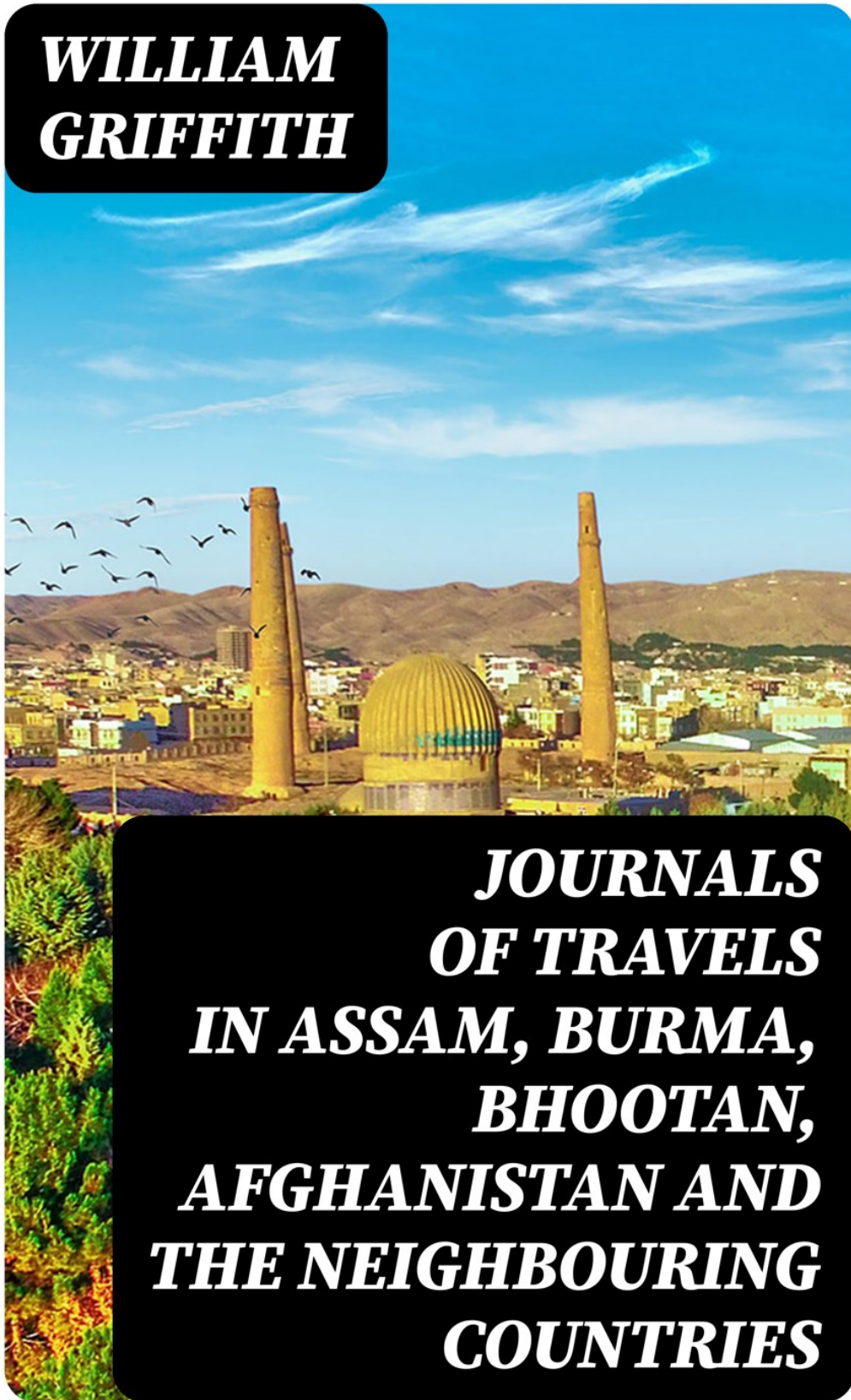


***WILLIAM
GRIFFITH***



***JOURNALS
OF TRAVELS
IN ASSAM, BURMA,
BHOOTAN,
AFGHANISTAN AND
THE NEIGHBOURING
COUNTRIES***

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William Griffith

Journals of Travels in Assam, Burma, Bhootan, Afghanistan and the Neighbouring Countries

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**NOTICE OF WILLIAM GRIFFITH, from
the Proceedings of the Linnæan
Society, with a few extracts from his
private correspondence.**

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“WILLIAM GRIFFITH, Esq., the youngest son of the late Thomas Griffith, was born on the 4th of March 1810, at his father’s residence at Ham Common, near Kingston-upon-Thames, in the county of Surrey.

