

more observations on this point. The hawk-moths mentioned by one correspondent are scarcely sufficiently common to serve as the usual pollinating agencies, and the dipterous insect (apparently a *Volucella*) arrived in too fragmentary a condition for identification. The *Bombi* certainly visit these flowers, but the vague "bee" used in the book under review would certainly lead to confusion with the true honey-bee, which is not known to visit *primulas*. I may add that in the Manchester Museum there is a series of insects taken by Prof. Weiss on the primrose. No moths are included amongst them.

THE REVIEWER.

An Optical Phenomenon.

Is your correspondent "V. P." (*NATURE*, June 3, p. 398) perfectly sure that there is not in the glass pane in question one of those flattened oval air bubbles so common in window glass, which he may have overlooked? The phenomenon of the dark disc of shadow with the bright edge so exactly corresponds with the effect produced by these common flaws in glass that, in spite of his assurances, I cannot help suspecting that he may have misjudged the angle of incidence of the sun's rays. A window is before me as I write which presents identically the same phenomenon, and I was nearly being misled

SPRUCE'S TRAVELS IN SOUTH AMERICA.¹

DR. ALFRED RUSSEL WALLACE has rendered a great service to the scientific world, not only in having consented to rescue from oblivion the account of Spruce's remarkable travels, but also by the admirable way in which he has edited the manuscripts placed in his charge. Spruce's journal, which forms the substance of these volumes of about 1040 pages, has been carefully edited and considerably condensed. Passages of no particular interest have been omitted, and short summaries by the editor take their place. Several letters to Sir William Hooker, Mr. Bentham, and personal friends have been inserted which carry on the narrative and give a more life-like impression of Spruce himself.

These letters, which are keenly alive and full of human interest, form some of the most interesting portions of the book. Those to Mr. Bentham show the ardent botanist fired with enthusiasm for his work, whilst those to his friend Mr. Teesdale reflect the character of the man himself, and give a vivid picture of the every-day occurrences and of the perils which he experienced.

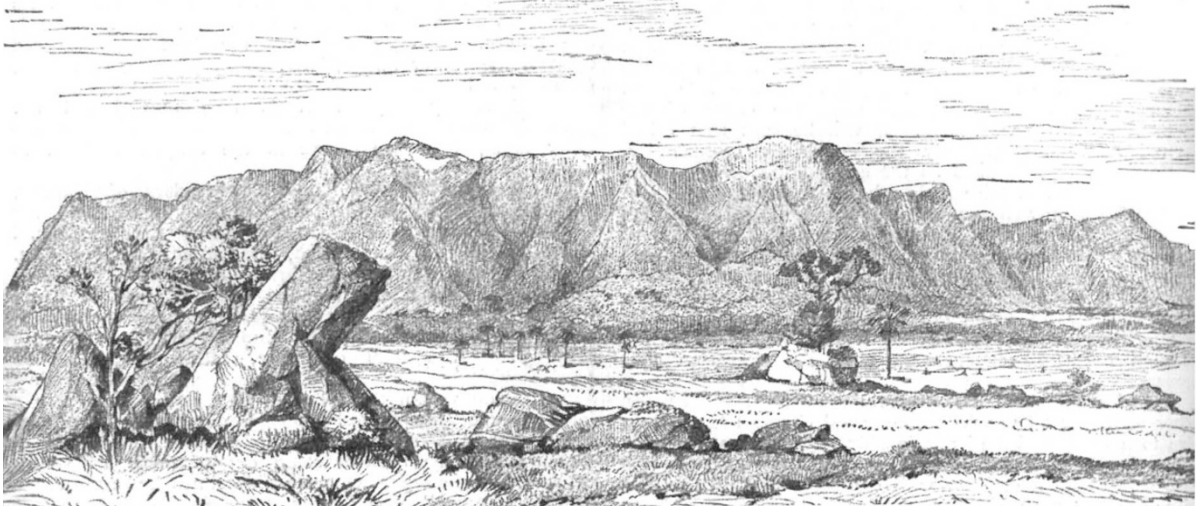


FIG. 1.—Cerro Duida (8000 feet), from the Cross near the Village of Esmeralda. Looking north. (R. Spruce, December, 1853.) From "Notes of a Botanist on the Amazon and Andes," vol. i.

until, with a pencil point laid on the pane, I tracked the shadow to its source, which was much higher up on the window than I should have judged.

