RICHARD SPRUCE STILL LIVES

RICHARD EVANS SCHULTES, Ph.D., F.L.S.

Botany! The joy of finding and, of course, collecting—for even the most austere addict of the Spartan way of life would hardly grudge a collector the modest trophy of a small dried specimen as a reward of arduous days of low living and high thinking—but above all of finding in their most ancient and inviolate haunts the children of Silence and slow Time, not in the interests of commerce nor to satisfy the competitive instincts of the habitués of Vincent Square, but in the service of undiluted science—here surely is to be found the purest of human pleasures.

CHRISTOPHER SANDEMAN: *Thyme and Bergamot.*

IN PRESENTING this short account reprinted from *Northern Gardener* 7 (1953) 20-27, 55-61, 87-93, 121-125, I hope to impart, in some measure, to plant lovers my own intense admiration for Richard Spruce. Since 1941, I have carried out botanical exploration in the Amazon Valley and have, during this period, had occasion to follow, in part, the itineraries of Spruce in this vast wilderness and to investigate many of the problems which occupied Spruce's attention. With every passing month and with every new event, my respect for the man and his work has deepened. This respect has been converted, as it were, into a relationship closely akin to personal friendship by my studies of Spruce's voluminous letters and manuscript notes preserved in various British institutions, and by a pilgrimage to Spruce's country in the vicinity of Malton. Although I hope one day to be able to prepare a book about Richard Spruce, based on a thorough study of his manuscripts and botanical works, this article offers nothing novel or unpublished, with the exception of several photographs. Most of what I have put into these pages has already appeared in print in one or more of the outstanding articles and books, listed below, which are available. Indeed, were it not for the disconcerting fact that Spruce is actually almost unknown even in that part of England where he was born, I should hesitate to write down the notes which make up the following pages. It is rather of the dauntless and sterling character of the man than of his work that I would write; but too much a part of Richard Spruce and his character was his research and travel that I must,

though perhaps repetitious of other better accounts, touch upon his botanical achievements. For the sake of brevity, I cite herewith only a few publications devoted to Spruce's life and work, with the single exception of Wallace's outstanding edition of Spruce's papers which, under no circumstances, can be omitted from any list of Spruceana; Spruce, R. [ed. A. R. Wallace] *Notes of a botanist on the Amazon and Andes*, 2 volumes (1908); Sandeman, C. *Thyme and Bergamot* (1947); von Hagen, V. W. *South America called them* (1945); C.H.G. [Grey, C.] *Richard Spruce—a great Yorkshire botanist.* NORTHERN GARDENER, 4, No. 2 (1950), 39-42.

Since it is extremely doubtful whether anyone can excel Spruce's depth of perception, wit, and forthright style in recounting his experiences and philosophy, I have deemed it advisable to let him speak for himself and have, accordingly, quoted freely from his own writings. As Sandeman has so truthfully confessed: "... everything is to be found in Spruce, and the temptation to quote him is irresistible...."

Profile of Richard Spruce, from a photograph taken before his departure for South America. Drawn by E. W. Smith from an original in the Gray Herbarium, published with permission of the Botanical Museum of Harvard University.

I.

ALL THE WORLD should know of Richard Spruce. His researches and discoveries in the field of plant science have benefited mankind in all corners of the earth, and have helped to enrich governments and private enterprises in far-flung regions of the globe. He still lives in the spirit of science and exploration; and the work which he began still cries aloud for workers of his calibre and dedication.

In Spruce, we find perhaps the greatest contrasts ever known in a botanist. A man of delicate health and plagued by chronic ills, he betook himself to one of the wildest and least known of jungle areas of the world, to spend fourteen years of his life in hard physical work, constant exposure to the tropical elements and diseases, insufficient diet, and complete lack of even rudimentary comforts. A scholar with a thorough classical training and of outstanding cultural and scientific attainments, he divorced himself from all centres of culture and lived for long periods amongst Indians and unlettered men. A superb correspondent, he plunged himself into regions where, for months on end, he received not one letter or newspaper. A botanist whose training and first love concerned mosses and hepatics—the most diminutive of land plants—he carried out painstaking research on some of the most gigantic of tropical trees and lianas, even discovering hundreds which had hitherto been unknown to science. A poor man, he contributed through his work on the quinine-tree in Ecuador, to the creation of great plantations and fortunes, which resulted from the domestication of this plant in the British possessions of the Far East. A mild-mannered and dignified person, he feared none of the dangers that his expeditions presented, and more than once had to take measures to defend his very life. A student whose scientific training had fitted him to handle masses of minute detail, he was able to cope with the endless problems attendant on the organisation and execution of cumbersome trips by canoe or on horseback of months' or even years' duration. And, perhaps most astonishing of all: a naturalist who looked with abhorrence on the philosophy that nothing not immediately beneficial to man was worthy of study, he nevertheless provided science with the first extensive botanical knowledge of *Hevea* rubber (which was just then beginning to attract extensive commercial attention), made far-reaching practical researches on the quinine-tree and filled his note-books with observations and studies on all manner of native economic plants, including gums and resins, fibres, foods, drugs, narcotics and stimulants, oils, dyes, and timbers.

MAP SHOWING SPRUCE'S ROUTES ON THE RI

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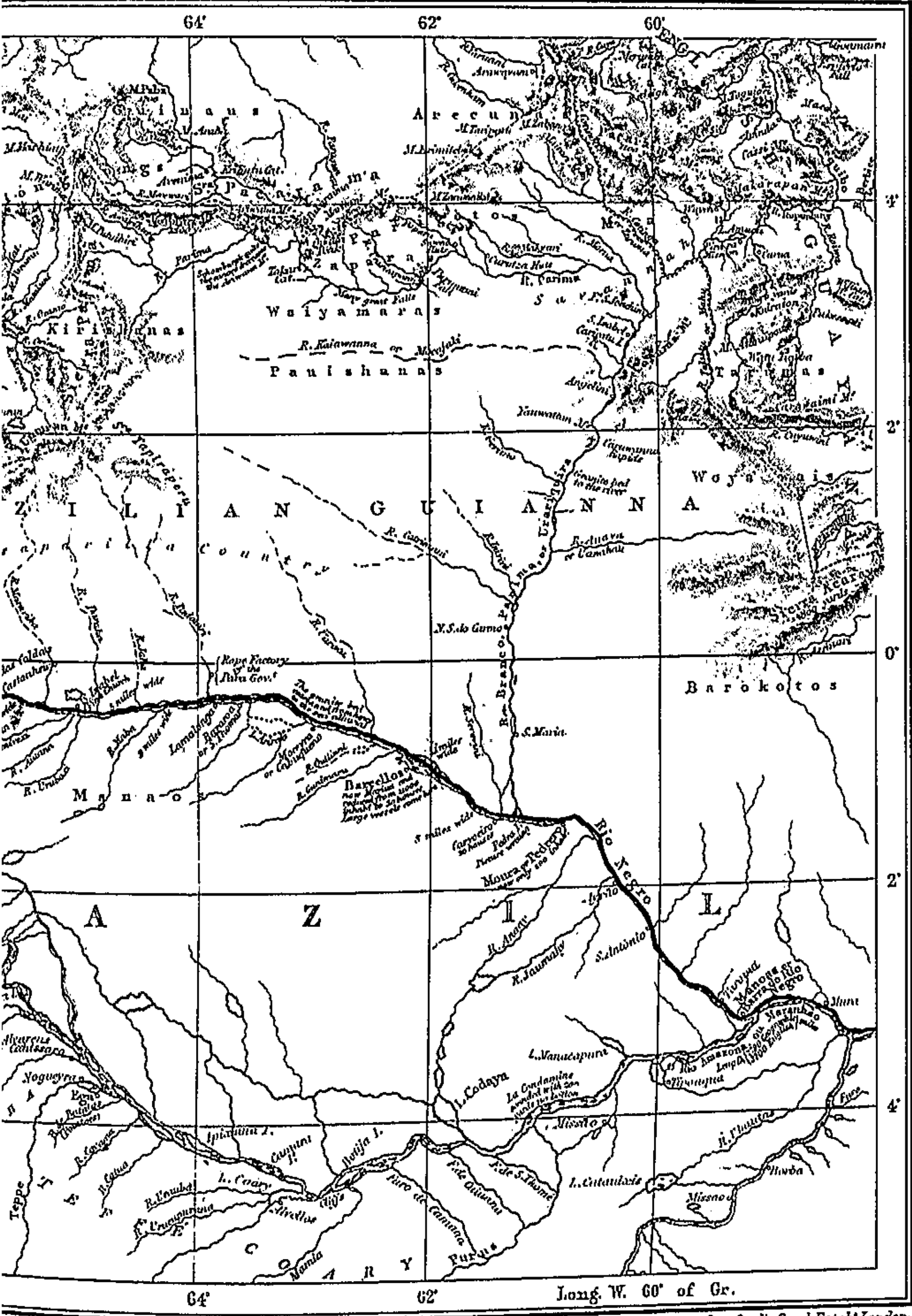


n & Co., Ltd.

