Commissioner of Supply, and attended meetings with his father, aiding him by his legal knowledge in the business.

As early as 1835 the name David Milne, advocate, is found in the List of a Committee appointed to consider Local Taxation, and how it could most equitably be levied. For a new law had been passed, declaring that in future the collectors of land and assessed taxes were no longer to be appointed by the Commissioners of

Supply, and to be responsible to them, but were to be appointed by the Treasury, and to hold their office only during the will and pleasure of the Treasury. Previously these collectors had always been men of local knowledge. It was feared that this might no longer be the case, and that political principles might be intruded into the business, which would no longer be carried on with such impartiality as in former years, and the Committee therefore determined to petition the Government that the clauses in the recent Act of Parliament with regard to these local collectors might be repealed. The rates for rogue money (*i.e.* the expenses for criminals and police) and for roads and bridges would still, according to this Act, be levied by collectors appointed by the Commissioners of Supply, but separate officers were to be appointed by the Treasury to levy the land tax and assessed taxes, licences for game, etc., etc. I find the whole case very clearly stated in a separate paper drawn up by my father. He said that this new arrangement for Scotland would cost the country £8000 more than when all the rates were collected by the same officials; and though it had been represented to the landed proprietors, in order to induce them to agree to this scheme, that they might give reduced salaries to their collectors, and so save their own pockets, Mr Milne indignantly repudiates such a possible motive, saying, "But the landed gentry of Scotland are not yet so degraded as to listen to considerations such as these, or so utterly destitute of spirit, as not at once to fling back, ay, and to resent, the insult thus offered to their independence."

Government's only inducement, he says, was to increase their own patronage in the country, and probably they thought this well worth the extra £8000, and so would not repeal the clauses.

Arising naturally out of this consideration of local taxation, the subject of the valuation of land next occupied Mr Milne's attention. The land was taxed according to a valuation made in 1656, and since that time there had been considerable change in the relative value of landed estates, and some were taxed beyond their value. A revaluation was much desired; but before this was done, it was a matter of great moment that the trigonometrical survey, which had been commenced in 1820, but was discontinued in 1825, should be recommenced and prosecuted with vigour. The Highland and Agricultural Society, therefore, of which Mr Milne was a Director in 1836, urged the Treasury no longer to delay this important work, and with such good effect that a promise was given that the survey would be recommenced as early as possible in 1838, and the Treasury invited suggestions as to the character of the maps. Mr Milne was then requested in 1837 to draw up another Memorial for the Directors to present, which was most exhaustive in all its descriptive details of the different ends to be accomplished, and from which it may be interesting to give a few extracts:—

"In the first place, your Memorialists hope, he said, that the maps would distinctly represent the physical features and configuration of the country, representing its mountains, valleys, and plains, its rivers and lakes, etc., as well as the outward signs of its inhabited and

social condition in respect of towns, villages, churches, and other prominent buildings, and its roads, canals, and harbours.

"In the second place, your Memorialists would suggest that the heights above the sea of all the mountains, whether isolated or in ranges, should be marked on the maps, and that along the river courses and watershed lines the levels above the sea every quarter of a mile should be marked. The importance of such information in showing whether and how the districts of country can be drained, and where canals and railroads can be executed, is sufficiently obvious.

"In the third place, your Memorialists would wish the boundaries of counties, parishes, and towns to be delineated. Questions frequently arise in the Scottish Civil, Criminal, and Ecclesiastical Courts, where it is necessary to bring forward proof of some of these limits, and it would be highly desirable to have maps which should be at once so authentic and authoritative as to supersede any other evidence.

"In the fourth place, your Memorialists beg to observe, that in the event of there being a revaluation of heritable property in Scotland, it would be desirable not only to distinguish in the maps the property belonging to different individuals, but to mark therein the subdivisions of each property. Your Lordships are aware that in Scotland the land tax payable to Government, the county rates for the support of gaols, roads, and bridges, and the parish rates for maintaining the poor, the erecting of churches and schools, etc., etc., are one and all by law only leviable from those possess-

ing heritable property, not as it now exists, but according to a valuation made as far back as the year 1656, since which time, of course, not only great changes have taken place in the relative value of landed estates, but many other kinds of real property have since come into existence, which consequently pay none of these taxes at all. This has been a subject of much complaint and dissatisfaction, and steps have been taken and are about to be renewed by various influential bodies with the view of obtaining by the authority of Parliament a revaluation of heritable property in Scotland. If this revaluation is to be executed, it would obviously be most desirable to have the maps of the Ordnance Survey constructed on such a scale as will supersede the necessity of constructing separate maps for this purpose.

"In the fifth place, your Memorialists suggest, that along with the maps exhibiting the surface of the country, there should be sections of it from sea to sea, showing at one view both its geological structure and an outline of its levels. It is understood, that in surveying a country, it is necessary for the correct triangulation, to ascertain the deflection of the plumb-line from the perpendicular, in consequence of the attraction of contiguous mountains, and for this purpose an examination of the strata composing those mountains will be necessary.

"In reference to this particular, your Memorialists beg leave to add, that the Society of which they are directors have lately procured reports and maps illustrative of the geology of several districts in Scotland; and these

documents, with any other information or assistance in their power, your Memorialists have no doubt they would be authorised by the Highland and Agricultural Society to afford to the officers of the Survey."

In 1838, Mr Milne was appointed Chairman of the Highland Society's Committee in connection with the Ordnance Survey; and he continued to take the deepest interest in the work during the many years it was carried on.

The Condition of the Poor was a subject to which Mr Milne Home gave his most thoughtful consideration, mingled with a deep compassion. In 1841 he drew up a report on Pauperism, which was generally circulated, and one of his correspondents wrote it might be applicable and useful to the whole of Scotland. It was so much approved of in Berwickshire that the following statement is recorded in the County Minutes Book: "The Meeting desire to record the high sense they entertain of the great labour bestowed by Mr Milne on the investigation of the important question referred to (matters connected with pauperism), not only as connected with this county, but as connected with the labours of the General Committee in Edinburgh, of which Mr Milne is Convener, he having drawn up a most able and lucid Report, with accompanying remarks, which have been transmitted officially to the Convener of this county. It appears to this Meeting that Mr Milne has clearly demonstrated the danger of interfering essentially with the present system of Scottish Poor Law, while at the same time it may be hoped that the various suggestions stated by Mr Milne will lead to

material improvements in the working of the system. It is agreed that the thanks of the Meeting be expressed in the strongest manner to Mr Milne." No copy of this report is now to be found, but probably the sentiments were much the same as those expressed in later years. And my readers may be surprised to hear that the appointment of a fixed legal poor rate was a measure very much deprecated. Mr Milne Home thought incalculable harm had been thereby done to both rich and poor. Most undoubtedly he wished the poor to be relieved in accordance with the Bible principles of both the Old and New Testaments, but he wished it could be by a voluntary charity, and he wrote in a pamphlet published in 1867: "There is one point which I consider a blot in our system, and that is the utter absence from it of all the true characters of Christian charity. Charity, in the proper sense of the word, we do not even affect to call it. It is known among us only as 'poor rates;' we regard it simply as a tax, and one more than usually odious, because it causes grumbling both in those who pay and in those who receive. Our system entirely wants that quality of true and genuine charity which is twice blessed."

When in France, and in Belgium, and in Germany, Mr Milne Home collected much information regarding the condition of the poor in those countries.

In 1865 he was at Antwerp, and recorded in his Note-book: "I have had a conversation with the landlord of the Hotel de l'Europe, an Englishman. He confirmed what I had heard as to the absence of all legal provision for the poor in Antwerp, and the whole of Belgium. He says, there is no difficulty found in

obtaining charitable aid, when needed in consequence of any emergency, and instanced the loss of two vessels belonging to Antwerp last year, by which 140 widows and children were left destitute. A subscription of several thousand pounds was at once raised in the town for their maintenance. There is a general fund which is aided by an occasional contribution from the town funds. At Philharmonic concerts money is often raised in this way; the musicians give their music gratuitously, and people come to these concerts, and the value of their tickets is given to the poor. He says the people are all most industrious; there are no idlers or drunkards, and any money they can save they keep to take their families excursions to the country." This town, as well as many others—Elberfeld in Prussia, for instance—are divided into districts; and there are so many volunteer inspectors, both male and female, that in Elberfeld no visitor was allowed to have more than four pauper cases under his charge! And Mr Milne Home writes:[1] "Will it be said that it would be impossible to get up in Scotland a similar staff of superior almoners, male or female, who would spend a portion of their time in administering to the relief of the poor? I should be ashamed of my country were this statement true. Until the attempt is made and proved a failure, I will not believe that there is any lack of kindhearted Christian men and women in all our large towns and in our populous country parishes ready to be employed in this work of Chris-

[1] In *Social Reforms needed in Scotland*, published by Messrs Blackwood in 1867.

tian usefulness. And there are facts which confirm me in this belief; for wherever a proper appeal has been made, or a right opportunity given to persons to enrol themselves as visitors of the poor, as many have always come forward as were wanted for the purpose. In London, even now, more than half of the sick and aged poor are supported in this way, and not out of the poor rates. There are in London upwards of six hundred institutions for dispensing relief to the poor, who, from dislike of the workhouses, refuse to make known their distresses to the overseers. This example has been already followed to a certain extent in Edinburgh by the Destitute Sick, the House of Refuge, and Night Asylum Societies, and at least a hundred other Societies; and I am satisfied that a machinery could be constructed for dispensing to the poor of Scotland out-door relief, through the instrumentality of gratuitous and kind-hearted almoners. Were the present unsatisfactory and unpopular method of relieving the poor by official inspectors to be abrogated, the public would be so pleased that I have every confidence voluntary contributions would be doubled. Whilst I would not supersede the present system of asking subscriptions from door to door, I would certainly encourage the raising of funds by the old Scotch method of Church collections, for there are many persons who prefer that method of giving their charitable contributions in order to show obedience to a Divine command.

"After the new poor rates in 1845 were levied, these Church collections had greatly fallen off, naturally so, as the ratepayers could not afford to give in both directions."

The establishment of large poorhouses all over Scotland was much deplored by Mr Milne Home, and he used all his influence to resist one in Berwickshire.

He wished, that, as in olden times, there should be comfortable lodging houses for the deserving poor, like the almshouses in England, and workhouses or houses of correction only for vagrants and people of vicious character. Notwithstanding his remonstrances, however, a large combination poorhouse was erected in Kelso, and some of the Berwickshire parishes had shares in it.

In July 1876 Mr Milne Home was appointed Convener of the county of Berwick, to succeed Mr Hay of Dunse Castle, who had recently died, and he much appreciated the honour of this position and the opportunities it afforded him of still further usefulness. As Convener of the county, he was applied to by the Lord Provost of Glasgow to aid in raising subscriptions for the relief of the shareholders ruined by the failure of the City of Glasgow Bank, the liabilities of which exceeded five millions of pounds.

To this he willingly acceded, and he was Chairman of the Berwickshire Committee appointed by the Commissioner of Supply to collect funds, and they succeeded in raising upwards of £3000.

In 1881 he was again, as Convener of the county, a chief promoter in procuring help for the widows and orphans of the Eyemouth fishermen who perished in the terrible gale of October in that year; and the following Circular Letter he wrote in their behalf brought in subscriptions from all parts of the country, and all classes of society, from the Queen of the realm herself to the humblest of her subjects:—

"I have received," he said, "a letter from the Committee appointed at a Public Meeting held in the east of Berwickshire yesterday, on account of the terrible disaster which has overtaken our sea-fishing population.

"The letter is addressed to me as Convener of the county, and it asks me to invite, in this county and throughout the United Kingdom, Subscriptions to mitigate the widespread misery arising from the unprecedented hurricane of 14th inst.

"It will be enough simply to state the extent of the disaster.

"In the villages of Eyemouth, Cove, Coldingham, and Burnmouth, on the Berwickshire coast, 31 boats, representing an aggregate value of at least £10,000, have been lost; 167 men have perished, leaving 91 widows and 302 orphan children, besides, in many cases, aged fathers and mothers or other relatives, who were dependent on them for support.

"Let me only add, from my own long personal knowledge of the population of these fishing villages, and especially Eyemouth, that the brave fellows who have so miserably perished were not only among the bravest, but among the best, in their respective communities. The skipper of one of the boats was Superintendent of a Sabbath School in the town where he lived. The touching incidents which may be found in newspaper reports, show that these men, whilst of affectionate disposition and habits, were aware of the terrible risks encountered in their useful calling. These risks they gallantly faced, knowing that due precautions were taken by having splendid boats, well built, properly

equipped, and skilfully managed. The tempest, however —at least on our coast—was beyond all previous experience in respect of suddenness, duration, and violence. The numbers of men drowned—some of them shockingly mutilated—are appalling, and the numbers of bereaved widows and children most heartrending. Wailings of woe and desolation from many dwellings, and cries of neighbourly sympathy from others, mingle in dismal accord, deepened by the prospect of future destitution, unless timely aid is forthcoming.

"Surely such a calamity must touch the hearts and awaken the sympathy of every feeling person throughout the country.

"It has been calculated that a sum of from £20,000 to £30,000 would be required to meet the exigencies of the case, towards which Subscriptions exceeding £2000 have already been given by persons connected with the locality."

An account of the disaster taken from the *Dundee Advertiser* is, I think, also worth repetition here:—

"*October* 22*nd*.—The Rev. Mr Campbell of the Free Church, Errol, visited Eyemouth and its neighbourhood yesterday, and gives the following interesting narrative of his visit.

"After all that has been written about Eyemouth within the last few days, a visit to the place gives an idea, which no words can convey, of the crushing nature of the calamity which has fallen on this little town. It used to be a place full of stir, every one busy, and all their business had relation to the fishing. Now all is desolate and still. On that ill-fated Friday morning

forty-five fishing boats, the finest that the coast can show, left Eyemouth, and out of these only twenty-two have crept back to their harbour, battered, crippled, with torn sails and damaged hulls, and not the least like their former selves. The sea has claimed the other twenty-three boats. Two hundred and fifty men in the first bloom of manhood went out to sea, and out of these 128 return no more. (Thirty-one boats were lost, and 167 men perished, including Coldingham Cove and Burnmouth.) One feature of the case is peculiarly painful. It is said that the average age of the men who are lost is about twenty-six. It is thus those from whom the most was to be hoped in the coming years, and who in most of the cases by their steady habits and high religious principles held out the highest promise for the future, that are taken, and the old and infirm, the widows and children, only remain.

"The warning given by the barometer at the harbour was not unnoticed by the men before they left the shore; and it is said in the town that nine-tenths went out that morning to sea with a grudge. They were quite aware that the barometer was lower than it had been for years, and the appearance of the sky was ominous of danger; but, on the other hand, they had not been out to sea but once that week. They wanted to have the bait taken off, and they thought they could safely do it and come back before the storm broke upon them. They took the chance and perished; but it only adds now to the useless sorrow to reflect on the brave men who are gone. It is said that never before have all the boats engaged in the haddock fishing gone

to sea when the storm signal was up. Some have always stayed in; but that morning the sea was so still, with a gentle breeze that scarce sufficed to carry them out of the harbour, so that first one boat's crew went off and then another, and at length those who were left behind did not like to incur the charge of being less active than their neighbours, and all went. All who felt the first blast of the storm in Berwickshire, whether on sea or land, speak of the terrible suddenness with which it began. There was a dead stillness in the forenoon; not a breath stirred; not a leaf was moved. Meteorologists would probably say that the centre of the depression rested over the Berwickshire seaboard. Suddenly, at 11.45 A.M., a black cloud was observed coming swiftly from the north-east. At 11.50 it struck the town, trees were torn up by the roots, houses shook to their foundations, and observers calm enough to notice the barometer at the moment saw that with the first blast the glass had sprung upwards two or three tenths of an inch in a few minutes, and it was doubtless in these first few minutes that the greater part of the havoc was wrought.

"The boats were not unprepared for ordinary storms; but for the like of that, from a calm to a hurricane in a moment, they were not prepared, and so the disaster came. The very fact that since 1850 no boat from Eyemouth had been lost at sea, and that the loss of that one boat is still remembered as an unprecedented event, is enough to show that the character for steadiness and good seamanship which the fishermen of Eyemouth enjoyed was well deserved, and that it was

through no want of all the best qualities which seamen should possess that the place has lost so many it can ill spare. The feeling in Eyemouth to-day is one of profound depression. The men gather in little groups, and when spoken to as to their prospects in the future say, 'We cannot think of going to sea just now.' In the course of the forenoon a telegram was posted up at the Post Office, announcing a donation of a £100 from the Queen for the relief fund, and the reading of this has called forth expressions of the liveliest gratitude."

The sum realised by Mr Milne Home's appeal was upwards of £26,000, and that by one issued by the Lord Provost of Edinburgh was nearly equal to it, a total of upwards of £52,000, of which the sum of £32,000 is still invested, and 288 beneficiaries are in the receipt of annual assistance. This was not the first time that my father had solicited subscriptions for the inhabitants of Eyemouth. The question of tithe from the fishermen for the minister's stipend had been a cause of great friction, and in some cases it had been allowed to lapse altogether. My father was made aware of this, and he saw that both for the sake of law and order, and for the cause of the Church, such a state of affairs could not be allowed to continue. So he aided the clergyman by legal processes to levy this tithe, notwithstanding the odium he knew it would bring upon himself. Yet he was at the same time convinced that in this instance such teinds were an unfortunate arrangement. It was an invidious thing for the clergyman of the parish to have to send down to the boats to request his share of the take of fish! So a scheme of

commutation of tithe was proposed and carried out, chiefly by my father's exertions, though other county gentlemen, Mr Robertson of Ladykirk, Mr Mitchell Innes of Ayton Castle, etc., generously subscribed to aid in raising the sum, to which the fishermen contributed also according to their ability.

Of all the departments of county business, that of Roads and Bridges may be said to entail the greatest amount of time and attention, and this assuredly my father did not spare. He was Chairman of the Roads Committee, and his desire was that these Berwickshire roads should be in as perfect order as it was possible for roads to be, and a pattern to all others. To this end he persuaded the other county gentlemen to join him in the purchase of a road roller. This was used with great benefit; but the difficulties attending its transit, for which an engine has to be hired, has prevented its being put into requisition as often as he had desired and anticipated. The abolition of tolls was a measure he much regretted, for he considered that all who use the roads should help to pay for them, and that therefore the fairest means of levying funds for their maintenance was by tolls.

In 1882, by Act of Parliament a change was made in the management of the roads. It was not henceforth to be entirely in the hands of the Commissioners of Supply, but members elected by corporations and by parochial ratepayers were to sit also on the different boards.

In every parish, therefore, elections had to take place according to writs issued by the Convener, which in-

volved a great deal of labour. The first day of meeting under the new management was at Greenlaw, on the 8th December, and this day of the inauguration of the new system was one never to be forgotten on the Berwickshire roads. Snow had set in the night previously, and fell so heavily during the day, that by the afternoon the roads were blocked, and those who had driven to Greenlaw found it quite impossible to leave by the same means. Carriages and horses had to be left there. Fortunately, the railway lines were not altogether blocked. The train from Greenlaw to Berwick was long delayed, but at last it reached its destination, too late however for any train going to Kelso. My father and some other gentlemen took a special train up the river, and he, between 10 and 11 P.M., stopped at Twizell Station and signalled for a boat. The relief of his family on knowing that he had arrived there was great, but their anxiety was not altogether ended with this arrival at Twizell. The ice on the Tweed was so thick, it was long before the men could cut a passage for the boat, and my father the meanwhile was exposing himself to cold, as he watched their efforts. It was not till between 1 and 2 A.M. that he reached home, and it was indeed marvellous that, considering his age, he was not seriously the worse of such fatigue and exposure. It was in the autumn of that year that, with the aid of the Ordnance Survey maps, he executed most useful plans of all the different districts of roads, and he made up detailed lists of roads in the different districts, which had not been done before, and which greatly simplified the work

of road management. The condition of the roads was a matter which continued to interest him till the last days of his life, and of which he still undertook some management, for it was owing to his representations that the steep hill with a road so narrow that a traction engine and conveyance could not pass each other on it, near his own gate, was altered in 1887.

I must now say something about the second half of this department of county business—Bridges. It is within this century that any bridges were erected in Berwickshire; and so many were the sad accidents which had happened at flooded fords on the Tweed and Whitadder, that for the safety of life and property, it was stated, such means of crossing could no longer be depended on.

The bridge over the Tweed near Norham was that in which my father was most interested. The first bridge there was commenced in 1838, and finished in 1841. Sir David Milne and his son were both on the general committee in 1837, when the erection of a bridge was discussed, and when it was unanimously decided that the kind of bridge was to be iron suspension. But at a small sub-committee meeting, this decision was reversed in favour of a wooden bridge, which would cost £500 less, *i.e.* £4370, whereas the design for a suspension bridge by Sir Samuel Brown was £4950. When Sir David heard of this he was much annoyed, because he was convinced that a wooden bridge was not suitable for that site, and that the expense of repairing it would far more than counterbalance the £500, and in consequence of this

both he and his son retired from the Committee, and would have nothing to do with this new bridge. Consequences proved how right Sir David had been. Floods did so much injury to the piers while the bridge was being constructed, that both to remedy this and to make the piers stronger than was originally contemplated in Mr Blackmore's plan, the expense of £2000 extra had to be incurred, and even so, the bridge did not last so long as a suspension bridge would have done. This wooden bridge got so hopelessly out of repair that a new bridge became imperative; and in 1884 a committee of Northumbrian and Berwickshire proprietors, of which my father was one, was appointed to take into consideration what design to adopt for a new bridge. Mr Codrington, Civil Engineer, and Inspecting Officer of the London Local Government Board, was consulted, and after much deliberation a stone bridge, as being the most substantial, was determined on. An iron suspension bridge might have been more ornamental, but not so lasting as stone. There is some anxiety, I believe, now regarding the suspension bridge between Norham and Berwick, and the overseer of the works of this stone bridge at Norham assured us after it was opened in 1887 that it was so strong he believed it would last for ever.