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Dew-Ponds.

IN the recent correspondence on this subject several rival theories have been put forward to account for the supposed fact that certain ponds situated on the tops of hills have a plentiful supply of water. It seems to me that no satisfactory solution of the question can be expected until much more definite data are at hand.

What is wanted is a detailed, contoured survey of a typical "dew-pond" with its drainage area, and a year's observations of the height of water in it, an estimate of the number of cattle using it, rainfall and hygrometric observations in the neighbourhood, and a section showing the construction of the bed of the pond and adjoining slopes. If someone interested in the question and resident in the neighbourhood of one of these ponds would undertake the work, it would be of far more value than twice the labour spent in founding theories on insufficient data.

Wirksworth, June 12.

L. GIBBS.

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At times the reader is inclined to complain of an occasional want of continuity and of abrupt changes of subject, but such blemishes are not common, and, owing to the necessity for condensation, could perhaps hardly have been avoided.

The first volume, covering the period from July, 1849, to January, 1855, deals with Spruce's travels on the Amazon and Rio Negro, including a journey along the Casiquari and to the Orinoco cataracts.

The second volume opens with the account of the voyage from Manaos to Tarapoto, and continues his travels in the eastern Andes of Peru from that place, his excursions in Ecuador and in the Cinchona forests, and his last years on the western side of South America. There are also botanical and historical notes, which conclude with a highly exciting story of a hidden treasure of the Incas. The period spent in South America covered by this volume is from March, 1855, to April, 1864.

¹ "Notes of a Botanist on the Amazon and Andes." By Richard Spruce. Edited and condensed by Dr. Alfred Russel Wallace, O.M., F.R.S., with a Biographical Introduction, Portrait, 77 illustrations and 7 maps. 2 vols. Vol. I, pp. li+518; vol. II, pp. xii+542. With a Glossary of Native Names and Index. (London: Macmillan and Co., Ltd., 1908.) Price 21s. net.

The first volume has for frontispiece an excellent portrait of Spruce, and the biographical introduction by the editor which follows is of great interest. That a man so feeble in health as Spruce was in his earlier years could have endured the privations he experienced on the Amazon, or could have ever recovered from his illness at Maypures, or, again, could have carried on his work in the Cinchona forests with dogged determination when crippled with rheumatism, seems little short of marvellous; and yet his botanical work, which was of the highest order, was pursued with unflagging zeal, in spite of every difficulty either natural or physical.

The two volumes are full, both of well-ordered botanical information of great value, and contain also tales of peril and adventure of stirring interest. The voyage up the Rio Negro and the frequent passages of the rapids show how often Spruce was in imminent danger of his life. In the first volume one of the most interesting portions of the book is that

On the return to Manaos from the Rio Negro, Spruce continued his journey up the Amazon to Tarapoto, where he spent a year and three-quarters making various difficult excursions. His letters at this period are full of graphic detail. While here he was able to effect a cure for a serious case of snake-bite, but had he failed his life would probably have been taken by the Indians.