Such a man was Richard Spruce, born in the tiny hamlet of Ganthorpe, a few miles from Malton, Yorkshire, on 10 September 1817, dying seventy-six years later in the neighbouring hamlet of Coneysthorpe, on 28 December 1893. The simplicity of his life is admirably brought out by this one fact: having travelled for fourteen years the wildest of areas—some so inaccessible that only now, after the passage of one hundred years, are scientists again penetrating them—Spruce returned, not to London or permanently to any of the great botanical centres of Britain, but to a little cottage in his native countryside. For it was his childhood rambles in this fascinating countryside that had fostered his love and knowledge of botany which developed at such an early period in his life that, in his sixteenth year, he had compiled a list of 403 species of plants of Ganthorpe, followed, several years later, by a *List of the Flora of the Malton District*, enumerating 485 species. It was during this period that he became deeply absorbed in mosses and liverworts, "the joy of his early manhood and the consolation of his declining years," groups of plants in which he became an investigator whose authority will stand as long as men delve into the natural history of the bryophytes.

Apparently of Scottish ancestry, Richard Spruce was the son of Richard Spruce who, at the behest of the Earl of Carlisle, had come to Ganthorpe and Welburn as schoolmaster, and Etty Spruce, a member of an old family of the City of York. Educated first by his father, then by a classics master, he entered the teaching profession himself as mathematics master for several years until his delicate health forced him to give it up. Several severe illnesses, a continual pulmonary trouble, and the closing, in 1844, of the York Collegiate School, where he taught, combined to force him to make other plans for the future: plans which necessarily involved work in a climate milder than that of Yorkshire. By this time, his fame as a meticulous observer and unsurpassed plant collector had attracted wide attention and had won the admiration of numerous men of influence in botanical circles.

In December 1844, Spruce resolved to visit the Pyrenees, planning to pay his expenses by selling sets of his plant specimens. Arriving in the Pyrenees in May 1845, he worked incessantly until April of the following year, amassing a superb collection which was especially rich in bryophytes, notwithstanding the fact that a famous guide-book of the region had stated most categorically that "la famille des mousses n'existe pas dans les Pyrénées." And, although a French bryologist published, in 1848, a list containing but 169 bryophytes, Spruce's collections demonstrated the presence in the Pyrenees of 478, of which

seventeen were new species and seventy-three others new to the flora of the Pyrenees. His bryological studies later formed the basis of a scholarly 114-page work entitled *The Musci and Hepatics of the Pyrenees.*

After his return to England with health much improved, he continued collecting plants for sale to foreign herbaria and working on his mosses. His preoccupations about the future, however, were taken with his accustomed calmness, as can be seen from an excerpt from one of his letters:

"I yearn to be independent, and I hope the next time I go out it will be to settle in some comfortable office; but I must be contented to wait until an opening occurs, and in the meantime what my hand has found to do I will do with all my heart, for my heart is in it."

How far from a "comfortable office" was his next and unexpected going out—to his epoch-making South American explorations! On a trip to London, in 1848, Spruce conferred with leading botanists and naturalists, some of whom had been to South America. He decided to proceed to the Amazon Valley, selling, through the good offices of the botanist Mr. George Bentham, sets of his plants to finance the trip.

On that memorable date of 12 July 1849, landing at Belém at the mouth of the Amazon River, he caught his first glimpse of the indescribably vast jungle, our understanding of which he was destined to advance in such a masterly fashion.

"The largest river in the world," he wrote in his awe of what he saw, "runs through the largest forest. Fancy, if you can, two millions of square miles of forest, uninterrupted save by the streams that traverse it. . . . The natives . . . think no more of destroying the noblest trees . . . than we the vilest weeds; a single tree cut down makes no greater gap, and is no more missed, than when one pulls up a stalk of groundsel or a poppy in an English cornfield. . . . Nearly all vegetation here is arborescent. . . . Here are grasses . . . of 40, 60, or more feet in height. . . . Vervains forming spreading trees. . . . Milkworts, stout woody twiners ascending to the tops of the highest trees. . . . Violets the size of apple trees. Daisies (or what might seem daisies) borne on trees like alders. . . . Sensitive plants . . . which you (in England) think so curious, are here so common that almost every day I scratch my fingers or my shins against some thorny member of the group."

It is needless here to recount in detail Spruce's long itinerary which took him into Brazil, Colombia, Ecuador, Peru, and Venezuela. An outline suffices to convince him who will follow it on a map of South America what an odyssey it would be even to-day.

The first few months after arriving at Belém, he collected at the mouth of the Amazon. He next worked for several months in the environs of Santarém, a town on the Amazon at the mouth of the Tapajoz River. Spruce's notes of his work at Santarém show him thoroughly awed by his natural surroundings; and that though happy he was not as yet thoroughly at home in the Amazon forest is borne out by his frequent comparisons of what he met, with familiar things at home: "The vegetation of the upland campos reminded me of an English pleasure-ground . . ."; "With the *caju* grew the *caimbé* (*Curatella americana L.*), a small tree not unlike a stunted oak in habit"; "They (*Erythroxylon*) grew to small trees, not unlike our plum trees or aloes. . . ." At Santarém, he met Wallace, who was preparing to ascend the Río Negro. From November to the following January, Spruce explored the region around Obidos and the Trombetas River and, from his notes, we see that he was fast acclimatizing himself, for his journal of this trip, unfortunately only in small part published, is extraordinarily illuminating. It was on this journey that he first became acquainted with cacao-cultivation on a large scale, and met with the *lingoa geral*—a native language spoken very widely in the Amazon by Indians and Brazilians alike—which Spruce himself later mastered. Before returning to Santarém, he had accurately mapped the Trombetas and an important tributary. During most of 1850, he worked near Santarém, making a vast collection and exceedingly interesting notes on the flora.

"I had every reason," he wrote, "to be satisfied with my collections at Santarém; but when I had nearly exhausted the flora accessible within a day's journey, I began to long for new fields, and I fixed the mouth of the Rio Negro for my next centre of operations."

The greater part of 1851 was dedicated to a meticulous combing of the curious forests around Manáos, a town on the lower Río Negro, and of neighbouring areas. How fully Spruce had grown into the life and customs of the region by this time appears in what he had to say concerning the *pirarucu*, which is a truly delicious fish and one of the few staples of diet in the Amazon but which, almost without exception, foreigners disdain because of its odour of cod-fish:

"It is the monarch of the fishes of the Amazon, and one of the finest fresh-water fishes in the world. When full-grown it measures six to eight feet long, weighs from 60 to 100 pounds, and yields about one-third of that weight of dried fish. When fresh, it is capital eating . . . the lower part of the belly which, being cut from the newly-caught animal and roasted on a spit over a brisk fire, is one of the choicest

morsels I ever tasted; and, although I call it a *morsel,* it is a meal for three."

The trials which Spruce experienced in the 63-day sail from Santarém to Manáos might have discouraged a man with less steadfastness of purpose, but he always managed to capitalise, even if only philosophically, on adversity. When one of his Indian sailors slipped away, stealing equipment essential to botanical work, Spruce's journal does not dwell upon the loss but laughs it off with the following anecdote:

"We had now but one sailor left . . . who, in spite of his crabbed disposition, worked well when not under the influence of *cachaça*—a thing which happened to him two or three times during the voyage, when he profited by my temporary absence to help himself to my demijohn; but his worn, dissipated look bore witness to habitual devotion to the fiery liquid. He was a bit of a philosopher in his way, and used to amuse me with his cynical views of life. . . . One evening he lay on the deck watching a cockroach, as it struggled to release itself from its old coat, and at length emerged—weak and tottering, but still clean, white, and new to look at; whereupon our Jacques moralized after this fashion: 'How is it . . . that almost every animal except man renews its youth and beauty . . . ? Birds moult their plumage—snakes slough their skins—even this dispicable *bicho,* the cockroach, casts off its old covering—and all come forth bright and beautiful as in the days of their youth; but we' (casting his eyes on his own wizened hand) 'grow uglier and more discoloured every year, and the same skin in which we were born must serve unto our dying day'!"