The pollution of rivers by factories, etc., and how this by chemical means could be prevented, without ruining the factories or poisoning people and fish, was a matter which met with my father's most serious consideration, and which indeed in more than one instance led to litigation. But if I were to dilate on this and other subjects, such

as Fishery Boards, with all their regulations about close time and water bailiffs, I think I should weary my readers. It is useful, however, that all should know something of the different departments I have enumerated, were it only for this reason, that they might in some measure appreciate what has been done for them by those who have conscientiously devoted so much of their time to the work.

An altogether new system of transacting county business, as is well known, was introduced into the country in 1889; and as this system would entail more work on the Convener than my father in his feeble state of health was able for, he *then*, but with very great regret, resigned the Convenership. After he was taken ill in 1885 he still clung to the hope that he might yet again be able to attend a county meeting, and with this hope he had been glad to be continued in the office. He now intimated to the meeting in May that in consequence of his state of health, and in the prospect of the work which would most probably fall on the Convener of the county in the event of the Local Government Bill for Scotland being passed this session, he must ask not to be re-elected to the office. At the same time, he wished to express how much he had appreciated the honour of holding it for so long, and especially the compliment which had been paid to him by his fellow-Commissioners during the last few years, notwithstanding that his health had prevented him attending the meetings. The following gratifying resolution was then passed: "Mr R. Baillie Hamilton moved that the Commissioners of Supply record on

their Minutes their high appreciation of the valuable services which Mr Milne Home had rendered to the county during his long life, and the unfailing interest which he took in all its affairs, the constant attention he gave to the business, and their deep sense of the loss which the county had sustained by his resignation; they sincerely sympathised with him in his state of health, and trusted that he might be long spared to enjoy the rest from his labours which he had so well earned. Mr Baillie Hamilton also moved that a copy of this resolution be forwarded to Mr Milne Home, which was agreed to."

POLITICS.

I have left Politics to the last, because though it was a subject which very much interested my father, as indeed it must interest every right-minded man, yet he did not enter into it so directly as he did into the other departments of public business. It was, if I may so call it, for him rather a side work, in which he aided others, and this he had done at an early age. He was, like his father, a Conservative, and he was with Sir David when he stood for the Leith district of burghs, which Sir David contested in vain with the Lord Advocate (Murray) in 1835; and he had assisted his cousin Sir Hugh Campbell during his canvass in Berwickshire, for which Sir Hugh was returned in 1834; and he also aided his son Colonel Milne Home with his presence and influence when he stood for Berwick-on-Tweed. With one exception, he supported all the other Conservative candidates

in the different towns and counties with which he was connected.

It had been suggested to my father that he should himself seek to be returned to Parliament, but late hours did not agree with him, and he feared his health would not stand the strain.

If, however, he had stood for Parliament, it would have been as an independent member. He was shocked with the idea that a member should vote as the majority of his constituents might wish, whatever his own opinions on the question might be. A Liberal member once gave as a motive for standing on the Liberal side that it was now in many districts the only way to get into Parliament. My father would have scorned such politics as that! And if he had obtained a seat in Parliament, he would not have been a strict party adherent. He would have voted for any measure that was good for the country, by whatever party it might be brought in, and he would have declined to vote for his own party had he thought their measure the reverse. He approved of Sir Robert Peel's Repeal of the Corn Laws, believing it to be a measure for the good of the whole country; but he much disapproved of Lord Beaconsfield's Reform Bill, and the reason is apparent from his own words in a lecture he delivered at Coldstream on the Working Classes.

"The working classes," he said, "supply the hands, muscles, and nerves necessary for our manufactures, our agriculture, our navy, our mercantile marine, and our army. Though these classes are not the mainspring of the national machine, they form its wheels and pinions,

its cranks and axles, which, to ensure regular and steady action, require to be of sound material, and ought also to work smoothly."

It seems now as if the working classes were going to take the place of the "head" and the "mainspring," instead of that of the "hands" and the "wheels," and one may well be apprehensive as to what the result of such a transformation may be.

I have said that there was one exception to my father's support of Conservative members. He voted for Sir Lyon Playfair in 1880, when Sir Lyon stood for re-election for the University of Edinburgh. He considered that Sir Lyon Playfair being a scientific man, and connected with the Edinburgh University, was specially well fitted to represent it. It must have required no small amount of courage to do this, but he thought it was right. And here I hope I may be pardoned for again quoting from Principal Shairp's "Life of James Forbes," as I could not find words more accurately to describe what I would wish to say of my father:—

"I never saw in any man such fearlessness in the path of duty. The one question with him was, Is it right? No dread of consequences, and consequences often bitterly felt by him, and wounding his sensitive nature, ever prevented him from doing that to which conscience prompted. His sense of right amounted to chivalry. So straight did he go to what he believed was the right, in the pursuit of this so entire was his disregard of consequences, so little did he shrink from opposition, keenly though he felt it,

that it amounted to a very chivalry. To those who met him only in work or in business, he seemed a man too much on the stretch, too intent on duty, ever to relax into a more playful or humorous mood. But on those within the more intimate circle of friendship or family life he turned another and tenderer side, not apparent to casual observers."

The last few lines of my quotation suggest what might be thought a want in my biographical sketch.

There is little or nothing said of domestic life, for I had felt this almost too tender a subject for the publicity of a printed volume. Yet I would say that this side of my father's character was to those who knew him well one of its best sides; and as years passed by, and in old age the physical powers were weakened, the virtues of domestic life—forbearance, sympathy, gratitude, and affection—were deepened, those qualities which ripen us for that better Home, for which this earthly life is only a preparation.

CHAPTER IX.

Religious and Church Life.

As we have seen, in the earliest years of the subject of our Memoir his religious education began at his mother's knee, and the faith then instilled remained unwavering and undimmed by the shadow of a doubt, till faith was merged in vision. Theology and Biblical study formed part of his College course, and essays on the deep subjects of Freewill and God's Providence are found among his papers, yet these difficulties and mysteries never seem to have proved any stumblingblock to his faith. His allegiance to his Maker and his Maker's Word was such that anything approaching to scepticism exceedingly shocked and pained him, and all books containing such views were carefully eschewed. Mr Milne was one brought up in an atmosphere of respectful reserve on sacred topics. Even in his journals, though there are some allusions to personal spiritual experience, it was too sacred a subject to dilate on; but he lived his Christianity, manifesting its upright principles in all the actions of his daily life, not only attending to the outward ordinances of religion in Church and family, and seeing that his children were duly instructed, but his justice, mingled with forbearance, in all his dealings with his fellowmen proved that his religion was no mere Sunday attire.

He was brought up a member of the Established Church of Scotland, was ordained an elder in the Parish Church of Inveresk in 1828, and the same year he was elected a member of the General Assembly by the Presbytery of Chirnside, Berwickshire.[1] He first spoke in the General Assembly in 1829; and every succeeding year (save one, when disabled by an accident), till he resigned on account of health in 1879, he joined in all the discussions for the Church's weal.

The evils wrought by the abuse of patronage were to him matter of such serious concern that he agreed to be a member of the Non-intrusion Committee in 1840. This had been a subject of discussion for many years since the famous Auchterarder case in 1835. An Act had been passed by the General Assembly in 1834 called the Veto Act, allowing parishioners to protest against the appointment of a minister should they have grave objections to receiving him. But this Veto Act, on which the proceedings of the Presbytery had been founded in the Auchterarder case, was, when the case was appealed to the Court of Session, declared to have been illegal, as it had not been ratified by Parliament.

Mr Milne hoped that Lord Aberdeen's proposed Bill, by which freedom was to be given to Presbyteries to consider objections and to decide as to the suitableness of any one nominated by a patron, to the circumstances of the particular parish, would modify, if it did not altogether remove, the evils arising from the abuse of

[1] He was also a member of the Kirk-Session of St. Andrew's, Edinburgh, elected 1832, and subsequently of Hutton and Coldstream, in Berwickshire.

patronage. He therefore in 1843 decided to vote for that Bill. This proposal, however, did not satisfy the extreme party, who wished the evil to be remedied by doing away altogether with patronage, and by vesting the power of the election of ministers solely in the people, and because they would not yield on this point they seceded from the Established Church. Two hundred and fifty parish ministers and 210 *quoad sacra* (*i.e.* chapels of ease) ministers gave up their livings, and this was the origin of the Free Church. Mr Milne wrote of the great excitement that prevailed in Edinburgh "when 120 ministers and 50 elders left the General Assembly and walked in procession down to Canonmills, followed by crowds of people, and most of the females in tears."

A Declaration had been laid on the table of the General Assembly setting forth the reasons why the Seceders had taken this step, and it was called their "Protest." A Commission of the General Assembly was appointed to consider this Protest, of which Mr Milne, much against his will, was appointed Convener. He wrote as follows to the Lord Advocate, Duncan M'Neill, afterwards Lord Colinsay, at the close of the sittings of the Commission in August:—

"*August* 11*th*, 1843.

"My Dear Lord Advocate,—You are aware that a Committee was appointed by the last General Assembly to answer 'The Protest.' This was done against my

wish, for my advice was that we should be contented with a general resolution of the Assembly denouncing the Protest. With that view, John Tait and I drew up such a resolution, and I put it into Dr Cook's hands, but he would not move it, and preferred the appointment of a Committee, of which he made me Convener, without asking my consent. I have done what I could to help our friends, and the Committee on Wednesday night presented their report, of which I enclose a copy. The Commission agreed to meet yesterday to consider it, and, fortunately, as I think, there was no quorum. The document is not public, and yet it is known that an answer to the Protest exists. The Free Churchmen, therefore, cannot say that we have shrunk from answering their Protest, when they see by the papers that one has been prepared by the Assembly's Committee. On the other hand, they have not got that answer to shoot at when they hold their Assembly in Glasgow next October. Knowing that you were aware of the appointment of the Committee, and that you considered that appointment injudicious, I was desirous of informing you of the share I had in that measure, and of the result to which it has been brought.

"This answer to the Protest will not be made public before next Assembly, by which time I hope less interest will attach to it. The Committee will unanimously support and defend the answer if required to do so.—Yours very truly, DAVID MILNE."

The 'Report' referred to in this letter is not now to be

found. Probably as my father did not approve of the measure, he was not careful to preserve the document.

The difficulty in the Auchterarder case had been a complicated one. The presentee had not previously been ordained; and the majority of the Presbytery, seeing that there was such a general feeling in the parish against him, decided not to proceed to ordination in this case; but the minority were subsequently obliged by the Civil Court to ordain the presentee.

Mr Milne mentions in his journal a conversation he had held with the late Dr Gilly, vicar of Norham, on the subject of presentation to livings in England. He wrote that "Dr Gilly held that one of the qualifications of a clergyman was his fitness for the particular charge, and he held that it was not competent for the Courts of Law to force the Bishop to receive a presentee. If rejected improperly, the appeal, Dr Gilly held, could only be to the Archbishop of Canterbury. In this respect, however," Mr Milne continues, "I think he is wrong. Certainly he differs from Lord Brougham, who said, when discussing the Auchterarder case, that a bishop could be compelled to say why the presentee rejected by him was not fit."

It was this principle, however, of discretionary power in the spiritual court that was embodied in Lord Aberdeen's Bill, and of which Mr Milne approved. Though, therefore, he did not think the principle of patronage wrong when thus held in check, yet eventually he saw the advisability of its repeal. He was on the Committee to consider how this should best be

done, and he voted in the General Assembly for the abolition of patronage in 1874.

Many of those who advocated this abolition of patronage in the Established Church hoped that it would lead to union with the other Presbyterian bodies, and indeed with some it was the main end in view. But my father, while entertaining most friendly feelings towards the members of other Churches, had no such expectation. He deemed it was practically impossible. Although he preferred the simple service of the Presbyterian Church, and without the aid of any modern innovations, yet he could also appreciate the ritual of the Episcopal Church. Sometimes in Scotland, and generally when in England, he attended her services. In 1849, on account of the delicacy of his wife and eldest daughter, he spent a winter at Brighton, where he took sittings in the Churches of Joseph Sortain (Lady Huntingdon's persuasion) and of Frederick Robertson.[1] He was much pleased with both, but specially with the latter; and his remarks about Frederick Robertson, who attained to such eminence, and the notes of his sermons, will, I think, be read with interest:—

"Mr Robertson surpasses any preacher I ever heard. It is a great privilege to hear him, and he addresses himself peculiarly to the practical duties of life. He has short notes before him, evidently inserted within the leaves of his Bible. I take it also that all his sermons are committed to memory, for the composition is very

[1] In later life, when in London, he attended Canon Fleming's Church, St. Michael's, Chester Square, and listened to the Canon's able discourses with much satisfaction.

correct. At all events, they must be the subjects of intense study and meditation. His text to-day (30th December 1849) was on that saying of Christ, 'The hour is coming when all ye shall be scattered and shall leave Me alone, and yet I am not alone, for my Father is with Me.' He said that there were two kinds of solitude—one of space, and the other of spirit. After saying that the fisherman on the wide ocean at night, and the traveller in the desert, though alone in one sense, were not so in another, when they thought of friends at home and God above, he proceeded to explain the feelings produced on different classes of men by solitude. Those who formed the greatest generals and statesmen, and who cared little for the opinions of others, did not dislike solitude. It was there they formed their deep resolutions, opinions, and designs, which were to astonish or enlighten the world, but others of weaker and gentler dispositions could not brook solitude."

Again is recorded in the Diary: "I heard Mr Robertson preach an eloquent sermon. Speaking of a future life and of the resurrection of the body, he said that life was unknown to us, except as connected with and clothed with an outward form, and life has the power of taking to itself particles and fashioning them into a body of certain nature. Even a plant has the power, from the life given to it, of forming a body for itself. So also the spirit of man, and the purer the spirit the more benevolent is the countenance. A child's expression of face is more innocent than that of a grown-up person, because there is more innocence of

spirit. He said that possibly the highest of all spirits, viz. God Himself, might be clothed with a form, His garment being the material universe. Our bodies were doomed to corruption; but the spirit being immortal, has still the power to appropriate to itself, at God's command, another and a brighter body, if its purity has been increased by the power of the Gospel. If a building is full of defects, the architect does not renovate it by taking out a brick here and a rafter there. He takes down the whole structure and renews it with better materials, with a uniform symmetry."

My father made Mr Robertson's personal acquaintance, and asked him to visit us in Scotland; but already Mr Robertson's health had begun to fail, and the further intercourse which had been hoped for was never realised. There are notes of yet another sermon, from which I give the following extract:—

"Preaching on the Fall of Adam and the labour it entailed, Mr Robertson said: 'By labour is meant something else than mere work. Work was the destiny of every human being, and he who does not work does not fulfil God's law. Before the Fall, Adam was put into a garden to till and to keep it. But labour implies the toil and fatigue which spring from excess of work. Whence arises this excess? From the selfishness which causes a large portion of mankind to live in idleness, and whereby the rest are overburdened. Were all to work with their hands or their brains, this would not be so. The world is to be managed by mankind; but in order to be well managed, all must work; and he who is idle extinguishes a pair of hands, or a brain

from the world, and oppresses his fellow-creatures with his share of the work which belongs to him. This selfishness is one of the forms of sin; indeed, it is perhaps the taproot, and all other sins are collateral and subsidiary.'"

All who knew Mr Milne Home might bear testimony to how fully he exemplified the principles of industry thus inculcated by Mr Robertson. He was never idle, and it would be a difficult task to enumerate all the works in which he was engaged. He was applied to on all sides; and if the object were a good one, he never turned a deaf ear, if it were at all possible to comply with the request. It would be impossible to say on how many committees he sat for the improvement of education, especially religious education, the improvement of the condition of the poor, the furtherance of temperance, etc. He was greatly in favour of Sir Wilfred Lawson's Bill to permit the prohibition of public-houses in localities where a majority of the ratepayers were opposed to them. Yet he always maintained that legislation was of comparatively little use to cure the evils of intemperance. To raise the tone of mind, so as to excite a desire for higher enjoyment, and so change the habits of the people, must be the end in view. And for this cause he did all he could to promote rational recreation, as a counter charm to the public-house. He established in the districts with which he was connected reading-rooms, where books and periodicals were supplied, and even games, for the mind cannot always be at its utmost bent, and a game of backgammon he did not himself despise. He took a great interest in the tem-

perance public-houses instituted in Edinburgh, in the funds of which he was a shareholder.

He was a member of the Scotch Christian Knowledge Society, and for some years he was President of the Berwick Branch of the British and Foreign Bible Society, and felt it a special honour to have been elected to such a post. He was President of the Scotch Sabbath School Union, and its annual festivals of sacred song were by him greatly enjoyed. He was a Vice-President of the Border Counties Association, the chief object of which is to provide bursaries for poor students. And this leads me to say, that of all the good objects in which my father was interested, there was none which he thought of greater importance than education. He was most careful in the supervision of the schools of Eyemouth and Paxton, with which, after his wife succeeded to her father's estates, he was specially connected, and he rarely omitted being present at the examinations. After religious inspection was no longer undertaken by the Government, he was foremost in the work of providing special religious inspectors to be appointed by the Church, for it was ever his conviction that education apart from religion had no moral value, as is evidenced by the following remarks taken from his journal as early as September 6, 1839: "I read in the *Courant* of yesterday some excellent speeches on the subject of Education at a meeting of the Mechanics' Institution. Mr Macaulay, Mr Bennie, and a Mr Alexander spoke well, though I dissent from their arguments. They contend that education in science cannot hurt religion, since one kind of truth cannot clash with another.

True, but the question is as to the impression on the heart. Suppose that A is educated in as much of religion as of science, and that B is educated in science only, which would be the better man? Can there be a doubt on the subject? It may be true, as some assert, that science and literature will not corrupt a man with pride or any other spring of corruption. But though science will not make him worse, I doubt whether it will, if unaccompanied by religious instruction, make him better. It is religion alone which will have this effect. I think that it would not be difficult to show that a man whilst under secular instruction alone not only stands still, but actually descends in the scale of piety. A good opportunity offers itself of attacking those ministers who at the above meeting supported a different doctrine."

The last sentence seems to indicate that he proposed to write an article in defence of the above views at that time, but if so, it has not been preserved.

In 1867, however, he wrote a pamphlet on the subject of "Legislation for Elementary Schools in Scotland with Reference to the Report of the Royal Commissioners," when it was proposed to make instruction in religion optional, no longer to be included in the subjects for examination by Government inspectors, either as regards teachers or their pupils. He said: "The chief defect of the Commissioners' scheme is the want of any *guarantee for that combined religious and secular instruction*, which I hold to be essential for the wellbeing of the community, and which hitherto has prevailed in Scotland. To afford that guarantee should, I think, be

one of the primary conditions and objects of any organisation; and I hope I am not wrong in believing that, unless that guarantee is afforded, the scheme of the Commissioners will not be either countenanced or tolerated."

And after quoting from various reports showing the evil wrought by such secular schools in other countries, he concludes with these words of warning:—

"Mr Fraser" (who had reported on these schools in Canada and the United States) "concludes his instructive and suggestive report by saying, 'I do not pretend to know where we are drifting!' Neither do I; but what I lament is that we should be drifting to nobody knows where. We are cutting away the old moorings in Church and State, one after another, without supplying others to keep us in safe anchorage. There is a restless spirit of shallow conceit abroad, which finds satisfaction in the easy employment of cutting down and pulling to pieces, without any setting up of other institutions calculated to ensure stability or inspire confidence."

Mr Milne Home was Convener of the General Assembly's Committee appointed to consider the disrepair of Churches and Manses, especially in the Highlands, of which he had seen evidence in his geological expeditions to these parts. Piteous were the details of distress revealed in letters to the Convener and other members of the Committee; and this Committee and these revelations were probably the cause of a still more extended movement, which has resulted in the raising at the present date of large contributions, aided by

bazaars in Edinburgh and Glasgow, to provide funds for the relief of the West Highland churches and manses.

Suddenly a cessation came in my father's busy life to this round of active work. After his severe illness in 1885, though his mind was quite clear, he was unable to read, and business meetings were an impossibility.

For long, as there was partial recovery, he hoped it might become more complete, and that he might again resume his business habits. But he came to see that such was not God's will; and keenly, most keenly, as he felt the deprivation, he submitted without a murmur. He did fully appreciate the blessings still left to him, enjoying the society of family and friends and the beauties of his country home. In 1887 and 1888 he was able to spend some weeks at Inveresk; and it was a great pleasure to him again to visit the scenes of his boyhood and youth; and Arthur Seat, where he had so often geologised, was gazed at with special satisfaction. After his return from Inveresk in 1888, he had another very dangerous illness, and he never left home again. At last, September 19th, 1890, the end came, and I do not think I can find a more appropriate conclusion to the sketch I have drawn of my dear father's life than the following words I find inscribed in his Journal:[1]—

"It is, many have frequently remarked, a solemn thing to die. It is a far more solemn thing to live. We need not trouble ourselves about our death, if only we trouble our hearts by many an anxious inquiry about the nature, the impulse, the substance of our life. If we are anxious how to live, God will relieve us of all

[1] From Dr Cumming's *Voices of the Day*.

the burden and anxiety of how to die. How gently the patriarchs died! Let us read the death of a patriarch as recorded in the Scriptures, how quiet, how confiding! They seemed to fall asleep, as the flowers on the approach of winter, which bow their heads quietly, submissively, as if rejoicing in the arrangements of their Father, whether for life or for death."

Even so calmly and peacefully did my father die, conscious to the last breath of this earthly life, listening to the words of the old Psalms and Paraphrases he loved so well, his spirit passed away, and those standing by could realise the truth of the sacred words, "Death is swallowed up in victory," and what with minor inspiration a modern poet writes—

> "There is no death, what seems so is transition.
> This life of mortal breath
> Is but the suburb of the life Elysian
> Whose portal we call Death."—*Longfellow.*

His body was laid to rest in Hutton Churchyard beside that of his wife, who died in April 1876, close to the church where they had worshipped together during the twelve years of his residence at Paxton.

