CHAPTER VI.

PROFESSOR OF NATURAL PHILOSOPHY AND FOR ONE YEAR CHAIRMAN OF THE FACULTY IN THE UNIVERSITY OF VIRGINIA (continued).

1846-1853.

Arrival of Agassiz in America. — Foundation of Scientific Schools in Harvard and Yale. — Seventh Annual Meeting of Geologists and Naturalists in Boston with Mr. Rogers Chairman. — James appointed Professor of Chemistry in the University of Pennsylvania. — William proposes to resign his Professorship and join Henry in Boston. — Degree of LL. D. from Hampden-Sidney College. — Organization of the American Association for the Advancement of Science. — Henry again visits Europe. — His Letters. — He returns and lectures in the Lowell Institute. — Death of James Rogers the Uncle. — William invited to lecture at the Smithsonian. — His Marriage. — Journey to Europe. — Birmingham Meeting of the British Association. — Return to the University of Virginia. — Dr. Wayland of Brown visits the University. — Kossuth's visit to America. — Illness and Death of James. — Robert appointed his Successor.

The summer of 1846 found Mr. Rogers again in Boston.

TO HIS BROTHER HENRY AT LAKE SUPERIOR.

Boston, July 17, 1846.

... I was at Cambridge day before yesterday with Sumner, and after listening to the closing class oration by young Phillips on mathematics, and taking the usual lunch in his rooms, we adjourned to Longfellow's, where we had a very pleasant sociable family dinner. Mrs. and Mr. Longfellow made very kind inquiries after you. Mrs. L. came up to me as I entered, and in a very cordial manner took my hand and bade me
welcome, all the time thinking it was you. Lovering was as kind as usual, and has just written to ask me to come down and see him and Mrs. Lovering at Nahant, where they are staying for her health. I had some talk, also, with Peirce and Gray, who asked in friendly terms about you.

Mr. Rogers returned to Virginia in the autumn, and Henry writes to him from Boston.

Boston, October 7, 1846.

Dear William,... Agassiz has arrived and will lecture [in the Lowell Institute] after I do. He is a most amiable, engaging and philosophic spirit. We shall see much of each other, and I shall draw new power and impulse from him. Verneuil sailed yesterday in the steamer.

Agassiz can help us much in our researches among our older fossils.

Boston, October 24, 1846.

... Tell me where it was we found the fish relics in the Matinal Limestone, and say if you have the specimens, and if they are undoubtedly fish-like. It will be a very important point if we can be the first to contradict the declaration of all geologists that no vertebrates occur in the older Silurian period. Agassiz says we ought to find them even there, and the laws of progression be still maintained.

William to Henry.

University of Virginia, November 11, 1846.

... It rejoices me to learn that you are satisfying yourself in your lectures; that you would please your class I never had the slightest doubt. And what a class you have! Eighteen hundred or two thousand auditors, such as one commands in Boston, is, perhaps, the very best audience assembled anywhere in the world to listen to instruction in science.

1 Edward de Verneuil, a distinguished French geologist.
2 On Geology, before the Lowell Institute.
TO GEORGE S. HILLARD, ESQ.

University of Virginia, November 15, 1846.

... S——, from whom I have learned a great deal of Boston and Cambridge gossip, tells me that Everett is endeavouring to do away with the elective studies and make all the students pursue the same course as matter of compulsion. This, I suppose, is in imitation of the English universities, and is, I think, a great stride backwards. Better far to make all the studies free, and place Harvard at once on the broad liberal basis of one of the German schools. I ought not, perhaps, to speak so positively, as after all perhaps Mr. E.'s views are not what are ascribed to him, and may be judicious under the existing arrangements at Harvard. ...

Robert and I have been making powder-cotton [gun-cotton], of which so much is said in the papers. Robert has now a small quantity which flashes off so instantly as not to fire the gunpowder upon which it is placed. It leaves no stain, and gives scarcely a perceptible smoke. I suppose by this time the Bostonians have seen this interesting product, as its preparation is not difficult, and Jackson would have the means at hand readily to make it. ...

WILLIAM TO HENRY.

University of Virginia, November 29, 1846.

Have you seen the October number of the "Athenaeum"? It contains a rather brief account of the doings of the last British Association, and among other things some remarks of Lyell concerning the Richmond coal. You remember that in Horner's address Lyell is made to intimate his doubt of the accuracy of my reference of these rocks to the Oölite period. Now in one of these latter statements he distinctly declares that Agassiz has pronounced the fish to be Oölite, and Bunbury has recognized the group of plants to be the same as those of Whitby.
Mr. Rogers was under engagement at this time to deliver before the Mercantile Library Association in Boston a lecture on "The Atmosphere, or the Balance of Nature in the Vegetable and Animal Kingdoms."

TO HIS BROTHER HENRY.

UNIVERSITY OF VIRGINIA, December 6, 1846.

The time is drawing near, my dear Henry, when I shall have the joy of meeting you and other friends. We are enjoying great quiet as yet. The professors have been giving the students a succession of very pleasant parties, and the utmost good feeling thus far prevails with nearly all the young men. The only symptom of mischief that has occurred was the explosion of a log loaded like a cannon on the lawn last night a little after supper-time. We have no apprehension of any recurrence of serious annoyances this year....

Is Dr. Jackson's vapour, which divides the public ear with gun-cotton, anything more than rectified ether?

The "vapour" referred to was in fact "rectified ether," and its use marked the discovery of anaesthesia by this agent.

The following letters from Lieutenant Maury are of historical interest:

OBSERVATORY, WASHINGTON, November 23, 1846.

DEAR PROFESSOR ROGERS,—I send a copy of our observations for 1845, of which I beg your acceptance. I have also sent a copy for the University, with a letter to the President, requesting the advice and aid of the Faculty in relation to our future operations. It is probable you will see that letter; therefore I beg to put you in possession of my views and wishes more fully than I felt at liberty to express them there.

In the first place, you know that the Observatory is yet an illegitimate concern, smuggled into existence...
under the name of a "Dépôt of Charts and Instruments," a circumstance significant enough of the hostility, or rather prejudice, still existing in the minds of the lawgivers to an Observatory.

Now to be useful the Observatory must feel that it is on its own bottom, firm and stable. This want of stability impairs its usefulness and prevents it from carrying out its plans with efficiency. . . . Should the work of the Observatory so far meet your approbation and give you confidence as to its management, any act on your part would help us along which would tend to strengthen our hands here for usefulness.

There was a bill unanimously supported by the Committee on Naval Affairs last session for separating the Observatory from the Bureau of Ordnance, and giving it a Bureau of its own. That bill comes up for final action at the approaching session; its passage would be productive of much good.

FROM THE SAME.

 Observatory, December 7, 1846.

. . . There is a bill before Congress to establish a Bureau of Hydrography, or Longitude, which embraces the Observatory. The passage of that bill would place the Observatory where it ought to be, upon its own bottom, and give it the lawful consequence in the public eye which it should have to facilitate its undertakings. As for reasons:—

First of all, there must be an American Nautical Almanac; it is the tangible fruit of our Observatory. The arguments in favour of it are, that every maritime nation of the least importance in Europe has its own Nautical Ephemeris, and that it would cost little or nothing, for the sales to merchantmen would pay for the expense of computation and publication. The arguments in favour of a Hydrographical Office are of a like character. Experience has taught all nations the importance of an office with authority to collect hydrographical information. For the want of such
information, we have witnessed the failures of several enterprises in the Gulf of Mexico against the Mexicans, for with proper information, Conner's attacks upon Alvarado would not have been the mortifying failures they are.

As to a chart of winds and currents, you recollect, which the American Geologists so heartily seconded me in, after much labour, and writing page upon page on the subject, I have prevailed on the Navy Department to order one ship to collect such information. With a Bureau of Hydrography the Chief would have authority to give the proper orders in the premises and enforce them.

Notwithstanding this, I have, after much entreaty and boring, been allowed the privilege of overhauling the old log-books for information, which is like hunting a grain of wheat in a bushel of chaff, and of constructing a chart therefrom. With such meagre materials, I am constructing a chart of the Atlantic, one sheet of which — the Gulf of Mexico — is now in the hands of the engraver. There is no telling the value even of this much. What appeared to be disorder and confusion among the currents there are thus made to appear all harmony and arrangement. The currents in the Gulf turn out to be rivers almost as sharp, constant and as well defined as the Mississippi itself. In fact, by the information which this chart already affords, the average passage from Havana to Pensacola, or Mobile, will be shortened at least one half, for we have revealed to us a current of three or four miles an hour, of which vessels thus bound may avail themselves for nearly the whole distance. This current was not known before. Like the shoals and channels of an unsurveyed but oft frequented harbour, the true draft of water that can enter is not known until the surveyor takes the soundings from his notebook and plots them down upon the chart. Then for the first time he comprehends the shape of the shoals and sees the winding of the channel. So with these
currents, when we come to put down the tracks of two or three hundred vessels, each showing currents, the crossing of these tracks enables us to assign both limits and strength with much precision.

You can enlarge upon the ideas thus hastily sketched. They are the things upon which the arguments for a separate and efficient organization turn. A memorial to Congress upon the subject, I suppose, would promote the object in view. Anything you may be pleased to say as to the volume of Observations, and the importance of having them regularly published, will help me on with an appropriation for the next volume.

Mr. Rogers, in reply to Lieutenant Maury, sent a recommendation to Congress in behalf of a Bureau of Hydrography.

In December, 1846, Mr. Rogers was offered the professorship of "Mineralogy, Geology and Agricultural Chemistry" in the University of Alabama. The salary mentioned was $1,700 and house rent. It is hardly necessary to say that he did not accept the offer.

It was in 1847 that the foundation of the Lawrence Scientific School at Cambridge was laid by Abbott Lawrence, Esq., afterward United States Minister to the Court of St. James, who gave for the purpose at the outset the sum of $50,000. Professor Henry Rogers, in a letter dated June 25, 1847, refers to the gift, and states that Mr. Lawrence was treating with Agassiz for the professorship of Geology, and with Courtenay (at that time Professor of Mathematics in the University of Virginia) for that of Engineering. He adds: "Courtenay would be well qualified, but he would hardly take a place worth at present perhaps less than $1,000, and hereafter only $1,500." We cite these facts as a contribution to the

SUNNY HILL, LUNENBURG, MASSACHUSETTS
educational history of the time, for it is worth noting that a scientific school was begun in 1847 at one of our most famous universities, with an endowment of (originally) only $50,000; that the chair of Engineering yielded but $1,000, or less; while the man naturally sought for to fill it, and regarded as "well qualified," was a university professor of Mathematics, who had had no other engineering experience than that of a West Point graduate.

The Scientific or "Philosophical" Department of Yale was first organized and opened to students in 1847.

Mr. Rogers, on the arrival of his summer holidays, journeyed to Massachusetts and visited the family of Mr. James Savage at their summer home in Lunenburg. As many of the happiest hours of his life were passed here, we give a brief description of the place.

Lunenburg is one of the typical "hill-towns" of Massachusetts. It is but sparsely settled by a farming community, though distant only a few miles east from the bustling manufacturing city of Fitchburg. "Sunny Hill," the home of Mr. Savage, commanded fine views of Mount Wachusett towards the west, and of many lesser hills on the horizon. In one of the valleys not far off winds the Nashua River, and in another, just below the Hill, lies "Whalom Pond," a beautiful lake bordered by sloping fields and woods. Here in complete retirement, yet only some two hours by rail from Boston, Mr. Rogers found for many years the perfect quiet, and companionship with nature, which are the best refreshments of the scholar. In this hospitable home the brothers James, Henry and Robert were also welcome guests.

In September, 1847, the seventh annual meeting of
the Association of American Geologists and Naturalists which had been organized, as above stated, in 1840, was held in Boston. At this meeting it was voted that the Association "should resolve itself into the American Association for the Advancement of Science, and that the first meeting, under the new organization, should be held in the city of Philadelphia on the third Wednesday (20th day) of September, 1848."  