From Manáos, Spruce's collections proved later, as he suspected at the time, to abound in new and rare plants; they included "examples of nearly every natural order of plants." It was here that he first met with the extraordinary wealth of palms which characterises the northern part of the Amazon Valley; he became so absorbed in this difficult group of plants that he not only attempted to collect even the largest but, as he wrote to Kew: "I am now describing completely every palm I find, and I hope some day to be able to work them up."

It is fully illustrative of Spruce's versatility that he, a specialist in tiny mosses, should become fascinated by this family of gigantic trees.

"A prickly palm gathered in the depths of the forest at a distance from one's canoe is a load for one man, and an exceedingly unpleasant one, for one's hands are almost constantly required to cut and pull aside the twiners that obstruct the way . . . as a spadix (of the miriti

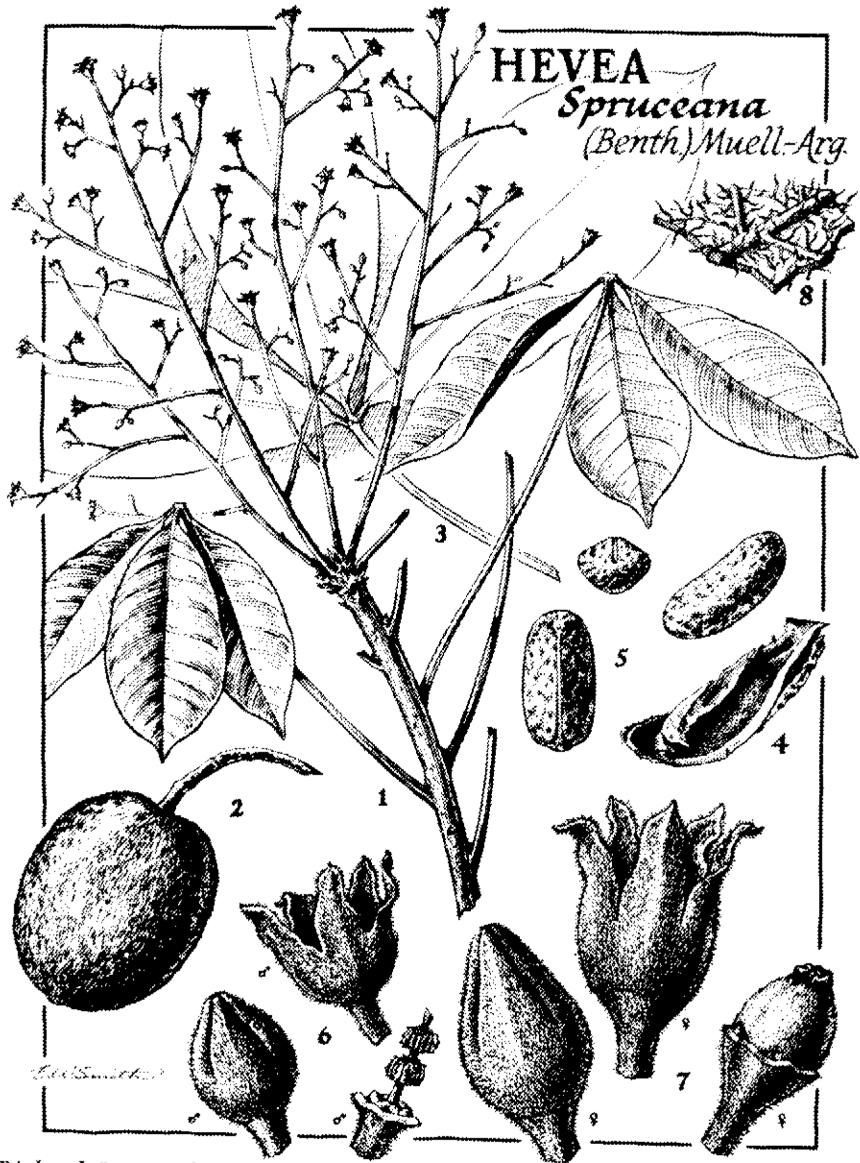
palm) is a load for two men, specimens are quite beyond the reach of a traveller like myself. However, notwithstanding all the difficulties that lie in my way, I feel that it would be quite a sin to leave so many fine things altogether unnoticed."

During the course of the year, a large boat and preparations for ascending the Río Negro were completed; and, on 14 November 1851, Spruce left Manáos with six men for points upstream. He remained in the upper Río Negro basin and adjacent parts of the upper Orinoco in Venezuela for three years, beginning his return to Manáos from the Casiquiare on 23 November 1854 and arriving in Manáos in March of the following year. There can be no doubt but that this odyssey represents the pinnacle of botanical expeditions in South America. Not only from the point of view of the amount and quality of plant material gathered, the number of new species and genera discovered, phytogeographical observations and investigations of an anthropological, ethnobotanical, linguistic, geographic, and meteorological nature, but also from the sheer physical undertaking and the demonstrations —too numerous to recount—of a moral stamina which beat down and overcame sickness, hunger, weariness, and loneliness—from all these points of view, Spruce's Río Negro trip cannot be matched in the annals of natural history in South America. Although this trip has been written up in masterly fashion by Wallace from Spruce's own letters and notes, there remains a mass of material which one day, it is to be hoped, will be incorporated into an even more extensive account. For now, after the passage of a century, botanists are at long last beginning to grasp the complicated and endemic flora of this area. And, at every step in our advancing understanding, we must perforce hark back to Spruce, whose observations, almost invariably, provide the basis of our present-day investigations. Spruce has made himself the *sine qua non* of Amazonian botany; and most especially of Río Negro botany. The naturalist of to-day, rebelling at the tendency in recent years to describe as "overspeciation" the reputed vastness of the tropical American flora, finds refreshing agreement in Spruce's letter to Bentham, written in the heart of the Río Negro area:

"I have lately been calculating the number of species that yet remain to be discovered in the great Amazonian forest, from the cataracts of the Orinoco to the mountains of Matto Grosso . . . there still should remain some 50,000 or even 80,000 species undiscovered."

How exceedingly up to date is this concept!

Richard Spruce devoted special attention in the Amazon to trees of the genus *Virola*, members of the Nutmeg Family. He discovered many new species, including *Virola theiodora*, from which the Indians prepare a powerfully hallucinogenic snuff. It is curious that, his study of this group of plants notwithstanding, Spruce failed to learn of this interesting use of *Virola* which was discovered only in 1954. Drawn by E. W. Smith.

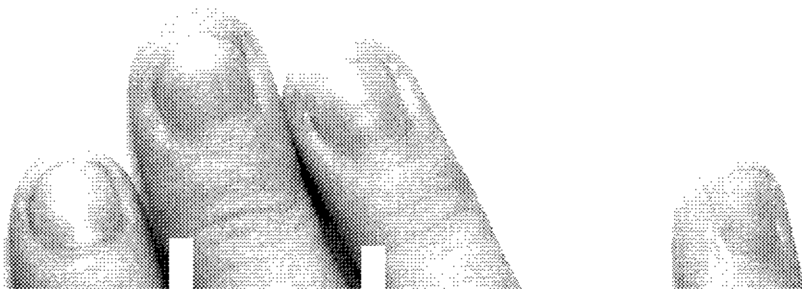


Richard Spruce discovered many new species of the rubber-yielding genus *Hevea*. One of these species was named in honour of Spruce by the British botanist Bentham: *Hevea Spruceana*. It does not yield a useful type of rubber but is of great interest in an evolutionary study of the genus. Drawn by E. W. Smith.

Hevea guianensis var. *lutea* in the forests of the Comisaria del Vaupes in Amazonian Colombia. Richard Spruce first collected this valuable rubber-yielding tree on the upper Rio Negro of Brazil and the Casiquiare of Venezuela and believed that it represented a distinct species. It is now regarded as a variety of the widespread *Hevea guianensis*, also a yielder of good rubber. Photograph by R. E. Schultes, Rio Apaporis, Colombia.