The Rev. W. Dobie of Ladykirk conducted the funeral service in Hutton Church and at the grave, Dr Kirke of Hutton being prevented by illness; and the services at Milne Graden before the mournful procession left it were conducted by the Rev. A. Nisbet of Coldstream, and the Rev. Arthur Gordon of St Andrew's Church, Edinburgh, the church which my father had attended for so many years, and where he had served so long as elder.

CHAPTER X.

AN ABSTRACT OF PAPER "On the Geology of Berwickshire," by DAVID MILNE, ADVOCATE, A.M., F.R.S.E., F.G.S. Published in the Transactions of the British Association for 1834.

MR MILNE commenced his paper by describing the boundaries of the district he had examined, and for the better illustration of which he exhibited a coloured map and sections. The district in question comprehends the Lammermuir hills on the north, the valley of the Tweed on the south, and a line drawn north and south through Melrose on the west. He mentioned that there are at least four different formations of rocks to be found in this district. *First*, the grauwacke[1] rocks, composing the greater part of the Lammermuir Hills; *second*, the old red sandstone, which ranges along the base of these hills, and is found filling up their valleys and burn courses; *third*, the coal measures, which to a certain extent are distinctly developed, resting on the old red sandstone, and forming the lower parts of Berwickshire; and *fourthly*, the trap (*i.e.* volcanic rock), which forms the greater

[1] "Grauwacke" is a German word signifying "greystone." "Cambrian," or "silurian," from the prevalence of these rocks in Wales, is the term now generally used.

number of the isolated hills that are outliers from the mountain chain of the Lammermuirs. Mr Milne then described the external appearance of the district as that of an oval-shaped basin, cut across at the east end by the German Ocean, and the northern edges of which are the grauwacke hills, some of which rise 1800 feet above the level of the sea. The country then slopes down to the valley of the Tweed, and is diversified by a number of tributary streams, which cut and form deep ravines in the soft clay strata, of which the lower parts of the country are chiefly composed. Next to the grauwacke formation in point of level is the old red sandstone group, ranging along the base of the Lammermuir, Gala Water, and Cheviot Hills, and occupying about a fifth of the intervening space between the hills and the Tweed, but which is never visible at a lower level than 200 or 300 feet, or higher than 900 or 1000 feet above the sea. The coal measures and marl strata occupy the west and lowest part of the surface of the basin, being cut through by the Tweed in its course from Kelso to the sea, the higher parts of the river above Kelso to Jedburgh displaying sections of the old red sandstone. Mr Milne proceeded to notice the situation of the trap rocks, the exact boundaries of which he said it was more difficult to describe, though they occur most abundantly in the grauwacke and old red sandstone formations. The traps in the two different groups possess very distinct characters, the grauwacke trap being remarkable for its compactness, and that of the old red sandstone being of a looser and more friable texture. Almost all the isolated hills

which diversify the appearance of the upper parts of Berwickshire, as Cowdenknowes, the Dirringtons, Cockburn Law, Lamberton, Home Castle, Kyles Hill, and others of inferior note, consist of this less compact trap, and are within the limits of the old red sandstone formation. He then entered into a more detailed account of these different formations.

1. *The Grauwacke Hills.*—These have been usually described as running from St. Abb's Head across the country to the Irish Channel; and though this is true as a general remark, yet on examination it is found that a considerable portion of them, perhaps one-fourth or one-fifth, consists of trap rocks intermixed. One-half of the promontory of St. Abb's Head consists of trap, and there are few ravines of the mountain torrents from these hills wherein masses of trap may not be perceived insinuating themselves even among the grauwacke strata, and deriving from them a stratified appearance. The grauwacke strata from this cause have been dislocated and contorted in a thousand different ways, and therefore they exhibit no uniformity in their dip and direction. But there is still, on the whole, and more particularly in those parts which have not been disturbed by immediate contiguity to trap, a tendency to a particular direction or run, viz. from east to west. The texture of the rock is finely granular, and is generally of a greenish or sometimes of a yellowish brown colour. Occasionally it passes into a slate, which is quarried for various purposes. No fossils have been found in the grauwacke rocks, nor any mineral except copper. There are veins of this metal in several

parts of the Lammermuir range, some of which have been worked, as at Elmford, Fassney, and Norton, and they run in a direction very nearly east and west.

2. *The Old Red Sandstone Formation.*—This formation consists of a coarse conglomerate at its basis, a slaty sandstone in the central parts, and of soft beds of unconsolidated sand or clay in the upper parts. This formation flanks the base of the grauwacke range, and is found filling up all the ravines and valleys of these hills up to a certain level. On the sides of the hills the thickness is inconsiderable, but towards the plains, and at a distance from the hills, it is found to be of great depth. In the upper parts of the Lammermuir the conglomerate appears to have a thickness of only ten or twenty feet; whilst on the banks of the Tweed, between Kelso and Melrose, there are cliffs of conglomerate eighty or one hundred feet high.

The same remark applies to the sandstones which have been deposited over the conglomerate, deep sections of them being visible on the Tweed, whilst in the upper parts of Lauderdale they are much more shallow. This fact, Mr Milne observed, could be at once accounted for on the supposition that these old red sandstone rocks had been deposited in an ocean which washed the sides of the Lammermuir hills, and which increased in depth at a distance from them. The grauwacke strata, on which the conglomerate has been deposited, must have formed the bed of that ancient ocean; and accordingly, though the conglomerate presents great unevenness and irregularities in its level, the upper part of the red sandstone series very nearly occupies

one level throughout the whole district, but slopes gradually from the hills. The conglomerate of the old red sandstone is composed of fragments varying in size from small gravel to boulders of a foot or two in diameter. They consist of the same rocks of which the neighbouring hills are composed, being either grauwacke or trap, though the grauwacke fragments greatly predominate. All the fragments have been completely rounded, as if they had been worn down by the action of water; not that they seem to have been transported from a great distance, for the fragments are generally either at the very base of the parent rocks, or in the immediate vicinity of them, but they seem to have been acted on like shingle, or a bank of gravel at the foot of a sea cliff, the pebbles of which have been worn and smoothed by the incessant motion of the waves. These fragments are agglutinated together by a cement of small gravel or sand, hardened by oxide of iron, which gives a red tinge to the mass, and wherever the fragments are oblong or flat, their flat sides are almost always parallel to the line of stratification. That these conglomerate rocks were thus deposited on the grauwacke, and form the *débris* which must have been collected at the foot of them, is not only the only possible way of explaining their present situation and appearance, but it is proved by sections at various points where the junction of the two formations is seen.

The conglomerate is overlaid by a deposit of sandstone, which, as has been already observed, is thinner near the edge of the deposit than at a greater distance from the hills. There is one character in the minera-

logical appearance of the rock, besides its red colour and slaty structure, viz. the occurrence of white or greenish white spots or patches upon its longitudinal fracture; these white spots do not generally exceed two inches in diameter, being sometimes semi-oval, but generally they are very nearly circular. (These white spots were described and explained in the correspondence with Dr Buckland, see page 88.)

The upper part of the old red sandstone formation consists of beds of red sand and red clay, which are so little consolidated, that in the part of the country where they are best seen, viz. between Whiteburn, Greenlaw, and East Gordon, numbers of hillocks and rounded knolls have been formed by the effect of the rains and the rivulets which now encircle them. In many places where the formation is less ferruginous, these upper beds are worked for the sand they yield. No fossil remains of any kind have been found in this formation (in Berwickshire). Since the deposition of these rocks they have been subjected to the most violent disturbance and dislocation. Through a great many different parts of the red sandstone girdle, flanking the hills, the trap is now seen protruding, and bearing far above the rest of the surface of the surrounding country the red sandstone strata on its top or sides. At Home Castle, which is built upon basalt,[1] a large quantity of the sandstone is seen enveloped in the trap. The whole mass of trap here is very considerable, and may be perhaps altogether two miles in circumference. Home Castle is about two

[1] Another term for volcanic rock.

hundred or two hundred and fifty feet above the red sandstone plains surrounding it; and very near its walls the red sandstone above referred to may be seen very highly inclined, leaning upon the basalt. There are various other hills of trap, which occur among the old red sandstone strata, such as the Dirringtons, Kyles Hill, the Eildons, etc. The protrusion of these immense masses of trap, some of them forming hills one thousand or twelve hundred feet above the level of the sea, and three hundred or four hundred feet above the surrounding country, could not fail to elevate the district immediately in contact with them, and the effect of this elevation must necessarily have been to produce great rents or fissures across the strata so elevated and disturbed. Suppose that by the elevation of Home Castle rock, for example, the red sandstones which were originally horizontal were pushed upwards so as to raise one part several hundred feet above the surrounding country, the width of the cracks or rents caused by this elevation, and their extent throughout the country, would, of course, depend upon the height to which the strata were raised, and the distance to which the disturbing force operated. But one thing is evident, that these rents or fissures would generally run from the point of highest elevation or greatest disturbance as a centre; and whilst *there* the rents would be of considerable width, they would gradually diminish in width in proportion to their distance from that centre. This observation is well illustrated by what actually occurs in the neighbourhood of Home Castle; for

two or three trap dykes are found to run across the country for several miles from that point as a nucleus, this nucleus having served as the source or fountainhead to supply the different currents of trap which now form the dykes that have filled up these extensive rents. These trap rocks seem to be generally confined to the old red sandstone group, and occur more frequently next the edge of the group contiguous to the hills than to the one more distant from them. There are several instances of the lower conglomerate having been cut through and hardened by veins of trap; indeed, in one locality, a mass of conglomerate, about thirty feet thick and one hundred yards long, the breadth unknown, may be seen resting on the top of a trap hill, which has risen up between the grauwacke and the old red sandstone. This is near the sea coast, at a small village called Burnmouth.

3. *The Carboniferous or Coal Formation, etc.*—Mr Milne then proceeded to describe the lowest parts of the basin, viz. those occupied by rocks decidedly members of the coal deposit, from which extensive supplies are obtained along the south bank of the Tweed. He here observed that in speaking of the Berwick coal-fields, or coal formation, which occurs along the south bank of the Tweed, he only meant to state the fact that strata are developed there, having all the distinctive features of the coal measures, derived both from the mineralogical characters, as well as from the organic remains found in them. These strata have, however, been described as subordinate members of the mountain

limestone[1] group, and to this opinion he cordially acceded. But his object was merely to state the fact of extensive deposits of coal, and its usual concomitant rocks, being in that neighbourhood, when he spoke of them under the convenient appellation of coal measures. There are on the south bank of the Tweed altogether eight workable seams of coal, and the collieries extend from near the shore at Berwick to the river Till, which joins the Tweed about twenty miles from the sea. Those strata, with the rest of the coal measures, rise at Berwick, about N.N.W.; but further inland they rise more and more decidedly to the westward; and near the Till, where they are not far from the Cheviot Hills, they rise nearly due west. In short, they appear to be conformably to the belt of old red sandstone, which winds along the foot of the Lammermuir and Cheviot ranges, and rise always to the hills nearest to them. These coal seams vary in thickness, from two and a half to five and a half feet, and are worked so extensively as to supply with fuel not only the district of Northumberland and Durham wherein they occur, but also the greater part of Berwickshire and Roxburghshire.

It is from the same coal deposit that all the lime used for agricultural purposes is procured. It is hardly necessary to add that the sandstones, limestones, and shales accompanying the coal which is worked south of the Tweed, contain all the fossil remains usually characteristic of a coal deposit. Crinoidea, with the

[1] The mountain limestone elsewhere is *under* the coal seams, without including coal in its deposit.

Producta, Spirifera, Modiola, and other marine shells are abundant, whilst the Equisetaceæ, Filices, and similar plants are easily distinguishable in the impressions visible on the sandstones and shales. It is by these limestones that the remarkable foldings are exhibited, which do not occur in the strata of shale lying above and below them. These foldings are seen at Berwick and at Scremerston on the shore. These coal measures cross the Tweed, and are observable in the lower parts of Berwickshire. The only members of them there indubitably belonging to the formation are the sandstones and a few shales. The rest of the formation of more doubtful character consists of thick beds of argillaceous blue clay, and strata of marl and sandstone slightly impregnated with calcareous matter. The thick beds of sandstone of decidedly carboniferous character are dark red, white, and yellowish, as usually occurs in coal fields, and the same beds of strata may be traced running through the country for many miles. All the freestone quarries in Berwickshire are worked in these carboniferous strata, which are sometimes fifty or eighty feet in thickness. These sandstones are filled with all the impressions of vegetable remains usual in coal fields, and no difference of any sort can be observed between them and the sandstones of the Midlothian deposits. On some of the beds of shale found on the banks of the Tweed, not far below Coldstream, impressions of marine shells are abundant, which seem to be of the genus Modiola. Mr Milne here also mentioned that on the north side of the Tweed, along the sea coast, these coal measures are accompanied not merely by the

characteristic limestone, but also by three seams of workable coal. These coal seams may be traced along the coast from Scremerston and Berwick, and are undoubtedly a continuation of the seams which occur there. But they form a narrow belt along the coast, and at length disappear under the German Ocean, at a point where the trap of Lamberton Hill projects into the sea, and throws up the coal measures, not only on their edges, but so as to form an obtuse angle with the horizontal basis of the hill. About thirty years ago, these three seams of coal were worked on several parts of the Berwickshire coast, and the proprietor has lately again advertised them to be let.

Mr Milne then came to describe those other deposits of doubtful character, which some have considered as of more recent origin, and belonging to the new red sandstone series. He described them as consisting generally of blue clay beds, and their marl strata, the latter being generally of a lightish brown, sometimes a yellowish colour. The ordinary dip and deviation of the strata are like those of all the other strata towards the hills, and though in particular localities, they do not lie altogether conformably to the coal measures; yet, on the *whole*, they may be said to be conformable; and in some places, as will immediately be seen, they are *actually* overlaid by the coal measures.

In these beds of soft blue clay numerous strata of sandstone are seen, but not of any great thickness or running to any extent. They are commonly wedge-shaped, and thin away to nothing. These embedded masses of sandstone very commonly contain, nay, some-

times are entirely composed of, accumulations of small conglomerate, containing numbers of pebbles, vegetable impressions, and even fossil remains, in curious and interesting confusion. This conglomerate not unfrequently is highly ferruginous. It was in the latter kind that Lord Greenock discovered an entire tooth and the remains of others. This tooth has been described in the *Edinburgh Philosophical Journal.* It was sent to London, and submitted to the inspection of Mr Clift; but Dr Grant has since more minutely examined it, and particularly its internal parts, which were not seen by Mr Clift, and he is decidedly of opinion that it is a tooth of the Sophius piscatorius or sea-devil, and further, to use his own words, that it "has been preserved to us precisely as it fell from the jaw upon the loose sand."

Besides these embedded sandstones, there is, in this marl formation, a yellowish calcareous and cellular rock, which has all the appearance and many of the properties of the magnesian limestone. This rock is seen on the banks of the Tweed, principally near Coldstream; the strata are thin, none of them exceeding a foot in thickness. It is not, however, only on the banks of the Tweed that this mineral has been found; it is associated in a beautifully crystallised state with the Scremerston seam of coal worked near Berwick, and even in some parts is blended with the coal, so as to render the latter impure, and in a great measure unfit for sale. This limestone has been analysed, and out of 100 parts, found to contain 50 of carbonate of lime, 44 of magnesia, 4 of silica, and 1·2 of peroxide of iron.

The specimen analysed was from Birgham Haugh. In beds of dark blue clay or shale, immediately in the vicinity of these strata of magnesian limestone, nodules of iron ore occur, though far less pure and genuine than generally occurs in the coal fields.

Another mineral of occasional occurrence in the marl formations is gypsum. There are three kinds—red and white gypsum in veins intersecting the clay beds of blue marl; and selemnite, which fills up the cracks and interstices of the marl beds, where they are exposed to the air. The red gypsum occurs in irregular masses, from the size of a walnut to three or four feet in diameter. The white is in thin veins, not always, but generally in the same beds with the red gypsum; and whenever they come in contact, the thin white vein is invariably cut off and intercepted by nodules of the red, which has therefore been the more recently formed. Although gypsum occurs in abundance in this district, no rock salt in a mineral state has been found; but several springs are known in it, which contain a considerale quantity of salt; for example, on an analysis of well water at the Manse of Eccles, out of 87 parts, 57 were found to be sulphate of lime, and 30 of common salt; and in the mineral water of Dunse Spa, also within the limits of the marl group, as analysed a number of years ago by Dr F. Home, a large proportion of common salt was found.

Vegetable fossils have been found among the marl beds, forming very extensive deposits. At three or four several localities large trees have been discovered, in beds of blue clay, in a petrified state. The trunks vary in size from a few inches to several feet in diameter,

but none have yet been discovered of any length, indeed, none exceed three or four feet, and they have generally the appearance of having been transported for some distance, being rounded at the ends. These trees have been converted into a hard calcareous rock, which does not always assume the shape and size of the tree enveloped in it, but is generally a little larger, and on being broken presents an accumulation of small twigs and branches of trees, which are found to be of the same species as the imbedded trunks. These fossils have been all ascertained to belong to the genus Coniferæ. These fossil trees are always covered or skinned over by a coaly matter, which seems to have been the original bark, and which has been occasionally found nearly one inch thick. The internal parts of these fossils have not been so entirely displaced by the intrusion of calcareous matter as to have lost all their woody structure. On the contrary, specimens are constantly met with in which the branch or trunk displays all the concentric rings formed by the annual growths. The original resinous matter of the tree has been seen oozing or exuding from its interior fibres. Many of the trees have been flattened, and flattened so entirely as to show that the whole of the interior parts have been, as it were, squeezed out, whilst the bark above has been preserved, of course, in a state of coal, and now appearing as thin seams of lignite in the beds of clay.

Besides these deposits of trees in the beds of clay, there are numberless impressions of vegetables in the marl strata very similar to those found in coal fields. The plants are entirely flattened, some of the impres-

sions being those of small branches and of very delicate structure. It is manifest that if these plants have not actually grown in the places where they are now found, they could not have been transported far, from the small degree of injury which they appear to have sustained. In some cases impressions of leaves have been found. The animal remains found in a fossil state are very few. In addition to the fish's tooth already noticed as having been found in the sandstone conglomerate of Tweed banks, there are a few shells of a minute character which appear to be the Teredo, the Serpulo, and Modiola, and which occur not only in these conglomerates, but also in marl strata, clearly contemporaneous with it. As to the position of these marl strata, in respect to their dipping under or overlying the coal measures, Mr Milne stated that there are two or three localities where these are distinctly seen to be covered by the coal measures. In particular, one locality on the sea coast was mentioned where these marl beds and the coal measures are found in contact, and where the genuine character of these respective strata is placed beyond all doubt by the occurrence of gypsum in the one and of seams of coal in the other. A section is there well exposed, showing the contact of the coal measures and marl strata, the latter manifestly lying beneath the coal measures.

Mr Milne alluded to the opinions of several distinguished geologists, that the marl rocks which he had just been describing belonged to an epoch more recent than the mountain limestone or carboniferous group; and there was no doubt, that they have many of the

characters of the true marls or new red sandstone formation.

But the nature of the fossils found in it, as well as the fact of its being seen dipping under the coal measures, Mr Milne stated, had led him to consider the formations as subordinate to them, and deposited nearly under the same circumstances. These circumstances were the prevalence of the same sea and a similar climate, as proved by the occurrence of the same marine shells in both kinds of strata. One distinction between them might be the unconsolidated condition of the calcareous deposits on the north of the Tweed, as compared with the compact limestones on the south of the Tweed; and also the absence of the larger marine shells and corallines from these marl beds, and the occurrence in them of deposits of trunks of fossil trees and branches, which have not been often found in the same uncompressed state in the coal measures. Whether or not these data would justify the impression that the sea, at the bottom of which these marl strata were formed, was not of the same depth as that part of the ocean where the thick beds of limestone south of the Tweed have been deposited, he did not venture to say. But Mr Milne remarked that it was a confirmation of this view that the same fossil trees which are found in the marl beds do not occur further south, as they would not probably be drifted very far from the shores whereon they grew. Besides, it is well known that currents and eddies at the bottom of the sea are more frequent along the coast and the mouths of large rivers than at a distance from land; so that the same cause might serve to explain the

formation of those wedge-shaped sandstone strata in the thick beds of clay and marl frequent on the banks of the Tweed, as well as the gravelly conglomerate, where are seen mixed up together not only fragments of various rocks, but vegetables, small shells, and fishes' teeth.

Another deposit derived from the marl strata just described consists of lacustrine deposits of shell marl. There are several of these worked, on account of the calcareous matter which they afford to be spread over the land for agricultural purposes. On the estate of Kimmerghame, near Duns, there is a mass of this nature about seven acres in extent. There is at the surface a covering of peat, which in some places is ten feet deep. Below this there are two beds of white calcareous marl filled with minute shells, the beds being separated by a stratum of blue clay. Each of the beds of marl is about six feet in thickness. The shells found in them seem to be of exactly the same genera as those found by Mr Lyell in the lacustrine deposits of Forfarshire, the Planorbis, Lymnæa, etc. In addition to these shells, remains of the beaver, and of a large species of deer, were some years ago discovered in this bog. The remains of the beaver, it is believed, are now in the museum. A specimen of the horns found in the mass was exhibited, together with portions of the marl containing multitudes of minute shells. In the parish of Merton, where a shell marl mass of one hundred acres occurs, horns of the same species of deer were found, as well as the remains of beavers. These horns were pronounced, by Sir Humphry Davy, to belong to an extinct species.