Mr. Rogers presided over the last meeting of the parent organization and, as chairman, took a prominent part in the establishment of the new Association. At the beginning of October he was again at his post in the University of Virginia.

WILLIAM TO HENRY.

UNIVERSITY OF VIRGINIA, October 3, 1847.

... The more I think of our plan of a Polytechnic School, the more confident I feel of its rapid and great success. The Lawrence School never can succeed on its present plan in accomplishment of what was intended. It can only, as now organized, draw a small number of the body of students aside from the usual college routine. It should be in reality a school of applied science, embracing at least four professorships, and it ought to be in a great measure independent of the other departments of Harvard. Besides, Cambridge is not the place for such a school. It should be in Boston. Thus organized and placed, it would really cover the ground of our School of Arts, and would undoubtedly become very popular and be highly successful.

In the autumn of 1847 James B. Rogers was elected to the Professorship of Chemistry in the University of Pennsylvania, to succeed Dr. Robert Hare, resigned.

1 *Proceedings of the American Association for the Advancement of Science* (1849), vol. i. p. 5.
All the brothers turned to William whenever they needed counsel, and especially for assistance and criticism in their literary or oratorical efforts. James now invoked William's aid in criticising his introductory address to be delivered on assuming the new office, and William, as usual, lent his aid:—

WILLIAM TO HIS BROTHER JAMES.

UNIVERSITY OF VIRGINIA, October 11, 1847.

... The task is finished, and I send you the remainder of the lecture, six pages, which, added to the twenty-eight despatched yesterday evening, will, I think, be quite as much as you can read. ... The subject of life is a ticklish one, you know, with theologians; but the view I take leaves full scope for the spiritual, while it is, I think, the truly logical one. ... This literary task just completed has cost me a good deal of toil, more, perhaps, than if from the very beginning I had struck out in a path of my own. But I enjoy, I cannot tell you how much, pleasure in feeling that it will relieve you of so much trouble and anxiety, and help you to launch your bark successfully on the wider sea you are about to navigate. ... In haste and tired,

Your ever affectionate brother,

WILLIAM B. ROGERS.

TO HIS BROTHER HENRY.

UNIVERSITY OF VIRGINIA, October 13, 1847.

... Do you hear anything further of this Chair of engineering? ... If the course were devoted to applied mechanics, of which engineering would form part, it would be more promising. In truth this department ought to embrace experimental physics in all its practical bearings, including the principles of Mechanics, Hydrodynamics, Pneumatics, Thermotics, etc., as the basis; and then the discussion of materials, and the principles of construction, and the motive
powers, with the machinery through which they are applied. How I long, my dear Henry, to be with you. We have not for many a year spent a working season together. I am sure we could accomplish a great deal by such a combination. To this my heart now looks with a pleasure I cannot express. . . .

William, Robert and James were now comfortably established in professorships, and Henry was doing well as a lecturer and geological expert in Boston. Nevertheless, mainly on account of a feeling of isolation, William began to think seriously of resigning his position in Virginia and going to join his brother Henry in Boston.

WILLIAM TO HENRY.

UNIVERSITY OF VIRGINIA, October 20, 1847.

. . . James delivered his lecture no doubt yesterday. He wrote in good spirits; the laboratory was looking vastly improved by its new arrangement, and students were pouring in rapidly upon him. Notwithstanding the increased length of the session, the University was looking for a large class. Household arrangements were progressing in the new residence, and, in a word, all things looked bright, as they certainly ought to do. What a cause for continual rejoicing is this glorious success which James has had! That his course will be eminently satisfactory I am perfectly sure. The Introductory I regard as his only trouble, and hereafter I would advise him to make it an extempore one. I have great hopes that the happy circumstances in which he is now placed, and especially the large leisure and means they will give for renewing his health by wholesome travel and occupation, will be of great service to him in a variety of ways. . . .

Your letter, written immediately on your return, gave us great pleasure. I have since thought of you
daily as one of the circle of dear friends at Sunny Hill, and have gone with you to the many beautiful points around, now so dearly familiar to my thoughts.

From some observations I made last year, I am doubtful of Dalton’s Law, that the amount of gas absorbed by water is in the exact proportion of the pressure. We are constructing a new, and I think beautiful, arrangement for testing it, and whatever the results may be they will be worth publishing.

Things are very quiet here. The class numbers 196, and my colleagues are all in the greatest glee.

Would it not be well, as occasion offers, to sound some of the leading practical men in Boston on the subject of our scheme? . . . I confidently think that after taking time to digest courses of lectures on practical subjects, we might even a year hence command immense classes from the ranks of the mechanics, manufacturers and part of the merchants of the city. . . .

My heart is full of confidence, and I look forward with unmixed happiness to the time now approaching when I shall be able to join you in preparing for our common effort and our common engagement in the ample and grand theatre which Boston offers. . . .

University of Virginia, November 3, 1847.

. . . But by and by, my dear Henry, we shall I trust be able, shoulder to shoulder, to win a position in which we may enjoy ourselves in science and socially, free from all anxiety and in a spirit of entire independence. We must be satisfied, for a time at least, with moderate success, and in wise culture and relaxation must seek that happiness which without them, wealth and a brilliant career cannot give. . . .

University of Virginia, December 27, 1847.

. . . Robert and I pass much of our leisure time in the laboratory, where we are busy completing our observations on the solubility of minerals. An inci-
dental result of much interest has disclosed itself since our determination of the great volatility of potash and its carbonate. We now see the reason for the absence of alkali from the ash of coals and lignite. It is dissipated by the intense heat necessary for their incineration; and for the same reason, it is obvious that the usual mode of finding the alkali in plants, by first reducing to ash, must involve serious loss. Powdered anthracite, etc., yield alkali readily by our extemporaneous process with CO₂ water! In this way, too, we can procure it from powdered woods of all kinds. . . .

So volatile is potash that the tache from a drop on platinum is dissipated in two seconds by the heat of the mouth-blowpipe. Lime is scarcely altered, magnesia is enfeebled, soda disappears in thirty seconds, and lithia in half that time. You thus see how different will be the behaviour of the tache from a feldspar, a hornblende, a serpentine, etc. Our experiments are so delicate now, that the solution of the glass of the bottles forms a source of embarrassment, and we are going to use more powder, shorter time and frequent agitation. You spoke in your last of sending an abstract to "Silliman:" I hope you have had time. At any rate, you must prepare an account of your geological matters for the next number. . . .

I form many a delightful picture of our future union in scientific labour. One of the first cares will be to fit up a neat working laboratory with all the more delicate equipments. There we can pursue analysis, and perhaps, if we chose, we might have a few pupils and then we might push on most happily our various matters of research. There are innumerable directions in which discoveries are readily within reach. In these late experiments scarcely a day passes without disclosing some new collateral inquiry, which, if followed, would itself prove the parent stem of others. The wide field of general chemistry is all to be re-explored, and is, I think, a far more inviting
and elevated ground than the organic chemistry which is now so passionately occupying the majority of inquirers. The latter is becoming a complex mixture of facts and mere interpretations, while the greater number of chemists seem, in utter neglect of a sound philosophical logic, to be setting forth mere formulae as the true pictures of natural relations. Berzelius is, after all, among the wisest of them; and Liebig, with all his genius, is, I fear, giving support to much error as well as much novel truth. . . .

HENRY TO WILLIAM.

BOSTON, February 19, 1848.

... The business of framing a new constitution for the Association of American Geologists need not engross much of my time. . . .

I send you the advertisement of the Lawrence Scientific School. I shall watch their progress with interest.

The announcement of the Lawrence Scientific School referred to is dated "Cambridge, February 17, 1848," and is issued by Eben N. Horsford, as Dean of the Faculty. The following paragraphs may be quoted: —

"Candidates for admission must have attained the age of eighteen years; must have received a good common English education, and must be qualified to pursue to advantage the courses of study to which they propose to give their attention. . . .

"The number and choice of studies to be pursued are optional on the part of the students, who will, however, be counselled on these points by the Faculty. Attendance on the lectures and recitations is voluntary. For this, as well as other reasons, the government of the University wish wholly to discourage the resort of young men to the Scientific School who do
not, in the opinion of their parents and guardians, possess that stability of character and firmness of purpose which will ensure a faithful performance of duty without academic discipline."

WILLIAM TO HENRY.

UNIVERSITY OF VIRGINIA, February 27, 1848.

... From the advertisement of the Lawrence School, I judge the authorities are very anxious to invite students to the department. ... If they would put it on a right footing, making the courses numerous, full and practical, and under charge of professors having no other duties in the college, it would by and by command large numbers. ... In a couple of weeks I shall send in my resignation to the Rector. It will create quite a stir and occasion no little regret. Harrison and his wife are quite downcast about it. ...

UNIVERSITY OF VIRGINIA, March 9, 1848.

... This week I shall draw up my letter of resignation, so as to send it to Mr. Cabell, the Rector, some two weeks before the required time. This I do in courtesy to the Board, that they may have the longer interval for choosing a successor. ...

Mr. Rogers duly sent in a formal letter of resignation, and received from the Hon. J. C. Cabell, Rector of the Board of Visitors of the University of Virginia, a courteous reply.

UNIVERSITY OF VIRGINIA, March 14, 1848.

JOSEPH C. CABELL, Esq., Rector of the Board of Visitors of the University of Virginia:

Dear Sir,—I write to notify you officially of my intention to resign my place in the University at the close of the present session. From the nature of my future plans, I have been for some time anticipating
an early removal to Boston, but until recently I had not entirely relinquished the prospect of a somewhat longer continuation at the University, and I have, therefore, abstained from making an earlier communication on the subject.

I need not say how much it will pain me to quit the literary home where, with some cares, I have had so large a share of enjoyment and such valued scientific opportunities. Nor need I speak of my regrets at leaving the circle of friends throughout Virginia whose intelligent regard I have felt to be one of the most grateful of the rewards by which my humble but earnest labours have been repaid. For the last twenty years it has been my privilege to aid in the scientific training of the young men of the State, and it would, indeed, be strange could I contemplate, without strong emotion, a change which, however desirable in itself, breaks up the kind associations which have yearly added to my interest in the intellectual progress to which they are contributing so large a share.

During the twelve years of my connection with the University, I have learned to value more and more the scheme of the organization, the method and thoroughness that preside generally in its halls of instruction, and the enlightened devotion to its interests of the distinguished citizens who form its Visitorial Board.

As I have hitherto deemed it an honour to be numbered among its professors, so shall I continue to be proud of what it has done and is doing for the cause of sound instruction in letters and science; nor shall any interests hereafter make me indifferent to its prosperity, or estrange me from that kind regard for its faculty and governors, which I shall carry with me into my new home.

With great consideration and respect,
Your obedient servant,

William B. Rogers.
FROM HON. J. C. CABELL.

WARMINSTER, April 2, 1848.

My dear Sir,—Your favour of the 15th inst., announcing your intention to resign your place in the University at the close of the present session, reached me on the 24th. I confess that this announcement took me altogether by surprise and gave me great concern. I had regarded you as permanently settled at our Institution, and was not apprised that you had an idea of removal. I am very sure that the regret which you express at the contemplation of the approaching separation is not greater than that felt by myself and the rest of the Visitors and the people of the State, in consequence of the loss which the University will sustain by your retirement. In view of the manner in which the duties of the Chair have been fulfilled, it will be no easy task to find a worthy and satisfactory successor. I cordially wish you success in your labours upon the new theatre of exertion upon which you will soon appear, and likewise happiness and prosperity in all your undertakings.

I am, dear sir, very respectfully,

Your obedient servant,

JOSEPH C. CABELL.

PROF. WILLIAM B. ROGERS.

WILLIAM TO HENRY.

UNIVERSITY OF VIRGINIA, March 21, 1848.

... I have sent my letter of resignation to Mr. Cabell. By this time I suppose he is aware of my purpose. I have also made known the change to all my friends. Harrison and family have been informed of it for a month past. I did not suppose it would produce such a shock as it appears to have occasioned to all to whom I mentioned it. They seem really distressed and confounded. They have valued me even more than I imagined.
FROM HIS BROTHER HENRY.