One of the rarest types of rubber trees, *Hevea rigidifolia*, was first collected by Richard Spruce in 1852 and was not found again until 1944. Restricted to small areas of sparse forests growing on white sand *(caatingas)* in the uppermost Rio Negro basin, this slender tree is now of interest in breeding work although its rubber is of no commercial importance. Spruce collected the type specimens at Ipanore on the Rio Uaupes of Brazil, the locality of this photograph. It may well be the same caatinga where he collected. Photograph by R. E. Schultes.

A vine of the caapi plant cultivated in the garden of the Barasana Indians of the Rio Piraparana in the Comisaria del Vaupes, Colombia. These Tukanoan Indians utilize the hallucinogenic drink prepared from this vine *(Banisteriopsis Caapi)* in the same manner as described 125 years ago by Richard Spruce from the adjacent Brazilian area of the Rio Negro. Photograph by R. E. Schultes.



II.

SPRUCE'S TRIP on the Río Negro was productive from the start. During the first month after leaving Manáos, it was "a good voyage considering that I worked all the way and consequently made frequent stoppages... [having dried] some 3,000 specimens." The entire trip yielded several thousand collections. Very few species were twice represented. Among his outstanding contributions to our knowldge of economic plants may be noted the following: his discovery and identification of a new narcotic—the *caapi*—used in Indian ceremonies for the visual hallucinations it produces; the great impetus to the study of rubber with the description of six new species based on his collections; the discovery of two new genera allied to the genus of the rubber tree; his study of the piassava fibre palm; and his botanical determination of a number of other useful trees which produce foods, timbers, oils, dyes, gums and other articles essential to man's living.

Spruce's interest in *caapi* and his willingness to experiment with the then unknown narcotic sets forth clearly that deep-rooted curiosity in natural things which makes him one of the peers among naturalist-explorers.

"I had gone [to the Indian *caapi* feast on the Río Vaupés]," he wrote in his notes, "with the full intention of experimenting the *caapi* on myself, but I had scarcely dispatched one cup of the nauseous beverage, which is but half the dose, when the ruler of the feast—desirous, apparently, that I should taste all his delicacies at once—came up with a woman bearing a large calabash of caxiri (mandioca beer), of which I must needs take a copious draught, and as I knew the mode of its preparation, it was gulped down with secret loathing. Scarcely had I accomplished this feat when a large cigar, 2 feet long and as thick as the wrist, was put lighted into my hand, and etiquette demanded that I should take a few whiffs of it—*I*, who had never in my life smoked a cigar or a pipe of tobacco. Above all this, I must drink a large cup of palm-wine, and it will readily be understood that the effect of such a complex dose was a strong inclination to vomit, which was only overcome by lying down in a hammock and drinking a cup of coffee which the friend who accompanied me had taken the precaution to prepare beforehand."

With Spruce's long and detailed account of this intoxicant and its use began a continuous series of researches—still in active prosecution—of a plant which one day may be of promise in medicine, due to its weird properties.

Drawing of the type specimen, collected on the Río Vaupés by Richard Spruce, of the famous narcotic *Caapi* or *yajé*. It was described by Spruce as a new species of *Banisteria;* recent research has indicated that its correct generic name is *Banisteriopsis.* (Drawing by E. W. Smith. Published by permission of the Botanical Museum of Harvard University.)

Adversity plagued Spruce almost constantly during these years. We can but wonder how he stood it so long and maintained his cheerful disposition through it all. The Río Negro was—and still is—the home of hunger. Food is the rarest of luxuries. What Spruce wrote over a century ago would remain true to-day, were it not for tinned groceries, that boon to the modern explorer.

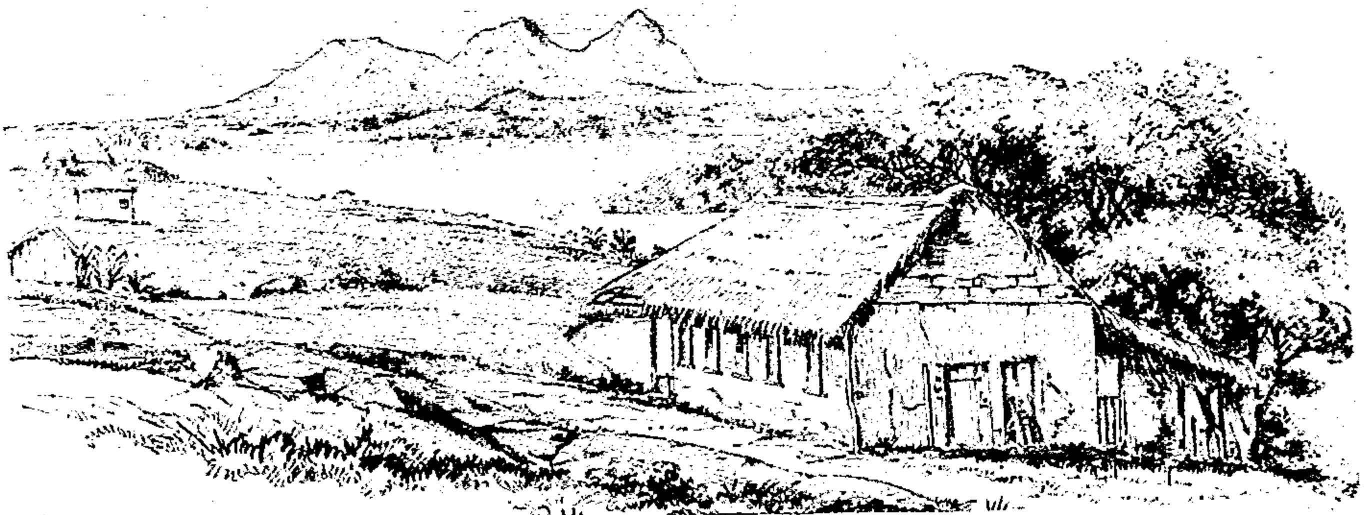
"Since last writing to you, I have been able to add scarcely anything to my collections . . . My hunter some three months ago was taken seriously ill . . . With my Indian disabled came the festa of Sao Gabriel . . . lasting above a month. During this time, no one would either hunt or fish. Never was I so near dying of hunger. I was reduced to take the

gun . . . and go out early in the morning . . . in quest of parrots and japus. Unless the rain came on very furious, I always succeeded in procuring my dinner, but I once passed three days solely on *xibé* (farinha mixed with water), which the Indians drink . . .; but to a person unused to it, it causes great flatulency and does not allay hunger. When the streams began to swell, the larger kinds of game retired deep into the forest, and it was necessary to go by water to some distance, pass the night in the forest, and with the dawn of morning proceed on the chase. But it is almost useless, a person hunting here who has not been used from his infancy to threading the forest and spying out the game . . .The day was so far broken into that I could rarely get more than a short walk in the afternoon."

Intellectual isolation gnawed at his heart. A great letter-writer, Spruce's greatest joy—next to the discovery of a new plant—came with the all-too-infrequent post. Sometimes he seemed almost resigned to despair, as when he wrote: "My last dates from England are a year old. Neither newspapers nor anything else ever reach me now. I seem to have taken my last leave of civilisation."

When, favoured by good weather and health, he amassed a valuable collection, which he would box up to ship to Manáos, a hundred agents of the devil lurked to put to naught his successes.