“He was educated for the Medical profession, and completed his studies at the London University, where he became a pupil of Prof. Lindley, under whose able instructions, assisted by the zealous friendship of Mr. R. H. Solly, and in conjunction with two fellow pupils of great scientific promise, Mr. Slack and Mr. Valentine, he made rapid progress in the acquisition of botanical knowledge. The first public proofs that he gave of his abilities are contained in a microscopic delineation of the structure of the wood and an analysis of the flower of *Phytocrene gigantea*, in the third volume of Dr. Wallich’s ‘Plantæ Asiaticæ Rariores’; and in a note on the development and structure of *Targionia hypophylla*, appended to M. de Mirbel’s Dissertation on *Marchantia polymorpha*, both published in 1832. So highly were his talents as an observer appreciated at this early period, that Dr. Wallich speaks of him as one “whose extraordinary talents and knowledge as a botanist, entitle him to the respect of all lovers of the science;” and M. de Mirbel characterizes him as “jeune Anglois, très instruit, très zélé et fort bon observateur.”

“His note on *Targionia* is dated Paris, April 2nd, 1832, and in the month of May of the same year, having finished his studies at the London University with great distinction, he sailed from England for India, which was destined to be the scene of his future labours. He arrived at Madras on the 24th of September, and immediately received his

appointment as Assistant-Surgeon in the service of the East India Company.

“His first appointment in India was to the coast of Tenasserim; but in the year 1835 he was attached to the Bengal Presidency, and was selected to form one of a deputation, consisting of Dr. Wallich and himself as botanists, and Mr. MacClelland as geologist, to visit and inspect the Tea-forests (as they were called) of Assam, and to make researches in the natural history of that almost unexplored district.

“This mission was for Mr. Griffith the commencement of a series of journeys in pursuit of botanical knowledge, embracing nearly the whole extent of the East India Company’s extra-peninsular possessions, and adding large collections, in every branch of natural history, but especially botany, to those which, under the auspices of the Indian Government, had previously been formed. He next, under the directions of Capt. Jenkins, the Commissioner, pushed his investigations to the utmost eastern limit of the Company’s territory, traversing the hitherto unexplored tracts in the neighbourhood of the Mishmee mountains which lie between Suddiya and Ava. Of the splendid collection of insects formed during this part of his tour some account has been given by Mr. Hope in the Transactions of the Entomological Society and in the eighteenth volume of our own Transactions.

“His collection of plants was also largely increased on this remarkable journey, which was followed by a still more perilous expedition, commenced in February of the following year, from Assam through the Burmese dominions to Ava,

and down the Irrawadi to Rangoon, in the course of which he was reported to have been assassinated. The hardships through which he passed during the journey and his excessive application produced, soon after his arrival in Calcutta, a severe attack of fever: on his recovery from which he was appointed Surgeon to the Embassy to Bootan, then about to depart under the charge of the late Major Pemberton. He took this opportunity of revisiting the Khasiya Hills, among which he formed a most extensive collection; and having joined Major Pemberton at Goalpara, traversed with him above 400 miles of the Bootan country, from which he returned to Calcutta about the end of June 1839. In November of the same year he joined the army of the Indus in a scientific capacity, and penetrated, after the subjugation of Cabool, beyond the Hindoo Khoosh into Khorassan, from whence, as well as from Affghanistan, he brought collections of great value and extent. During these arduous journeys his health had several times suffered most severely, and he was more than once reduced by fever to a state of extreme exhaustion; but up to this time the strength of his constitution enabled him to triumph over the attacks of disease, and the energy of his mind was so great, that the first days of convalescence found him again as actively employed as ever.