Boston, March 26, 1848.

... I am also to examine the two tunnels of the aqueduct\(^1\) for the Water Commissioners, a work of two or three days, for a fee of $100; at least, so says Robert's old friend Chesbrough, their engineer. Thus, you perceive, I have at all times a little professional work in prospect. When you come here to live we must have an office and laboratory, and what with such work and with lecturing we can make a very fair income and be our own masters. ...

WILLIAM TO HENRY.

University of Virginia, March 29, 1848.

... Every day brings me some new evidence of the regret occasioned by my resignation. The students generally evince much concern about it, especially my own class, and the very considerable number who expected to be with me the next year. I understand they say my place cannot be filled. Of course I am pleased with these marks of appreciation, but not the less happy in the prospect of my change. I do not doubt we shall do well in Boston. But to be happy we must not be over-wrought or over-excited. Moderate efforts with steady but moderate aims, and a proper appreciation of home enjoyments apart from ambition, will best conduce to our happiness. ... What stirring news from France! Heaven prosper the movement to the best results. ...

University of Virginia, March 31, 1848.

I hope to be able this afternoon to send you a short account of our experiments on the diamond, which were completed with an entirely satisfactory result

\(^1\) The Cochituate Aqueduct.
this morning. But time has not allowed, and as to-morrow will be my day of double work, I shall probably be unable to draw up the statement in question until Sunday. I will at that time give you a brief sketch of our process for the analysis of graphite, with a diagram and some of the results. The procedure for the liquid oxidation of the diamond is the same, but the resulting CO₂, instead of being arrested by PO₅ in a Liebig tube, is passed into lime water. We are quite pleased to find the result unequivocal and striking, and think it will be regarded by chemists as interesting and curious. It is certainly entirely new.

University of Virginia, April 9, 1848.

... I shall lecture for Robert to the chemical class this week (Robert being ill). The subject is easy, — the metals, — and I shall have but two lectures to give. I find lecturing on chemistry a very easy business, especially as I have Robert’s admirably digested notes to aid me. The present little practice will be of service to me. My own course just now is particularly simple, so that you must not fear lest I should be overworked.

On Saturday, James closed his duties by the Address. In Horner’s absence on a proposed visit with Wood to Europe, James is to act as Dean. This will involve but little trouble through the summer, but will give him a good deal to do at the opening of the next session. It is gratifying to see how highly he is appreciated in the institution.

Professor Henry Rogers had, during the winter, made an attempt to secure from the Legislature of Pennsylvania an appropriation which should enable him to publish his final Report. In this attempt he was bitterly disappointed.

ENCOURAGEMENT.

WILLIAM TO HENRY.

UNIVERSITY OF VIRGINIA, April 15, 1848.

... Ere this, my dear Henry, you have no doubt heard from Harrisburg of the fate of the Report. Robert and I have been grieving this morning at the thought that this disappointment will prove much more painful to you than we had at first supposed. The despondent tone in which you close the letter received this morning has given us pain. But is it not almost certain that in another year a wiser legislation will prevail? And even should it not, in a scientific point of view you can reap higher advantages by devoting your time, by moderate and steady efforts, to the production of a systematic work on American Geology. With easy labours of authorship and occasional lectures in the Lowell Institute or elsewhere, and your geological examinations, you will be abundantly employed for the present, and who can doubt, my dear Henry, that before long some more permanent scientific plan will offer itself, in which you or both of us can happily engage. It is true your faithful labours and your unbending uprightness have in many instances been cruelly repaid, but then how much have you won of the love and respect of friends who appreciate you fully, and how strong have you grown in the opinions of men of science and the widening circle of your acquaintance. See, my dear Henry, how much cause there is for cheerful views of the present and for bright confidence in the future. Since this time last spring how great has been our common gain in the almost unhoped-for advancement of James to his present enviable place. To "labour and to wait," the former wisely and moderately, so as to make our tasks a pleasure, the latter patiently and in cheerful hope; these should form our plan. How much of true enjoyment lies before us, especially when we can all more frequently unite in science and recreation. The call for accomplished teachers of science
is daily and rapidly augmenting. In the large cities, and Boston especially, we can surely have abundant employment in this way. Did I not think so I should be really pained to give up my present position.

MR. ROGERS TO MISS LUCY SAVAGE. ¹

UNIVERSITY OF VIRGINIA, May 8, 1848.

... Nothing could exceed the beauty of the gardens, fields and woods around us here. The mock-orange (*Philadelphus coronatus*) is loaded with fragrant blossoms, the honeysuckles of various kinds are filling the air with sweet odours, the locust-trees are hung with clustering flowers of the richest fragrance, and a multitude of other plants are blooming, or preparing to hang out their honours in the sun. Among these the roses are especially full of promise. All day the sound of bees and birds swells delightfully on the ear. How often, dear Lucy, have I wished that you could be here to breathe the warm, fragrant air, and feast your eyes and heart upon the beauty and music of the smiling, happy scene. But you will soon all take flight to sweet Sunny Hill, where like pleasures await you, and where Whalom and Wachusett will smile a sweet welcome on your arrival, and where the harsh eastern winds will not dare to follow you. Thither, by and by, I too will hasten. Will you not listen for the sound of the coach wheels in the evening, as they toil up the gravelly slope of Clarke’s Hill?

TO HIS BROTHER HENRY.

UNIVERSITY OF VIRGINIA, May 10, 1848.

Your view of our future in Boston must, I am sure, be correct. We can find much to do undoubtedly in the line you mention, and I confidently believe we can soon get up a Franklin Institute, or School of Arts, which will be a source of great pleasure as well as

¹ Youngest daughter of Mr. James Savage.
A VIEW FROM SUNNY HILL, LUNENBURG, MASSACHUSETTS
profit. Could we not count certainly on large classes from among the mechanics and merchants to patronize lectures such as we could give on applied science, and science in itself in its more elevated bearings? I am sure of it. . . .

TO HIS BROTHER JAMES.

University of Virginia, May 12, 1848.

. . . We were delighted with your account of the boys and Mary. William 1 will become quite a politician, and no doubt a good Whig, during the Convention. The skill he is acquiring in stenography may be of much use to him and to you also. I have often wished that some one could have taken down my lectures on certain parts of my course; for I find that in the free play of thought during the lecture I strike out occasional new views or illustrations which I am unable afterwards to recover, and which might be of use at a subsequent time.

HENRY TO WILLIAM.

Boston, May 16, 1848.

. . . Letters have just come from Hillard from Paris, where he arrived on the 23d day of the Elections. . . . Of the ability of the French for republicanism I have not for a long while felt any serious doubt. Their political economy is not greatly to be praised, but is our own? In truth, the great science of the adjustment of human labour is but in its infancy, and no country has hitherto legislated at all upon commerce or labour with any light from the profound laws which experience is slowly evolving. Certainly neither England nor New England need boast of any wisdom in this branch of legislation, comprising indeed for the future, directly or indirectly,

1 William Barton Rogers, 2d, eldest son of James B. Rogers, later an assistant to his uncle Henry in the Geological Survey of Pennsylvania.
nearly all legislation. . . . I am at work on the new Rules for the Association, a labour of some responsibility and trouble, as I am writing a few explanatory pages to go into the Circular. I think you will entirely approve of my Constitution, it is democratic, federal, flexible and expansive, progressive, with all the true conservatism these features imply. . . .

WILLIAM TO HENRY.

UNIVERSITY OF VIRGINIA, May 27, 1848.

. . . I see that in my new field I shall have more to do to make my reputation than I had anticipated. My position in the South for the past fifteen years has in some degree spoiled me. For a good part of that time my scientific rank has been fixed, and, as you know, I have been looked up to in Virginia and around as the authority in matters of science. My pride is not obstinate, or I should be concerned at the thought of having to take a lower place and again to work my way up the hill. But I do not doubt that I shall seek happiness in other objects than mere scientific rank or office, and ask only for independence and opportunities of being useful in teaching and research. . . .

HENRY TO WILLIAM.

BOSTON, May 30, 1848.

. . . Remember that at the American Association you will represent both yourself and me. I send you in two or three days the Circular for your suggestions and valued criticism before permitting the printer to strike off an edition. . . .

In spite of his determination to leave the University, Professor Rogers ultimately yielded to the solicitation of his friends in Virginia and the advice of those in Boston, and withdrew his resignation.

1 American Association for the Advancement of Science.
SUNNY HILL, August 14, 1848.

. . . What you say of Edinburgh and its environs in your letter to Mrs. B. touched my heart with a deep sympathy which you can easily understand. Even in this country in my journeyings I have once or twice caught those tones and looks of which you speak, which carried my heart back to the home of our childhood, and filled my soul with holy images of the loved ones that hung over us with such devoted affection. I verily believe, my dear Henry, that in spirit we truly sympathize with the Scotch character. Our philosophy will always take its mould from the closely analytic and inductive forms of the great teachers of Scotland. I can feel and think with a Brewster much more entirely than with a Whewell, or even with a Herschel. I trust, my dear Henry, you will see more of Scotland than in this first brief visit. There I am sure you could soon make good, enduring friends among the men of science. You will, of course, try to see Brewster and Forbes and Jamieson, etc. . . .

On August 4, 1848, Mr. Rogers was informed that the degree of LL. D. had been conferred upon him by Hampden-Sidney College in Virginia.

MERTHYR TYDVIL, SOUTH WALES, August 17, 1848.

. . . In Scotland I saw many of the northern geologists and some interesting portions of northern geology. Jamieson, Hugh Miller, David Milne, Mac- laren, etc., among the men, and Arran, Glencoe, Glen Roy, the Highlands and Edinburgh among the scenes. I was both surprised and gratified to find our names familiar to the Scotch geologists, and really touched when I heard honest praise from Jamieson and others
of your own and Robert's chemical researches. I passed nearly a week in Edinburgh and its vicinity, and visited Melrose, Stirling and other scenes of great beauty. At Glasgow I was hospitably received by Nichol, and went thence to Arran, and afterwards to the Highlands. Among my pleasures in the beautiful and grand mountains of Scotland, not the least was my visit to the Parallel Roads of Glen Roy, and my success in solving the problem of their origin. I shall give my views to the Geological Society, and in my next, if time permits, shall sketch to you my theory. From Scotland, where I felt like a native, who, after a life's absence, had wandered home to his birthplace, I went to London to join Lyman,¹ and came to Swansea.

The meeting of the Association has been one of fair average merit, not a brilliant one by any means. The geological section was somewhat spoiled by Sir Henry De la Beche's presiding; he is excessively prosy and wasted time fearfully.

Phillips has been a zealous and most useful friend, and I shall have a glorious time this autumn in the field with him in Derbyshire, with Ramsay in North Wales, and Oldham in Ireland. De la Beche will give me every facility. Brewster is very cordial and kind, and so is Horner, Lyell's father-in-law. Lyell was not at the meeting, being prevented by the illness of his own father. Murchison is in Italy, and Sedgwick could not come. Sedgwick spoke lately to Hillard of us both in terms of the warmest praise, and I shall make him a special visit at Cambridge. Daubeney was at Swansea, and invites me to Oxford; he remembers you with much kindness. Sir Philip Egerton invites me to Cheshire, and in fact, I have more invitations than I can possibly accept. There are about twelve of us here, at Dowlass Works, in the luxurious mansion of Sir John Guest, and for two or three days we shall have rare sport. Lady Charlotte Guest is a woman of rare endowments and high intel-

¹ Mr. Joseph Lyman, of Northampton, Massachusetts.
lectual powers. We are already organized into sections, and to-morrow I entertain the company on the subject of earthquakes, with blackboard and chalk for my means of illustration. Wheatstone will give us some of his ingenious things, and Brewster is inexhaustible. Layard is here with his portfolio full of wonderful transcripts from the walls of Nineveh! friezes and inscriptions almost rivalling those of the age of Pericles, made by the Syrians eighteen hundred years before Christ.