Throughout his journeys on this side of the Andes, Spruce encountered exceptionally heavy rains, which severely hindered his botanical work, and rendered his voyage up the Amazon, particularly from Tarapoto to Canelos, very dangerous. He vividly describes the storm at Puca-yacu, where the river, normally only three feet deep and twenty-five yards wide, rose eighteen feet during the night, and they had to hold on to every creeper to prevent the canoes from being swept away, and were in constant danger of being dashed to pieces by the trees borne along by the surging waters. The journey from Canelos to Banos through the



FIG. 2.—Chimborazo, from the Paramo of Sanancajas. From "Notes of a Botanist on the Amazon and Andes," vol. ii.

dealing with the little-known region of the Casiquari, the channel which unites the Rio Negro with the Orinoco. Here, in the country where Humboldt travelled, Spruce explored some rivers hitherto unmapped, and made extensive collections. He was much harassed by the mosquitoes, which, at the time of his visit, were making the region of Esmeraldas almost impossible for human habitation. The slopes of Duida and the Esmeraldas country are said to be magnificent, and Spruce's sketch, which is here reproduced, confirms his description. In addition to his sketches of the scenery, he gives some interesting drawings of the natives in this region, with good accounts of the different types of Indians with whom he met. After the excursion to the Duida mountains Spruce returned to the Rio Negro, and, going up stream, made the short portage of Pimichin, and then travelled down the Atabapo and Orinoco rivers as far as the falls of Maypures. Thence he retraced his steps a short distance; but fever was upon him, and so severe was the attack that for thirty-eight days he was unable to move.

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Montana, over a route which has hardly been traversed since, was attended with many perils, which were increased by the adverse weather conditions. Despite difficulties, however great, Spruce never ceased to add to his collections. Few people, we venture to think, would have dared to cross the foaming torrent of the Topo on improvised bridges of three bamboos, too slender to bear the weight of a man with his burden. The luggage and collections, therefore, had to be left, but, fortunately, they were recovered later.

On this journey Spruce describes how he walked through forests of giant Equisetums, 18 to 20 feet high, with stems as thick as one's wrist; to quote his own words, "a wood of young larches may give you an idea of its appearance. . . . I could almost fancy myself in some primeval forest of Calamites, and if some gigantic saurian had suddenly appeared . . . my surprise could hardly have been increased."

After a stay of some length in the Ecuadorean Andes at Riobamba and Ambato, whence numerous

excursions were made, Spruce then crossed to the western side of the Cordillera to explore the Cinchona forests, being commissioned to obtain seeds and young plants of Cinchona for India. It was fortunate that such a man as Spruce was on the spot to undertake the work. As his first visit to the forests of Alausi proved unproductive, he moved further north to the red-bark forests on the lower western slopes of Chimborazo, where the red-bark region extends from 2000 feet to 5000 feet above sea-level. Here he, with Mr. Cross, in the face of extraordinary difficulties, and in the midst of a revolution, collected seeds and raised plants of *Cinchona succirubra*. After a perilous voyage, they brought their cargo of Wardian cases safely to Guayaquil, whence they were shipped to India. The story of this enterprise is a remarkable narrative of energy and determination overcoming innumerable obstacles.

An interesting chapter in this second volume is

into particulars, but attention must be directed to the original and wonderfully exact map of the country, which is reproduced with the tracks of former treasure-seekers indicated. As Dr. Wallace offers an ingenious and apparently correct explanation of the reason why everyone has diverged from the right path at a certain point, there seems now to be every inducement for someone filled with the spirit of adventure to set out, chart in hand, on the five days' journey from Pillaro, and solve the question of the treasure of the Incas. A. W. H.

AN ANTARCTIC ALBUM.¹

AMONG the most valuable assets of the National Antarctic Expedition were the artistic ability of Dr. E. A. Wilson and the photographic skill of Engineer-Lieut. Skelton; and a large selection from their sketches and photographs, supplemented by those