4. The only remaining formation in the district is *The Trap*, which in Berwickshire, as in most other districts, may be divided into three kinds, according to the epochs at which it was successively ejected:—

(1) The older trap occurs, as has been already mentioned, not only in large amorphous masses among the grauwacke strata, but also occasionally alternating with these rocks, and assuming their regular stratified appearance. An example of the stratified trap may be seen at Fassney Water (a locality described by Professor Playfair), and on the north face of Soutra, about 200 yards east from the London Road. In these places it has all the appearance of sienite, both from its hardness and the intermixture of red felspar and hornblende. It is hardly necessary to add that these sienitic and other trap strata which appear in this stratified form have acquired that condition from the grauwacke strata, between which they have been pushed up in a way similar to what occurs in Salisbury Crags; and the like effect as is there seen has been produced upon the grauwacke rocks, which are greatly hardened, and even made to assume so crystalline an appearance as to render it difficult to find the exact line of division.

(2) The trap of St Abb's Head belongs to a more recent period. It may be traced, except for a very short interval, occupied by grauwacke, southwards along the coast to a point where it is found enveloping the conglomerate of the old red sandstone. On this point of the coast the conglomerate may be seen in vertical beds, and at another point, viz. at Eyemouth

Harbour, in immense horizontal masses, resting on the trap, and dipping at a small angle into the sea. Here copper is found in the trap in great abundance, not in the form of veins, but in small nodules, which by oxidizing on exposure to the air give a curious appearance to the surface of the rock, which is in consequence speckled over with green patches. To the same epoch may be referred the eruption of most of the trap hills of Berwickshire; those, at least, which have protruded through the old red sandstone, some of which, as, for example, the Eildon Hills, are about 1300 feet above the level of the sea.

There are trap dykes which traverse the red clay beds and sandstones of this formation, some of which run from Home Castle, and in which numerous red crystals occur. Some of these red crystals are of that red colour and jasper appearance, as to lead to the opinion that the trap had occasionally taken up some particles of the adjacent red strata, and jaspidified them. These dykes abound also with large crystals of glossy green felspar. This old red sandstone trap is of various textures, from the crystalline basalt to the friable and almost vesicular tufa, which is seen on the outskirts of the trap hills. It sometimes also occurs as a soft breccia or conglomerate, the imbedded portions being manifestly derived from the rocks or soil among which it had flowed. In one locality the conglomerate consists of very small pebbles or gravel, which are agglutinated together by a tufaceous paste or mud, having exactly the appearance of a stream of hardened lava. This occurs in the middle of the old red sand-

stone formation, on the banks of the Whitadder, north-west of Duns.

(3) There are a few examples of trap ejected after the deposition of the coal measures, which in consequence are greatly disturbed in its neighbourhood. The whole of Lamberton Hill, near the sea coast, is an example of this; the coal measures, which run along its base for about four miles on the shore, being now seen not only vertical, but even inverted to a considerable extent. The trap here has risen up, and is so extensive as to have upraised not merely the coal measures on the one side, but the grauwacke on the other; and completely obliterated the old red sandstone group at this point, the only trace of it left being a patch of conglomerate on the top of the hill.

A few miles to the south of Berwick there is another mass of trap, which forms the Kyloe Hills, and from which a dyke runs fifteen miles in a straight line towards Home Castle rock. In the Tweed below Coldstream it thins out to nothing. The dyke is a light-coloured greenstone. It varies in width, though, generally speaking, it is broader near the Kyloe Hills than at its further extremity. The usual effects of trap in hardening the strata, with which it is in contact, are observable in this dyke, and in those previously described. In some places there has been a slight overflow of the trap dyke into the other strata in contact with it; as, for example, the shales and coal, which could less easily resist the lateral pressure of the confined current. There do not, however, appear at any of the localities where the dyke and the sedimentary rocks are seen in

contact to have been any other changes effected on them. They are in no case turned up on their edges, or altered in their general bearings. But the case is widely different with the trap hills, all of which have, wherever they are in contact with the trap, upraised the adjoining rocks. The difference between the effect of trap hills and the effect of dykes may be explained by supposing that they were merely currents of trap, which flowed into fractures or rents previously existing across the country, caused, perhaps, by the elevation of particular points by masses of trap which have been pressed up from below. Such a rent was very likely to be produced by the elevation of the Kyloe Hills, and the direction it took would naturally be towards some other point, where a similar disturbing and rending force existed.

Kyloe dyke was traced by Mr Milne for about fifteen miles in a direct line towards the trap hills of Home Castle. May not the consideration just stated account for the direction of this dyke? He noticed another circumstance as a probable effect of the trap upon the incumbent strata, viz. the occurrence of indurated clay beds, and even of chert, in the immediate vicinity of it. At Carham there are thick beds of a coarse, gritty limestone, which contain abundance of quartz of a dusky brown and red colour. These beds of limestone are themselves of a whitish cream colour, and much indurated clay of the same colour, occasionally a little tinged with green or red, accompanies them. These strata rest upon a porphyry, which is in some places amygdaloidal, containing small grains of quartz tinged

with green earth. Near Duns the same chert is again seen, but in strata of calcareous sandstone, which are of about the same thickness as the limestone beds at Carham. They are here also immediately incumbent on the trap. At Newton Douy, at Marchmont, at Preston, and at Berwick the same indurated marls have been found, which are sometimes so compact as to have been mistaken and burned for limestone, but which proved to be only marls, hardened by their contact with or vicinity to trap.

The only other object to which Mr Milne adverted was the changes which appear to have been produced on the surface of the district, and on its elevation above the level of the sea at successive periods. He described at least four elevations of the land at successive periods: (1) The elevation by which the grauwacke strata were upraised; (2) the elevation by which the old red sandstones were made to emerge from the waters wherein they were deposited; (3) the elevation which converted the marine strata of the coal measures, or mountain limestone of Northumberland, into dry land; and (4) a still more recent elevation, the precise epoch of which has not yet been exactly determined.

It may perhaps throw light on the causes of these successive elevations to remember, that at the time when these formations were respectively disturbed and elevated, trap rocks appear to have risen up, which at each successive outburst most probably acted, not merely upon the particular group of rocks among which they now protrude, but on the whole district of country, including the grauwacke range. These outbursts of

ancient lava would most probably, like the cones on the sides of a volcanic mountain, take place laterally, where the resistance would be less than directly among and through the grauwacke hills; and thus it is that after the ejection of the old red sandstone trap, along the sides and base of the grauwacke range, the more recent eruptions are more distant from the hills, and among the more modern deposits of coal measures. But still, these successive upheavings of trap, though they have found an outlet among the softer rocks, have increased the elevation of the grauwacke at different periods, without there being on these occasions any visible eruption of trap among these hills. It is perhaps a confirmation of this remark that the old red sandstone conglomerate, which was, of course, originally at the same general level along the base of the grauwacke range, is now 800 feet, and 900 higher in the western parts of it than at the sea coast, and the rise is most remarkably uniform and regular on proceeding inland from the coast. At the seashore, as already stated, the conglomerate is lifted on the top of the trap, and dipping into the sea. About two miles inland, at Foulden, it is about 150 feet above the sea; at Old Melrose, in the valley of the Tweed, it is 300 feet above the sea; at Greenlaw, nearer the hills, it is 480 feet; at Dod's Mill, near Spotiswoode, 500 feet above the sea; at Norton, in Lauderdale, 540 feet; at Carfrae Mill, still nearer the central range, 640 feet; and at the foot of Soutra Hill, on both sides of the ridge, which is probably about twenty-eight miles from the sea, between 820 and 890 feet above its level.

Since, however, the elevation of the country at these

successive periods, corresponding to the three kinds of trap now visible in the district, there seems to have been a fourth, though it is admitted that this fact is more problematical, and is supported by indications of a less decisive character. The vertical coal measures at the foot of Lamberton Hill along the sea coast have been described. Immediately south of Burnmouth there is a tract of tableland, now about a hundred feet above the level of the sea, which extends between the beach and the base of the hill. It is in shape a triangle, the base of which runs along the foot of Lamberton Hill for about a mile and a half, and the two sides form the present sea cliffs for about three and a half miles in extent. This tableland consists of the vertical strata, which run parallel with the base, and are seen at the two sides of the triangle, at the sea-shore, running right across the tableland. It is not a little curious that these vertical strata should all have had their edges worn down to a horizontal and level plain, just as would have been the case if the rocks had been exposed to the action of marine currents incessantly sweeping over their edges. When the tide is far out, exactly the same appearance is presented by the vertical rocks, which form the bottom of the shore, for a considerable distance out from the existing cliffs; and were there to be an elevation of the coast, we should have another tableland, formed of vertical strata, with their edges worn down to a nearly horizontal level, like the tableland, at present about a hundred feet above the level of the sea. Perhaps connected with this very recent elevation of the coast may be some extensive rents

and fissures in the land visible near St Abb's Head, and particularly on the north side of it about Dunglass. One of the most perceptible of these fissures runs for about a mile and a half from the Siccar Point past the ruins of a church called St Helen's, and towards the valley of the Pease Bridge, where the rent is nearly 150 feet deep. In the part of its course first described the valley is perfectly dry, and there are no symptoms of any rivulet having ever run in it. The strata of grauwacke are here and there nearly vertical, and form a smooth, unbroken wall for several hundred yards, on both sides of the valley, which has been formed by the sundering, or separating, or slipping of the strata from off each other.

Similar rents are seen at Cockburnspath and at St Abb's Head, some of which are about 180 feet deep, and have small rivulets running at the bottom of them, which are too insignificant to have cut through these hard strata to such a depth; but some of these rents are so shaped that they could never have had rivulets running in them at all. This district bears upon its front the well-marked symptoms of diluvial action. Large boulders of mica slate, and every variety of trap, are found buried in the alluvial strata on the banks of the Tweed, as well as at the foot of the hills, and the hills most generally are devoid of vegetation, and bared to the rock upon their south-western flanks. This is particularly the case with Home Castle rock, Cowdenknowes, Stitchel, Bemerside, and others of less note.

A good deal of red soil is found scattered over

localities, and even among the grauwacke hills, where alone it could have been brought and deposited by a flood, which swept the red sandstones of Roxburghshire, and, as it were, painted the south front of the Lammermuirs with a vermilion edge, to mark the force and the direction of its waters.

AN ABSTRACT OF PAPER: "Notes of Elongated Ridges of Drift common in the South of Scotland, called Kaims," by D. MILNE HOME, F.R.S.E. Published in Transactions of the Sections of British Association for 1861, page 115.

THE author described a number of examples of these ridges in Berwickshire, Roxburghshire, and other places. He stated that they were so regular as to have the appearance of railway embankments or fortifications, and that they had often been mistaken for the latter. They were from forty feet to sixty feet in height, and sometimes could be traced for three or four miles. They were found at various heights above the sea, up to 700 feet. In examining their internal structure, they were seen to consist generally of sand, gravel, and boulders; the latter generally rounded, but also occasionally angular. He adverted to the fact that they are sometimes intersected by rivulets and even rivers; but that, notwithstanding this, they had all the appearance of having when originally formed been continuous. The author offered some remarks on the agency supposed to have been concerned in the produc-

tion of the Kaims. He repudiated the notion of their being formed by glaciers. He considered they were due to the action of water, as indicated by their internal structure, and supposed that they must have been formed by the waters of the ocean, when they stood at least 800 feet above the present level. The only question, as he thought, was, whether they had been thrown up as submarine spits or banks, or whether they had been formed by a process of scooping out, when the land emerged from the ocean. His opinion wavered between these two views, but he was inclined to the former. In the east of Scotland these Kaims had mostly one direction, the east and west; and as they were in different positions, sometimes on level land, and sometimes on sloping hills, he thought that a sudden lift of the country out of the ocean would better produce that uniformity of direction than any other view, and also occasion the scooping out and removal of materials leaving continuous ridges.

Some further Private Notes about the Berwickshire Kaims by D. Milne Home in December 1857 and January 1858:—

"I visited the Kaims in Greenlaw Parish, accompanied by Mr Robert Chambers of Edinburgh. Mr Chambers before going there expected that he would discover them to be glacier moraines. However, when we saw the interior structure exposed at some gravel pits, he was satisfied that they had been formed by

water. At the freshest of these excavations the strata of sand and fine gravel were quite distinct, and strongly indicative of aqueous action. There are also quantities of rounded stones, viz., old red sandstone and grey-wacke, and I found several blocks of the basaltic greenstone, not rounded, being so hard, which have apparently been brought from the west, but none of the yellow or buff-coloured porphyry of the Dirringtons (to the north of the Kaims). I feel quite perplexed, and it is more easy to see what is *not* their origin than what is. I do not think they are glacial moraines. (1) Because I see no locality for a glacier. When glaciers bring forward *débris*, these *débris* (as I understand) are projected at the termination of the glacier, where it melts. In such places the mountains must be so high above the level of the moraines as to keep the glacier in a frozen state. Now here there is no mountain range with a valley out of which a glacier could have flowed in a frozen state, and with its lower end melted. For such a state of things, surely there must be a difference of level to the extent of several thousand feet, which is the case in Switzerland. Now here, the Kaims are not at the mouth of any valley, and the hilly district to the north is only four hundred or five hundred feet above them. Moreover, if the Kaims are moraines, viz., *débris* caused by the rubbing of the sides of a valley, the quantity is such as should show a very long valley, and nothing of the kind exists. If a glacier flowed towards those Kaims, it must have come from the Dirringtons, which are composed of yellow porphyry, and I could see no porphyry among the

débris.[1] The general direction of the Kaims is east and west, or parallel with the Lammermuir chain, so that they cannot be the moraines of a glacier from the west.

Mr Chambers, however, thought that these gravel ridges had been formed out of previously existing detritus brought by an icy sea, as he says that the rounded stones containing ruts and scratches on their surface betoken this cause. I maintained that these could have been formed by the stones rubbing on one another, and at all events I could not understand how ice could produce the effect. Mr Chambers said that as diamond could scratch glass by being set in a stick, so hard stones sticking in the bottom of ice could scratch or be scratched. This is, however, assuming a state of things very improbable. It supposes the ice to be sliding over the surface of the country, instead of floating on the sea. As to a more probable solution of the problem, perhaps the following circumstances should be kept in view. In several places there is a break in the continuity of the ridge, but these breaks have apparently taken place since they were formed. Through the largest of these breaks the river Fangrist now runs; but there are several through which there is no stream, and yet it seems to me manifest that the ridge has been continuous at these places, particularly towards the east end. Supposing that the ridge was formed while the country was under the ocean, it is most probable that it would be all continuous. If it was formed by tides, currents, or breakers, they would act uniformly

[1] During a subsequent examination a few specimens of Dirrington porphyry were found towards the east.

and extensively, and not at isolated points. Now supposing the land to rise out of the sea, the rush of waters off the adjoining slopes, both to north and south, would break through the ridge at some points; and these points would generally be near the inside angles of curves, which is the fact. That water has had much to do in the formation of the ridge is quite manifest from its internal structure. That a great scooping out has occurred is probable from the fact that the surface of the adjoining moors is very much lower at the places where the ridge is highest. The height of the ridge seems to be due not to the larger accumulation of *débris* there, but to the subsequent scooping out and washing away of the detritus. It is also remarkable that though the general level of the country, on which the Kaims stands, falls towards the south, the top of the ridge is everywhere much on the same level. Now this rather points to the accumulation being formed by a power which had a horizontal termination. The *débris* if formed into a ridge by the tides or currents would go to a certain height, but no further. I believe that many of the Yarmouth sandbanks come to an equal distance from the surface, though varying very much in perpendicular height, caused by the varying depths of the adjoining sea bottoms. The turnings and sinuosities of the ridge are very perplexing. At several places the line actually forms a right angle. Now this is the chief difficulty in any theory which ascribes the formation of the ridge to tides, currents, or breakers. It is true that the general direction is parallel with the Lammermuirs; but opposite to the Dirringtons there is a bulge

or curve towards the south, as if the Dirringtons had in some way influenced the power, whatever it was, which formed the Kaims. Is it possible that the Dirringtons have modified the direction of the current which threw up the *débris*?

"Notice of Stone Cannon Balls found in Parish of Swinton, Berwickshire," by DAVID MILNE HOME, Esq., of Milne Graden, LL.D., etc.

HAPPENING to pass through the village of Swinton one day last autumn (1878), I observed in a small garden plot, adjoining the principal inn, what appeared to be a large cannon ball of stone.

On asking the innkeeper the history of it, he informed me, that it was one of five or six which had been found together in the river Leet, in 1865, when its channel was being altered; and that his idea was that they had belonged to the large cannon known by the name of Mons Meg. He added that when in Edinburgh lately he had gone to the Castle, and found that Mons Meg has a mouth large enough to admit the ball; and that there were lying beside the gun several stone balls, apparently about the size of the one in Swinton. He said that some one had told him it was known to readers of Scotch history that Mons Meg was at the siege of Norham Castle in the time of King James IV.

The above six balls were thus disposed of: Mr Chalmers has one at Swinton Inn. The Rev. Mr Shearer, F.C., Swinton, has one. A third was got by Mr White, which is now at Milne Graden. Mr Hannan, of Duns Castle, took away the other three. One of these is now at St Mary's Cottage, Duns Castle. Mr

Chalmers thinks the other two were sent by Mr Hannan to Edinburgh.

I went to Swinton House and saw there three stone balls—two are in the garden on a wall. The third is at the end of the house occupied by the farm steward. This last one I found has a girth of 58½ inches. He said it had been found in the river Leet, at the back of his house. The other two in the garden seemed to be of smaller size. Mr Chalmers did not know their history; but he was sure they had been in the garden more than forty years.

The ball at the steward's house has inserted into it a piece of iron, and a groove has been made at each side in connection with this bit of iron. It is probable that the object of this was to convert it into a heavy weight for a cheese press.

There is another stone, somewhat smaller, at a cottage door in Swinton village, with a bit of iron in it, which is supposed to have been used for a similar purpose.

On obtaining this information, I asked Mr Cossar of Greenknowe to have the goodness to inquire as to the exact spot where the balls were found, and in what position they had been lying.

He did make inquiry; and he writes to me that when the channel of the river Leet was lowered in the year 1865, five stone balls were found at the side of a bridge over the river to the north of Swinton Mill, on the property of Colonel Trotter of Charter Hall. Mr Cossar says the balls were at the S.E. side of the bridge, placed apparently so as to guide the water through the arch of

the bridge. The bridge (Mr Cossar adds) was repaired in the year 1745.

I went to Edinburgh Castle and examined Mons Meg. The gun rests on a handsome iron carriage, bearing the following inscription: "At siege of Norham Castle, in 1497."

On measurement, I found the mouth of the gun to be twenty inches across, and that the inside bore becomes slightly smaller towards the breech. The length of the gun is 16 feet.

It has evidently been made with longitudinal iron bars, outside of which other iron bars have been hooped round and across the former.

I found six stone balls lying beside the gun, the largest of which is about 42 inches in girth. The others are 35 or 36 inches.

Having, through the good offices of Mr Cossar, obtained possession of one of the stone balls, I find that its girth is 56 inches. It is apparently of limestone, as vinegar poured on it causes effervescence.

The ball at Swinton village has a girth of 58 inches, and is said to be of grey granite.

Lately, on visiting Norham Castle, I found near the porter's lodge a stone ball, with a girth of 57 inches, which I learned had some years ago been found in the river Tweed, a few hundred yards to the west of the Castle. The spot where it was found is in a line between the Castle and Ladykirk village. An old grass field to the east of the village shows the remains of military ramparts, where artillery might suitably have been stationed for firing on Norham Castle. The probability

therefore is that Mons Meg had been brought to this field, and that a stone ball fired from it had fallen short of the Castle and fell into the Tweed, where it had lain till discovered on the occasion just referred to, when the river was unusually low. The ball was drawn out from the channel by some of the Norham fishermen, and was taken up to the Castle in a cart.

Thinking that Scottish historical books might throw light on the subject, I went to the Library of the Society of Scottish Antiquaries, and obtained access to a book containing copies of extracts from the Scottish Lord High Treasurer's Accounts, in which all expenditure by or for the Scottish Executive Government is minutely detailed. There is a valuable preface by Mr Dickson of the Edinburgh Register House, which supplies the following particulars:—

"*Mons Meg*" is supposed to have been constructed at the town of Mons, in Flanders; and to have been brought to Scotland about the year 1455. At that time there was great intercourse between Scotland and Flanders, and many articles were obtained from Flanders. Prior to 1497, occasional references are made to the gun under the appellation only of *Mons*. In July 1489 it seems to have been taken to Glasgow to assist in the siege of Dumbarton. In the year 1578, the gun is still referred to in the Treasury Accounts under the name of *Mons*. In the year 1650 it is referred to in these accounts as "*the great iron murderer Muckle Meg*."

In the early part of the summer of 1497, preparations began to be made in Scotland for a siege of Norham

Castle. It seems that the expense of military expeditions at that period was arranged in this way: That the king made a proclamation of a *raid* having been resolved on, and that thereupon each district of country was bound to send a certain number of men, provided with arms, and also with provisions to last twenty-one days. The cost of the artillery fell on the sovereign personally.

Mr Dickson states that a tax called "Spear Silver" was on such occasions leviable from the inhabitants of towns; but that in order to obtain exemption from supplying soldiers and from paying this tax, it was allowable to contribute a lump sum of money. The following entries illustrate this point:—

"1497. July 18.—Received fra the community of the toune of Perth, for ane composition maid with thaim be the King, for leif to them to remain at hame *fra the Raid of Norem*."

"24th July.—License was giffen to the toune of Dundee, to remane at hame, fra the host at this time, for the soume of 450 crowns of gold, giffen be thaim to the furth bringing of the King's artillery."

To obtain the full sum necessary to defray the King's expenses in sending artillery to Norham, it is mentioned by Mr Dickson (from entries in the State Accounts) that the King had to sell a certain *great chain of gold*, and other personal ornaments. He appears also to have sent the hat round among the nobility, as in the State Accounts credit is given for many donations towards the raid; one of £100 being from David Home, of Wedderburn.