I am losing the opportunity of a tour through the works, and you must therefore excuse my incoherent haste. . . .

When at Swansea I communed much with Owen, the naturalist. He is one of England’s strongest men, gifted with an amazing perception of the profounder analysis of things. He was very cordial towards me, and I hope to profit by the intercourse on my return to London. I wish him to examine my specimens of Mosasaurus bones. . . .

WILLIAM TO HENRY.

UNIVERSITY OF VIRGINIA, October 13, 1848.

. . . Your last letter has given me and Robert more happiness than I can express. We have repeatedly followed your steps on our good maps, and I have tried to make myself, by reading and charts, more familiar with the Jura and Alps. What a glorious support for our generalization you have acquired in these journeys. I think you must be correct in referring to the Vosges as the great line of disturbance which has determined the form of the flexures. The rocks of that belt are, I believe, the old metamorphic, like our Blue Ridge and the region on its southeastern side. The existence of a great line of fault along Lake Neuchâtel would be interesting as forming a natural terminus to the series of related flexures. Just as is the case of the great lines of fault in southwest Virginia, etc., where the series of folds and
flexures cease with the fault. But in the case you have been examining, the region beyond the fault (the Alps) has been subsequently very greatly invaded and disturbed, while with us the great Western coal-field has remained without disturbance. . . .

We see that the "Chemical Gazette" and Jamieson have republished our paper upon solubility of rocks, etc., but we have not seen anything of the communication on the absorption of CO₂ by sulphuric, which you read for us to the meeting. I am quite desirous that this should come out, as Noad and others have been denying our results, as formerly stated, and the brief paper sent you was, as I mentioned at the time, to satisfy those who were doubting on the subject. . . .

HENRY TO WILLIAM.

PARIS, October 25, 1848.

. . . I have had several interesting interviews with George Sumner, a brother of my friend Charles Sumner. He has been ten years in Europe, is very bright and full of historical and political knowledge, and is able to give me strange revelations concerning men and parties here. Just now all Paris is talking of the great chances there are that Louis Napoleon will be elected the first President; the day of election is set for the 10th of November. He is very weak intellectually, yet formidable from the blind veneration which the peasantry, especially of the south of France, entertain for the name Napoleon. Many people say that after him will surely come a king, Henry V. At present all is pacific in France, and externally Paris bears no marks of its recent turmoils. The National Assembly has finished with the Constitution, and the state of siege is withdrawn, and all without a sensation. My own belief is that France has seen the worst, and that with much political agitation for the next few years, she will gradually fit herself for republican forms, and resume her commercial activity.
HENRY TO ROBERT.

LONDON, November 5, 1848.

... As I stated in my letter to William I went to the Institute and there saw Arago, Pouillet, Dumas and other eminent men. Subsequently, through the kindness of Pentland and De Verneuil, I saw and conversed with Élie de Beaumont, Count D’Archiac, Valenciennes and others. Élie de Beaumont seemed right glad to see me, and gratified me much by the manner in which he spoke of the labours of William and myself in geology, and of the fraternal association of our names. He had read all we have written, and even said, at the meetings of our Association. My reception by D’Archiac was of the same flattering sort. Being occupied on a work of the history of the recent progress of Geology, the first volume of which is in print, he has been a careful student of American Geology, and I found him well informed in relation to our colours, which he seems highly to appreciate, as I had already learned from his friend De Verneuil.

... Not only was it gratifying to find our names well known in Paris by the geologists, it was more so to perceive that the views we have contended for at home, often in the face of a bitter opposition, meet general approval. Thus, our doctrine of flexures being produced by an undulation of the crust will, I feel convinced, meet a prompt reception by the French geologists, even while many of the English may hesitate.

LONDON, December 1, 1848.

I have returned from a visit of four days to Sedgwick, who entertained me in a most hospitable and complimentary manner, at Trinity College, Cambridge. He was delighted with our maps and sections. I dined at his table with Adams, Hopkins, Challis,¹ etc., and had much pleasant chat with them there and on other occasions about our geological generaliza-

¹ An English astronomer.
tions and other topics. I also saw Whewell, who is certainly a Hercules in his way, and yesterday, at the anniversary dinner of the Royal Society, sat between him and Murchison. He asked me concerning some points in my earthquake theory, and I entered into the whole subject. He took a very large view of the question, and pleased me by telling me not to be impeded by Hopkins’s mathematics, for observation and a common-sense view of the mechanism in such a case was infinitely safer than the calculus. He said, moreover, what I had suspected, that Hopkins has passed over greater unexplained elements to seize upon a lesser one, and has been precipitate in deciding that there can be no countervailing conditions connected with nutation and precession. In fact, he thinks the determination of thickness of the earth’s crust, by such a line of argument, quite wild. This gives me new courage, for the geologists have had a superstitious awe of Hopkins’s mathematics, as Whewell says, a lot of “Oxford superstition.”

Professor Rogers, replying to a letter from a parent, asking advice concerning the education of his son, writes: —

TO JOSEPH ALLEN, ESQ.

UNIVERSITY OF VIRGINIA, October 7, 1848.

. . . We have as yet in this country no school of mining and metallurgy, nor can your son procure at any of our universities direct practical instruction on this subject. At Harvard, the Lawrence School embraces a course of practical chemical analysis, and is designed also to include a course on geology, but on this latter subject, I believe provision has not yet been made for instruction in mining and practical metallurgy. At Yale, the laboratory furnishes some facilities, but less ample than those of Harvard. At either of these institutions he could, I think, obtain such a knowledge of practical chemistry as would aid him in
his future vocation, and with this he should unite the
study of mineralogy and geology, which, although not
taught at those places to great extent, or with a
systematic practical bearing, would throw a useful
light on his pursuits. Were I to decide between the
two institutions, I should be disposed to recommend
the Lawrence School at Cambridge. . . .

In the beginning of 1849, Henry had returned from
Europe, and was preparing to give a course of Lowell
lectures on the Application of Science to the Useful
Arts. William writes of himself and his classes to
Henry in Boston.

University of Virginia, January 26, 1849.

Dear Henry, . . . As I get on now with my
classes, I think I shall be able to carry them through
all that is needful in my department before the close
of May, or at any rate, by the first week in June.
The students seem all rejoiced at my coming back,
and are willing to do all in their power to help on the
course. The University has continued perfectly quiet
from the opening of the session to this hour. At
night not a voice is heard to break the general tran-
quillity. The kindest feelings prevail towards the
college authorities. This is a truly gratifying state
of things. . . . I weigh 135 pounds, which is quite a
gain.

Early in March, 1849, occurred the death of Mr.
James Rogers the uncle, some of whose letters have
been given above and who had for some years made
his home with William. In writing to one of the
brothers, William says: “To me his loss is a sad
blow, for he has for eight years past been my constant
companion . . . and I feel truly desolate.”

In May Mr. Rogers received a letter from Pro-
Professor W. B. Rogers:

My dear Sir,—Dr. Bache informs me that you have made an interesting series of observations on thunderstorms, from which it appears that storms of this kind occur nearly at the same time, in patches, along lines extending many miles in an east and west direction. Please inform me whether your observations have been published, and if so, where I can have access to an account of them.

We have commenced our courses of lectures in the Smithsonian Institution, but shall not do much in this line until after the meeting of Congress. The plan we have adopted is that of inviting only those who have distinguished themselves by original research, or those who can speak with authority from their own experience on the subject on which they lecture. Among those by whose assistance we wish to make an impression on Congress, in the way of improving the science of the country, are your brother Henry and yourself. I regret that our funds are so much absorbed by the erection of the building, that we are able to pay scarcely more than is sufficient to defray the expense, say twenty-five dollars a lecture.

I remain, very respectfully, your obedient servant,

Joseph Henry,
Secretary, Smithsonian Institution.

On account of ill-health Professor Rogers applied for and received leave to close his courses at the University somewhat earlier than usual. On June 20, 1849, he was married to Miss Emma Savage, eldest daughter of Hon. James Savage, LL. D., author of the "Genealogical Dictionary of New England;" and on
the same day sailed from Boston for England via Halifax, on the Cunard steamer *Europa*.

**TO HIS BROTHERS IN AMERICA.**

**Liverpool, Sunday, July 1, 1849.**

... Our passage has been without any stormy weather, but excepting two days we have been continually in a thick, cold fog.

You will see in the paper that accompanies this a detailed account of the heart-rending casualty of which we were witnesses on Wednesday last, in the midst of the Atlantic. At a time when the fog was so thick that it was impossible to discover any object at a distance equal to the length of our own vessel, a ship of 400 tons, laden with iron and lead, and having on board 160 passengers, together with a crew of 14, advanced directly towards us. We were moving at the rate of 12 knots, and the approaching ship with all the speed her full-spread canvas could impart. Collision was inevitable, and it took place almost immediately after her sails were discovered from our deck. Our bow entered her a little behind the main hatchway, and, like an enormous wedge, actually penetrated nearly to the opposite side. An awful scene of silent horror ensued. Before the boats could be lowered to rescue the men and women and children crowding the deck, the vessel went down, and in the resistless vortex of waters carried down the greater part of those on board. Out of the whole, only about forty were saved, and of them but one woman, although there were forty women on board! ... It was fortunate that our ship was so stanch at the bows, for the whole of the outer bow, or cut-water, was torn away, and even the main timbers beneath deeply lacerated. But not the slightest injury was done to her framing or butts. For a time, until this was confidently known, there was the most painful anxiety among those of us on board who understood the great
peril in which we had been placed. Excepting this sad event, our voyage has been a very happy one. ... Two or three of the passengers had been fellow-travellers of Henry, and knew me at once by our likeness.

The first sight of the Irish coast, near Cape Clear, and the view of that picturesque shore, as we sailed along and near it for many hours yesterday morning, filled my heart with a pleasure indescribably sweet and sad. I felt that its heathery hills and verdant slopes claimed something of a filial love, and spoke to me in our dear father's voice. God bless and prosper that beautiful but helpless land! We had a most charming run up the Channel yesterday evening and last night; and through the soft haze I this morning saw the bold outline of the Welsh mountains with an interest and delight which you can better imagine than I describe. My own dear brothers, need I tell you that I have more than ever tenderly and affectionately thought of you all. ...

We reached London after a most charming journey. Mrs. Chapman ¹ was expecting us, and had provided a comfortable room in a quiet part of the house. The position, 142 Strand, is good for sight-seeing, and the house is comfortable. ...

TO HIS BROTHER HENRY.

LONDON, July 13, 1849.

... De la Beche has been extremely kind. Buckland gave up all the spare hours of last Sunday to us, and we breakfasted with him, attended service, and heard the wondrous harmony of the Abbey Choir and organ; then were conducted by him over all the Abbey, seeing many parts that are not commonly shown; then lunched with him. He spoke warmly of you. I have seen Playfair and Phillips, Mantell, Morris, Grant, Sowerby and Forbes, but as yet have missed Murchison and Mitchell. On our return from Scot-

¹ Wife of John Chapman, editor of the Westminster Review.
land I hope to see others, and, at any rate, I shall meet them at the Association.

Doubleday has been as kind as any dear old friend could be, and all on your account, my dear Henry. I am quite charmed with the frank politeness and ever active kindness of those we have met.

It has been a source of no small gratification to find our names so well known, and so respected by the men of science. I need no other introductions, and this I have been repeatedly told by those I have met with. One gentleman, Professor Hopkins, of Cambridge, who was with us at the Dean's, and who spoke highly of you, said that we really emulated the Gregories of Scotland, and that it was truly delightful to see four brothers all devoting themselves to science.

What shall I say of this wonderful London! At first I could not take in the impression of its vastness. But day by day, as I have driven from place to place, it has grown upon me, until now I feel truly overwhelmed with the thought of its immensity. And yet it is a cleaner and more quiet place than either of our great cities. With all the amazing activity exhibited in its thoroughfares, there is less noise and less of the feverish driving than you witness with us. People give more time to recreation and do not work so fast as we do. The English character is altogether quieter than ours.