“On his return to Calcutta in August 1841, after visiting Simla and the Nerbudda, he was appointed to the medical duties at Malacca: but Dr. Wallich having proceeded to the Cape for the re-establishment of his health, Mr. Griffith was recalled in August 1842 to take, during his absence, the superintendence of the Botanic Garden near Calcutta, in

conjunction with which he also discharged the duties of Botanical Professor in the Medical College to the great advantage of the students. Towards the end of 1844 Dr. Wallich resumed his functions at the Botanic Garden. In September Mr. Griffith married Miss Henderson, the sister of the wife of his brother, Captain Griffith, and on the 11th of December he quitted Calcutta to return to Malacca, where he arrived on the 9th of January in the present year. On the 31st of the same month he was attacked by hepatitis, and notwithstanding every attention on the part of the medical officer who had officiated during his absence, and who fortunately still remained, he gradually sunk under the attack, which terminated fatally on the 9th of February. "His constitution," says his attached friend, Mr. MacClelland, in a letter to Dr. Horsfield, "seemed for the last two or three years greatly shattered, his energies alone remaining unchanged. Exposure during his former journeys and travels laid the seeds of his fatal malady in his constitution, while his anxiety about his pursuits and his zeal increased. He became care-worn and haggard in his looks, often complaining of anomalous symptoms, marked by an extreme rapidity of pulse, in consequence of which he had left off wine for some years past, and was obliged to observe great care and attention in his diet. In Affghanistan he was very nearly carried off by fever, to which he had been subject in his former travels in Assam. No government ever had a more devoted or zealous servant, and I impute much of the evil consequences to his health to his attempting more than the means at his disposal enabled him to accomplish with justice to himself."

“The most important of Mr. Griffith’s published memoirs are contained in the Transactions of the Linnæan Society. Previous to starting on his mission to Assam, he communicated to the Society the first two of a series of valuable papers on the development of the vegetable ovulum in *Santalum*, *Loranthus*, *Viscum*, and some other plants, the anomalous structure of which appeared calculated to throw light on this still obscure and difficult subject. These papers are entitled as follows:—

1. On the Ovulum of *Santalum album*. Linn. Trans. xviii. p. 57.

2. Notes on the Development of the Ovulum of *Loranthus* and *Viscum*; and on the mode of Parasitism of these two genera. Linn. Trans. xviii. p. 71.

3. On the Ovulum of *Santalum*, *Osyris*, *Loranthus* and *Viscum*. Linn. Trans. xix. p. 171.

“Another memoir, or rather series of memoirs, “On the Root-Parasites, referred by authors to *Rhizanthææ*, and on various plants related to them,” occupies the first place in the Part of our Transactions which is now in the press, with the exception of the portion relating to *Balanophoreæ*, unavoidably deferred to the next following Part. In this memoir, as in those which preceded it, Mr. Griffith deals with some of the most obscure and difficult questions of vegetable physiology, on which his minute and elaborate researches into the singularly anomalous structure of the curious plants referred to will be found to have thrown much new and valuable light.

“In India, on his return from his Assamese journey, he published in the ‘Transactions of the Agricultural Society of

Calcutta,' a 'Report on the Tea-plant of Upper Assam,' which, although for reasons stated avowedly incomplete, contains a large amount of useful information on a subject which was then considered of great practical importance. He also published in the 'Asiatic Researches,' in the 'Journal of the Asiatic Society of Bengal,' and in the 'Transactions of the Medical and Physical Society of Calcutta,' numerous valuable botanical papers; but the most important of his Indian publications are contained in the 'Calcutta Journal of Natural History,' edited jointly by Mr. MacClelland and himself. Of these it may be sufficient at present to refer to his memoir "*On Azolla and Salvinia*," two very remarkable plants which he has most elaborately illustrated, and in relation to which he has entered into some very curious speculations; and his still unfinished monograph of "*The Palms of British India*," which promises to be a highly important contribution to our knowledge of a group hitherto almost a sealed book to European Botanists.

"But the great object of his life, that for which all his other labours were but a preparation, was the publication of a General Scientific Flora of India, a task of immense extent, labour and importance. To the acquisition of materials for this task, in the shape of collections, dissections, drawings and descriptions, made under the most favourable circumstances, he had devoted twelve years of unremitting exertion. His own collections, (not including those formed in Cabool and the neighbouring countries) he estimated at 2500 species from the Khasiya Hills, 2000 from the Tenasserim provinces, 1000 from the province of Assam, 1200 from the Himalaya range in the Mishmee country,