It appears that much expense was incurred in equipping *Mons Meg* for joining in the expedition. One hundred workmen and five carpenters and smiths were hired by Sir Robert Ker, the master of the artillery, *to pass with Mons alone, i.e.* to attend to her exclusively.

It will be seen also from the entries in July 1497 (annexed hereto) that a *cradil* or carriage was made for *Mons*, and *canvas* to *cover her*—as well as *tows* or *ropes* to draw her.

At this time *Mons* was in Edinburgh Castle. After her *cradil* was made, she was drawn *doune the gait*—that is, the Canongate, to the Abbey of Holyrood, where the rest of the artillery probably was collected. It had been made a public ceremony, as there is a payment to the *Minstrels that playit before Mons, doune the Gate.*

The first attempt to start *Mons* for the Borders was unsuccessful. For, as Mr Dickson observes, "the great gun broke down before the outskirts of the town were passed." Accordingly, there is an entry on 24th July for carrying *trees* to be *Mons* new *cradil*, to her at St. Leonards, where she lay.

This mishap delayed the setting out of the expedition. The extracts show, that on the 6th August six horses were employed to draw *Meg* to "Norem."

Mr Dickson says that the King, impatient of the delay, had started for the Borders on the 20th July, and repaired to Melrose, where there was to be a general gathering of troops. He probably started from Edinburgh on the 19th July; for on that day there is an entry of a payment to a woman who brought straw-

berries to the King at *Dryden*, which is a village in Mid-Lothian, on the way between Edinburgh and Melrose.

On the 7th August, Mr Dickson says the King had established his quarters at *Upsetlington*, on the north bank of the Tweed, immediately opposite Norham; and he is found there playing cards with the Spanish Ambassador, and others of his retinue. This was no good trait of the King, when he ought to have been looking after his troops, and planning the siege of a most formidable stronghold.

Mr Dickson observes that the "Bishop of Durham (to whom Norham Castle belonged) being forewarned of King James' expedition, had garrisoned and strengthened the Castle so effectually that the King found it impregnable. News at the same time came of the rapid advance of the Earl of Surrey with a numerous force. King James immediately withdrew into Scotland. Surrey followed, hoping to overtake the retreating army, and failing in this, laid siege to Ayton Castle."

On the 30th September 1497, a truce was entered into between England and Scotland, to last for seven years. It was signed in the Church of Ayton, on behalf of King James, by Andrew Forman (Prothonotary and Prior of May), Patrick Home of Fast Castle, and Mr Lawson, Justice Clerk of Scotland. Hostilities being thus at an end, orders were given for the home bringing of the artillery, and Sir Robert Ker accordingly collected and brought back to Edinburgh the guns which had been placed at Wedderburn, Home, and other strengths on the Borders."

"During the hostilities of this and the preceding year, the lands on the East March (holding of the Crown) had suffered so much that an abatement was allowed on the rents,—"propter vastitatum terrarum de *Hersell*, *Gradene*, *Letheme*, *Grenlaw*, et *Birgham*, vastatas per guerras Anglorum."

Mons Meg was, in the year 1745, carried off from Edinburgh Castle to the Tower of London, where she remained till the year 1825. It is understood that the gun was restored to Scotland, by means of a personal application by Sir Walter Scott to King George IV. when His Majesty visited Scotland.

It is uncertain where the quarries were from which these large Cannon Balls were taken. The Treasurer's Accounts show that there were quarries belonging to government at Dunbar and Stirling. In the Lord Treasurer's Accounts, frequent reference is made to one Johne *Quarreour;* this surname being synonymous with our word "quarryman;" and this Johne is also spoken of in the Accounts as one of the gunners, whose duty it was to obtain Stone Balls for the artillery. In the Extracts of 5th and 6th August, payments are entered as made for "Gun-Stanes that were new made," to go to Norham, and which required six horses to draw them.

It is evident, therefore, that the six Stone Balls found in the channel of the Leet were balls which belonged to "Mons Meg." How they should have been left there can only be matter of conjecture. It is possible that when Mons Meg, with the rest of the Scotch Artillery, was being brought back to Edinburgh,

the retreat may have been so hurried, that the balls were left behind. The passage of the Leet would, no doubt, be difficult for any carriage or vehicles which conveyed balls of such size and weight; and one may have broken down so completely, that there was no way of extracting the balls from the moss or mud which abounded on the low flat through which the river Leet meandered.

I heard a report that at or near the place where the balls were found, the bones of a horse and some iron bars were found. In that case the probability of this last conjecture would be strengthened.

In Boston's Biography there is notice of a lake which, even in his time, covered a part of the meadow where the Stone Balls were found; and he mentions that on one occasion when he was fording this lake, his horse *laired* in the mud, and it was with difficulty he got out.

Extracts from State Accounts kept by the Lord High Treasurer of Scotland.

1496.—To Johne Quarriour, for correking of gun-stanes, £4, 2s.

1497. April 5.—To 4 miller quarreours at Dunbar, for stanes wynning.

April 7.—To Johne Quarreour, for the redding of Dunbar, at the mason's mycht wirk.

(Johne Quarreour was one of the gunners who had charge of the artillery.)

April 10.—Giffen to John Mawer, elder, in part payment of quhelis (wheels) making to the Bombards and to *Mons*.

1497. April 10.—(Another payment for same object).

July 8.—One hundred workmen and 5 carpenters to pass with *Mons* to Norham,

For 4 great trees to *Mons*, weighing 16 stones.

July 9.—To seven wrights for 2½ days, to mak cradill for *Mons*.

July 9.—To Lord of Hilhouse, for expense of coming hame for *Mons*.

To stones weight of irne and clath for *Mons*.

July 19.—To the wif that brocht straberries to the King fra Dridene, 14s.

July 20.—To ane wif that brocht cheriis to the King, 4s.

July 20.—For four gret towis (ropes?) to *Mons*, weyand 16 stans, £4, 5s. 8d.

July 20.—To bere them to the Abbey for *Mons*.

July 24.—To pynouris (pioneers) to bere ye tree, to be *Mons* new cradil, to her at St. Leonards, where she lay, 4s. 6d.

July 28.—For 13 stanes of irne to mak graith to *Mons* new cradil, and Gavilokkis to go with her, 30s. 4d.

July 28.—To the Minstralis that playit before *Mons* doune the gait, 14s.

July 29.—To 7 wrichtis for twa days, that maid *Mons* cradill, 23s. 4d.

For walking (watching) of *Mons* and uther artillery.

To Robin Ker to fee workmen to pass with *Mons*.

For 23lbs. of talloune to *Mons*.

For ½ gallone of tar to *Mons*.

For 8 elne of cammus (canvas?) to be *Mons* claits to cover her, £9.

For sewing of it, 4d.

To twa wrichtis to pass wi *Mons*, for their owke's wages, 32s.

1497. August 3.—Giffen for wyne to the King at none and evin (noon and evening?)

August 5.—For 2 spikin nales to turs with *Mons.*

For 6 carriage horses, to *Norem* fra Edinburgh with gun stanes that were new maid.

August 6.—Giffen for 6 hors of carriage to *Norem*, wi ma (more?) gun stanes, for ilk hors, 5s.

August 7.—Giffen to the King to play at the Cartis with the Spanziards at *Norem*, 20 unicorns.

August 7.—To Robin Ker for the artillery at *Norem* that day we cam away, £9 18s.

A ıgust 10.—Giffen to the littill gunner that cam with the King fra *Norem*, at the King's command, 18s.

August 11.—To Schir Thomas Gabreth, for paynting of *Mons* claith.

To ane man of Sir Robert Kerris, that brocht tithings to the King of the Inglismenn's coming.

Sept. 18.—To the workmen to bring hame *Mons* and other artillery fra Dalkeith.

APPENDIX I.

MEMORANDUM by FLETCHER N. MENZIES, Esq., Secretary of Highland and Agricultural Society, as to the Offices held by the late Mr MILNE HOME of Milne Graden in Connection with the Highland and Agricultural Society of Scotland.

MR MILNE HOME was elected a Member of the Society on 13th January 1835.

He was awarded a premium of £50 for Geological Survey of the county of Berwick, January 1836.

He was elected an Ordinary Director on 12th January 1836, again to the same office in January 1853, and in January 1872. He served with much acceptance for the usual period of four years on each occasion.

He was elected an Extraordinary Director in January 1880, and acted during that year and the following.

Appointed Chairman of the Society's Standing Committee on Geology, in room of Lord Greenock, in 1837, and acted in that capacity till 1855, when the Committee on Geology ceased to exist.

Addressed the General Meeting of the Society on the Establishment of the Royal Agricultural Society of England in July 1838.

Named Chairman of the Committee on the Ordnance Survey, November 1838.

Reported the Proceeding of the Committee on the Ordnance Survey to the General Meeting held on 8th July 1839.

The Thanks of the Society were voted to MILNE for his Memoir on the Lothian Coal Fields.

Mr MILNE wrote an Article descriptive of the Society's Museum, which appeared in the *Scottish Standard* Newspaper, May 1840.

He reported the Proceedings in regard to the Museum, June 1840.

Reported on the Museum in January 1842.

Appointed Vice-Chairman of the Museum Committee, 1842; the Chairman being Lord Greenock.

Appointed one of the Deputy Chairmen of the Society's Monthly Meetings, 1843; the Chairman being Viscount Melville.

Named one of the three Directors appointed by the Society to act as Members of the Committee of the Association for procuring an Agricultural Chemist, and reported on the subject to the General Meeting of the Society, 1843.

APPENDIX II.

CONTRIBUTIONS of D. MILNE HOME, Esq., LL.D., to the Transactions of the Edinburgh Geological Society, from information supplied by Ralph Richardson, Esq., Vice-President.

Vol. II. Nov. 7, 1872.—Address as Vice-President on the Post-Pliocene Geology of Scotland.

„ Feb. 26, 1874.—Notice of a Striated Boulder lately found in Tynecastle Sandpit, Edinburgh.

„ Feb. 26, 1874.—Notice of a Striated Boulder found at Drylaw, near Liberton, East Lothian.

Vol. III. Nov. 16, 1876.—Presidential Address.

„ Nov. 21, 1878.—Presidential Address and Obituary Notice of Sir Richard J. Griffith, Bart.

„ May 20, 1880.—Presidential Address.

Vol. IV. March 17, 1881.—Notes on Geology of Carstairs, Moffat, and Loch Skene.

„ May 26, 1881.—Presidential Address.

„ Nov. 17, 1881.—Presidential Address.

Vol. V. March 20, 1884.—Notice of Greenstone Boulder excavated in North Palmerston Place, Edinburgh.

LIST OF SCIENTIFIC PAPERS BY DAVID MILNE, CONTRIBUTED TO EDINBURGH WERNERIAN NATURAL HISTORY SOCIETY.

On Fossil Trees found near Coldstream. February 2nd, 1825.

Description of Stratification on Left Bank of the Whitadder. March 1825.

CONTRIBUTED TO EDINBURGH NEW PHILOSOPHICAL JOURNAL.

An Account of Slip and Breaking-up of Strata on Whitadder Banks. Vol. for 1828.

An Essay on Comets. Vol. for 1828.

Magnetic Variation near Edinburgh and in Berwickshire. Vol. for 1837.

Notices of Earthquake Shocks felt in Great Britain, and especially in Scotland. Vols. XXXI. to XXXVI. from 1841 to 1843.

Notes on Ancient Glaciers. Vol. for 1861.

CONTRIBUTED TO BRITISH ASSOCIATION.

On the Geology of Berwickshire (also in Highland Society's Transactions in 1837). Vol. for 1834.

On the Berwick and North Durham Coal Fields. Vol. for 1839.

Reports of Committee on Earthquake Shocks, by William Buckland and David Milne. Vols. for 1842 and 1843.

Notice of Elongated Ridges and Drift common in the South of England, called Kaims. Vol. for 1861.

On the Old Sea Cliffs and Submarine Banks of the Forth. Vol. for 1867.

CONTRIBUTED TO EDINBURGH ROYAL SOCIETY.

On the Midlothian and East Lothian Coal Fields. Transactions for 1840.

Notice respecting Depletion of Rivers Teviot, Nith, and Clyde, November 27th, 1838. Trans. 1840.

Notice of two Storms which swept over the British Isles in November 1838. Trans. 1840.

On the Geology of Roxburghshire. Trans. 1844.

On a Remarkable Oscillation of the Sea in 1843. Trans. 1844.

Superficial Deposits of Gravel over Rock in the Lothians and South of Fife. Proceedings 1845.

On Polished and Striated Rocks of Arthur Seat and its Neighbourhood. Trans. 1847.

On Parallel Roads of Lochaber, Trans. 1847.

Notice of Large Calcareous Stalagmite from Bermuda. Proceedings 1866.

On Boulder Clay of Europe. Proceedings 1867.

On Large Boulder in Parish of Rattray, with Cup and Groove Markings. Proceedings 1872.

On Supposed Upheaval of Scotland in its Central Parts since Time of the Romans. Trans. 1876.

Notice of High Water Marks on Banks of the Tweed and its Tributaries. Trans. 1876.

On Parallel Roads of Lochaber. Trans. 1876.

Additional Memoir on Lochaber. Trans. 1877.

Reports of Boulder Committee Proceedings from 1871 to 1884.

Address, with Obituary Notices of Dean Ramsay, etc Vol. x. page 256.

Closing Address, with Obituary Notices. July 1884.

CONTRIBUTED TO THE SOCIETY OF ANTIQUARIES OF SCOTLAND.

An Account of a Subterranean Building near Broomhouse, Edron, Berwickshire. Vol. viii. page 20.

Notes of a Number of Circular Stone Huts, called the Harefaulds, in Lauder Parish, Berwickshire. Vol. ix. page 465.

LIST OF INDEPENDENT PUBLICATIONS.

Observations on the Failure of the Potato Crop in 1845 and 1846. Published 1847.

Report of Visits to Sussex Farms. 1850.

Legislation for Elementary Schools. 1867.

On Social Reforms needed in Scotland. 1867.

Poorhouses in Scotland. 1868.

Scotch Poorhouses and English Workhouses. 1873.

The Estuary of the Forth considered geologically. 1871.

On Ancient Water Lines. 1881.

BERWICKSHIRE NATURALISTS' CLUB.

JAMES HARDY, LL.D., Oldcambus, Cockburnspath, *Secretary*, by whom the following information is supplied:—

DAVID MILNE HOME, Esq., LL.D., F.R.S.E., etc. etc. Elected member of the Club, September 21, 1836; President, 1861. On the death of Dr Francis Douglas, 7th March 1886, Mr Milne Home, as next in seniority of membership, stood at the head of the Club.

Contributions to "The History of the Club"—the title given to its "Proceedings:"—

VOL. I.

1. On some Lenticular-shaped Stones on the Banks of the Tweed near Norham and Ladykirk House, and on an Ancient Channel of the Tweed near Norham. (Abstract) p. 162, 1838.

VOL. IV.

2. Address delivered at Berwick on 27th September 1861, pp. 220 to 260.

3. Notes of a Visit to Crailing in the county of Roxburgh, August 1861. (Crailing Caves), pp. 316 to 319, Plate.

4. On the Berwickshire Kaims. (Abstract), pp. 341 to 344.

5. Notices of the Remains of Ancient Camps on both sides of the River Tweed, near Milne Graden. Plate and cut, pp. 454 to 458.

VOL. V.

6. Geological Observations on St Abb's Head, made at the Meeting there in June 1865. (Abstract), p. 221.

VOL. IX.

7. Note on the Effects of the Winter of 1879-80, at Milne Graden and Paxton House, p. 311.

Border Magazine, Edinburgh, 1863 (only vol. published). Some Account of an Ancient Fortlet, and the "Shearers' Stones," near Hownam, Roxburghshire. Illustration, pp. 183 to 184. Dated 21st July 1863.

10 Castle Street,
Edinburgh, *February* 1891.

LIST OF BOOKS PUBLISHED BY

DAVID DOUGLAS.

View of the Political State of Scotland in the last Century. A Confidential Report on the Political Opinions, Family Connections, or Personal Circumstances, of the 2662 County Voters in 1788. Edited, with an introductory account of the Law relating to County Elections, by Sir Charles Elphinstone Adam of Blair-Adam, Bart., Barrister-at-Law. Crown 8vo, 5s.

On the Philosophy of Kant.
By Robert Adamson, M.A., Professor of Logic and Mental Philosophy, Owens College; formerly Examiner in Philosophy in the University of Edinburgh. Ex. fcap. 8vo, 6s.

The New Amphion: Being the Book of the Edinburgh University Union Fancy Fair, in which are contained sundry Artistick, Instructive, and Diverting Matters. *all now made publick for the first time.* 12mo, Illustrated, 5s.; Large-Paper Edition, 21s. (only 100 Copies printed).

"An especially dainty little morsel for the lovers of choice books."—*Academy.*

"There is no need to say that the book is valuable. It will be eagerly and widely sought for. . . . The external appointments are such as would charm the most fastidious bibliomaniac."—*Scotsman.*

Stories by Thomas Bailey Aldrich.
The Queen of Sheba. 1s., or in cloth, gilt top, 2s.
Marjorie Daw, and other Stories. 1s., or in cloth, gilt top, 2s.
Prudence Palfrey. 1s., or in cloth, gilt top, 2s.
The Stillwater Tragedy. 2 vols., 2s., or in cloth, gilt top, 4s.
Wyndham Towers. A Poem. 1s., or in cloth, gilt top, 2s.

"Mr. Aldrich is, perhaps, entitled to stand at the head of American humourists."—*Athenæum.*

"*Marjorie Daw* is a clever piece of literary work."—*Saturday Review.*

Johnny Gibb of Gushetneuk in the Parish of Pyketillim, with Glimpses of Parish Politics about A.D. 1843. By William Alexander, LL.D. Ninth Edition, with Glossary, Ex. fcap. 8vo, 2s.

Seventh Edition, with Twenty Lithographic Illustrations—Portraits and Landscapes—by George Reid, R.S.A. Demy 8vo, 12s. 6d.

"A most vigorous and truthful delineation of local character, drawn from a portion of the country where that character is peculiarly worthy of careful study and record."—*The Right Hon. W. E. Gladstone.*

Life among my Ain Folk.

By WILLIAM ALEXANDER, LL.D., Author of "Johnny Gibb of Gushetneuk."
Ex. fcap. 8vo. Second Edition. Cloth, 2s. 6d. Paper, 2s.

Notes and Sketches of Northern Rural Life in the

Eighteenth Century. By WILLIAM ALEXANDER, LL.D., the Author of "Johnny Gibb of Gushetneuk." Ex. fcap. 8vo, 1s. Cloth, 2s. 6d.

American Authors.

Latest Editions. Revised by the Authors. In 1s. volumes. By Post, 1s. 2d.

Printed by Constable, and published with the sanction of the Authors.

By W. D. HOWELLS.
A FOREGONE CONCLUSION.
A CHANCE ACQUAINTANCE.
THEIR WEDDING JOURNEY.
A COUNTERFEIT PRESENTMENT.
THE LADY OF THE AROOSTOOK. 2 vols.
OUT OF THE QUESTION.
THE UNDISCOVERED COUNTRY. 2 vols.
A FEARFUL RESPONSIBILITY.
VENETIAN LIFE. 2 vols.
ITALIAN JOURNEYS. 2 vols.
THE RISE OF SILAS LAPHAM. 2 vols.
INDIAN SUMMER. 2 vols.

By FRANK R. STOCKTON.
RUDDER GRANGE.
THE LADY OR THE TIGER?
A BORROWED MONTH.

By GEO. W. CURTIS.
PRUE AND I.

By J. C. HARRIS (*Uncle Remus*).
MINGO, AND OTHER SKETCHES.

By GEO. W. CABLE.
OLD CREOLE DAYS.
MADAME DELPHINE.

By B. W. HOWARD.
ONE SUMMER.

By WILLIAM WINTER.
SHAKESPEARE'S ENGLAND.
WANDERERS, AND OTHER POEMS.
GRAY DAYS AND GOLD.

By JOHN BURROUGHS.
WINTER SUNSHINE.
PEPACTON.
LOCUSTS AND WILD HONEY.
WAKE-ROBIN.
BIRDS AND POETS.
FRESH FIELDS.

By OLIVER WENDELL HOLMES.
THE AUTOCRAT OF THE BREAKFAST TABLE. 2 vols.
THE POET. 2 vols.
THE PROFESSOR. 2 vols.

By G. P. LATHROP.
AN ECHO OF PASSION.

By R. G. WHITE.
MR. WASHINGTON ADAMS.

By T. B. ALDRICH.
THE QUEEN OF SHEBA.
MARJORIE DAW.
PRUDENCE PALFREY.
THE STILLWATER TRAGEDY. 2 vols.
WYNDHAM TOWERS. A Poem.

By B. MATTHEWS and H. C. BUNNER.
IN PARTNERSHIP.

By M. E. WILKINS.
A HUMBLE ROMANCE, AND OTHER STORIES.
A FAR-AWAY MELODY, AND OTHER STORIES.

*** *Other Volumes of this attractive Series in preparation.*

Any of the above may be had bound in Cloth extra, at 2s. each vol.

"A set of charming little books."—*Blackwood's Magazine.*

"A remarkably pretty series."—*Saturday Review.*

"These neat and minute volumes are creditable alike to printer and publisher."—*Pall Mall Gazette.*

"The most graceful and delicious little volumes with which we are acquainted."—*Freeman.*

"Soundly and tastefully bound . . . a little model of typography, . . . and the contents are worthy of the dress."—*St. James's Gazette.*

"The delightful shilling series of 'American Authors' introduced by Mr. David Douglas has afforded pleasure to thousands of persons."—*Figaro.*

"The type is delightfully legible, and the page is pleasant for the eye to rest upon; even in these days of cheap editions we have seen nothing that has pleased us so well."—*Literary World.*

Alma Mater's Mirror.