Glasgow, July 19, 1849.

I had the good luck to meet, in Johnston's shop in Edinburgh, with Hugh Miller, who inquired very kindly after you. He is much such a man as I expected to see from your description. Just now he is bringing out a little work designed as an answer to the geological part of the "Vestiges," which, as I suppose you know, is now universally accredited to the pen of Robert Chambers.

Of all the places we have seen, Edinburgh is certainly the most picturesque and beautiful. The eye

could hardly tire of the grand scene before us, as we gazed from our window in Prince’s Street over the deep and narrow valley of the Prince’s garden, to the Castle, crowning with its irregular massive walls and battlements the lofty, blackened crag, and the towering walls of the strange edifices, which extend themselves thence towards the Old City, descending into the dark, narrow avenues of the Cowgate and Cannongate, until they are closed by the old, gray towers of Holyrood. . . .

We are both much pleased with the Scotch.

. . . My dear brothers, I could throw my arms around you in the fervour and fulness of my heart’s love for you. God bless you. Be careful of your precious health. I trust dear Robert will use the season wisely for recreation, and that James will do likewise. I will collect all the information I can for them on chemical apparatus, etc., when I get back here and to London. . . .

LONDON, August 9, 1849.

. . . By the papers I see that great preparations are making for the Birmingham meeting, which promises to be an unusually large and spirited one. . . .

Mr. Clarke [the Rev. James Freeman Clarke] is now here, and will not leave for the Continent, I believe, until next week. . . . We shall regret to part with him, for we have really enjoyed his society since he came to London. But his plan of travel and his objects are so different from ours that our union would only incommode and obstruct both parties. We all went together last night to Astley’s.

I may mention, as a good token in regard to my health, that in crossing Waterloo Bridge I was weighed by one of the convenient machines stationed there, and I came up to 145 pounds! My throat only occasionally gives me any annoyance, and then it is but slight. I expect confidently to go home enjoying better health than I have had for several years, but my throat will still require care.
HEIDELBERG, August 19, 1849.

... I hourly wish to communicate to you fully all the pleasing impressions I receive in my travels through this most delightful region, so beautiful by nature and exquisite cultivation, and so rich in monuments of the past.

Professor and Mrs. Bischoff¹ were affectionately pressing in their entreaties that we would remain longer in Bonn. Von Dechen was absent; Von Buch had lately been at Bonn to attend a meeting of the Naturforscher, at which Bischoff presided, but had left for Berlin before we got to Bonn. Robert and James need not be ashamed of their laboratory arrangements, compared with those of Bischoff, or indeed any others I have seen. Bischoff and Noeggerath repeated several times, with marked admiration, the fact that there were four brothers of us all engaged in science. I find that on the Continent the title of Professor is one of the most valuable I could bear, and that being known as an American is much in my favour. The number of the English we meet in all the boats and hotels is really amazing, and with them is no small sprinkling of our own countrymen, none of whom, however, have thus far proved specially attractive. . . .

We spent the late afternoon yesterday in rambling over the heights, which are occupied by the ruins of the castle, and by its lovely parks and gardens, and enjoying the superb views, afforded from those lofty terraces, of the city, river, neighbouring mountains, and the far-stretching Valley of the Rhine, walled in on the horizon by the blue heights of the Vosges in France. Nothing of the kind could exceed the beauty of the cultivated plain and the mountain slope, called the Bergstrasse, between Frankfort and this place. Indeed, throughout all the Valley of the Rhine and its tributaries, we have had but a succession of pictures, rich with cultivation and abounding

¹ Gustav Bischoff, Professor of Geology at Bonn.
in views combining all the elements of picturesque beauty.

But in this lovely land where the landscape is so smiling, there remain social features which the feeling traveller is called upon hourly to deplore. The people, kind-hearted and simple-minded as I think they are, and intelligent, as they certainly prove themselves, are sadly pressed down by their political institutions, and so strongly have the cords of power, aided by old prejudices, been woven about their limbs, that I fear a long time must elapse before they can place themselves in that erect and fearless attitude for which of late, many have been earnestly but blindly struggling. Nothing I have seen on this side the Atlantic has impressed me so painfully as the continual display of military force we meet with in our travels. All the towns are crowded with troops, chiefly Prussian. Frankfort is at this time occupied by Austrian, Prussian and Bavarian battalions. From every height on the Rhine the ramparts, bristling with cannon and resounding with the rattling drum, frown down upon the peaceful villages, and intimate to the traveller the fears of the rulers and the terrible scenes which are likely to result when the antagonizing elements are brought into actual conflict. Oh, how happy should we be in America, in that security and sanctity of personal rights and free progress which we enjoy!

We are now emerging from the region of almost unmixed Romanism into the land of Protestants. I am not sure that we shall find any great improvement of morals or of social comforts....

We had much rain between Coblentz and Mayence, but were able to keep on deck and see every important site as we passed. The Old Slates, which are so largely exposed from time to time in the lofty hills on either side, reminded me continually of the aspect of our Matinal slate, as exhibited in the valley of Pennsylvania and Virginia, where it is most largely developed, and is barren of fossils. In this long section
the dips, with one or two exceptions, are to S. E., but I discovered an alternation of steeper and gentler dips in that direction, such as I have marked in our folded rocks, and I have no doubt that the whole of this wide slaty belt consists of such folded masses. How curious that here, as with us, these and the other Silurians have a general N. E. and S. W. strike. . . .

I will try to make one or more good sections in the Jura, and as many in the Alps. . . .

TO MRS. JAMES SAVAGE.

GENEVA, September 7, 1849.

. . . I need not say, dear mother, that in all our journeyings and enjoyings we have wished that you were with us, for who could feel more deeply than you the happiness of communing with the beautiful Alpine flowers and the clear rushing streams, or the majestic solitudes where snowy Alps sit girdled by the clouds, or fold their glacier drapery around green valleys musical with tinkling bells or the soft voice of the rude Alpine horn. You will smile at the poetic vein into which my pen is falling, but no one better understands the enthusiasm which such scenes can awaken, and had you been with us I am sure you would say that the highest efforts of the descriptive muse must fail to paint the sublime and lovely scenes through which we have been travelling. Since Emma’s last letter we have ascended the Valley of the Rhone to Martigny, have crossed the celebrated pass of the Tête Noir, and have sojourned for a day or two at Chamounix, where from the chamber window we commanded a superb view of Mont Blanc. The sky was clear all the time, and we saw the snowy slopes of this vast pile successively in the dazzling brightness of sunshine, in the exquisite rose hues of the evening, and in the soft phosphorescence of the moonlight. What pictures there and elsewhere in the Alps have been engraved upon our hearts! . . .
BIRMINGHAM, September 14.

We have been all the morning at the meeting of the Association, and are going by and by to the great dinner, where I suppose there will be much amusement in the way of speaking after the cloth is removed, and when I suppose I shall be compelled to show my Yankee "gift of the gab." We are having a very pleasant time here. The scientific gentlemen are very kind and complimentary, and Lady Lyell, Miss Phillips and others will help to make E. at home.

On our return to London, we shall see Mr. Kenyon ¹ and other friends, and will not again ramble from the great metropolis, except on a short excursion to Oxford and Cambridge. Professors Buckland and Sedgwick, who are here, are very desirous of our making such a visit. . . .

TO HIS BROTHERS.

LONDON, September 21, 1849.

I have now for the first time, leisure sufficient for an account of the delightful meeting at Birmingham. By the last steamer I wrote a hasty line the day after I reached Birmingham, and before I knew much of the affairs of the Association. From the humble but comfortable quarters in which we had placed ourselves, we were soon transferred to the keeping of the city, and were placed in very elegant apartments in the superb edifice of the Grammar School, where most of the sections held their meetings. Here the kindness of Mr. Gifford, the principal, and his wife made us very comfortable. For this very pleasant and complimentary change we are no doubt indebted to the friendly suggestion of Phillips, Lyell and Horner, all of whom have been cordially kind in their attentions to us. Miss Phillips was much with E., and Mrs.

¹ John Kenyon, English poet, 1784–1856.
Lyell and Miss Horner displayed much interest in having her comfortable, and contributing to her pleasure.

No one could have been more warmly and heartily welcomed than I was, not merely by those who personally knew me, but by the scientific men generally, with the greater number of whom I soon became acquainted,—Darwin, Ansted, Ramsay, Mallet, Oldham, Griffiths and, above all, Murchison, Sedgwick and Phillips among the geologists, taking me cordially by the hand. Phillips, Murchison, and De la Beche were throughout generously kind to me, and Lyell and Horner scarcely less so. The chemists were no less hospitable,—Percy, Playfair, Hunt, Stenhouse, Warington, etc., all paid me kind attentions. In the physical section I was rarely able to be present, yet I esteem myself happy in having made the acquaintance of Brewster, Robinson, Adams and Faraday. But let me say a word of my own doings.

On Friday, the day after our arrival (which I regret we deferred so late), I made my début, as I mentioned formerly, in some remarks connected with Murchison’s paper on gold veins. On that night another opportunity of a rather different kind was afforded me of speaking. This was in reply to a toast of Murchison, in which he referred to the corresponding members, naming you in terms of the strongest eulogy, and calling upon me, as Phillips had previously arranged. I made quite a respectable speech, which was often and loudly applauded, and at the close I was honoured by many flattering congratulations from De la Beche, Saboni, Dr. Robinson, the president, Phillips and others. This dinner was truly a grand affair. More than seven hundred were seated in a hall said to be the most spacious and elegant of the kind anywhere in Britain. You may imagine how my heart beat to hear your name so honoured, and to have our labours so warmly eulogized. I sat between Phillips and De la Beche, and near the president.
Forchhammer and Schroeter, of Jena, were also there, but had nothing to say. . . .

"Mallet," above referred to, was the distinguished English engineer, whose son, J. W. Mallet, afterwards for many years Professor of Chemistry at the University of Virginia, was also present at this dinner, and has described Mr. Rogers's appearance on this occasion:

"Although I was but a boy at the time," says Professor Mallet, "attending the meeting with my father, I recollect most distinctly the marked impression made upon the large assembly by Professor Rogers's speech, and the enthusiasm it kindled. It came late in the evening, after much, perhaps most, of the matter appropriate to the occasion had been already utilized by others; yet it was clearly the success of the banquet. Americans were less known in England than they have since become, and the slight foreign flavour which accompanied a speech excellent in itself, and fluently delivered in the mother tongue, added to the piquancy and effect."

Mr. Rogers's letter continues:

On Saturday the members occupied themselves with the various delightful excursions which had been so well planned for them. To Dudley, first to the remarkable ten-yard coal here on end, and then through the caves, or underground quarries, of enormous extent in the limestone, and which Lord Dudley had caused to be superbly illuminated. There in the cavern, while the blue and red lights were glowing in the distance, Murchison delivered a geological speech to some thousands. After escaping unhurt from the crowd and fumigation of the caverns, we passed with

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1 See an Address delivered before the Alumni of the University of Virginia, by William Cabell Rives, June 27, 1863.
the great procession to the base and sides of the Wren's Nest. There Murchison gave another geological harangue in which he again complimented us warmly by name, and called upon me, as a present witness to his Silurian researches. He was followed by Wilberforce the Bishop of Oxford, a truly eloquent speaker, and then I was compelled to mount the stump by a call from Murchison and from all around. . . . After a pleasant collation in Dudley, and sundry amusing adventures, we returned in one of the beautiful canal boats, at eight miles the hour, and were glad to get to bed and forget the pleasures and honours of the day.

On Monday I was chiefly active in the chemical section, sharing in several interesting discussions, for which, luckily, I had facts of interest to state. I gave as one, an account of the gaseous ingredients of our thermal and other springs, in connection with a paper on the nitrogen of springs, read by West, and I communicated in some detail the mode and result of our researches on the solvent action of carbonic acid, water, etc.