1700 from the same great range in the country of Bootan, 1000 from the neighbourhood of Calcutta, and 1200 from the Naga Hills at the extreme east of Upper Assam, from the valley of Hookhoong, the district of Mogam, and from the tract of the Irrawadi between Mogam and Ava. Even after making large deductions from the sum-total of these numbers on account of the forms common to two or more of the collections, the amount of materials thus brought together by one man must be regarded as enormous. The time was approaching when he believed that he could render these vast collections subservient to the great end which he had in view. He had some time since issued an invitation to many eminent botanists in Europe to cooperate with him in the elaboration of particular families; and he purposed after a few years' additional residence in India to return to England with all his materials, and to occupy himself in giving to the world the results of his unwearied labours. But this purpose was not destined to be fulfilled, his collections have passed by his directions into the hands of the East India Company, and there can be no doubt, from the well-known liberality of the Directors, which this Society in particular has so often experienced, that they will be so disposed of by that enlightened body as to fulfil at once the demands of science and the last wishes of the faithful and devoted servant by whom they were formed. It is hoped too, that the most important of his unpublished materials, both in drawings and manuscripts, will be given to the world in a manner worthy of the author and of the rank in science which he filled."—*Proceedings of the Linnæan Society*, No. xxv, 1845.

To the foregoing brief sketch which was read before the Linnæan Society at the Anniversary Meeting 24th May 1845, it is scarcely necessary to make any addition. It is worthy of remark however, as showing how talents sometimes run in families, that Mr. Griffith was great grandson of Jeremiah Meyer, Historical Painter to George the Second, and one of the founders of the Royal Academy. It is also but fair to state on the present occasion, that he was not himself the only member of the family who would appear to have inherited something of his grandfather's peculiar art, as we owe the transfer of the landscapes to stone, which add so much to the appearance of the following volume, to the talent and kindness of his sister.

It may perhaps be acceptable in this place to afford a few extracts from the private letters of Mr. Griffith, especially those in which he adverts with a liberality of feeling to his contemporaries, no less honourable to himself than to the persons mentioned.

The following notes addressed to his uncle, at various periods, exhibit the sentiments with which he regarded the late Mr. Bauer not merely as an artist, but original observer.

* * * * *

From letters of Mr. GRIFFITH, to Mr. MEYER.

Mergui: January 17th, 1835.

“My last accounts of Mr. Bauer state him to have been in excellent health: he had just completed some more of his unrivalled drawings.”

* * * * *

Suddya: December 30th, 1836.

“Pray give the compliments of the season to Mr. Bauer, to whom I look up with the greatest admiration: what a pity it is for science that such a life as his is not renewable *ad libitum*. Tell him that I have a beautiful new genus allied to *Rafflesia*, the flowers of which are about a span across, it is dioecious and icosandrous, and has an abominable smell. How I look back occasionally on my frequent and delightful visits to Kew.”

* * * * *

To MRS. H---

Serampore, Calcutta: July 22nd, 1841.

“I was aware of the departure of Mr. Bauer through the *Athenæum*, in which an excellent notice of him appeared. He certainly was a man to whom I looked up with constant admiration: he was incomparable in several respects, and I am happy to find, that his death was so characteristic of his most inoffensive and meritorious life. It is also very pleasing to me to find that he continued to think well of me. How I should have been able to delight him had he lived a few years longer.”

* * * * *

Calcutta: June, 1843.

“Poor Mr. Bauer, we never shall see his like again, I have seen but few notices of his life, which assuredly is worthy of study. There is not a place I shall visit with better feelings than Kew, it has so many pleasant associations even from my school-days.”

* * * * *

Calcutta: December 31st, 1843.

“Mr. Bauer is not half appreciated yet; he is considered a very great artist, but what is that to what he was? But he did not fight for his own hand, though he worked hard enough in all conscience. Mr. Bauer in fact preceded all in the train of discovery: he saw in 1797, what others did not see till 30 years after. For instance, the elongation of the pollens’ inner membrane into a tube, the first step towards the *complete* knowledge we now have of vegetable embryogeny. Unfortunately, Mr. Bauer drew, but did not write, and when I recall to mind a remark of Mr. Brown, that it was a disadvantage to be able to draw, I always fancy he had Bauer in his mind’s eye; for had he been a writer and not a drawer, before 1800, in great probability we should have known nearly as much of embryogeny as we do now. But he shut his portfolio, and folks went on believing the old fovivillous doctrine and bursting of the pollen, which, his observations of the pollens’ inner membrane, would have destroyed at once. Then with regard to Orchideæ and Asclepiadeæ, he was equally in advance: it would be a rich treat if some one would come forward and publish a selection from his drawings, without a word of letterpress.”

* * * * *

Calcutta: February 11th, 1844.

“Mr. Bauer’s light is not yet set on the hill. Really when I look back at his works I am lost in admiration, and always regret that he worked more for others than for himself, and that he did not use his pen as freely as he did his brush. When, in the name of all that is generous, will great men think that true greatness consist in endeavouring to make others more prominent than themselves?”