Edited by THOMAS SPENCER BAYNES and LEWIS CAMPBELL, Professors in the University, St. Andrews. Printed in red and black, on antique paper. Bound in white, richly tooled in gold in the ancient manner, with ribbon fastening. In box, price 5s.

Modern Horsemanship. Three Schools of Riding. An Original Method of Teaching the Art by means of Pictures from the Life. By EDWARD L. ANDERSON. New Edition, Re-written and Re-arranged. Demy 8vo, 21s. With 40 Moment-Photographs.

Vice in the Horse, and other Papers on Horses and Riding. By E. L. ANDERSON, Author of "Modern Horsemanship." Illustrated. Demy 8vo, 5s.

The Gallop.
By E. L. ANDERSON. Illustrated by Instantaneous Photography. Fcap. 4to, 2s. 6d.

Scotland in Early Christian Times.
By JOSEPH ANDERSON, LL.D., Keeper of the National Museum of the Antiquaries of Scotland. (Being the Rhind Lectures in Archæology for 1879 and 1880.) 2 vols. Demy 8vo, profusely Illustrated. 12s. each volume.

Contents of Vol. I.—Celtic Churches—Monasteries—Hermitages—Round Towers—Illuminated Manuscripts—Bells—Crosiers—Reliquaries, etc.

Contents of Vol. II.—Celtic Medal-Work and Sculptured Monuments, their Art and Symbolism—Inscribed Monuments in Runics and Oghams—Bilingual Inscriptions, etc.

Scotland in Pagan Times.
By JOSEPH ANDERSON, LL.D. (Being the Rhind Lectures in Archæology for 1881 and 1882.) In 2 vols. Demy 8vo, profusely Illustrated. 12s. each volume.

Contents of Vol. I.—THE IRON AGE.—Viking Burials and Hoards of Silver and Ornaments—Arms, Dress, etc., of the Viking Time—Celtic Art of the Pagan Period—Decorated Mirrors—Enamelled Armlets—Architecture and Contents of the Brochs—Lake-Dwellings—Earth Houses, etc.

Contents of Vol. II.—THE BRONZE AND STONE AGES.—Cairn Burial of the Bronze Age and Cremation Cemeteries—Urns of Bronze-Age Types—Stone Circles—Stone Settings—Gold Ornaments—Implements and Weapons of Bronze—Cairn Burial of the Stone Age—Chambered Cairns—Urns of Stone-Age Types—Implements and Weapons of Stone.

Scotland as It Was and as It Is.
By the DUKE OF ARGYLL. 1 vol. Demy 8vo. Illustrated. New Edition. Carefully Revised. 7s. 6d.

Contents.—Celtic Feudalism—The Age of Charters—The Age of Covenants—The Epoch of the Clans—The Appeal from Chiefs to Owners—The Response to the Appeal—Before the Dawn—The Burst of Industry—The Fruits of Mind.

"Infinitely superior as regards the Highland land question to any statement yet made by the other side."—*Scotsman.*

"It presents a series of strikingly picturesque sketches of the wild society and rude manners of the olden time."—*Times.*

Crofts and Farms in the Hebrides:
Being an account of the Management of an Island Estate for 130 Years. By the DUKE OF ARGYLL. Demy 8vo, 83 pages, 1s.

Continuity and Catastrophes in Geology.
An Address to the Edinburgh Geological Society on its Fiftieth Anniversary, 1st November 1883. By the DUKE OF ARGYLL. Demy 8vo, 1s.

Iona.
By the DUKE OF ARGYLL. A Popular Reprint, Revised and Corrected, Illustrated, extra fcap. 8vo, 1s.

What is Truth? By the DUKE OF ARGYLL. Extra fcap. 8vo, 1s.

Some Words of Warning to the Presbyterians of Scotland. By the DUKE OF ARGYLL. Demy 8vo, 6d.

The History of Liddesdale, Eskdale, Ewesdale, Wauchopedale, and the Debateable Land. Part I., from the Twelfth Century to 1530. By ROBERT BRUCE ARMSTRONG. The edition is limited to 275 copies demy quarto, and 105 copies on large paper (10 inches by 13). 42s. and 84s.

Reminiscences of Golf on St. Andrews Links.
By JAMES BALFOUR. Price 1s.

The Religion of Humanity: An Address delivered at the Church Congress, Manchester. By the Right Hon. ARTHUR J. BALFOUR, M.P., LL.D., etc. etc. Demy 8vo, 5s.
Also a Popular Reprint. Fcap. 8vo, 6d.

Studies of Great Cities. Paris.
By DAVID BALSILLIE, M.A. Fcap. 8vo, 1s.
*** This little book is written with a view to aid visitors to the Exposition to see into Parisian Life, and to derive instruction and enjoyment from the permanent institutions of this beautiful city.

The Ethic of Nature: and its Practical Bearings.
By DAVID BALSILLIE, M.A. The Author's object is first to prove that the Darwinian conception of Nature involves the cardinal ideas of the Christian Ethics, and secondly to show how the principles of this Ethic of Nature should be applied in solving the great problems of our time. Crown 8vo, price 6s.

The Reality of the Spiritual Life.
By Mrs. RUSSELL BARRINGTON. Ex. fcap. 8vo, 1s.

Bible Readings. Extra fcap. 8vo, 2s.

The Voyage of the Paper Canoe.
A Geographical Journey of 2500 miles, from Quebec to the Gulf of Mexico, during the year 1874-75. By N. H. BISHOP. With Maps and Plates. Demy 8vo, 10s. 6d.

On Self-Culture:
Intellectual, Physical, and Moral. A *Vade-Mecum* for Young Men and Students. By JOHN STUART BLACKIE, Emeritus Professor of Greek in the University of Edinburgh. Seventeenth Edition. Fcap. 8vo, 2s. 6d.
"Every parent should put it into the hands of his son."—*Scotsman.*
"Students in all countries would do well to take as their *vade-mecum* a little book on self-culture by the eminent Professor of Greek in the University of Edinburgh."—*Medical Press and Circular.*
"An invaluable manual to be put into the hands of students and young men."—*Era.*
"Written in that lucid and nervous prose of which he is a master."—*Spectator.*
"An adequate guide to a generous, eager, and sensible life."—*Academy.*
"The volume is a little thing, but it is a *multum in parvo*, . . . a little locket gemmed within and without with real stones fitly set."—*Courant.*

By the same Author.

On Beauty.
Crown 8vo, cloth, 8s. 6d.

Lyrical Poems.
Crown 8vo, cloth, 7s. 6d.

The Language and Literature of the Scottish Highlands. Crown 8vo, 6s.

Four Phases of Morals:
Socrates, Aristotle, Christianity, and Utilitarianism. Lectures delivered before the Royal Institution, London. Ex. fcap. 8vo, Second Edition, 5s.

Essays on Social Subjects. Ex. fcap. 8vo, 5s.

Songs of Religion and Life. Fcap. 8vo, 6s.

Musa Burschicosa.
A book of Songs for Students and University Men. Fcap. 8vo, 2s. 6d.

War Songs of the Germans. Fcap. 8vo, 2s. 6d. cloth; 2s. paper.

Political Tracts. No. 1. GOVERNMENT. No. 2. EDUCATION. 1s. each.

Gaelic Societies. Highland Depopulation and Land Law Reform. Demy 8vo, 6d.

Homer and the Iliad. In three Parts. 4 vols. Demy 8vo, 42s.

A Letter to the People of Scotland on the Reform of their Academical Institutions. Demy 8vo, 6d.

Love Revealed: Meditations on the Parting Words of

Jesus with His Disciples, in John xiii-xvii. By the Rev. GEORGE BOWEN, Missionary at Bombay. New Edition. Small 4to, 5s.

"No true Christian could put the book down without finding in himself some traces of the blessed unction which drops from every page."—*Record.*

"Here is a feast of fat things, of fat things full of marrow."—*Sword and Trowel.*

"A more stimulating work of its class has not appeared for many a long day."—*Scotsman.*

"He writes plainly and earnestly, and with a true appreciation of the tender beauties of what are really among the finest passages in the New Testament."—*Glasgow Herald.*

"Verily, Verily": The Amens of Christ.

By the Rev. GEORGE BOWEN, Missionary at Bombay. Small 4to, cloth, 5s.

"For private and devotional reading this book will be found very helpful and stimulative."—*Literary World.*

Daily Meditations by Rev. George Bowen, Missionary

at Bombay. With Introductory Notice by Rev. W. HANNA, D.D., Author of "The Last Day of our Lord's Passion." New Edition. Small 4to, cloth, 5s.

"These meditations are the production of a missionary whose mental history is very remarkable. . . . His conversion to a religious life is undoubtedly one of the most remarkable on record. They are all distinguished by a tone of true piety, and are wholly free from a sectarian or controversial bias."—*Morning Post.*

Works by John Brown, M.D., F.R.S.E.

HORÆ SUBSECIVÆ. 3 Vols. 22s. 6d.

Vol. I. Locke and Sydenham. Fifth Edition, with Portrait by James Faed. Crown 8vo, 7s. 6d.

Vol. II. Rab and his Friends. Thirteenth Edition. Crown 8vo, 7s. 6d.

Vol. III. John Leech. Fifth Edition, with Portrait by George Reid, R.S.A. Crown 8vo, 7s. 6d.

Separate Papers, extracted from "Horæ Subsecivæ."

RAB AND HIS FRIENDS. With India-proof Portrait of the Author after Faed, and seven Illustrations after Sir G. Harvey, Sir Noel Paton, Mrs. Blackburn, and G. Reid, R.S.A. Demy 4to, cloth, 9s.

MARJORIE FLEMING: A Sketch. Being a Paper entitled "Pet Marjorie; A Story of a Child's Life Fifty Years Ago." New Edition, with Illustrations. Demy 4to, 7s. 6d. and 6s.

RAB AND HIS FRIENDS. Cheap Illustrated Edition. Square 12mo, ornamental wrapper, 1s.

LETTER TO THE REV. JOHN CAIRNS, D.D. Second Edition, crown 8vo, sewed, 2s.

ARTHUR H. HALLAM. Fcap., sewed, 2s.; cloth, 2s. 6d.

RAB AND HIS FRIENDS. Sixty-sixth thousand. Fcap., sewed, 6d.

MARJORIE FLEMING: A Sketch. Sixteenth Thousand. Fcap., sewed, 6d.

OUR DOGS. Twentieth thousand. Fcap., sewed, 6d.

"WITH BRAINS, SIR." Seventh thousand. Fcap., sewed, 6d.

MINCHMOOR. Tenth Thousand. Fcap., sewed, 6d.

JEEMS THE DOOR-KEEPER: A Lay Sermon. Twelfth thousand. Price 6d.

THE ENTERKIN. Seventh Thousand. Price 6d.

PLAIN WORDS ON HEALTH. Twenty-seventh thousand. Price 6d.

SOMETHING ABOUT A WELL: WITH MORE OF OUR DOGS. Price 6d.

Dr. John Brown and his Sister Isabella: Outlines.

By E. T. M'LAREN. Fcap. 8vo, 1s. 6d. Also 4th Edition, with three Portraits, sm. 4to, 5s.

From Schola to Cathedral. A Study of Early Christian

Architecture in its relation to the life of the Church. By G. BALDWIN-BROWN, Professor of Fine Art in the University of Edinburgh. Demy 8vo, Illustrated, 7s. 6d.

The book treats of the beginnings of Christian Architecture, from the point of view of recent discoveries and theories, with a special reference to the outward resemblance of early Christian communities to other religious associations of the time.

George Buchanan: Humanist and Reformer. A Biography.
By P. Hume Brown. 1 vol. demy 8vo, 12s.

The Capercaillie in Scotland.
By J. A. Harvie-Brown. Etchings on Copper, and Map illustrating the extension of its range since its Restoration at Taymouth in 1837 and 1838. Demy 8vo, 8s. 6d.

A Vertebrate Fauna of the Outer Hebrides.
By J. A. Harvie-Brown and T. E. Buckley. Small 4to, illustrated. 30s.

"It is rarely indeed that a book comes before us which promises so little and gives so much as the delightful volume which Harvie-Brown and Buckley have dedicated to the Outer Hebrides. We regard the volume as a very important contribution to our knowledge of the British Islands."—*Saturday Review.*

A Vertebrate Fauna of Orkney.
By J. A. Harvie-Brown and T. E. Buckley. Small 4to, illustrated. [*In the Press.*

The History of Selkirkshire: Chronicles of Ettrick Forest.
By T. Craig-Brown. Two vols. Demy 4to, Illustrated. £4, 10s. net.

"The Red Book of Menteith" Reviewed.
By George Burnett, Advocate, Lyon King of Arms. Small 4to, 5s.

John Burroughs's Essays.
Six Books of Nature, Animal Life, and Literature. Choice Edition. Revised by the Author. 6 vols., cloth, 12s.; or in smooth ornamental wrappers, 6s.; or separately at 1s. each vol., or 2s. in cloth.

Winter Sunshine.
Locusts and Wild Honey.
Wake-Robin.
Fresh Fields.
Birds and Poets.
Pepacton.

"Whichever essay I read, I am glad I read it, for pleasanter reading, to those who love the country, with all its enchanting sights and sounds, cannot be imagined."—*Spectator.*

"Mr. Burroughs is one of the most delightful of American Essayists, steeped in culture to the finger-ends."—*Pall Mall Gazette.*

Fresh Fields. By John Burroughs. Library Edition. Crown 8vo, 6s.
Signs and Seasons. Library Edition. Crown 8vo, 6s.

Dr. Sevier: A Novel.
By Geo. W. Cable, Author of "Old Creole Days," etc. In 2 vols., crown 8vo, price 12s.

Old Creole Days.
By Geo. W. Cable. 1s.; and in Cloth, 2s.

"We cannot recall any contemporary American writer of fiction who possesses some of the best gifts of the novelist in a higher degree."—*St. James's Gazette.*

Madame Delphine.
By Geo. W. Cable, Author of "Old Creole Days." 1s.; and in cloth, 2s.

Contents.—Madame Delphine—Carancro—Grande Pointe.

My Indian Journal.
Containing Descriptions of the principal Field Sports of India, with Notes on the Natural History and Habits of the Wild Animals of the Country. By Colonel Walter Campbell, Author of "The Old Forest Ranger." Small demy 8vo, with Illustrations by Wolf, 16s.

Life and Works of Rev. Thomas Chalmers, D.D., LL.D.
Memoirs of the Rev. Thomas Chalmers. By Rev. W. Hanna, D.D., LL.D. New Edition. 2 vols. crown 8vo, cloth, 12s.
Daily Scripture Readings. Cheap Edition. 2 vols. crown 8vo, 10s.
Astronomical Discourses, 1s.
Commercial Discourses, 1s.
Select Works, in 12 vols., crown 8vo, cloth, per vol. 6s.
Lectures on the Romans. 2 vols.
Sermons. 2 vols.
Natural Theology, Lectures on Butler's Analogy, etc. 1 vol.
Christian Evidences, Lectures on Paley's Evidences, etc. 1 vol.
Institutes of Theology. 2 vols.
Political Economy, with Cognate Essays. 1 vol.
Polity of a Nation. 1 vol.
Church and College Establishments. 1 vol.
Moral Philosophy, Introductory Essays, Index, etc. 1 vol.

Memoir of John Brown, D.D.
By JOHN CAIRNS, D.D., Berwick-on-Tweed. Crown 8vo, 7s. 6d.

Lectures on Surgical Anatomy.
By JOHN CHIENE, M.D., Professor of Surgery in the University of Edinburgh. In demy 8vo. With numerous Illustrations drawn on Stone by BERJEAU. 12s. 6d.
"The book will be a great help to both teachers and taught, and students can depend upon the teaching as being sound."—*Medical Times and Gazette.*

Lectures on the Elements or First Principles of Surgery.
By JOHN CHIENE, M.D., Professor of Surgery in the University of Edinburgh. Demy 8vo, 2s. 6d.

The Odes of Horace.
Translated by T. RUTHERFURD CLARK, Advocate. 16mo, 6s.

Circuit Journeys from 1837 to 1854.
By the late LORD COCKBURN. 1 vol. crown 8vo. Second Edition. 6s.
"These journals are chiefly valuable for their topographical descriptions, and they form an indirect contribution to the Social History of Scotland. They will be read with pleasure by every one who has enjoyed Lord Cockburn's *Memorials*, to which work indeed they form an interesting and worthy supplement."—*Scotsman.*

Archibald Constable and his Literary Correspondents:
A Memorial. By his Son, THOMAS CONSTABLE. 3 vols. demy 8vo, 36s., with Portrait.

The Earldom of Mar, in Sunshine and in Shade, during
Five Hundred Years. With incidental Notices of the leading Cases of Scottish Dignities from the reign of King Charles I. till now. By ALEXANDER, EARL OF CRAWFORD AND BALCARRES, LORD LINDSAY, etc. etc. 2 vols. demy 8vo, 32s.

A Clinical and Experimental Study of the Bladder
during Parturition. By J. H. CROOM, M.B., F.R.C.P.E. Small 4to, with Illustrations, 6s.

Wild Men and Wild Beasts.
Adventures in Camp and Jungle. By Lieut.-Colonel GORDON CUMMING. With Illustrations by Lieut.-Colonel BAIGRIE and others. Small 4to, 24s.
Also a cheaper edition, with *Lithographic* Illustrations. 8vo, 12s.

Prue and I.
By GEORGE WILLIAM CURTIS. 1s. paper; or 2s. cloth extra.

The Story of Burnt Njal; or, Life in Iceland at the end
of the Tenth Century. From the Icelandic of the Njals Saga. By Sir GEORGE WEBBE DASENT, D.C.L. 2 vols. demy 8vo, with Maps and Plans, 28s.

Gisli the Outlaw.
From the Icelandic. By Sir GEORGE WEBBE DASENT, D.C.L. Small 4to, with Illustrations, 7s. 6d.

Popular Tales from the Norse.
By Sir GEORGE WEBBE DASENT, D.C.L. With an Introductory Essay on the Origin and Diffusion of Popular Tales. Third Edition. Crown 8vo, 10s. 6d.

Memories of a Long Life.
By Lt.-Col. DAVID DAVIDSON, C.B. Crown 8vo, with illustrations, 6s.

A Manual of Chemical Analysis.
By Professor WILLIAM DITTMAR. Ex. fcap. 8vo, 5s.
TABLES FORMING AN APPENDIX TO DITTO. Demy 8vo, 3s. 6d.

A Chat in the Saddle; or, Patroclus and Penelope.
By THEO. A. DODGE, Lieut.-Colonel, United States Army. Illustrated by 14 Instantaneous Photographs. Demy 8vo, half-leather binding, 21s.

The Fireside Tragedy, etc.
By Sir GEORGE DOUGLAS, Bart. Fcap. 8vo, 5s.

A Short Introduction to the Origin of Surnames.
By PATRICK DUDGEON, Cargen. Small 4to, 3s. 6d.

Veterinary Medicines: Their Actions and Uses.
By FINLAY DUN. Seventh Edition, revised and enlarged. Demy 8vo, 15s.

Social Life in Former Days;
Chiefly in the Province of Moray. Illustrated by Letters and Family Papers. By E. DUNBAR DUNBAR, late Captain 21st Fusiliers. 2 vols. Demy 8vo, 19s. 6d.

Letters of Thomas Erskine of Linlathen.
Edited by WILLIAM HANNA, D.D., Author of the "Memoirs of Dr. Chalmers," etc. Fourth Edition. Crown 8vo, 7s. 6d.

The Unconditional Freeness of the Gospel.
By THOMAS ERSKINE of Linlathen. New Edition, revised. Crown 8vo, 3s. 6d.

By the same Author.

The Brazen Serpent:
Or, Life coming through Death. Third Edition. Crown 8vo, 5s.

The Internal Evidence of Revealed Religion.
Crown 8vo, 5s.

The Spiritual Order,
And other Papers selected from the MSS. of the late THOMAS ERSKINE of Linlathen. Third Edition. Crown 8vo, 5s.

The Doctrine of Election,
And its Connection with the General Tenor of Christianity, illustrated especially from the Epistle to the Romans. Second Edition. Crown 8vo, 6s.

The Fatherhood of God Revealed in Christ, the Comfort
and Hope of Man. A Lesson from "The Letters" of THOMAS ERSKINE of Linlathen. Fcap. 8vo, 1s.

Three Visits to America.
By EMILY FAITHFULL. Demy 8vo, 9s.

Ogham Inscriptions in Ireland, Wales, and Scotland.
By the late SIR SAMUEL FERGUSON, President of the Royal Irish Academy, Deputy Keeper of the Public Records of Ireland, LL.D., Queen's Counsel, etc. (Being the Rhind Lectures in Archæology for 1884.) 1 vol. demy 8vo, 12s.

Twelve Sketches of Scenery and Antiquities on the
Line of the Great North of Scotland Railway. By GEORGE REID, R.S.A. With Illustrative Letterpress by W. FERGUSON of Kinmundy. 4to, 15s.

Guide to the Great North of Scotland Railway.
By W. FERGUSON of Kinmundy. Crown 8vo; in paper cover, 1s.; cloth cover, 1s. 6d.

Robert Ferguson "The Plotter"; or, The Secret of the
Rye House Conspiracy and the Story of a Strange Career. By JAMES FERGUSON, Advocate. A Biography of one of the strangest figures of English Politics in the period between the Restoration and the Accession of the House of Hanover. Demy 8vo, 15s.

The Laird of Lag: A Life-Sketch of Sir Robert Grierson.
By ALEX. FERGUSSON, Lieut.-Colonel, Author of "Mrs. Calderwood's Journey." Demy 8vo, with Illustrations, 12s.