On Tuesday I made a communication on the geology of Virginia, specially referring to the features of our great faults. I did not occupy more than an hour, but Murchison, Lyell and De la Beche occupied even a longer time in expressing their sense of the importance of our joint labours. Indeed, they laid on the compliments so thick that I could hardly stand up under them. But it was a real triumph and joy to hear them successively declare that our development of the great law of flexures was one of the grandest contributions to geology ever made, and to find that they gave us the entire and exclusive credit of having thus furnished a clue to the most difficult problems in European geology. This really made me happy and proud, and I only wished, my dear Henry, that you could have been present to share in the enjoyment. You cannot imagine the degree of kindness with which inquiries were continually made after you.
Murchison and De la Beche, Saboni, Sedgwick, Pentland and Darwin are a few of those who repeatedly asked about you, and spoke of the pleasure your visit had given them. I should have named Brewster among the first. He said he had received great happiness from your society. What a charming man is this venerable Scotch philosopher! I could almost have knelt down to ask his scientific benediction....

Wheatstone has marvellous ingenuity. He showed me his exquisite apparatus for making visible all the conditions and combinations of waves, plane, circular, elliptical, and indeed, of all possible forms. It is an admirable thing for the lecture-room, and I intend purchasing one, although it will cost ten pounds....

In the Physical section, Robinson gave an interesting popular account of the late performances of Lord Rosse's telescope, which was perhaps the most attractive thing done at the meeting. Mallet's report on the statical and dynamic laws of earthquakes was able....

WILLIAM TO HENRY.

LONDON, October 5, 1849.

... Yesterday we dined at Playfair's, and had a pleasant meeting with Wheatstone, Lancaster, etc.; to-day I go to dine at Miller's (of King's College), where I shall meet many of the chemists, among them Andrews of Belfast, and probably Magnus.¹...

Since my last to you we have made a short visit to Oxford, indeed this was the cause of my not writing by the last steamer. We were delighted with the quiet beauty of the college grounds, and I felt the conservative spirit of the place sinking into my heart. But how shocked was I to find that the chemistry and botany of the great university was exhausted upon about ten students! Ackland, the anatomist, as well as good Dr. Bliss, Mr. Savage's friend, treated us with

¹ Heinrich Gustav Magnus, Professor of Chemistry and Physics, Berlin.
great attention. We are proposing going to Cambridge to-morrow, and tarrying there until Monday morning. There I hope to see Sedgwick, Hopkins, and perhaps other acquaintances.

After all, our scientific opportunities at home are nearly if not quite as good as they have here. The men of science are poorly paid and work hard, and then they have as a class an inferior social position.

Professor Rogers returned to the University of Virginia in October. Henry was in Boston, and the correspondence of the brothers was resumed.

HENRY TO WILLIAM.

Boston, November 14, 1849.

I thank you for your very kind letter of the 11th, and for your sincerely affectionate words. These are ever to me a source of cheerfulness and consolation, and they seem at this time of double value, coming when my spirit is oppressed with an unwonted sense of loneliness and of life's disappointments. In all hours of trial, in all time of need, your love has given me strength. The faith that some turn of fortune may bring me again to live, as in earlier blessed days, with you and our generous and gentle Robert has for a long while past been to me the one calm star of hope that, when all other beacons have gone out, has never once grown dim. Daily do I take counsel with my heart that it may keep itself worthy of a companionship out of which, if pure, it will derive a peace such as is not in store for it from any other earthly source. That Heaven may shed upon you both, my dear brothers, its sweetest blessings is my never ceasing prayer.

I rejoice to learn that your classes are so large. Yours even much surpasses my anticipations, and as for Robert's, it quite amazes me. . . .

They have filled the chair of Engineering at the Lawrence Scientific School a few weeks ago. Lieu-
tenant Eustis, a former colleague of William Henry Wright, under Colonel Thayer in the construction of the fortress in Boston Harbor, is the professor; he has been of late an assistant professor at West Point. Military engineering is hardly wanted in this community, and something more should be given in the Scientific School of the applications of physical science, than even civil engineering. . . .

The "Warren Club," now called the "Thursday Evening Club," has begun its meetings.

The Club here referred to, has long been one of the best features of Boston life. It meets at the houses of members on the first and third Thursday evenings of every month from December to April. It is composed of gentlemen of literary and scientific tastes or acquirements, and embraces in its membership professors, authors, scientific men, and leaders in affairs. Literary and scientific essays constitute the chief interest of the meetings, although the social element is not neglected. The club was founded by Dr. John C. Warren, and named in his honor. He was succeeded in the presidency by Edward Everett. On the death of his son, Dr. J. M. Warren, who followed Mr. Everett, Mr. William B. Rogers became its president.

WILLIAM TO HENRY.

UNIVERSITY OF VIRGINIA, December 16, 1849.

. . . What a scene is this our law-makers at Washington are presenting! Surely the people will punish the factionists for the danger which their passion and party feeling are threatening to the country! . . .

There is great excitement growing up in the South, and I fear there will be great passion thrown into the debates of the coming Congress by both sides. But as yet I have no fear of the integrity of the Union.
HENRY TO WILLIAM.

Boston, December 22, 1849.

... I had the pleasure of making a few very agreeable acquaintances when in Providence, among whom I deem Dr. Wayland a valuable accession to my list. I stayed this time, as before, with Zachariah Allen, a very enlightened manufacturer and a trustee of Brown University. Dr. Wayland dined with me the first day, and next day (yesterday), I dined at his house with Professor Caswell. Wayland is intent upon some valuable and important collegiate reforms, and his views are shared by Allen and a majority of the trustees. They contemplate an entire reorganization of their college, introducing much more science and practical instruction, less Greek, etc., and adopting some of your system. Wayland is tired of the old monastic system, and is wishing to see the colleges more like our ideal School of Arts, if they cannot be true universities. I have nowhere found a more enlightened and independent thinker than Wayland. He has great native strength which has enabled him to get himself free from many early trammels. You would be greatly interested in his views.

I think the time is nearly at hand for an important revolution in this whole matter of collegiate education. The old institutions with their vast funds, educating youth at enormous expense, yet fitting them for nothing truly useful or calculated to advance the age, must soon meet the rivalry of institutions which will embody modern ideas.

Wayland much wishes a copy of your exposition of the system, etc., at the University, Memorial to the Legislature, and any documents or notes of your own having a bearing on the subject. He has had a copy and lent it to some of his trustees, and it may not suffice for his wants just now, therefore send him another. I wish you and I could together put our

1 President of Brown University.
thoughts on paper, — we need not just now print, — on this whole subject of the sort of collegiate institution which would best suit the true wants (I do not mean the conservative wishes) of the United States, or rather of New England, where we might show what departments of human knowledge in especial should be taught, and next, how taught. We should find most willing readers in Wayland and Allen and their friends. Now, or soon, I conceive to be the fitting time.

Dr. Wayland and Mr. Allen visited the University of Virginia in 1850, and were the guests of Mr. and Mrs. Rogers. Dr. Wayland afterwards published a Report which “is said to have marked an era in the history of collegiate education in America.”

WILLIAM TO HENRY.

University of Virginia, January 13, 1850.

. . . Have you seen Henfrey’s “Outlines of Structural and Physiological Botany”? It is an admirably compact little work, posting up the subject to the latest microscopic researches. Is it not odd that comparative anatomy here succeeds without owning or using even so much as a pocket microscope? . . .

The proposition is again before the legislature in Richmond to appoint an agricultural chemist and mineralogist for the State, to make analyses of soils, etc., and deliver lectures in the counties as well as make annual reports to the government. Some of the folks in these parts have wonderful faith in agricultural chemistry, believing that if they once know the composition of their soils, they are sure to be able to make their land and themselves rich. Liebig with much good has done some harm. The agricultu-

1 Thomas Jefferson and the University of Virginia, by H. B. Adams; U. S. Bureau of Education: Circulars of Information, No. 1, 1888, p. 131.
ral problem, so far from being solved, is only beginning to be properly investigated. Is it not true that the problem combines all the difficulty of the most complex chemical, with the most obscure physiological questions? Is it not as difficult, or more difficult than the medical problem? . . .

HENRY TO WILLIAM.

BOSTON, March, 1850.

... I am also busy as Chairman of a Committee for ventilating the Natural History Society's rooms. . . . For a man of any brains whatever, Boston has no peace or quiet, all is restless excitement and unproductive change of thought and of pursuit. The overworking of the brain here without the fruits of intellectual labour is appalling to a mind of contemplative tendencies. Often do I envy you and Robert your calmer studious atmosphere. . . .

WILLIAM TO HENRY.

UNIVERSITY OF VIRGINIA, April 18, 1850.

... Dr. Wayland and Mr. Allen arrived on Tuesday afternoon and remained with us until Wednesday night. Dr. Wayland attended all the morning lectures on Wednesday, as did Mr. Allen also, and both expressed themselves as greatly pleased with our system. They appear quite determined to adopt our more liberal features in their new scheme. They spent their time chiefly here and at Robert's, and were evidently much gratified by the welcome we gave them. The members of the faculty called upon them, and were much struck by the intelligence and large views of Dr. W. On the whole I am satisfied that our guests have carried away with them much encouragement for their plan of reform, as well as valuable guides in conducting them. Robert and I had a great deal of pleasant talk with both gentlemen, especially with Dr. Wayland, and were charmed by
his liberal and expansive spirit, as well as his remarkable clearness of head. He spoke frequently of you and always with much commendation. ... Some days ago I received a letter from Mr. Joseph Cabell written informally in behalf of the directors of the James River and Kanawha Company, requesting me to make a geological examination of the mountain belt in the Allegheny from near the Sweet Springs across to the north of Greensboro, etc., with a view to decide upon the feasibility of placing there large feeders for the canal, which is designed to pass through that belt. You know this is Mr. C.'s hobby, and he urges me strongly to undertake the work next summer.

TO HUGH MILLER.

UNIVERSITY OF VIRGINIA, May 6, 1850.

To HUGH MILLER, Esq.:

My dear Sir,—My friend Professor Hitchcock hopes to meet with you while in Scotland, and as I have already had that good fortune, I am proud of the opportunity of giving him a line of introduction to you. His name is, I am sure, well known to you in connection with American geology. Our New Red sandstone has borrowed from his able researches an interest somewhat akin to that which your eloquent revelations have imparted to the Old Red of Scotland. I do not doubt that the author of "Footprints" will find in the explorer of "Bird Tracks" a congenial mind.

With many thanks for the pleasure I have had in reading your last work, and with the kindest wishes, I remain,

Very truly yours,

WILLIAM B. ROGERS.

1 Reference is made to this visit of the authorities of Brown University in A Memoir of the Life and Labors of Francis Wayland, D. D. and LL. D., by his sons, Francis and H. L. Wayland, pp. 92 and 93, N. Y., 1867.
TO HIS BROTHER HENRY.

UNIVERSITY OF VIRGINIA, May 12, 1850.

... Professor Froebel stayed with me the two days of his sojourn here. He won the sympathy and regard of all of us. How much he has lived in a short life, and how truly does he deserve respect and honour for the spirit in which he has devoted himself to a good cause. He impressed us as a high-aiming, earnest, single-hearted man. Robert and I, you may be sure, did all we could to make him happy while here, and I gave him such directions as might aid him in his present inquiries. ...

The following letter gives glimpses of Newport life and of Henry Clay:

TO HIS BROTHER HENRY.

NEWPORT, August 12, 1850.

... Every spot in and about Newport is crammed with visitors, for the most part very transient ones. We have been here only nine days and feel like old residents. Mr. Clay is at our hotel—much observed, but trying to keep quiet. Henry Tuckerman, of New York, whom I meet daily, has made many kind inquiries after you. The Nortons have a cottage near us, and the two Miss Guilds are now there. The Wormleys and Bruens have cottages hard by, and many other Boston folks whom you would doubtless know, but I do not. ...