"Whatever advantages São Gabriel may have as a station, on account of its interesting vegetation, it has disadvantages so great that, if I had commenced my South American collections here, I dare say I should have given them up in despair. The house I am in is very old; the thatch is stocked with rats, vampires, scorpions, cockroaches and other pests to society; the floor (being simple mother earth) is undermined by *saúba* [leaf-cutting] ants, with whom I have had some terrible contests. In one night they carried off as much farinha as I could eat in a month; then they found my dried plants and began to cut them up and carry them off. I have burnt them, smoked them, drowned them, trod on them, and, in short, retaliated in every possible way, so that at this moment I believe not a *saúba* dares show its face inside the house . . . Then the termites . . . have covered ways along every post and beam. They have already eaten me up a towel and made their way into a deal packing-case . . . But the greatest nuisance . . . I had not foreseen. Almost the sole inhabitants are the soldiers . . . When a man commits a crime . . . he is enlisted and marched off to one of the frontier posts. Thus, of the fourteen men . . ., there is not one who has not committed some serious crime, and at least half of them are murderers. Judge with what security I can leave my house

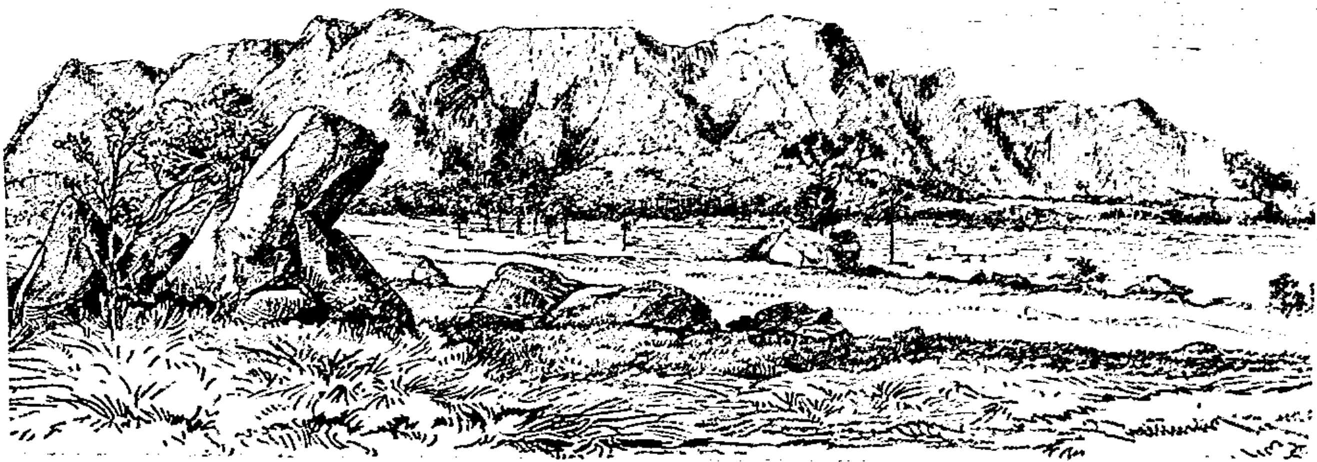


A drawing by Richard Spruce of São Gabriel on the Río Negro, looking towards the Mountains of Curicuriari. July 1852. Original preserved by the Linnean Society of London.

. . . [which] has already been twice entered . . . and about two gallons of spirits, a quantity of molasses and vinegar, and some other things stolen from it."

Spruce's uncanny ability at searching out rare plants and at evaluating a good location for plant collecting seems to have failed him but once. After his long stay at the confluence of the Río Negro with the Casiquiare, he proceeded up the Casiquiare to the Río Orinoco, where he stopped at Esmeralda, near the base of the now botanically famous Mount Duida. "At sunset, the mountain was very grand, the ridges assuming a purple hue, while the interstices were veiled in an impenetrable gloom, and a stratum of white fleecy cloud was floating beneath the summit." Since he had found the flora of the granitic mountains on the Río Negro little different from that of the surrounding basal jungle, he did not attempt to ascend this forbidding landmass, picturesque and inviting though it was to the eye. He had, however, earlier resolved that one of his aims in South America would be to "rifle its botanical treasures." This unfortunate misjudgement is to be deplored, for recent studies of the flora of Duida have indicated that it is undoubtedly one of the richest and most endemic on the whole continent, having yielded undreamed-of treasures in new species and genera, many of which are not known from any other locality in the world. This prize should have been Spruce's. It may be that Spruce felt, at the time, too worn to face the formidable exertion of scaling the cliffs and ravines of Duida, which he studied assiduously with the telescope. If so, he is easily forgiven. For the very fact that he had to dwell for a time at Esmeralda must have sapped the fire of his warmest enthusiasm:

". . . to the sight, Esmeralda is a Paradise—in reality it is an Inferno scarcely habitable by man. When I stood in . . . the small square, round which are built the [six] houses at Esmeralda—the straw doors all carefully closed and looking as if nothing human ever came forth from them—the warm east wind fanning my face and raising the sand . . ., but bringing no sound of life on its wings—no bird or even a butterfly to be seen—amid the luxuriance of vegetable life, animal life almost extinct—I thought the scene inexpressibly mournful. But the utter absence of living things was only apparent, not real. If I passed my hand across my face, I brought it away crushed with blood and with the crushed bodies of gorged mosquitoes. In this you have a key to explain the unearthly silence. The apparently tenantless houses all had inhabitants in them who, bat-like, drowse away the day . . . Throughout the day, the very air may be said to be alive with mos-



A drawing by Richard Spruce of Cerra Duida (8,000 feet), looking north from the cross near the village of Esmeralda. December 1853. Original preserved by the Linnean Society of London.

quitoes . . . I constantly returned from my walks with my hands, feet, neck and face covered with blood . . . If I climbed the cerros, or buried myself in the forest, or sought the centre of the savannas, it was the same; but it was worst of all on the river . . . Many times, there is no sitting down to eat a meal, but one must walk about, platter in hand, and be content to eat one's food well peppered with mosquitoes. I found working at my plants very difficult, although I put on gloves and tied down my trousers over my ankles . . . Most of these minute flies leave a small clot of blood . . ., and with me the wounds often bled considerably."

Intense joy is registered in Spruce's journal when he arrived in "Humboldt's country"—the Upper Orinoco. Here he explored and mapped several affluents which, to this day, have not been revisited by men of science. He continued down the Orinoco as far as the rapids at Maypures, a trip during which he nearly gave his life with tropical fevers.

Returning to the Río Negro by the same route, and descending the Río Negro, he finally arrived at Manáos, at the end of 1854, physically much spent, but still the mild-mannered naturalist, content with his lot, who could write:

"At the highest point I reached on the Vaupés . . . I spent about a fortnight, in the midst of heavy rains, when . . . very few trees open their flowers. But when the time came for my return . . . the weather cleared up, and as we shot down among the rocks which there obstruct the course of the river, on a sunny morning, I well recollect how the banks of the river became clad with flowers, as it were by some sudden magic, and how I said to myself, as I scanned the lofty trees with wistful and disappointed eyes, 'there goes a new *Dipteryx*—there goes a new *Qualea*—there goes a new *the Lord knows what'*.", until I could no longer bear the sight, and covering up my face with my hands, I resigned myself to the sorrowful reflexion that I must leave all these fine things 'to waste their sweetness on the desert air'. From that point upwards, one may safely assume that nearly everything was new, and I have no doubt that [that] . . . tract of country . . . offers as rich a field for a botanist as any in South America. But I . . . find that it will be necessary to cross *paramos* of the most rugged and inhospitable character, and afterwards risk oneself among wild and fierce Indians, so that I fear its exploration must be left to someone younger and more vigourous than myself."

During the years of Spruce's isolation in the Río Negro and Orinoco areas, a vast change had come over the sleepy little town of Manáos,

to which he returned in 1854. A contagious fever had gripped the Amazon Valley. Rubber, previously a curiosity produced in insignificant amounts, now was become a world commodity. Prices soared and life, even unto the farthest recesses of the Amazon, was completely altered. With his knowledge of rubber plants, of many species of which he was discoverer, Richard Spruce could have left his botany and have made a fortune. He did not. Instead, arriving in Manáos, he rested a while, continued to collect plants and began to dream of virgin forest reaches farther to the west. Accordingly, on March 14th, he set out up the Amazon towards Peru on an iron steamer, one of the manifestations of the revolution that the rubber boom was producing in the Valley—and "enjoyed much the rapid run up the Solimoes [upper Amazon], contrasting strongly with the painful way in which we crept up in a canoe in 1851, when it took a week to reach Manaquiry." "In the steamer," he wrote, "we spent ten hours."

This leisurely trip up and up the Father of Rivers gave Spruce a much-needed rest and a chance to see, unfolding before his eyes, a panoramic motion-picture, as it were, of changing vegetation. He was impatient, however, as is every naturalist who has travelled in a vehicle which he himself does not command, for he could not bear to see the wonderful trees—mostly new to him—that were passing. His journal is replete with minute descriptions of the luxuriant vegetation of the river-banks. On and on, up further up, the mighty Amazon, past the ruins of an ancient fortress at "Tabatinga, the frontier town of Brazil, situated on the north bank, a miserable place containing scarcely any houses but those of the garrison" where the "soil is clayey and the vegetation luxuriant" and finally reaching "Loreto [now an abandoned ruin above the Colombian town of Leticia], the first town in Peru and decidedly better than Tabatinga." Several days later, the steamer put in at Iquitos, now a city built upon the rubber trade, but then, in 1854, "a considerable village" ... "containing many people of mixed race, besides a great many Iquitos Indians."