Major Fraser's Manuscript: His Adventures in Scotland and England: His Mission to and Travels in France: His Services in the Rebellion (and his Quarrels) with Simon Fraser, Lord Lovat. 1696-1737. Edited by ALEX. FERGUSSON, Lieut.-Colonel. 2 vols. fcap. 8vo, 12s.

Autobiography of Mrs. Fletcher (of Edinburgh); with Letters and other Family Memorials. Edited by her DAUGHTER. Third Edition. Crown 8vo, 7s. 6d.

L'Histoire de France.
Par M. LAME FLEURY. New Edition, corrected to 1883. 18mo, cloth, 2s. 6d.

The Deepening of the Spiritual Life.
By A. P. FORBES, D.C.L., Bishop of Brechin. Seventh Edition. Paper, 1s.; cloth, 1s. 6d.

Kalendars of Scottish Saints;
With Personal Notices of those of Alba, etc. By ALEXANDER PENROSE FORBES, D.C.L., Bishop of Brechin. 4to, price £3, 3s. A few copies for sale on large paper, £5, 15s. 6d.
"A truly valuable contribution to the archæology of Scotland."—*Guardian.*

Missale Drummondiense: The Ancient Irish Missal in the possession of the Baroness Willoughby d'Eresby. Edited by the Rev. G. H. FORBES. Half-morocco, demy 8vo, 12s.

Fragments of Truth:
Being the Exposition of several Passages of Scripture. Third Edition. Ex. fcap. 8vo, 5s.

Studies in English History.
By JAMES GAIRDNER and JAMES SPEDDING. Demy 8vo, 12s.
Contents.—The Lollards—Sir John Falstaff—Katherine of Arragon's First and Second Marriages—Case of Sir Thomas Overbury—Divine Right of Kings—Sunday, Ancient and Modern.

Gifts for Men.
By X. H. Crown 8vo, 6s.
"There is hardly a living theologian who might not be proud to claim many of her thoughts as his own."—*Glasgow Herald.*

Sketches, Literary and Theological:
Being Selections from the unpublished MSS. of the Rev. GEORGE GILFILLAN. Edited by FRANK HENDERSON, Esq., M.P. Demy 8vo, 7s. 6d.

The Roof of the World:
Being the Narrative of a Journey over the High Plateau of Tibet to the Russian Frontier, and the Oxus Sources on Pamir. By Major-General T. E. GORDON, C.S.I. With numerous Illustrations. Royal 8vo, 31s. 6d.

Ladies' Old-Fashioned Shoes.
By T. WATSON GREIG, of Glencarse. Folio, illustrated by 11 Chromolithographs. 31s. 6d.

Mingo, and other Sketches in Black and White.
By JOEL CHANDLER HARRIS (*Uncle Remus*). 1s.; and in cloth, 2s.

Notes of Caithness Family History.
By the late JOHN HENDERSON, W.S. 4to, in cloth, 21s. net.

Works by Margaret Maria Gordon (née Brewster).

THE HOME LIFE OF SIR DAVID BREWSTER. By his DAUGHTER. Second Edition. Crown 8vo, 6s. Also a cheaper Edition, crown 8vo, 2s. 6d.

WORK; or, Plenty to do and How to do it. Thirty-sixth Thousand. Fcap. 8vo, cloth, 2s. 6d.

WORKERS. Fourth Thousand. Fcap. 8vo, limp cloth, 1s.

LITTLE MILLIE AND HER FOUR PLACES. Cheap Edition. Fifty-ninth Thousand. Limp cloth, 1s.

SUNBEAMS IN THE COTTAGE; Or, What Women may Do. A Narrative chiefly addressed to the Working Classes. Cheap Edition. Forty-fifth Thousand. Limp cloth, 1s.

PREVENTION; or, An Appeal to Economy and Common Sense. 8vo, 6d.

THE WORD AND THE WORLD. Twelfth Edition. 2d.

LEAVES OF HEALING FOR THE SICK AND SORROWFUL. Cheap Edition, limp cloth, 2s.

THE MOTHERLESS BOY. With an Illustration by Sir NOEL PATON, R.S.A. Cheap Edition, limp cloth, 1s.

OUR DAUGHTERS: An Account of the Young Women's Christian Association and Institute Union. 2d.

HAY MACDOWALL GRANT OF ARNDILLY: His Life, Labours, and Teaching. New and Cheaper Edition. 1 vol. crown 8vo, limp cloth, 2s. 6d.

The Birds of Iona and Mull, 1852-70.

By the late HENRY DAVENPORT GRAHAM. With a Memoir of the Author. Edited by J. A. HARVIE-BROWN, F.Z.S. 1 vol. sm. 4to, 21s. net.

The Life of our Lord.

By the Rev. WILLIAM HANNA, D.D., LL.D. 6 vols., handsomely bound in cloth extra, gilt edges, 30s.

Separate vols., cloth extra, gilt edges, 5s. each.

1. THE EARLIER YEARS OF OUR LORD. Fifth Edition.
2. THE MINISTRY IN GALILEE. Fourth Edition.
3. THE CLOSE OF THE MINISTRY. Sixth Thousand.
4. THE PASSION WEEK. Sixth Thousand.
5. THE LAST DAY OF OUR LORD'S PASSION. Twenty-third Edition.
6. THE FORTY DAYS AFTER THE RESURRECTION. Eighth Edition.

The Resurrection of the Dead.

By WILLIAM HANNA, D.D., LL.D. Second Edition. Fcap. 8vo, 5s.

Highland Flora, and other Poems.

By Mrs. DAVID HENDERSON. Fcap. 8vo, 3s. 6d.

The High Estate of Service.

Fcap. 8vo, 1s.

Errors in the Use of English.

Illustrated from the Writings of English Authors, from the Fourteenth Century to our own Time. By the late W. B. HODGSON, LL.D., Professor of Political Economy in the University of Edinburgh. Fifth Edition. Crown 8vo, 3s. 6d.

"Those who most need such a book as Dr. Hodgson's will probably be the last to look into it. It will certainly amuse its readers, and will probably teach them a good deal which they did not know, or at least never thought about, before."—*Saturday Review.*

Life and Letters of W. B. Hodgson, LL.D., late Professor of Political Economy in the University of Edinburgh.

Edited by Professor J. M. D. MEIKLEJOHN, M.A. Crown 8vo, 7s. 6d.

Sketches: Personal and Pensive.

By WILLIAM HODGSON. Fcap. 8vo, 2s. 6d.

"Quasi Cursores." Portraits of the High Officers and Professors of the University of Edinburgh.

Drawn and Etched by WILLIAM HOLE, R.S.A. The book is printed on beautiful hand-made paper by Messrs. T. & A. Constable. It contains 45 Plates (64 Portraits), with Biographical Notices of all the present Incumbents. The impression is strictly limited. Quarto Edition (750 Copies only for sale), £2, 10s. Folio Edition, Japan Proofs (100 Copies only for sale), £5, 10s.

Memorial Catalogue of the French and Dutch Loan Collection, Edinburgh International Exhibition. Letterpress by W. E. HENLEY. Etchings and Sketches by WILLIAM HOLE, R.S.A., and PHILIP ZILCKEN. The book is printed by CONSTABLE on wove hand-made paper, in dark-green ink. It gives an account of the rise of Romanticism, a biography of the principal Masters of that School, and a description of each of the Pictures. It is illustrated by fifteen original Etchings and fifty-four outline Sketches. Pott folio. Edition limited to 520 Copies. £3, 3s.

The Breakfast Table Series.
In 6 vols. By OLIVER WENDELL HOLMES. New and Revised Editions, containing Prefaces and additional Bibliographical Notes by the Author.

THE AUTOCRAT OF THE BREAKFAST TABLE. 2 vols., 2s.
THE POET AT THE BREAKFAST TABLE. 2 vols., 2s.
THE PROFESSOR AT THE BREAKFAST TABLE. 2 vols., 2s.

Also bound in dark blue cloth, at 2s. a vol., or in a neat cloth box, 15s.

"Small enough to be carried in any sensibly constructed pocket, clear enough in type to accommodate any fastidious eyesight, pleasant and instructive enough for its perusal to be undertaken with the certainty of present enjoyment and the prospect of future profit."—*Whitehall Review.*

Also a LIBRARY EDITION, in 3 vols. crown 8vo, printed at the Riverside Press, Cambridge, with a Steel Portrait of the Author, 10s. 6d. each volume.

A COMPLETE EDITION of the Poems of OLIVER WENDELL HOLMES, revised by the Author, in 3 vols. [*In the Press.*

Traces in Scotland of Ancient Water Lines, Marine, Lacustrine, and Fluviatile. By DAVID MILNE-HOME, LL.D., F.R.S.E. Demy 8vo, 3s. 6d.

A Sketch of the Life of George Hope of Fenton Barns. Compiled by his DAUGHTER. Crown 8vo, 6s.

One Summer. By BLANCHE WILLIS HOWARD. Paper, 1s.; cloth, 1s. 6d. and 2s.

W. D. Howells's Writings:—

In "American Author" Series.

INDIAN SUMMER. 2 vols., 2s.
THE RISE OF SILAS LAPHAM. 2 vols., 2s.
A FOREGONE CONCLUSION. 1 vol., 1s.
A CHANCE ACQUAINTANCE. 1 vol., 1s.
THEIR WEDDING JOURNEY. 1 vol., 1s.
A COUNTERFEIT PRESENTMENT, and THE PARLOUR CAR. 1 vol., 1s.
THE LADY OF THE AROOSTOOK. 2 vols., 2s.
OUT OF THE QUESTION, and AT THE SIGN OF THE SAVAGE. 1 vol., 1s.
THE UNDISCOVERED COUNTRY. 2 vols., 2s.
A FEARFUL RESPONSIBILITY, and TONELLI'S MARRIAGE. 1 vol., 1s.
VENETIAN LIFE. 2 vols., 2s.
ITALIAN JOURNEYS. 2 vols., 2s.
THE SHADOW OF A DREAM. 1 vol., 1s.

All the above may be had in cloth at 2s. each vol.

Copyright Library Edition.

A MODERN INSTANCE. 2 vols., 12s.
A WOMAN'S REASON. 2 vols., 12s.
DR. BREEN'S PRACTICE. 1 vol., 3s. 6d.
INDIAN SUMMER. 1 vol., 6s.
ANNIE KILBURN. 1 vol., 6s.
A HAZARD OF NEW FORTUNES. 2 vols., 12s.
THE SHADOW OF A DREAM. 1 vol., 6s.
APRIL HOPES. 1 vol., 6s.
THE MINISTER'S CHARGE; OR, THE APPRENTICESHIP OF LEMUEL BARKER. 1 vol., 6s.
TUSCAN CITIES: WITH ILLUSTRATIONS FROM DRAWINGS AND ETCHINGS OF JOSEPH PENNELL and others. 4to, 16s.
MODERN ITALIAN POETS. 1 vol., 7s. 6d.

How to Catch Trout.
By THREE ANGLERS. Fifth Edition. Fcap. 8vo, Illustrated. Price 1s.; and cloth, 2s.

"The advice given by the 'Three Anglers' whose combined wisdom is bound within the covers of this book is always sound."—*Field.*

"The work is sound in the essential doctrines of the craft."—*Scotsman.*

Ireland under Coercion: The Diary of an American. By WILLIAM HENRY HURLBERT. 2 vols. crown 8vo, 15s. Popular Reprint of the Revised and Corrected Second Edition, 1s. net.

"Mr. Hurlbert's conclusions and criticisms are worthy of all attention; but we attach still greater value to the book as a collection of evidence on the present phase of the Irish difficulty, the genuineness of which it would be idle to impeach."—*Times.*

"Mr. Hurlbert is a most acute observer and far-seeing thinker, and his style is as clear and lucid as his thought. His pages are full of important facts, interspersed with characteristic and humorous anecdotes. Mr. Hurlbert goes to the core of the Irish question in a manner which, perhaps, no other living writer could rival. His vast acquaintance with men, laws, and customs in America and Europe entitles him to speak with authority."—*Scotsman.*

Epitaphs and Inscriptions from Burial-Grounds and Old Buildings in the North-East of Scotland. By the late ANDREW JERVISE, F.S.A.Scot. With a Memoir of the Author. Vol. II. Cloth, small 4to, 32s.
Do. do. Roxburghe Edition, 42s.

The History and Traditions of the Land of the Lindsays in Angus and Mearns. By the late ANDREW JERVISE, F.S.A.Scot. New Edition, Edited and Revised by the Rev. JAMES GAMMACK, M.A. Demy 8vo, 14s.
Large Paper, demy 4to, 42s.

Memorials of Angus and the Mearns: An Account, Historical, Antiquarian, and Traditionary, of the Castles and Towns visited by Edward I., and of the Barons, Clergy, and others who swore Fealty to England in 1291-6. By the late ANDREW JERVISE, F.S.A.Scot. Rewritten and Corrected by the Rev. JAMES GAMMACK, M.A. Illustrated with Etchings by W. HOLE, R.S.A. 2 vols. demy 8vo, 28s.; Large Paper, 2 vols. demy 4to, 63s.

Chronicles of Glenbuckie.
By HENRY JOHNSTON, Author of "The Dawsons of Glenara," etc. Ex. fcap. 8vo, 5s.

*** A book of humour and pathos, descriptive of the social, political, and ecclesiastical life in a Scottish parish of fifty years ago.

"A delightful, humorous, and evidently faithful picture of Scottish life in a rural Ayrshire parish."—*Scotsman.*

"Graphic in style, rich in local colour, and instinct with real life."—*Glasgow Herald.*

"A genuine bit of Scottish literature, of which all who are jealous of the native talent may be proud."—*Scottish Leader.*

Sermons by the Rev. John Ker, D.D., Glasgow.
Fourteenth Edition. Crown 8vo, 6s.

Sermons (Second Series) by the Rev. John Ker, D.D.
Fifth Thousand. Crown 8vo, 6s.

Thoughts for Heart and Life.
By the Rev. JOHN KER, D.D. Edited by the Rev. A. L. SIMPSON, D.D., Derby. With Portrait by JAMES FAED. Ex. fcap. 8vo, 4s. 6d.

Letters of the Rev. John Ker, D.D., 1866-1885. Second Edition, with Index. Ex. fcap. 8vo, 4s. 6d.

The History of Curling. Scotland's ain Game, and Fifty Years of The Royal Caledonian Curling Club. By the Rev. JOHN KERR, M.A., Dirleton. One volume, demy 8vo, 10s. 6d. net. Also an Edition on large paper, royal 8vo, with 13 extra full-page engraved plates, 31s. 6d. net.

Memories of Coleorton: Being Letters from Coleridge, Wordsworth and his Sister, Southey, and Sir Walter Scott to Sir George and Lady Beaumont of Coleorton, Leicestershire. 1803 to 1833. Edited, with Notes and Introduction, by WILLIAM KNIGHT, St. Andrews. 2 vols. crown 8vo, 15s.

Colloquia Peripatetica (Deep Sea Soundings):
Being Notes of Conversations with the late John Duncan, LL.D., Professor of Hebrew in the New College, Edinburgh. By WILLIAM KNIGHT, Professor of Moral Philosophy in the University of St. Andrews. Fifth Edition, enlarged, 5s.

Lindores Abbey and the Burgh of Newburgh;
Their History and Annals. By ALEXANDER LAING, LL.D., F.S.A.Scot. Small 4to. With Index, and thirteen Full-page and ten Woodcut Illustrations, 21s.
"This is a charming volume in every respect."—*Notes and Queries.*
"The prominent characteristics of the work are its exhaustiveness and the thoroughly philosophic spirit in which it is written."—*Scotsman.*

Recollections of Curious Characters and Pleasant Places. By CHARLES LANMAN, Washington, Author of "Adventures in the Wilds of America," "A Canoe Voyage up the Mississippi," "A Tour to the River Saguenay," etc. etc. Small Demy 8vo, 12s.

Essays and Reviews.
By the late HENRY H. LANCASTER, Advocate; with a Prefatory Notice by the Rev. B. JOWETT, Master of Balliol College, Oxford. Demy 8vo, with Portrait, 14s.

An Echo of Passion.
By GEO. PARSONS LATHROP. 1s.; and in cloth, 2s.

Would You Kill Him?
By GEORGE PARSONS LATHROP, Author of "An Echo of Passion." Copyright Edition. 3 vols. post 8vo, 31s. 6d.

On the Philosophy of Ethics. An Analytical Essay.
By S. S. LAURIE, A.M., F.R.S.E., Professor of the Theory, History, and Practice of Education in the University of Edinburgh. Demy 8vo, 6s.

Notes on British Theories of Morals.
By Prof. S. S. LAURIE. Demy 8vo, 6s.

Sermons by the Rev. Dr. Lind, Elgin.
Ex. fcap. 8vo, 5s.

Sermons (Second Series) by the Rev. Dr. Lind, Elgin.
Ex. fcap. 8vo, 3s. 6d.

Local Taxation.
An Enquiry into the Proposal to subject Feu-Duties and Ground-Rents to Local Rates. By H. H. S. 6d.

Leaves from the Buik of the West Kirke.
By GEO. LORIMER. With a Preface by the Rev. JAS. MACGREGOR, D.D. 4to.

A Lost Battle. A Novel. 2 vols. Crown 8vo, 17s.
"This in every way remarkable novel."—*Morning Post.*
"We are all the more ready to do justice to the excellence of the author's drawing of characters."—*Athenæum.*

Memorials o the Families of Lumsdaine, Lumisden, or Lumsden. By Lieut.-Col. H. W. LUMSDEN, late Royal Artillery. With illustrations. 4to, 42s. net.

How to Know Grasses by the Leaves.
By A. N. M'ALPINE, B.Sc., Botanist to the Highland and Agricultural Society of Scotland, etc. With a Preface by ROBERT WALLACE, F.R.S., F.R.S.E., etc., Prof. of Agriculture and Rural Economy in the University of Edinburgh. 18 plates, containing 200 figures. Price 3s. 6d. net.

"Macs" in Galloway. Price 6d.

John Calvin: A Fragment by the late Thomas M'Crie, Author of "The Life of John Knox." Demy 8vo, 6s.

Among the Old Scotch Minstrels. Studying their Ballads of War, Folk-lore, and Fairyland. By WILLIAM MACDOWALL, F.S.A. Scot. Fcap. 8vo, 3s. 6d.

The Parish of Taxwood, and some of its Older Memories.
By Rev. J. R. MACDUFF, D.D. Extra fcap. 8vo, Illustrated, 3s. 6d.

Principles of the Algebra of Logic, with Examples.
By ALEX. MACFARLANE, M.A., D.Sc. (Edin.), F.R.S.E. 5s.

The Castellated and Domestic Architecture of Scotland, from the Twelfth to the Eighteenth Century. By DAVID M'GIBBON and THOMAS ROSS, Architects. 4 vols., with about 2000 Illustrations of Ground Plans, Sections, Views, Elevations, and Details. Royal 8vo. 42s. each vol. net.

"No one acquainted with the history of Great Britain can take up this neatly bound volume . . . without being at once struck by its careful completeness and extreme archæological interest, while all students of architectural style will welcome the work specially for its technical thoroughness."—*Building News.*

"A learned, painstaking, and highly important work."—*Scottish Review.*

"One of the most important and complete books on Scottish architecture that has ever been compiled."—*Scotsman.*

"The authors merit the thanks of all architectural readers."—*Builder.*

The Architecture of Provence and the Riviera. By DAVID M'GIBBON. Illustrated with nearly 300 sketches by the Author showing the various styles of Architecture in the South of France. Demy 8vo, 21s.

Memoir of Sir James Dalrymple, First Viscount Stair: A Study in the History of Scotland and Scotch Law during the Seventeenth Century. By Æ. J. G. MACKAY, Advocate. 8vo, 12s.

Storms and Sunshine of a Soldier's Life. Lt.-General COLIN MACKENZIE, C.B., 1825-1881. With a Portrait. 2 vols. crown 8vo, 15s.

"A very readable biography . . . of one of the bravest and ablest officers of the East India Company's army."—*Saturday Review.*

Nugæ Canoræ Medicæ. Lays of the Poet Laureate of the New Town Dispensary. Edited by Professor DOUGLAS MACLAGAN. 4to, with Illustrations, 7s. 6d.

The Hill Forts, Stone Circles, and other Structural Remains of Ancient Scotland. By C. MACLAGAN, Lady Associate of the Society of Antiquaries of Scotland With Plans and Illustrations. Folio, 31s. 6d.

"We need not enlarge on the few inconsequential speculations which rigid archæologists may find in the present volume. We desire rather to commend it to their careful study, fully assured that not only they, but also the general reader, will be edified by its perusal."—*Scotsman.*

The Light of the World. By DAVID M'LAREN, Minister of Humbie. Crown 8vo, 6s.

The Book of Psalms in Metre. According to the version approved of by the Church of Scotland. Revised by Rev. DAVID M'LAREN. Crown 8vo, 7s. 6d.

In Partnership. Studies in Story-Telling. By BRANDER MATTHEWS and H. C. BUNNER. 1s. in paper, and 2s. in cloth.

Antwerp Delivered in MDLXXVII.: A Passage from the History of the Netherlands, illustrated with Facsimiles of a rare series of Designs by Martin de Vos, and of Prints by Hogenberg, the Wiericxes, etc. By Sir WILLIAM STIRLING-MAXWELL, Bart., K.T. and M.P. In 1 vol. Folio, 5 guineas.

"A splendid folio in richly ornamented binding, protected by an almost equally ornamental slip-cover. . . . Remarkable illustrations of the manner in which the artists of the time 'pursued their labours in a country ravaged by war, and in cities ever menaced by siege and sack.'"—*Scotsman.*

Studies in the Topography of Galloway: Being a List of nearly 4000 Names of Places, with Remarks on their Origin and Meaning. By SIR HERBERT MAXWELL, Bart., M.P. 1 vol. demy 8vo, 14s.