For some years before his death, Mr. Griffith would appear to have had a presentiment that he would not be spared to complete the description of all his collections. On one occasion, when enumerating those who might contribute most efficiently to this object, in the event of its not being permitted to himself, he writes:—

“I cannot however refrain from paying my tribute of respect to Mr. George Bentham, the most industrious, perspicuous, and philosophical Botanist who has systematically contributed to lessen the difficulties under which Indian Botanists have generally suffered.

“There are a few others from whom the sincerity of friendship fully warrants me in expecting every possible assistance: of these Dr. Wight is already well known, and others are rising rapidly to fill, I hope, the highest Botanical stations when these shall have been vacated by the leviathans who now occupy them. Let not the cynic accuse me of partiality when I mention the names of William Valentine, of Decaisne, and C. M. Lemann.”

He also delighted to speak and write in terms of the warmest regard of those to whom he was indebted for facilities in his pursuits. To Lord Auckland he invariably alluded in terms of the deepest gratitude—“Under his Lordship’s patronage” he remarks on one occasion, “I have received such advantages as make me ashamed of the little I have done, and which are constantly holding up before me my deficiencies in many branches of enquiry connected with the physiology and distribution of plants.”

* * * * *

The following letters are quoted chiefly for the additional information they afford on the subject of his travels and pursuits. His letters to Botanists would of course be more important and interesting.

* * * * *

Suddyah: 16th September, 1836.

“I am anxiously awaiting the arrival of the cold weather, as on the 1st of November I hope to accompany ----- to Ava, but in the meantime, I intend proceeding in search of the tea plant to the Mishmee Hills, especially about Bramakoond, where it is reported to grow. If I find it there, I will endeavour to trace it up into the mountains, which form due east of this an amphitheatre of high rugged peaks.”

* * * * *

November 1st, 1836.

“I here write from the foot of the ‘dreaded’ Mishmee Hills. I left Suddyah on the 15th October, and have already been to Bramakoond, where I spent three days. I miss you much; you would have been delighted with the place, which is nothing but rocks and hills. I am recruiting my resources for a movement into the interior of the hills, in which I shall follow Wilcox’s route, taking with me 15 coolies, for whom I am collecting grain. I have already made considerable collections, chiefly however in Botany, with a few stones and birds. I hope before my return to have seen *Coptis teeta* in flower, and to have proved that the Beese is different from that of Nepal. I have already seen numbers of the Mishmees who are civil people. I have however had great difficulties with the Chief of the Khond, who though apparently friendly, will, I fear, do all he can to hinder me

from getting to Ghaloom, with the Gham of which place I wish to have a conference.”

* * * * *

Noa Dihing Mookh: January 20th, 1837.

“I have just returned from the trip to the Lohit much sooner than I expected. I saw nothing of any consequence except rapids which are horrid things, and make one quite nervous. I made a beautiful collection on the Mishmee mountains, of which more anon. Many of the plants are very interesting. I was however worked very hard, all my people being sick: I had even to wash my own clothes, but I fear you will think I am grumbling: so good-bye.”

* * * * *

Loodianah: 11th December, 1838.

“I arrived here in 14½ days, notwithstanding some delays on the road, and have put up with Cornet Robinson, Acting Political Agent. I am not pleased with the up-country, and would rather live in Bengal, for I cannot abide sandy plains and a deficiency of vegetation. Loodianah is a curious place, very striking to a stranger, the town is large, built under official direction, and consequently well arranged in comparison with native towns: there is much trade carried on in it, and it has the usual bustle of a large town.

“Capt. Wade’s house is well situated on a rising ground, and the demesne is a pretty one. Otherwise the country is ugly enough, and very bare, yet it is here well wooded, in comparison with what I hear of Ferozepore. Along the face of the hill near the town, a nullah flows, abounding in fish, of which more anon. The rock pigeons, or grouse, are very abundant, and there are two species, one remarkable for

the elongated side-feathers of the tail. Both are beautiful birds, but very difficult of access. Crows, kites, vultures, adjutants, herons, Drongoles, sparrows, parrots, etc. remain as before, but most of the less common birds are different from those to the south; the most European are genuine starlings; and, to my memory of eight years back, identical with those of Europe. I have already got thirty to forty species of fish. Cyprinidæ, are by far the most common; one loach, and one of Macrognathus.