Peru, its culture, language and people, were, like its magnificent flora, strange to Spruce. In the pages of his journals, Spruce records again and again his wonder at the novel jungle paradise that unfolded its panorama to him as he ascended the gentle eastern slopes of the Andes, paddling up past the villages of Nauta, Yurimaguas and, finally, in June, arriving at the thriving little town of Tarapoto, nestling in a broad and rich valley. This trip was not without its hardships and unpleasant experiences, but all was forgotten when the wealth of plants at Tarapoto appeared. Tarapoto had previously been visited

by the German botanist Poeppig, and Spruce, in choosing to locate here, undoubtedly knew of the treasures that lay waiting for his penetrating search. He resided in Tarapoto for two years, amassing a vast collection, including more than 250 species of ferns within a radius of twenty-five miles.

"These steep narrows are called *pongos*," he wrote to Mr. Bentham, "and often include falls and rapids. They are rich places for ferns, but it is difficult and dangerous getting along them, now and then scrambling over large, slippery rocks . . ., or wading up to the middle through dark holes with the water below 70°. An exploration of one of these places generally costs me a week's suffering in the feet. I have at last got into the fern country, and I have already gathered more species than in all my Brazilian and Venezuelan travels."

Here he rested, paradoxical it may seem, amidst his arduous labour, for the village was peaceful and quiet and the climate, at an altitude of 1,500 feet, superb. He was happy and was accepted by the simple townsfolk as one of their number. He wrote to Bentham in December, 1855, that he proposed "extending my stay at Tarapoto to a little over the twelve-month" in order to "gather a few things which illness and fatigue obliged me to leave at the time of my arrival," but in March, 1857, he communicated: "I am still a prisoner here, what with revolutions on the one hand which render the Sierra unsafe to pass and with the swollen river on the other."

He had planned to proceed to Ecuador over the mountain passes by way of Lima, but the revolution, which did not abate, caused a change in his projected itinerary. Fearless, Spruce would ordinarily not have hesitated to cross country torn by civil strife, but such was the general degeneration of law and order that it would have been impossible to obtain men or beasts for the trip. The serious hampering of Spruce's work from this state of affairs can be imagined from passages in his letters:

"It was festival time at Tarapoto . . . As day broke, they were preparing to resume the festivities . . . when all at once the cry arose '*Viene el reclutamiento!*' The horror of that word to a Peruvian may be comprehended when I add that 'recruiting' in Peru is something like what the pressgang used to be in England, only much more barbarous. Somebody had caught sight of the soldiers' uniforms and at once concluded it to be a recruiting party. Immediately, all was panic and confusion, and in less than an hour nearly the whole population was in full flight. As I sat with my door open, quietly working at my plants, I could see a continuous stream across the

pampa of people laden with their household goods . . .; and the drums, fiddles and guitars which had been so noisy the three previous days were all silent."

It was then, due to these unsettled conditions, that Spruce decided to concrete plans for a trip to Ecuador by way of the Río Pastaza which, previously, he had rather vaguely yearned to carry out.

It was during his residence at Tarapoto, towards the end of 1857, that Spruce received a communication from the British Government which led to empire-changing results. Her Majesty's Secretary of State for India commissioned this modest botanist from Yorkshire—who although buried for ten long years in the remote verdure of South America was, as a result of his achievements, now a leading figure in world botany—to proceed to the Cinchona forests of Andean Ecuador to study the quinine-yielding species and to collect seeds and living plants of the types best suited for a plantation programme in the colonial possessions of the East. A mighty commission it was: to lay the scientific basis of an ambitious new industry.

III.

IT WAS LATE IN MARCH 1857 when Richard Spruce, attendant upon his government's bidding, began another trip of formidable dimensions: by canoe for some 500 miles from Tarapoto to Canelos by way of the Ríos Huallaga, Marañon (the uppermost Peruvian course of the Amazon), Pastaza and Bombonasa, and from Canelos to Baños, at the base of the Volcano of Tunguragua in Ecuador, on foot. This trip was without question the most difficult and hazardous one that the intrepid explorer had ever faced, but he faced it with accustomed stoicism and even with happy anticipation of the as yet unknown marvels of nature that lay ahead of him. The voyage took three months. It was accomplished in open dugout canoes—travellers and equipment at the mercy of the elements—and over perilous cataracts in almost completely uninhabited rain-forests.

"I arrived here," he wrote to Mr. Bentham from Baños, "on the 1st of July, after a voyage of exactly a hundred days from Tarapoto. Such a journey! I can hardly bear to think of it, much less to write at length of what I saw and suffered . . . I had with me a large, handsome dog . . . when my canoe was caught in the whirlpool, the horrid roar of the waters, which drowned our voices, and the waves which splashed over us, so frightened the dog that he went mad!"

Another experience shows the perseverance typical of Spruce's work: "We had scarcely resigned ourselves to sleep . . . when the storm burst over us and the river almost simultaneously began to rise; speedily the beach was overflowed, the Indians leaped into the canoes; the waters continued to rise . . . coming in on us every few minutes in a roaring surge which broke under the canoes in whirlpools and dashed them against each other . . . The Indians held on by the branches . . . using all their efforts to prevent the canoes from being smashed by the blows from each other or from the floating trees which now began to careen past us like mad bulls. So dense was the gloom that we could see nothing . . .; but each lightning-flash revealed to us all the horrors of our position. Assuredly, I had slight hope of living to see the day, and I shall ever feel grateful to those Indians' who, without any orders from us, stood through all the rain and storm of that fearful night, relaxing not a moment. . . ."

It seems that swollen rivers presented Richard Spruce with his greatest problems on this trip. Constructing temporary bridges in the deepest mountain-forests from bamboo was exceedingly time-consuming and perilous work. The very task of cutting the bamboo and carrying it through the jungle to the place chosen for the bridge was a major operation. Then often a bridge would be finished only to fall or to be washed away by a continued swell of the current, or else found too weak for transit. Thus, at the Río Topo, Spruce had to build four bridges, and even then he was forced to abandon much of his heavy baggage for fear of overtaxing the bridge.

"It had been raining heavily for some time, and the river already began to show signs of a further rise; our safety depended therefore on getting over as speedily as possible. And now [it] became evident . . . that the second bridge was so long and so weak, and bent so much when a man went over it, that a very little addition to his weight would plainly either cause it to break or the farther end to slip off the rock whereon it rested but too insecurely. To get across my heavy boxes would be plainly impossible; the Indians, indeed, flatly refused to risk themselves on the bridge under the weight of any one of my boxes. . . . Those who have escaped from death by hunger or drowning may understand what a load was taken off my heart when we had all got safely across the Topo, although I had been obliged to abandon so many things which were to me more valuable than money."

From Canelos to Baños, Spruce gradually quitted the hot lowland jungle which had been his home since 1849. It took a fortnight to make this overland trip, and Spruce's journal is exceedingly full for

this portion of his travels. There was much that was new to him, not only in the vegetation but also in customs of the Indians, geography, and experience. They had entered the Andean rain-forest, and the excessive moisture presented new hindrances to travel, living, and botanical endeavour. Beds were palm leaves laid upon the soggy ground under a palm-thatch shelter erected in quick order by the natives, but physical weariness always assured a good night's rest.

"When we had got our house set up and the necessary fuel and water brought to it, my first care was to prepare coffee—the greatest consolation a traveller can have after a day's work in the wet forest. After coffee, a salt fowl was boiled and plantains roasted for supper. Then, wrapped in my blanket and stretched on my mattress, with my feet near to a good fire, I prepared to pass the night, and I may say that however much I might have suffered through the day, I generally slept tolerably well and rarely suffered from cold."

Hunger such as he had never met, even on the Río Negro, was one of Spruce's chief problems on this trek.

"I sallied forth . . . to see if I could meet anything eatable. . . . Among them (granite rocks), grew scattered plants of a small Cardamine, of which I gathered all I could find to eat as salad. I then . . . scrutinized all the trees and the ground beneath them, in the hope of meeting some edible fruit; but it was not the proper season, and I could only find a single tree of Miconia . . . with small insipid black berries. . . . This I decided to cut down the following day . . . and boil up the berries with about a handful of sugar which I still had left. Neither I with my gun nor the Indians with their blowing canes could meet a single living thing save toads."