Clay holds a levée every day for an hour or two from twelve o’clock, and they say on these occasions takes the opportunity of kissing all the good-looking girls that present themselves. I believe a majority of his visitors are women. ... I have seen no men of science amid the crowd.

1 Julius Froebel, a German traveller, nephew of the founder of the kindergarten system; in search of lands in the United States suitable for German emigrants.
Yesterday afternoon Emma and I had a delightful ramble along the cliffs, gathering seaweed, of which the variety here is truly wonderful. . . . What superb sunsets are visible here. I have never seen finer, even in Virginia. . . .

The following are comments on features of New England geology:

TO HIS BROTHER HENRY.

UNIVERSITY OF VIRGINIA, January 5, 1851.

. . . The impressions from Greenfield are unquestionably Lycopodites uncifolius, or a form generally the same. I am not yet prepared to say whether these impressions are all of one fern or belong to two. But some of them I cannot distinguish from Lindley’s and Hutton’s figures and descriptions of Lyc. unc., which occurs in the Yorkshire Oölite, and with more delicate foliage in Chesterfield coal rocks. Take the largest-leafed specimens from Chesterfield, and the smallest from Springfield, and there is the closest resemblance. The fossils left me by Werth are truly superb. They are Pecopteris, etc., bearing a strong family resemblance to those of the Jura in Sternberg, and Oölite in Lindley and Hutton, but excepting a magnificent frond of Pecopteris Whitbyensis (the English fossil), a foot square, they will require new names. When you are next in Boston I will get you to make a short communication on these subjects to the Natural History Society.

UNIVERSITY OF VIRGINIA, February 24, 1851.

. . . While I was in Richmond the Governor expressed to me a strong desire to have a beginning made in the publication of my final Report. He has very just notions as to the scale on which it ought to be done, and says that he will be glad, in his next annual message, to bring before the Legislature any
scheme I may suggest for engraving and publishing, and for revising the work in various districts of the State. He is now employing a draftsman to compile the materials of a better state map from the numerous surveys of railroads, turnpikes and other improvements. This is a proper beginning.

We passed a little more than three days in Richmond, and were very kindly entertained at Mr. Brown's. The Reform Convention is in session, and has entered on the discussion of the basis of representation which is hereafter to be established. All west of the Blue Ridge urge the white basis as indispensable. The eastern members insist on what they call the mixed basis, in which every five blacks are equivalent to two white men. It is difficult to see how the parties can make any compromise, and it is apprehended by some that the Convention will adjourn without settling the matter. There is a large mass of mediocrity in this body, but I believe a good deal of practical sense and much of a reforming spirit. . . .

Have I told you before of the excitement which Johnson created at Raleigh by a lecture before the Legislature, in which he extolled the value of the coal fields and other mineral resources of that State? The Legislature, on the strength of these representations I suppose, has organized a geological, botanical, etc., survey, appropriating $5,000 per annum for the purpose. He computes the number of cubic yards of coal at 365,000,000! by taking the distance between the two most remote parts where coal has been found and multiplying this by the breadth of the sandstone belt, counting the coal as continuous and four feet in thickness! Is not this a bold stroke? The only distinct fossil I have yet made out in this region is *Equisetum columnare*, one of the characteristic forms in Chesterfield. I have no doubt that these rocks are of about the same age. . . .

In a former letter you spoke of some saurian remains found in the Mesozoic of Pennsylvania, now in
Leidy's hands. The little conical curved tooth which I found some years ago in the sandstone of Chesterfield was at the time broken in the attempt to take it out. I have the small fragments. Perhaps a section under the microscope would give useful information. I remember that I thought it most like a tooth in Brongniart, from the Lias.

University of Virginia, March 8, 1851.

I am now holding my intermediate examination. We have been seven hours in the lecture-room, and some of the slow ones have so much work remaining that I fear I shall not be released for an hour or two longer...

Have you seen Maury's paper on the subject of Winds, recently published as an appendix to the Washington Observations? He has snatched at Faraday's discovery of the magnetism of oxygen to make it the basis of a wild dream as to the cause of spiral storms or currents of the air. I cannot imagine why he has published anything so unripe as this...

University of Virginia, June 2, 1851.

... What you say of the Canadian fossils is very remarkable. Surely we have not yet reached the lowest horizon of life. I cannot believe that it began in forms so developed...

University of Virginia, June 23, 1851.

... Whatever may be the age of the limestone at Burlington, Vt., which in my notes I describe as looking like a Levant rock, I cannot believe that the Berkshire limestone is of that age. Indeed, I am sure that the two are in entirely different belts. That of the Winooski is a prolongation of the belt near Whitehall, which, as you know, is much to the west of the trend of the Berkshire belt. The latter is in a line with the limestone of Rutland in Vermont, which lies immediately at the western base of the Green Mountains.
I feel with you, my dear Henry, the importance of our being able to renew our attention systematically to the comparison of our Palæozoic formations in order to secure justice to our previous labours, and to make our nomenclature acceptable. . . .

FROM HIS BROTHER HENRY.

BOSTON, March 13, 1851.

. . . Will the Smithsonian Institute do anything truly useful through the telegraph in studying the laws of our weather? What a noble field, what a chance for some one placed, we will say, in Philadelphia or New York, at one of the great ganglia of these nervous chords, to work out, day by day, the wide oscillations of weather and all the atmospheric conditions, to have a newspaper containing only the telegraphic news, and a department devoted to weather, with stereotyped map of the United States and Canada, on which the distribution of the various winds, etc., say at noon, for each day, might in four hours' time be given to the public. This will be done, I prophesy, in less than seven years. . . .

TO HIS BROTHER HENRY.

SUNNY HILL, September 16, 1851.

. . . I believe the new Harvard professors of Latin, rhetoric and chemistry have entered upon their duties. From James I learn that the students are greatly pleased, because, for the first time, they are shown some chemical experiments. Last year they committed the chemistry to memory! . . .

UNIVERSITY OF VIRGINIA, October 26, 1851.

. . . How I long, my dear brother, for a daily communion with you. I always catch from you fresh spirit for research, and it seems to me that we are both greatly benefited by the stimulus of thought which each of us can best apply to the other. . . .

1 James Savage, Jr.
University of Virginia, November 6, 1851.

... I have just been contriving a little instrument which, with a single mirror, gives the effect of Wheatstone's stereoscope. By and by I will send you an account of it, as I think it is new and curious.

University of Virginia, November 17, 1851.

... I believe I mentioned in my last that Hackley of Columbia College, N. Y., paid us a visit some time ago. He mentioned to me that Renwick would soon vacate his place, and he made some remarks that looked as if he had been thinking of me for the situation. The institution is magnificently endowed, and there is talk of an enlarged plan. At present the professors are better paid than anywhere else north of the Potomac, and according to his account, have light duties. If you have a chance in New York, make some inquiry about this.

I am beginning to make arrangements for the Smithsonian lectures. I shall take with me some simple means of exhibiting the prominent properties of all the constituents of the air. Robert and I have constructed a very nice instrument for endosmose, and one for burning a jet of atmospheric air in hydrogen.

University of Virginia, December 26, 1851.

... I feel quite troubled on account of your perplexity in regard to help in your survey, and most earnestly do I wish that I could point to a suitable assistant. You will find it next to impossible, I think, to find any one person uniting all the qualifications you desire. But I would, at any rate, not seek for such abroad. ... I do not know anything personally of Mr. Brush, but I have seen some chemical analyses of his in the "Journal of Science." In the number

1 George J. Brush, formerly Professor of Mineralogy and afterwards Director of the Sheffield Scientific School of Yale University.
for November, 1850, is a good paper on American spodumene by "George J. Brush, of Yale University." This, I suppose, is the same person. In previous volumes he has published analyses of albite, etc. He is no doubt fully acquainted with chemistry, general and analytical, as well as with mineralogy and goniometry, and has, I presume, had the Yale training in geology. I suppose you especially need just now one who has skill in geological drawing and such knowledge of structure as to be able to put together the materials of the summer's work. . . .

You ask what is thought of Kossuth's cause in Virginia. I hear but little of it. But our neighbours at the University are disposed to depreciate him, and are entirely opposed to his advanced policy. Indeed, this seems to be the prevailing opinion throughout the State. The Whig papers are decided in denouncing any departure from the neutral policy of our government; and the Democratic papers, although they express a stronger sympathy with Kossuth's objects, agree with the others in sustaining the necessity of a neutral course. I have no idea that he will obtain any action from the government or from the people which will compromise this country in European troubles. Still, I think his presence in Washington will create a powerful impression. How can it be otherwise? Is he not a sublime man, one whose faculties are equal to the sublimest mission that mortal ever undertook? His presence will do our country good, and not harm, as some apprehend. But the interests of liberty will be best advanced, I think, by an adherence on our part to the neutral policy. By and by when we are stronger, and when the masses of Europe are better prepared for a permanent change, and therefore stronger for the contest, our intervention joined with that of England will suffice almost peacefully to secure the right.

What a curse to France is hero worship. How artfully does the usurper in his proclamation carry his
countrymen back to the institutions of government planned by the first consul. But can it be that the great empire of France will tolerate the usurpation? The army in Paris may for a time repress the public indignation. But must it not at last hurl the usurper from the presidency? I am most impatient to hear the course and result of the election. . . .

UNIVERSITY OF VIRGINIA, January 6, 1852.

I observe that Dr. Kane, of the Arctic exploration, is lecturing in the Smithsonian upon the history of their voyage and the Arctic phenomena, and I am glad he succeeds so well, for I have much respect for his manliness and generosity of character. . . .

As far as I can learn there is here far less sympathy with Kossuth's cause, and more decided opposition to his proposed national action than in the Middle or Western States. This is greatly due to the prejudice created by the prominence of the abolitionists in New York in doing him honour, but it is also the natural result of that conservatism which of late has become the strong feeling of the politicians of the South, a feeling which could not fail to spring up in antagonism to the aggressive philanthropy of other parts of the Union. The result shows how deeply these feelings operate, since from the excitable character of the South, and its great admiration for eloquence and chivalrous daring, Kossuth is a person for whom, under other circumstances, an unbounded enthusiasm would be aroused. As it is, I cannot imagine how any one who reads his speeches can fail to do reverence in his heart to the truthful and magnetic soul that pours out its prayer for sympathy, and pleads for the brotherhood of nations in language so touching and sublime. How I wish to see and hear him. Perhaps in Washington we may enjoy that opportunity. . . .

Early in January Mr. and Mrs. Rogers went to Washington, where Mr. Rogers gave before the Smith-
sonian Institution a course of four lectures on "Phases of the Atmosphere."

TO HIS BROTHER HENRY.

UNIVERSITY OF VIRGINIA, March 5, 1852.

... I have come to just the same conclusion as you in regard to Espy's labours. Some weeks ago I received a letter from Mr. Stanton, of the House of Representatives, desiring my opinion of his reports as to their practical and theoretical value, and before replying I had to look them over with some care. It gave me real pleasure to be able to say to Mr. Stanton that they contained a large amount of meteorological data skilfully tabulated so as to present to the eye a number of important partial generalizations; that I believed the dynamical theory proposed by Mr. Espy brought to light a cause of atmospheric disturbances never proposed before, and which probably had an important agency in their production; that his views were thoroughly philosophical, and that whatever variety of opinion might exist as to his theory as compared with others, Mr. Espy deserved great credit for the researches which he had embodied in the Reports and other works, which were a really precious contribution to meteorology. I really think that Espy has shown more power of philosophical analysis than either Redfield or Reid. It is surely a higher aim, that of demonstrating the great dynamic cause of storms, etc., from preestablished physical principles, than merely to determine the lesser inductions regarding them, such as their rotary direction, etc. I think with you that Espy's views must be taken along with the rotary doctrine, or perhaps it may be found to explain the rotation. It is a very difficult subject, but hereafter I am determined to speak out in behalf of Espy's merits as a thinker and investigator. I hope they may continue him in his present place. The question was to be brought up, and on this account Mr. Stanton wrote me. ...
ROBERT TO HENRY.