“But as they are all from one water, viz. the neighbouring nullah, and the Sutledge being five miles off, I shall put them all into bottles, and send them off before I leave this. The most edible fish, and one of the most common is the Roh, but it is not the Roh of Bengal, and might well be called *Cyprinus ruber*. Burnes has given I think a drawing of it, which is faithful as to colour. All the forms will be familiar to you, but I hope there will be some new species.

“I have made further arrangements, and such as will give you a good insight into the fish of the Sutledge, as to the number of duplicates!—it is the safest plan for an ignoramus not to discriminate too nicely. I am to-day to get large specimens of the Kalabans, Rohi, etc. what a splendid fish the Rohi is, both to look at and to eat. There are two or three species of the transparent *Chandas*, and three or four Perilamps, six or eight Siluridæ, besides the Gwali, which is too large; of *Ophiocephalus* two or three, exclusive of the Sowli, but all ought to be examined, as there is no relying on native discrimination. There is a curious animal here burrowing like a mole, but more like a rat: of this I have not yet got a specimen, although they are very common.

“I commence with a list of the fish of this place. I have only to mention that several species are confounded under the name Bhoor, all the Chandras under Chunda Begla, Loaches under Pote, all the Perilamps except the Chulwa, which may be from its flavour a *Clupeia*, etc. The fact is, that the fishermen are aware of genera, but not of species, excepting when the distinctive marks are very strong. The fisherman enumerates forty species, but I have only twenty-six, I have promised him one rupee when he completes the list:

Native Name. Family. General size.

1. Khaila,) (6.
2. Bhoor,) (mature.
3. Rewa,) Cyprins, (mature.
4. Bangun,) (18 inches, called also Kala Bhans.

5. Chund Bigla, mature.
6. Ditto ditto, ditto.
7. Ditto ditto, ditto.
8. Pote, Loach, ditto.
9. Mailoa, Perilamps, ditto.
10. Khurda, ditto Trichopterus?
11. Puttra, Salurida, 20 seers.
12. Kuttoa, Ditto, 6 inches.

13. Ghichila,) Macrognathus(7 ditto.
14. Bham,) (3 feet.

15. Nunghree,) (6 inches.
16. Nowhan,) Cyprins, (ditto.
17. Pootea,) (12 inches.

18. Seengh, Silurida, 8 inches.

19. Bugarlea, ditto.
20. Mootunna, nearly mature.
21. Bardul, 6 inches.
22. Chilwa, Perilamp,? mature.
23. Nuwha, Esox, ditto.

24. Gwalee,) Silurus, (2 maunds,
25. Ruttgull,) (nearly mature.

26. Chundee Clupeia, ditto ditto.

* * * * *

Candahar: May the 2nd, 1839.

“We have seen three changes in the geological structure of the country.

“The Khojah Omrah was chiefly clay slate, and we are now in another formation, which no one seems to know; but it must be different as the outlines of the hills are completely changed. We are now 3,500 feet above the sea. The climate is good, and would be delightful in a good house, but in tents the thermometer varies from 60° to 98° and even 105°.

“I have got a decent collection of plants, only amounting however to 650 species. The flora continues quite European. I have some of singular interest. Compositæ, Cruciferæ, and Gramineæ form the bulk of the vegetation. All fish are very different from those below the Ghats. I have five or six species of Cyprinidæ. One very inimitable fuscous loach. There are few birds, and fewer quadrupeds; in fact the country is at a minimum in both these respects.”

* * * * *

Ghuzni: July 25th, 1839.

“We have been gradually ascending since leaving Candahar, and are here at an elevation of 7,600 feet. The same features continue. I have as yet not more than 850 species. The mountains on every side, and indeed the whole face of the country, is still bare. Mookloor, a district through which we passed, about seventy miles from this, is well cultivated and inhabited. There are few birds to be seen, and scarcely any insects, but there are numerous lizards. The thermometer varies in tents from 60° to 90°.”

* * * * *

Cabul: August 11th, 1839.

“I am encamped close to Baber’s tomb, lulled by the sound of falling water, and cooled with the shade of poplar and sycamore trees, with abundance of delicious fruit, and altogether quite happy for the nonce. I have not yet seen the town which is a strange place, buried in gardens: but nothing can exceed the rich cultivation of the valley in which we are encamped. Beautiful fields on every side, with streamlets, rich verdure, poplars, willows, and bold mountain scenery, which contrasts most favourably with the dreary barren tracts to which we have been accustomed. I go with the Engineers to Bamean in the course of a few days, when we shall cross ridges of 12,000 to 13,000 feet high.