It was at Tarapoto and during this trip to Baños that the unexcelled collection of bryophytes basic to Spruce's master-work *Hepaticae Amazonicae et Andinae* began to swell. He lamented, however, that he could collect so little during the trip:

"I had brought from Tarapoto a boxful of drying-paper, and on our way up the rivers I had dried a sprig or two of everything accessible. . . . At Puca-yacu, fearful of increasing the weight of my cargoes, I limited my collections to mosses. The only way of lightening my cargoes was to throw away all the paper not occupied by plants. . . . This I did—with a heavy heart—for I knew I should have much difficulty in replacing the paper when I got out into the Sierra. The savages made a bonfire of my precious drying-paper and danced round it!"

Delayed by a tremendously swollen affluent of the Pastaza, Spruce contented himself:

My chagrin at this delay was somewhat lessened by the circumstances of finding myself in the most mossy place I had yet seen anywhere. Even the topmost twigs and the very leaves were shaggy with mosses, and from the branches overhanging the river were suspended festoons of several feet in length composed chiefly of *Bryopteris* and *Phyllogonium fulgens*. . . . Throughout the journey, whenever rains, swollen streams, and grumbling Indians combined to overwhelm me with chagrin, I found reason to thank heaven which had enabled me to forget the moment of my troubles in the contemplation of a simple moss."

Nor were these delays merely the instrument for extensive collections of bryophytes; they enabled Spruce to make numerous curious observations which otherwise would have been impossible:

"The trunks and branches . . . and often even the uppermost leaves are densely enveloped in mosses . . . to the length of one to three feet, and in such thick bunches that, when saturated with rain, they often break off even green branches by their weight. I have been told by the cargueros (porters) . . . that, when they pass . . . after much rain has fallen, they step with constant dread of being crushed by some ruptured branch."

During Spruce's enforced delay in "the sloppy ground, the soaked forest, and the unceasing rains" of the swollen river Topo, he discovered a tiny hepatic completely unknown to science: *Myriocolea irrorata*, one of the most interesting bryophytes he ever collected and, as Wallace has remarked, the "only agreeable souvenir he preserves of that river," where he had to abandon his botanical equipment and fight for his life against time.

Spruce worked in the vicinity of Baños, "a poor little place of about a thousand souls" that "nestles under Tunguragua in a gorge of the Pastaza" and on Mount Tunguragua for six profitable months. It must have been a considerable relief to arrive at a locality where food was plentiful and good: ". . . we have oranges, bananas, and sugar-cane, and on the hills close by barley, beans, and potatoes" and where bread, although dear, was brought down from Ambato. Arriving "much fallen in flesh" after his recent travels, with his "thin face nearly hidden under a beard of three months' growth," Spruce "could easily demolish sixpenny-worth a day" of such a novel windfall as common bread, to say nothing of mutton and beef! He minded the cold because of his years of life in the tropics and his weakened health, but science

was given a magnificent collection of unexcelled quality as a result of his ceaseless activity in this region. Spruce suspected the value of the plants and wrote: "I believe most of the trees will be undescribed." When ready to quit Baños, Spruce was a different man—rejuvenated in body and renewed in spirit, and he noted: "I don't think I was ever so stout in my life as I am at this moment."

His next period of residence was at Ambato, at the foot of Mount Chimborazo. And here he stayed until April 1860. Again, the period was productive in the extreme, and included visits to Riobamba, Quito, and other highland areas. War with Peru and a resultant scarcity of goods curtailed the trips Spruce wanted to make, but the greatest blow of all was his complete physical breakdown in April of 1860, coming after a period in his life when he had enjoyed health which he had not known for a long time. But, fortunately, he was able, before this calamity, to begin his great work on Cinchona which he continued and completed against unspeakable odds of physical pain. "I awoke in the morning paralysed in my back and legs," he wrote to a friend. "From that day forth I was never able to sit up straight or to walk without great pain, soon passing to mortal exhaustion." Nevertheless, his determination to win out was steeled, and he wrote of his Cinchona mission: "This task will occupy me (if my life be spared) the greater part of next year."

Diplomacy and tact in securing permission to explore the richest Cinchona areas and in overcoming local pride and jealousy was needed, but finally, after long delay, he was able to report to Sir William Hooker:

"I have succeeded in hiring the forests producing the *cascarilla roja* after about ten times as much correspondence as would have been necessary in any civilised country, and I am now getting together a staff of workmen (no easy task in these revolutionary times) with which to enter the forests."

By August, although a physical wreck, Spruce was hard at work in the forests of Alausí, one of the richest of the quinine-bark areas of Ecuador, studying the various types of bark, determining the species producing them, and carrying out a general ecological survey of the forests. All this was done in a countryside swarming with soldiers and revolutionaries. The most detailed and fundamental observations he made, to unravel and to test the at times confused folk-knowledge concerning the different grades of bark. We can see, in reading his letters, a gradual and logical progress resulting from his determined researches.

Out from the town of Guataxí with a good guide well acquainted with the quinine-forest, Spruce began this work:

"From him I learnt that the *cascarilla roja* did not commence until another day's journey . . . and that to have a chance of seeing it in any quantity . . . it would be necessary to penetrate at least three days in the forest. As the object for the present was merely to make myself acquainted with the plant and with the soil and climate in which it grows, I decided to go on no farther than until I should meet with it. . . ."

On finding, after much disappointment, his first Cinchona, his "first thought was to verify a report that had been made to me by everyone who had collected *cascarilla*, namely, that the trees had milky juice, which to me was strange and incredible in the Rubiaceae." He found that the "juice is actually colourless but the instant it is exposed to the air it turns white and in a few minutes red." He made further detailed observations on the *cascarilla roja*, then went to another locality to study another type, *cascarilla serrana*, in the bleak forests of Llala where "the trees are so thickly clad with mosses that it is difficult to push one's way through them"; and from there, on to still other regions and other types of *cascarilla*. Thus, slowly, he amassed more data than any man ever had gathered on the life and habits of this life-saving tree.

The ground work done, he was soon ready to gather living material of the very finest for the Indian Government. His notes on this phase of his long botanical record in South America, covering 112 printed pages and of inestimable value to the later cultivation of Cinchona in India, are fascinating and should be read by all who are attracted to botany either by hobby or profession. As Wallace has so feelingly written about Spruce's account of the quinine-bark forests: "It is so full of information on points of geographical distribution and of examples of unusual plant structure, and also contains so many short descriptions of strange or beautiful flowers still unknown to our horticulturists as to make it both interesting and instructive to all who study or appreciate the beauty and variety of the vegetation of tropical regions."

With the care and devotion so characteristic of all his endeavours, Spruce did all of the work connected with his Cinchona mission himself, entrusting nothing to servants, in spite of his crippled and suffering condition. When natives, thinking that Spruce would buy any seeds that they gathered, went out collecting on their own, he went so far as to pay them not to molest the trees.

"The seeds were gathered under my eye, and were dried, sorted and packed by myself. Partly on horseback, partly dragging myself about with the aid of a long staff, I explored pretty thoroughly and gathered, in particular, numerous fine ferns and mosses."

Later, he was able to report triumphantly:

"I had now gathered about 2500 well-grown capsules (without enumerating many smaller ones), namely 2000 from the trees at Limón and 500 from five trees at San Antonio. Good capsules contain forty seeds each—in some I have counted forty-two—so that I calculated I had (in round numbers) at least 100,000 well-ripened and well-dried seeds. . . . Had the month of July been as sunny as it is said usually to be, many more capsules would doubtless have ripened; as it was, only about one flower in ten produced ripe seeds. I had scarcely finished drying my seeds at Tabacal, when I received welcome intelligence that the army of General Flores had obtained possession of Guayaquil and that the communication between the coast and the interior was reopened. I therefore resolved to proceed to Guayaquil and dispatch from thence a portion of my seeds by the first opportunity."

Arriving in early October in Guayaquil, he was able to send his treasure to Jamaica by freighter. Immediately thereupon, he returned for an invaluable collection of seedlings which he had planted. These, brought out of the highlands and down to Guayaquil by raft, were shipped from Ecuador on the second day of 1861.