University of Virginia, March 14, 1852.

... We have seen a notice of a meeting of some scientific men at Albany, connected with the organization of a university there, but have learned none of the details. Agassiz, Peirce, Gould, Hall, Porter and others were there, and were spoken of as intending to take part in its organization. ...

Indications now appear in the correspondence of the brothers that James was in failing health. On April 1, 1852, William wrote to Henry concerning him, but expressed no special anxiety, although he recommended that James be urged to take an ocean voyage. A month later a change for the worse had occurred, and the brothers William, Henry and Robert began to feel the gravest apprehensions.

It was soon discovered that Professor James Rogers was suffering from Bright’s disease; and he died on June 12, 1852, in the fifty-first year of his age.

WILLIAM TO HENRY.

University of Virginia, June 20, 1852.

... The day after receiving the sad news from you and Robert, I wrote, as well as I could, to Rachel, and intended writing to you, but I had not the power to do it. My mind for weeks past had accustomed itself to the contemplation of the sad result which has occurred, and the news of our dear James’s departure, terrible as it was, was less overwhelming to me than I could have supposed it would be. But I feel that my heart can never forget this sorrow. In active occupation with books, and with preparations for the closing session, I endeavour to withdraw my thoughts from the sad theme. ... But do not think, my dear Henry, that I give way to sorrow, or that I do not
feel in all their force the views of affectionate duty suggested in yours and Robert's letters.

Those who have followed the history of the four brothers thus far will perhaps have been sufficiently apprised of the career of the eldest, James, who was now deceased; but the following brief summary of the facts already recorded may be given here.

James Blythe Rogers, the eldest of the four brothers, was born in Philadelphia, on February 11, 1802. He was educated in Baltimore, Md., and at William and Mary College in Virginia. He studied medicine, and received the degree of M. D. in Baltimore in 1822. After practising medicine for a time in Harford County, Maryland, he was chemist to a firm of manufacturing chemists in Baltimore, and subsequently lecturer on chemistry in Washington Medical College, Baltimore. He was later professor of chemistry for four years in the Cincinnati College, and also served as an assistant to his brother William, then State Geologist of Virginia, upon the geological survey of that State. In 1840 he became a permanent resident of Philadelphia, serving as Professor of Chemistry, successively, in the Philadelphia Medical Institute, the Franklin Institute, and the University of Pennsylvania. The last-mentioned position he held at the time of his death. He left a widow, two sons, and one daughter. A "Memoir of the Life and Character of James B. Rogers, M. D.,” by Joseph Carson, M. D., was published in Philadelphia in 1852. A good account of his life and works is also to be found in a pamphlet entitled, “The Brothers Rogers,” by W. S. W. Ruschenberger, M. D., Philadelphia, 1885.

The vacancy caused in the faculty of the University of Pennsylvania by the death of Professor James
Rogers was filled in August by the appointment of his brother, Robert,\textsuperscript{1} who resigned his position in the University of Virginia to accept the vacant chair in Philadelphia.

To the professorship resigned by Robert was appointed Professor J. Lawrence Smith, a chemist of distinction, who brought to the University, as assistants in his private researches, Mr. George J. Brush, now Director of the Sheffield Scientific School of Yale University, and Mr. Ogden W. Rood, now Professor of Physics in Columbia College, New York.

\textbf{WILLIAM TO HIS BROTHER HENRY.}

\textit{University of Virginia, October 24, 1852.}

... Dr. Smith has not yet got fully under way with his duties. His assistant arrived some days ago. He and the Dr. and his wife are still staying with us, but will probably, to-morrow, remove to their own quarters. Young Brush is a zealous mineralogist of the Yale school, and seems to be familiar with all parts of chemical analysis. He talks a great deal and very admiringly of young Silliman and Dana, and I find that he supposes New Haven to be the great centre of American science. Dr. Smith is evidently much attached to the same persons and locality. ... I think he is an independent man, and I see that he is ambitious to advance himself by actual research. He will, I am sure, be open, fair, and direct in all his scientific dealings. ... He has yet to learn that with large classes, in our system, he will be compelled, or at least expected to devote just as much time to teaching as Robert was accustomed to give, and that he cannot have much leisure for his own researches. I am doing what I can to direct him rightly in his plans. ...

\textsuperscript{1} Robert E. Rogers was already a member of the Academy of Sciences, and the Franklin Institute, of Pennsylvania.
It grieves me to hear of the failure of that good cheerful, faithful friend, our gray horse. How strangely thoughtless are many persons of this most precious of servants! . . .

I am truly concerned on account of Horner's precarious health. He is a conscientious, good man, simple-hearted and faithful to his duties. It will be much easier to find a more brilliant lecturer than it will be to find as honest and true a man.

Our classes here have now mounted to about 390, so that we are quite certain of passing the 400. . . .

The year 1852 was marked by a recurrence of the cholera.

FROM PROFESSOR S. F. BAIRD TO MRS. ROGERS AT SUNNY HILL.

CARLISLE, July 23, 1852.

MY DEAR MRS. ROGERS,—I write to you for the sake of greater certainty in sending my letter to the Professor. . . . My object is to know from him his views as to the propriety of postponing the Cleveland meeting of the Association in case the cholera should increase to any extent. There have already been several deaths there, and no decided abatement as yet. I have written to the committee at Cleveland, for its opinion, but in the mean time would like the Professor's views.

Even if the real danger of cholera be slight, yet the apprehension may keep away some of the best members. A political meeting to be held at Columbus on the 22d of August has been postponed on this account. . . .

WILLIAM TO HIS BROTHER HENRY.

UNIVERSITY OF VIRGINIA, November 28, 1852.

. . . You will see in Saboni's address a reference to quite an important discovery of Stokes,\(^1\) the mathe-

\(^1\) Sir George G. Stokes.
matician of Cambridge. He finds that the invisible rays beyond the violet are converted into blue light by transmission through a compound solution of sulphate of quinine. Have you not noticed the peculiar blue colour of the upper film of this solution viewed in certain directions? I have been to-day examining the alcoholic solution of chlorophyll formed by adding this liquid to the bruised leaves of our common running box. When you look obliquely down upon it in certain lights, the liquid, although of a clear and intense green, appears reddish brown and opaque, and in almost every light the upper film appears of this colour. This is another case of the alteration of the refrangibility of the rays by the medium, according to Stokes. I find the red and the yellow colouring matter of the autumnal leaves to be so far quite unaltered. The delicacy of the former as a test for alkalies is, I think, very remarkable, and the reaction is beautiful. I will send you some to try.

FROM HIS BROTHER HENRY.

Boston, December 16, 1852.

... Have you read in the "Journal of the Geological Society" the controversy between Sedgwick and Murchison, touching Silurian and Cambrian? I think our friend Sedgwick has all the philosophy and the justice on his side, yet, through our fault of procrastination in publishing, he has allowed Murchison to encroach on his whole ground, and to secure a sort of title by mere priority of occupancy of what is not his. As we must commit ourselves to one side or the other, if we use the European equivalent nomenclature at all, we ought now to study the whole matter and make up our decision. I wish much to learn your views. Sedgwick's beautiful classification and nomenclature of the British rocks is infinitely better in harmony with our American Palæozoic Geology than Murchison's. He calls all the Palæozoic one system, and
terminates the Cambrian with the Caradoc, just where we would draw our strongest equivalent line, being at the top of our Matinal shales.

Sedgwick's Cambrian series takes in then our Primal, Auroral and Matinal series; the Silurian, etc.,—he insists on restricting it,—our Levant, Surgent, Scalent and Pre-meridian; the Devonian, our Meridian, Post-meridian, Cadent, Vergent and Potent.\(^1\) Certainly on this side the Atlantic the formations approximately equivalent to the Cambrian and Silurian are as much separated by their fossils as are the Silurian from the Devonian, either in Europe or here. But all this geographical nomenclature will pass away in time. The ablest geologists are feeling doubts of the identification of strata, across wide spaces, by fossils.

WILLIAM TO HENRY.

UNIVERSITY OF VIRGINIA, December 25, 1852.

I cannot let the mail set off on its journey northward without committing to it a word of Christmas greeting. My heart longs more than I can express for the coming time when we may all spend together, as in our childhood, these festival days, and when we shall always be so near as not to feel the sense of separation. How much of true happiness is yet in store for us, my dear brother, when we shall thus be reunited. The sad thought of dear James's absence from among us is the only shadow in this happy prospective. . . .

From what I hear, I suppose that Columbia College may, ere long, be extended upon the plane of a great university. Merely collegiate establishments do not prosper in any of our large cities.

The reference here made to Columbia College was due to the fact that Professor Rogers had lately received from Dr. King, then President of Columbia,

\(^1\) For a note on this nomenclature, see Appendix to vol. ii.
a circular letter relating to a proposed extension of that college upon university lines.

WILLIAM TO HIS BROTHER HENRY.

University of Virginia, January 7, 1853.

... When you have time read a paper in the December number of "Philosophical Magazine Supplement," by Helmholtz, on the "Theory of Compound Colors." It is the continuation of a critical review of Brewster's analysis of the spectrum. Helmholtz proves beyond question that the reduction of the colours to the three, blue, yellow, and red, cannot be maintained. In a word, he points out the fallacies in Brewster's observations. But strangest of all, he shows that blue and yellow, when pure and of proper intensity, form not green but white.

I send you the means of making this experiment at once. Take a small slip of thin clear glass like a microscope slide. Hold it erect upon the flat surface of black paper or the cover of a book, place the blue paper behind it at B, and the yellow in front at Y, then look obliquely through the glass, and by a little trial of position, you will see the yellow superposed on the blue to form a pale white spot. Looking more steeply, and thereby getting a fainter blue and more intense yellow, the spot appears palish yellow. But in no case do the two tints, when superposed, produce any shade of green. This, I think, a capital new fact. The green formed by the mixture of the yellow and blue pigments is due to light transmitted from some little depth.

Have you tried Stokes's experiment with the solution of sulphate quinine? — remember to add a few drops of $SO_3$, and make the solution very dilute.
Until I found the effect of the \( \text{SO}_3 \), I could not get any striking phenomenon. . . .

**University of Virginia**, January 18, 1853.

. . . I regret very much that last summer I was not able to pause in New York to see one of the working engines of Ericsson's new construction. How absurd the little *caloric engine!* But is not his a superb triumph? and yet how simple and entirely known the principle. I am waiting impatiently to have the details of the engine, for in this consists, I think, all the intellectual merit of the triumph.

**Richmond**, February 16, 1853.

. . . My lectures have been marvellously successful. I have had all the best intelligence and refinement of Richmond to hear me, and such has been the interest taken in the lectures that after the first, which was a full hour, the throng has been so great that half an hour before the appointed time of beginning, the room has been completely packed with people, and it has been necessary to stop the sale of tickets and close the doors. I have never seen so interested an audience, and I have been really touched to see how universally my old friends and acquaintances here have turned out to bid me welcome. Even old Mrs. Wickham, Mrs. Bruce, old Judge Robertson, and such have come forward to greet me. . . . Until now the lectures at the Atheneum here have failed to pay expenses, and this year they had barely paid for the gas and the servant. . . .

**University of Virginia**, March 5, 1853.

. . . I find that I am in bad luck in regard to my matters of original thought, for in a recent number of "Poggendorff," just received, I see a long article on *irradiation*, coming very close to my results and explanations, although these, you know, have been familiar to me for the last ten years at least. So much for tardiness and timidity in putting into print. I have
been teaching these matters in my lectures here for at least ten years. I want you to make a sketch in pencil of the appearance of a star or distant lamp, 1st for each eye separately, and 2d as seen when both are open. There is a remarkable difference in the appearance as perceived by different persons, and even by the right and left eyes of the same individual. I wish to collect a considerable number of specimens.

I think this spoke-like irradiation is produced by the influence of certain rays from the edge of the iris, which is thicker and wider than the pupil, and therefore makes the rays stretch farther over the retina. In this and some other points I am not anticipated by the German.