“I can only find three kinds of fish in this neighbourhood. I have been making some drawings, and collecting a few plants which continue to be entirely European.”

* * * * *

Peshawur: November 17th, 1839.

“I hope some day or other to turn out a real traveller. I am now in hopes of becoming a decent surveyor, and before

many years have passed a decent meteorologist. I leave the Army here, and shall part with it, particularly Thomson and Durand of the Engineers, with regret. I start in a short time to travel up the Indus with little before me but difficulties, however *à la renommée*. If I can do something unparalleled in the travelling way I shall be content for a year or two at least.

“I have obtained some few specimens of fossil shells from the shingly beds of the Khyber Pass. They seem to be a *Spirifer* with a very square base, quite different from the common species of the Bolan Pass, which is like a large cockle, and of which I have one beautiful specimen. How I regret not seeing Bukkur, for with a few days’ leisure, a number of fossils might be obtained. The older I grow the less content am I scientifically: would that I had received a mathematical education. I was much interested with some quotations from Lyell’s *Elements* in a late *Calcutta Courier*, especially about the Marine Saurian from the Galapagos. What further proof can be wanted of the maritime and insular nature of the world during the reigns of the Saurian reptiles? What more conclusive can be expected about the appearance of new species? This point would at once be settled if the formation of these islands can be proved not to have been contemporaneous with the Continents. Then the animal nature of chalk!

“I am doing nothing in botany, but learning Persian, and the use of the theodolite, with nothing but difficulties to look at all around. I begin to feel of such importance, (do not think me conceited in relation to my collections and information on geographical botany,) that I am not

overpleased with the idea of facing dangers alone: however I suppose every thing is as usual exaggerated.”

* * * * *

Bamean: August 3rd, 1840.

“Yesterday I crossed the Hindoo-koosh by my former route, and this morning while out, i.e. trout fishing, was most agreeably interrupted by the post. The fishing was ended forthwith. Indeed the sun in this country even at elevations of 12,000 feet is very hot, and has excoriated my hands, beautifully white as they were after my sickness, but not before I had caught 3 barbels, evidently different from those of the other side of the range. I caught some trout yesterday evening, it is a most beautiful fish, I was particularly struck with the size of the eye, its prominence, and expressive pupil, in opposition to the sluggishness of the eyes of carps.

“It is strange that Botany has always been the most favoured of the natural sciences, it is strange that in spite of what all do say it is the least advanced of any. How can I reconcile my own splendid opportunities with those of more deserving naturalists in other branches? and I would willingly share them on the principle of common fairness with others, who I know would turn them to a better account. Oreinus takes the worm greedily; in the Helmund, 11,000 feet above the sea, it is abundant. It is the same species I think as that in the Cabul river; but in the Cabul river, Barbus is the predominant fish: in the Helmund it is the reverse. How can one account for the small elevation at which fish are found in the Himalayan? I cannot imagine it is owing as some think to the relative impetuosity of the rivers, which after all is only an assumption.

“This Bamean valley is the strangest place imaginable, its barrenness and the variegated colours of the rocks convey the idea of its volcanic origin, and give it a look as if it had come out of the furnace. I cannot make out where the stones so universally found all over the slopes of the mountains, came from, for very generally they seem water-worn. I find no great peculiarity in the flora of this side of the range, except an abundance of odd-looking Chenopodiaceous plants, probably resulting from the saline saturation of the soil. There is a very singular spring on the other side of the range, about 11,000 feet above the sea: the water very clear, with no remarkable taste, but every thing around is covered with a deposit of a highly ferruginous powder. I shall write next from the fossil locality, which is said to be about forty miles from this. I am as stout as ever, but by no means so strong.”

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Bamean: August 21st, 1840.

“I am now out of the region of trees, excepting a poplar, of which I will send you a bit, as the same tree grows in much lower places. The want of rings in wood is by no means unusual in tropical vegetation. For the production of rings, some annual check to vegetation is required: their absence is particularly frequent in climbers. The walnut will not be a good instance, because even if you can get it from Java, it is a tree that requires cold, and must consequently be found at considerable altitudes. Your instances must be taken from subjects that can bear a great range of climate: you have some in the apricot, vine, etc. I will not fail in sending you what you want from Cabul, and also from Peshawur, in which almost the extremes of temperature can

be contrasted. I will also get the woods of apricots, cherries, etc., at the highest elevations on my road back, as I hope to pass through the grand fruit country of Affghanistan. No Jungermannias are obtainable in this part, nor anywhere indeed, except towards the true Himalayas. I do not remember having seen the pomegranate growing at Cabul: the place is too cold for it. I think however, I can get some from Khujjah, where snow lies in winter. I leave for the Provinces early in October, and shall travel 30 miles a day. I want to get to Seharunpore, 15 or 20 days in advance of my time, as I must run up to Mussoorie and fish in the Dhoon. I shall be in Calcutta in all February."