With these shipments, the eastern quinine industry, destined to assume such vast proportions and to afford such profound economic and medical benefits to mankind, was born. How much it owed to the modest Yorkshireman who spared nothing to make it all possible, few, even of those intimately connected with the industry, fully realised. Later in life, an invalid back in his native Yorkshire, Spruce was awarded a modest pension of £100 by the Governments of Great Britain and of India, in recognition of his outstanding achievements on behalf of the founding of the new industry.

For eleven years Spruce had been away from home when he successfully completed his quinine mission. Tired and ill, he would have returned to an easy life had he been an ordinary man. Friends urged him to return. But so much had he given of himself to botany that he was too poor in worldly goods, he felt, to retire; and there remained so much collecting that he wanted to do.

"I should be very glad," he wrote, "to return to England . . . but I have no funds beyond what are in your hands; these would soon be

exhausted and poverty is such a positive curse in England. . . . I have often wished I could get some consular appointment here, were it only for £150 a year; but I have no powerful friends, without which a familiarity with the country, the inhabitants, and the languages go for little."

So, for three more years, Spruce collected, exploring various parts of the Pacific coastal area of Ecuador and Peru.

IV.

DURING HIS STAY on the coastal area of Ecuador and Peru, Spruce received a shock of such drastic impact that a lesser man would never have recovered from it. Nearly all of his paltry savings—£700—vanished when an Ecuadorian establishment in which he had deposited it pending his return to England went bankrupt. It was almost too much for even Spruce to stand, and it occasioned one of the few letters he ever wrote which cast even a justified and understandable complaint. After this catastrophe in 1862, he wrote to his good friend, Mr. Hanbury, who was enquiring about vegetable gums:

"Your last letter shows plainly that you consider your correspondent both listless and dilatory. He confesses to both . . . If you knew how entirely disabled I am; how rarely I can sit at a table to do anything, but must write, eat, etc. in my hammock; how I cannot walk except for short distances, nor ride on horseback without being in danger of falling, from an arm or a leg suddenly turning stiff, you would surely not be surprised at my want of activity. I had never calculated on losing the use of my limbs . . . When after loss of health came wreck of fortune, simple though my wants be and modest as were my aspirations, I felt for a time completely prostrated . . . I have been too constant to botany; several times in the course of my travels I might have taken to some occupation far more lucrative; and I have met many men who, beginning without a cent, have made more money in two or three years than I in the thirteen, and that without being exposed to thunderstorms and pelting rain, sitting in a canoe up to the knees in water, eating of bad and scanty food once a day, getting no sleep at night from the attacks of venomous insects, to say nothing of the certainty of having every now and then to look death in the face, as I have done. Excuse these personal details, which I have not entered into with any hope or desire of exciting sympathy, but simply to explain that, although still in the midst of objects interesting

to the enquirer into the productions and processes of nature, I can pay little heed to them."

Too constant to botany! Spruce himself never really meant to say this. He would have chosen the same course were a new life opened to him—because he was fired by a God-given urge to live with nature and to try to understand the mysteries of earth's green cover. How much better off are all we who have followed him that he was so constant to botany. Of no man can Juvenal's words be more truly spoken: *Scire volunt omnes, mercedem solvere nemo.*

But thanks to his deep-rooted absorption in things green, Spruce bounded back from his momentary despondency. However, physical pain nevermore left him, and it gradually reduced his unexcelled capacities for work. More and more, his letters betray his condition, until finally, in April 1864, he wrote to Mr. Bentham:

"During the last twelve months, I have experienced some relief from my pains, and life has not been so barely tolerable a burthen as during the three preceding years; but I see plainly I can never hope to regain my former activity, or indeed be able to undertake any occupation whatever, and I have made up my mind to return to England, my present intention being to embark at Payta for Southampton on the 1st of May. . . ."

It was not alone a world of plant-friends that Spruce left behind him in South America. Everywhere he had worked he left loyal acquaintances and friendship for the tall gaunt Englishman whose sympathetic spirit renewed their faith in humankind. A letter he received in 1867 from Señor Manuel Santander of Ambato to his "much-thought-of and never-to-be-forgotten friend," Don Ricardo, speaks eloquently, and wishes "that London was no farther off than Ambato to Lligna, that we might go to Señor Ricardo":

"The receipt of your much-desired and consolatory letter has filled me and my family with joy, especially on seeing the portrait that accompanied it. But what a notable difference it presents from that you sent us in 1864, which showed you much the same as we had known you, whereas this last shows you with a beard as white as the snow of Chimborazo and a stoutness that (for you) is extreme."

And, on another occasion he wrote that his wife:

"is ready to complain that she ever knew you, because she could not then have felt your loss; but consoles herself with the hope that one day you will return to Ambato, stout, healthy and rich. That is what we all desire and that, leading with us a simple and peaceful life, we may end our days together."

When he returned to England, it was to Kew, to his plants and to his botanical friends that he bent his first steps. The jungles of South America still held him, however, and he found the dreary English winter a foreign experience. On 20th December 1864, he wrote from Kew:

"I am thankful we are so near the shortest day. It is an awful sight to me to see that the sun at noon barely rises as high as the weather-cock on Kew church steeple . . . and the poor skeletons of trees! I have not seen trees without leaves for more than fifteen years."

Finally, it was his native Yorkshire that claimed Spruce, for he repaired to the haunts of his youth to spend the remainder of his life in a tiny cottage in Coneysthorpe and to produce the greatest work in South American bryological annals: *The Hepaticæ of the Amazon and the Andes of Peru and Ecuador:* a critical catalogue of 700 species and varieties, 500 of which were represented in his own collections and 400 of which were new to science and described by Spruce himself. A monument to scholarly biological research and written in an impeccable technical Latin, it was qualified by Sir Joseph Hooker as Spruce's crowning work [which] will ever live." This work is a work of love. All through its pages of accurate measurement and description, one feels the intense love of the liverworts, Spruce's favourite group of plants. Indeed, only the flame of an intense love could have brought this sick old man to terminate such a monograph, for his researches were done in pain and disability: "I have made two attempts to complete my monograph of the South American *Plagochilar,* but sitting up to the microscope has brought on internal bleeding to such an extent that I fear, to my deep regret, that I must renounce the task." His monograph is far from an impersonal Latin treatise on a little known group of lowly plants, but stands as a monument, still living because it still inspires, to the deep companionship Richard Spruce felt for his hepatics, of which he did so feelingly say:

"The *Hepaticæ* are by no means a 'little family'. They are so abundant and beautiful in the tropics, and in the Southern Hemisphere generally, that I think no botanist could resist the temptation to gather them. In equatorial plains, one set creeps over the living leaves of bushes and ferns, and clothes them with a delicate tracery of silvery green, golden or red-brown and another set, along with mosses, invests the fallen trunks of old trees. In the Andes, they sometimes hang from the branches of trees in masses that you could not embrace with your arms. I have some species with a stem half a yard long, and other so minute that six of them grow and fruit on a single leaflet of an

Acrostichum. Then, as to number and variety, I suppose that the working up of my South American *Hepaticæ* may entail equal labour to that of monographing the world's *Rubiaceæ*. In the largest genus, *Lejeunea,* I have not merely thousands of specimens, but thousands of papers covered with specimens . . . I like to look on plants as sentient beings, which live and enjoy their lives—which beautify the earth during life, and after death may adorn my herbarium. When they are beaten to pulp or powder in the apothecary's mortar, they lost most of their interest for me. It is true that the *Hepaticæ* have hardly as yet yielded any substance to man capable of stupefying him or of forcing his stomach to empty its contents, nor are they good for food; but if man cannot torture them to his uses or abuses, they are infinitely useful where God has placed them, as I hope to live to show; and they are, at the least, useful to, and beautiful in themselves—surely the primary motive for every individual existence."

* * * *

I have felt it in the deep shadows of the Amazonian forests and in the blinding brightness of the Amazonian waters; I have felt it in herbaria; I felt it while standing before Spruce's humble cottage in the hamlet of Coneysthorpe; I felt it again as I stood reverently before Spruce's grave in the churchyard at Terrington; but there, under the lowering sky of a Yorkshire April, I *knew* it to be true: Richard Spruce still lives, and will live on to fire the heart and shape the thoughts of many a plant-explorer as yet unborn, who will tread Spruce's trail to carry forward his great, unfinished work.

Written on the Apaporis River in Amazonian Colombia, South America, October to December 1951.

Yours very faithfully
Richard Spruce.