The Art of Love; or, New Lessons in Old Lore. By Sir HERBERT MAXWELL, Bart., M.P., author of "Sir Lucian Elphin." 3 vols. post 8vo, 31s. 6d.

Passages in the Life of Sir Lucian Elphin of Castle Weary. Edited by his SISTER. 2 vols. demy 8vo, 24s.

Researches and Excavations at Carnac (Morbihan), The Bossenno, and Mont St. Michel. By JAMES MILN. Royal 8vo, with Maps, Plans, and numerous Illustrations in Wood-Engraving and Chromolithography.

Excavations at Carnac (Brittany): A Record of Archæo- logical Researches in the Alignments of Kermario. By JAMES MILN. Royal 8vo, with Maps, Plans, and numerous Illustrations in Wood-Engraving, 15s.

The Past in the Present—What is Civilisation?
Being the Rhind Lectures in Archæology, delivered in 1876 and 1878. By Sir ARTHUR MITCHELL, K.C.B., M.D., LL.D. In 1 vol., demy 8vo, with 148 Woodcuts, 15s.

"Whatever differences of opinion, however, may be held on minor points, there can be no question that Dr. Mitchell's work is one of the ablest and most original pieces of archæological literature which has appeared of late years."—*St. James's Gazette.*

Our Scotch Banks:
Their Position and their Policy. By WM. MITCHELL, S.S.C. Third Edition. 8vo, 5s.

On Horse-Breaking. By ROBERT MORETON. Second Edition. Fcap. 8vo, 1s.

Ecclesiological Notes on some of the Islands of Scot- land; with other Papers relating to Ecclesiological Remains on the Scottish Mainland and Islands. By THOMAS S. MUIR, Author of "Characteristics of Church Architecture," etc. Demy 8vo, with numerous Illustrations, 21s.

The Birds of Berwickshire.
By GEO. MUIRHEAD. 2 vols. demy 8vo, Illustrated. Vol. I., 15s. net.
[Vol. II. in the Press.

"The Lanox of Auld": An Epistolary Review of "The Lennox, by William Fraser." By MARK NAPIER. With Woodcuts and Plates. 4to, 15s.

Tenants' Gain not Landlords' Loss, and some other Economic Aspects of the Land Question. By JOSEPH SHIELD NICHOLSON, M.A., Professor of Political Economy in the University of Edinburgh. Crown 8vo, 5s.

Camps in the Caribbees: Adventures of a Naturalist in the Lesser Antilles. By FREDERICK OBER. Illustrations, demy 8vo, 12s.

"Well-written and well-illustrated narrative of camping out among the Caribbees."—*Westminster Review.*

"Varied were his experiences, hairbreadth his escapes, and wonderful his gleanings in the way of securing rare birds."—*The Literary World.*

Cookery for the Sick and a Guide for the Sick-Room.
By C. H. OGG, an Edinburgh Nurse. Fcap., 1s.

On the Links: Being Golfing Stories by Various Hands.
Edited by a NOVICE. With Two Rhymes on Golf by ANDREW LANG. Extra fcap. 8vo, 1s.

An Irish Garland. By Mrs. S. M. B. PIATT. Crown 8vo, 3s. 6d.

The Children Out of Doors: A Book of Verses.
By TWO IN ONE HOUSE. Crown 8vo, 3s. 6d.

Phœbe.
By the Author of "Rutledge." Reprinted from the Fifth Thousand of the American Edition. Crown 8vo, 6s.

"'Phœbe' is a woman's novel."—*Saturday Review.*

Popular Genealogists;
Or, The Art of Pedigree-making. Crown 8vo, 4s.

The Gamekeeper's Manual: being Epitome of the Game Laws for the use of Gamekeepers and others interested in the Preservation of Game. By ALEXANDER PORTER, Deputy Chief Constable of Roxburghshire. Second Edition, 3s. net.

May in Anjou; with other Sketches and Studies.

By ELEANOR C. PRICE, Author of "A Lost Battle," etc. Fcap. 8vo, 1s.

Contents.—May in Anjou—Winter and Summer—In Old France—The Châteaux of Touraine—An Old French House—A Study of a Town—Up the Feeder.

Scotland under her Early Kings.

A History of the Kingdom to the close of the 13th century. By E. WILLIAM ROBERTSON. In 2 vols. 8vo, cloth, 36s.

Historical Essays,

In connection with the Land and the Church, etc. By E. WILLIAM ROBERTSON, Author of "Scotland under her Early Kings." 8vo, 10s. 6d.

A Rectorial Address delivered before the Students of

Aberdeen University, in the Music Hall at Aberdeen, on Nov. 5, 1880. By THE EARL OF ROSEBERY. 6d.

A Rectorial Address delivered before the Students of

the University of Edinburgh, Nov. 4, 1882. By THE EARL OF ROSEBERY. 6d.

Aberdour and Inchcolme: Being Historical Notices of

the Parish and Monastery, in Twelve Lectures. By the Rev. WILLIAM ROSS, LL.D., Author of "Burgh Life in Dunfermline in the Olden Time." Crown 8vo, 6s.

"If any one would know what Aberdour has been, or, indeed, what to some extent has been the history of many another parish in Scotland, he cannot do better than read these Lectures. He will find the task a pleasant one."—*Saturday Review.*

"We know no book which within so small a compass contains so varied, so accurate, and so vivid a description of the past life of the Scottish people, whether ecclesiastical or social, as Dr. Ross's 'Aberdour and Inchcolme.'"—*Scottish Review.*

"It seems a pity that so good a thing should have been so long withheld from a wider audience; but better late than never."—*Scotsman.*

Notes and Sketches from the Wild Coasts of Nipon.

With Chapters on Cruising after Pirates in Chinese Waters. By Admiral HENRY C. ST. JOHN. Small demy 8vo, with Maps and Illustrations, 12s.

"One of the most charming books of travel that has been published for some time."—*Scotsman.*

"There is a great deal more in the book than Natural History. . . . His pictures of life and manners are quaint and effective, and the more so from the writing being natural and free from effort."—*Athenæum.*

"He writes with a simplicity and directness, and not seldom with a degree of graphic power, which, even apart from the freshness of the matter, renders his book delightful reading. Nothing could be better of its kind than the description of the Inland Sea."—*Daily News.*

Natural History and Sport in Moray.

By the late CHARLES ST. JOHN, Author of "Wild Sports in the Highlands." Second Edition. In 1 vol. royal 8vo, with 40 page Illustrations of Scenery and Animal Life, engraved by A. DURAND after sketches made by GEORGE REID, R.S.A., and J. WYCLIFFE TAYLOR; also, 30 Pen-and-Ink Drawings by the Author in facsimile. 50s.

"This is a new edition of the work brought out by the friends of the late Mr. St. John in 1863; but it is so handsomely and nobly printed, and enriched with such charming illustrations, that we may consider it a new book."—*St. James's Gazette.*

"Charles St. John was not an artist, but he had the habit of roughly sketching animals in positions which interested him, and the present reprint is adorned by a great number of these, facsimiled from the author's original pen-and-ink. Some of these, as for instance the studies of the golden eagle swooping on its prey, and that of the otter swimming with a salmon in its mouth, are very interesting, and full of that charm that comes from the exact transcription of unusual observation."—*Pall Mall Gazette.*

Life of James Hepburn, Earl of Bothwell.

By Professor SCHIERN, Copenhagen. Translated from the Danish by the Rev. DAVID BERRY, F.S.A.Scot. Demy 8vo, 16s.

A Tour in Sutherlandshire; with Extracts from the Field-Books of a Sportsman and Naturalist. By the late CHARLES ST. JOHN, Author of "Wild Sports and Natural History in the Highlands." Second Edition, with an Appendix on the Fauna of Sutherland, by J. A. HARVIE-BROWN and T. E. BUCKLEY. Illustrated with the original Wood-Engravings, and additional Vignettes from the Author's sketch-books. In 2 vols. small demy 8vo, 21s.

"Every page is full of interest."—*The Field.*

"There is not a wild creature in the Highlands, from the great stag to the tiny fire-crested wren, of which he has not something pleasant to say."—*Pall Mall Gazette.*

Scotch Folk.
Illustrated. Fourth Edition, enlarged. Ex. fcap. 8vo, 1s.

"They are stories of the best type, quite equal in the main to the average of Dean Ramsay's well-known collection."—*Aberdeen Free Press.*

The Journal of Sir Walter Scott, 1825-32.
From the original Manuscript at Abbotsford, annotated and illustrated from his "Life" and Correspondence. 2 vols. demy 8vo. With 2 portraits, 32s.

Buddhism and Christianity: A Parallel and a Contrast.
Being the Croall Lectures for 1889-90. By ARCHIBALD SCOTT, D.D., Minister of St. George's, Edinburgh. 1 vol. demy 8vo, 7s. 6d.

The Scottish Military Directory, compiled under the authority of the Major-General commanding the Forces in Scotland. Fcap. 8vo, 1s. 4d. net.

Studies in Poetry and Philosophy.
By the late J. C. SHAIRP, LL.D., Principal of the United College of St. Salvator and St. Leonard, St. Andrews. Fourth Edition, with Portraits of the Author and Thomas Erskine, by WILLIAM HOLE, A.R.S.A. Crown 8vo, 7s. 6d.

"The finest essay in the volume, partly because it is upon the greatest and most definite subject, is the first, on *Wordsworth*. . . . We have said so much upon this essay that we can only say of the other three that they are fully worthy to stand beside it."—*Spectator.*

Culture and Religion.
By the late PRINCIPAL SHAIRP. Seventh Edition. Fcap. 8vo, 3s. 6d.

"A wise book, and, unlike a great many other wise books, has that carefully shaded thought and expression which fits Professor Shairp to speak for Culture no less than for Religion."—*Spectator.*

"Those who remember a former work of Principal Shairp's, 'Studies in Poetry and Philosophy,' will feel secure that all which comes from his pen will bear the marks of thought at once careful, liberal, and accurate. Nor will they be disappointed in the present work. . . . We can recommend this book to our readers."—*Athenæum.*

"We cannot close without earnestly recommending the book to thoughtful young men. It combines the loftiest intellectual power with a simple and child-like faith in Christ, and exerts an influence which must be stimulating and healthful."—*Freeman.*

Sketches in History and Poetry.
By the late PRINCIPAL SHAIRP. Edited by JOHN VEITCH, Professor of Logic and Rhetoric in the University of Glasgow. Crown 8vo, 7s. 6d.

Kilmahoe: A Highland Pastoral,
And other Poems. By PRINCIPAL SHAIRP. Fcap. 8vo, 6s.

Shakespeare on Golf. With special Reference to St. Andrews Links. 3d.

The Divine Comedy of Dante Alighieri, The Inferno.
A Translation in Terza Rima, with Notes and Introductory Essay. By JAMES ROMANES SIBBALD. With an Engraving after Giotto's Portrait. Small demy 8vo, 12s.

"Mr. Sibbald is certainly to be congratulated on having produced a translation which would probably give an English reader a better conception of the nature of the original poem, having regard both to its matter and its form in combination, than any other English translation yet published."—*Academy.*

The Use of what is called Evil.

A Discourse by SIMPLICIUS. Extracted from his Commentary on the Enchiridion of Epictetus. Crown 8vo, 1s.

The Near and the Far View,

And other Sermons. By Rev. A. L. SIMPSON, D.D., Derby. Ex. fcap. 8vo, 5s.

"Very fresh and thoughtful are these sermons."—*Literary World.*

"Dr. Simpson's sermons may fairly claim distinctive power. He looks at things with his own eyes, and often shows us what with ordinary vision we had failed to perceive. . . . The sermons are distinctively good."—*British Quarterly Review.*

Archæological Essays.

By the late Sir JAMES SIMPSON, Bart. Edited by the late JOHN STUART, LL.D. 2 vols. 4to, 21s.

1. Archæology.
2. Inchcolm.
3. The Cat Stane.
4. Magical Charm-Stones.
5. Pyramid of Gizeh.
6. Leprosy and Leper Hospitals.
7. Greek Medical Vases.
8. Was the Roman Army provided with Medical Officers?
9. Roman Medicine Stamps, etc. etc.

The Art of Golf.

By SIR W. G. SIMPSON, Bart., Captain of the Honourable Company of Edinburgh Golfers. With Twenty Plates from instantaneous photographs of Professional Players, chiefly by A. F. Macfie, Esq. Demy 8vo, Morocco back, price 15s.

Should Feu-Duties be Taxed? By VINDEX. Demy 8vo, 3d.

Celtic Scotland: A History of Ancient Alban.

By WILLIAM F. SKENE, D.C.L., Historiographer-Royal for Scotland. New Edition, revised. In 3 vols. Demy 8vo, 45s. Illustrated with Maps.

I.—HISTORY and ETHNOLOGY. II.—CHURCH and CULTURE.
III.—LAND and PEOPLE.

"Forty years ago Mr. Skene published a small historical work on the Scottish Highlands which has ever since been appealed to as an authority, but which has long been out of print. The promise of this youthful effort is amply fulfilled in the three weighty volumes of his maturer years. As a work of historical research it ought in our opinion to take a very high rank."—*Times.*

The Four Ancient Books of Wales,

Containing the Cymric Poems attributed to the Bards of the Sixth Century. By WILLIAM F. SKENE, D.C.L. With Maps and Facsimiles. 2 vols. 8vo, 36s.

The Gospel History for the Young:

Being lessons on the Life of Christ, Adapted for use in Families and Sunday Schools. By WILLIAM F. SKENE, D.C.L. Small crown 8vo, 3 vols., with Maps, 2s. 6d. each vol., or in cloth box, 7s. 6d. net.

"In a spirit altogether unsectarian provides for the young a simple, interesting, and thoroughly charming history of our Lord."—*Literary World.*

"This 'Gospel History for the Young' is one of the most valuable books of the kind."—*The Churchman.*

Tommie Brown and the Queen of the Fairies: A new

Child's Book. By WILLIAM F. SKENE, D.C.L. In fcap. 8vo, with Illustrations, 4s. 6d. *Let pain be pleasure, and pleasure be pain.*

LETTER from the late Dr. JOHN BROWN.

"DEAR MR. SKENE,—I have to thank you for making me a child, and a happy child, for an hour and forty minutes to-night. That is a delightful story, at once strange and yet sort of believable, and I was, like the other children, at the end, and like Oliver Twist 'asking for more.' It is something to have written 'Little Tommie' and another book just published. With much regard and envy, yours sincerely, "J. BROWN."

"There is no wonder that children liked the story. It is told neatly and well, and is full of great cleverness, while it has that peculiar character the absence of which from many like stories deprives them of any real interest for children."—*Scotsman.*

Fishin' Jimmy: A Sketch.

By A. TRUMBULL SLOSSON. Fcap. 8vo, 6d.

Shelley. A Critical Biography.
By GEORGE BARNETT SMITH. Ex. fcap. 8vo, 6s.

An Aberdeenshire Village Propaganda Forty Years Ago.
By ROBERT HARVEY SMITH, M.A. With an Introduction by WILLIAM ALEXANDER, LL.D., author of "Johnny Gibb of Gushetneuk." Cr. 8vo, 3s. 6d.

The Sermon on the Mount.
By the Rev. WALTER C. SMITH, D.D. Crown 8vo, 6s.

Life and Work at the Great Pyramid.
With a Discussion of the Facts ascertained. By C. PIAZZI SMYTH, F.R.SS.L. and E., Astronomer-Royal for Scotland. 3 vols. demy 8vo, 56s.

Madeira Meteorologic:
Being a Paper on the above subject read before the Royal Society, Edinburgh, on the 1st of May 1882. By C. PIAZZI SMYTH, Astronomer-Royal for Scotland. Small 4to, 6s.

Timbers and How to Know them.
By DR. ROBERT HARTIG. Translated from the German by WILLIAM SOMERVILLE, D.Œ.C., B.Sc. Illustrated, 2s.

Saskatchewan and the Rocky Mountains:
Diary and Narrative of Travel, Sport, and Adventure, during a Journey through part of the Hudson's Bay Company's Territories in 1859 and 1860. By the EARL OF SOUTHESK, K.T., F.R.G.S. 1 vol. demy 8vo, with Illustrations on Wood by WHYMPER, 18s.

By the same Author.

Herminius: A Romance. Fcap. 8vo, 6s.

Jonas Fisher: A Poem in Brown and White. Cheap Edition, 1s.

The Burial of Isis, and other Poems.
Fcap. 8vo, 6s.

Darroll, and other Poems.
By WALTER COOK SPENS, Advocate. Crown 8vo, 5s.

Rudder Grange.
By FRANK R. STOCKTON. 1s.; and cloth, 2s.
"'Rudder Grange' is a book that few could produce, and that most would be proud to sign."—*Saturday Review.*
"It may be safely recommended as a very amusing little book."—*Athenæum.*
"Altogether 'Rudder Grange' is as cheery, as humorous, and as wholesome a little story as we have read for many a day."—*St. James's Gazette.*

The Lady or the Tiger? and other Stories.
By FRANK R. STOCKTON. 1s.; and cloth, 2s.
Contents.—The Lady or the Tiger?—The Transferred Ghost—The Spectral Mortgage—That same old 'Coon—His Wife's Deceased Sister—Mr. Tolman—Plain Fishing—My Bull Calf—Every Man his own Letter Writer—The Remarkable Wreck of the "Thomas Hyke."
"Stands by itself both for originality of plot and freshness of humour."—*Century Magazine.*

A Borrowed Month, and other Stories.
By FRANK R. STOCKTON, Author of "Rudder Grange." 1s.; and cloth, 2s.
Contents.—A Borrowed Month—A Tale of Negative Gravity—The Christmas Wreck—Our Archery Club—A Story of Assisted Fate—The Discourager of Hesitancy—Our Story.

Christianity Confirmed by Jewish and Heathen Testimony, and the Deductions from Physical Science, etc. By THOMAS STEVENSON, F.R.S.E., F.G.S., Member of the Institution of Civil Engineers. Second Edition. Fcap. 8vo, 3s. 6d.

What is Play?
A Physiological Inquiry. Its bearing upon Education and Training. By JOHN STRACHAN, M.D. Fcap., 1s.

Sketch of Thermodynamics.
By P. G. TAIT, Professor of Natural Philosophy in the University of Edinburgh. Second Edition, revised and extended. Crown 8vo, 5s.

Talks with our Farm-Servants.
By An Old Farm-Servant. Crown 8vo; paper, 6d.; cloth, 1s.

Our Mission to the Court of Marocco in 1880, under Sir JOHN DRUMMOND HAY, K.C.B., Minister Plenipotentiary at Tangier, and Envoy Extraordinary to His Majesty the Sultan of Marocco. By Captain PHILIP DURHAM TROTTER, 93d Highlanders. Illustrated from Photographs by the Hon. D. LAWLESS, Rifle Brigade. Square Demy 8vo, 24s.

The Upland Tarn: A Village Idyll. Small Crown, 5s.

Walks near Edinburgh.
By MARGARET WARRENDER. With Illustrations by the Author. Fcap. 8vo, 3s. 6d.

A Year in the Fields. By JOHN WATSON. Fcap. 8vo, 1s.

Mr. Washington Adams in England.
By RICHARD GRANT WHITE. 1s.; or in cloth, 2s.
"An impudent book."—*Vanity Fair.*
"This short, tiresome book."—*Saturday Review.*
"Brimful of genuine humour."—*Montrose Standard.*
"Mr. White is a capital caricaturist, but in portraying the ludicrous eccentricities of the patrician Britisher he hardly succeeds so well as in delineating the peculiar charms of the representative Yankee."—*Whitehall Review.*

A Humble Romance, and other Stories.
By MARY E. WILKINS. 1s. paper, or 2s. cloth extra.

A Far-away Melody, and other Stories.
By MARY E. WILKINS. 1s. paper, or 2s. cloth extra.

Rosetty Ends; or, the Chronicles of a Country Cobbler.
By Job Bradawl (A. DEWAR WILLOCK), Author of "She Noddit to Me." Fcap. 8vo, Illustrated, 2s. and 1s.
"The sketches are amusing productions, narrating comical incidents, connected by a thread of common character running through them all—a thread waxed into occasional strength by the 'roset' of a homely, entertaining wit."—*Scotsman.*

Reminiscences of Old Edinburgh.
By DANIEL WILSON, LL.D., F.R.S.E., Professor of History and English Literature in University College, Toronto, Author of "Prehistoric Annals of Scotland," etc. etc. 2 vols. post 8vo, 15s.

The India Civil Service as a Career for Scotsmen.
By J. WILSON, M.A. 1s.

Shakespeare's England.
By WILLIAM WINTER. 1s. paper, or 2s. cloth extra.
Contents.—The Voyage—The Beauty of England—Great Historic Places—Rambles in London—A Visit to Windsor—The Palace of Westminster—Warwick and Kenilworth—First View of Stratford-on-Avon—London Nooks and Corners—Relics of Lord Byron—Westminster Abbey—The Home of Shakespeare—Up to London—Old Churches of London—Literary Shrines of London—A Haunt of Edmund Kean—Stoke-Pogis and Thomas Gray—At the Grave of Coleridge—On Barnet Battlefield—A Glimpse of Canterbury—The Shrines of Warwickshire—A Borrower of the Night.

Wanderers: Being a Collection of the Poems of William WINTER. 1s., or in cloth, 2s.

Gray Days and Gold. By WILLIAM WINTER. [*In the Press.*

The East Neuk of Fife: Its History and Antiquities.
Second Edition, Re-arranged and Enlarged. By the Rev. WALTER WOOD, M.A., Elie. Edited, with Preface and Index, by the Rev. J. WOOD BROWN, M.A., Gordon. Crown 8vo, 6s.

Christianity and Reason:
Their Necessary Connection. By R. S. WYLD, LL.D. Extra fcap. 8vo, 3s. 6d.

EDINBURGH: DAVID DOUGLAS, CASTLE STREET.