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Cabul: September 26th, 1840.

“I despatch to-morrow the first of the bits of wood, the duplicates will be sent on the 28th or 29th: on this latter day I leave for Peshawur, and right glad am I that the time has come at last. I will send you the same woods from Peshawur, but shall scarcely be able to send you pomegranate from any thing like a cold place.

“On receiving your specimens of vine, the following question occurred to me. If wood is a deposit from the leaves or fibres sent down from the leaves, how is the presence of wood to be accounted for in tendrils, which have no leaves, but yet which are evidently branches? The theory of the formation of wood, which considers it as above, is deemed ingenious, but it will not I think be found to be true. The bark evidently has a great deal to say to the matter.

“I shall be most rejoiced at a remote prospect of again setting to work. I take no interest now in the vegetation of this country. I hope to be at Loodianah *early* in November; my present intention is to run up to Simla, thence to Mussoorie, and descend on Seharunpore. If I do this, I shall only leave one point unfinished, and that is the Hindoo-koosh Proper, where however I shall have the advantage of Major Sanders of the Engineers, who will pick up a few plants for me. I wish much to take notes of the vegetation about Simla and Mussoorie, this I can do at a bad season. I shall afterwards be able to compare the Himalayan chain at very distant points.”

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Serampore, -- 1841.

“I will send you to-morrow dissections of Santalum if I can get a small bottle for them: under $\frac{1}{2}$ inch lens you can easily open the pistillum of Santalum having previously removed the perianth: it is a concial body; you must take care to get it out entire, especially at the base, then place it in water, and dissect off the ovula of which there are three or four, as per sketch. I shall not say what I see, as I want to have your original opinion unbiassed, etc.; but whenever you see the tubes with filaments adhering to their apices, pray mark attentively what takes place, both at the point and at the place where the tube leaves the ovulum; your matchless 1/1500 would do the thing. Try iodine with all such, after having examined them in water.

“Should you find any difficulty in dissecting away the ovula, light pressure under glass will relieve you. I shall be very anxious to know what your opinion is, particularly with regard to the tubes and all adhering filaments; the question now occupying botanists, being this, is the embryo derived directly from the boyau or is it derived from some parts of the ovulum?

“I hope you can understand these sketches.”

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Peshawur. 13th December, 1839.

“What a shame it is that botanists should know nothing whatever of the formation and structure of wood! They look at a section of a piece of oak, and imagine they have discovered the secret, and write volumes on this imagination, yet they have been told over and over again, that nothing is to be learnt on such subjects without beginning at the commencement, which they are too idle to do. To name an abominable Aster, is among them of much

higher importance than to discover the cause of the growth of wood. Medullary rays are most difficult, because they are very often deficient particularly in climbers. I am horridly idle, and yet what can I do without books; yet with regard to books, the more originality we possess, the less we require them? There is nothing to be got here except a few marsh plants coming into flower. One beautiful Chara, which might disclose the secret, had I good glasses, it is a most graceful pellucid form, an undescribed duckweed, a floating Marchantiaceæ. Would that I was settled with a Ross on one hand, and a Strongstein on the other, around my collections with good health and good spirits. Tell ---- I have in view the division of the vegetable kingdom analagous to radiata, they include all the Marchantiaceæ, and are, to all intents and purposes, Vegetable Radiata.”

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Pushut, 1st march beyond Kooner. January 29th, 1840.

“This will be a letter of odds and ends, you know I was to return to Jallalabad; well I reached that place, but left the encampment and crossed the river, where an advance road making partly for the Kooner expedition were employed, and having originally determined on going to Kooner, I accompanied them two marches, when they were overtaken by the army, to avoid which, I halted one day, and on the next proceeded onwards by the north bank of the river, thus saving all the fords of this horrid river. I should call it beautiful at any other season. The road was bad, and the last one and a half mile into camp most difficult, the path winding round and over spurs of sharp limestone rocks which must have had abundance of silex in them they were so very hard. At the very worst part, my headman being in