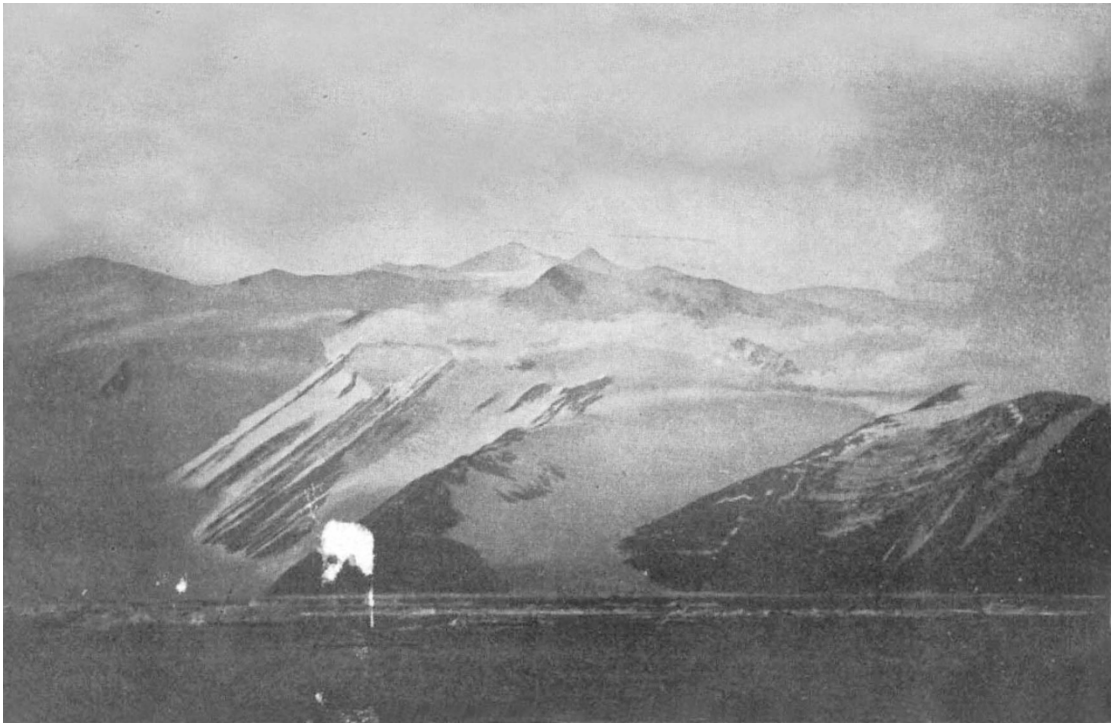


FIG. 1.—Mount Sabine. From a telephotograph by Lieut. R. W. Skelton; looking S. from Cape Adare to Mount Sabine, at the head of Robeson Bay, January 9, 1902. From "National Antarctic Expedition, 1901-4 Album of Photographs."

occupied by Spruce's paper entitled "Ant agency in plant structure, or the modifications in the structure of plants which have been caused by ants, by the long continued agency of which they have become hereditary, and have acquired sufficient permanence to be employed as botanical characters." The paper was rejected by the Linnean Society in the form sent in in 1869, and was never printed, but it is worthy of careful perusal.

Other chapters deal with narcotics, the Amazons, and the interesting rock-pictures of the Amazon valley. The volume concludes with an account of the hidden treasure of the Incas, including a translation of one of the few existing copies of Valverde's guide to the Llanganati Mountains—the locality of the treasure—and the Royal warrant of the King of Spain discovered by Spruce after persistent search. It would spoil the exciting interest of the narrative to enter

taken by other members of the expedition, has now been issued in a sumptuous volume and portfolio containing 165 plates. The illustrations included in this collection have been selected and arranged by Dr. Wilson, and he has also written the introduction and the description of the plates; he gives full acknowledgment to Captain Scott and other of his colleagues for their help in this respect.

Sir Archibald Geikie contributes the preface, in which he states that the album has been printed by Messrs. Oliver and Boyd, of Edinburgh, and many of the photogravures are the work of the Swan Electric Engraving Company, by whom the pencil drawings were produced by a new process invented by Mr. Donald Cameron Swan. The sketches of the aurora and various meteorological effects are reproduced as

¹ "National Antarctic Expedition, 1901-4." Album of Photographs and Sketches; with a Portfolio of Panoramic Views. Pp. xvi + 303; 165 plates, 2 maps. (London: Royal Society, 1908.)