THE MALAY ARCHIPELAGO

ALFRED RUSSEL WALLACE

Introduction by Tony Whitten

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THE
MALAY
ARCHIPELAGO

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Alfred Russel Wallac

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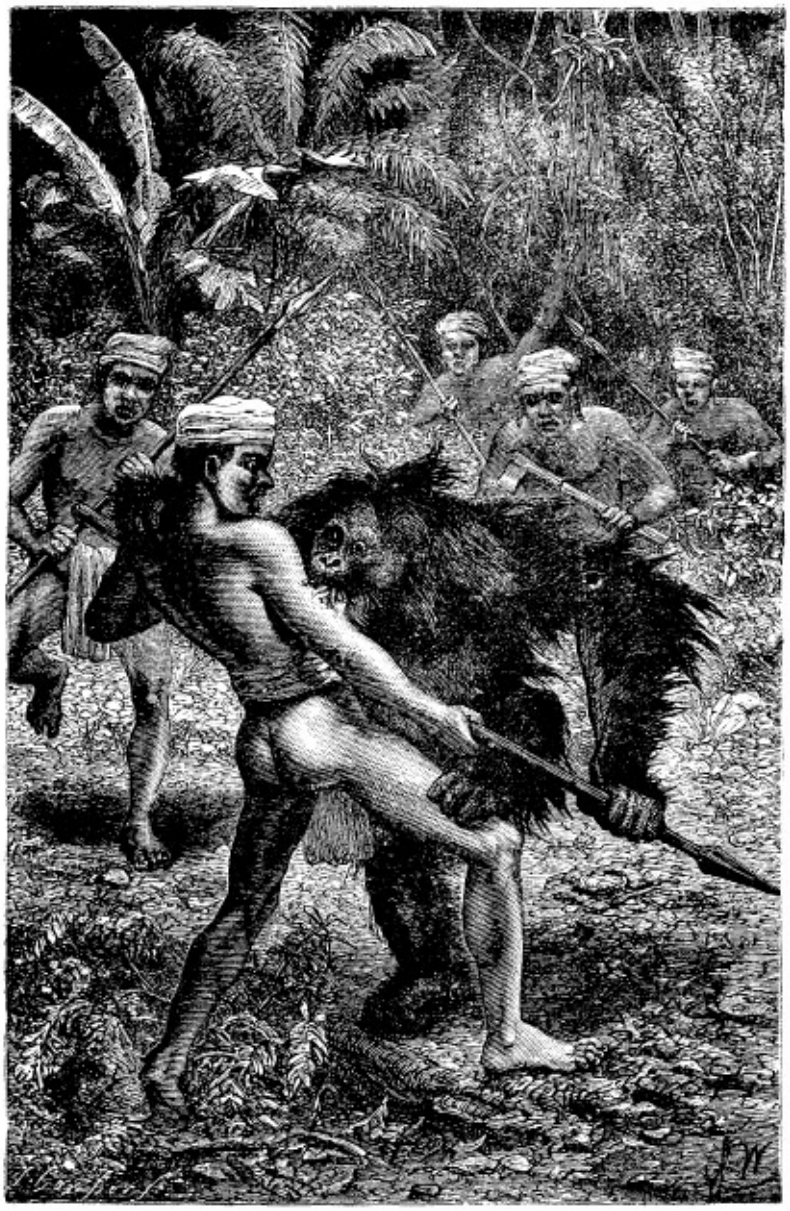

An orangutan attacked by Dayaks.

To
Charles Darwin
Author of *The Origin of Species*
I Dedicate this Book
not only
as a token of personal esteem and friendship
but also to express my deep admiration
for his genius and his works

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Introduction

OH, HOW I WISH I HAD KNOWN WALLACE! He was such a pleasant man, rather shy but passionate abo what he did. I don't think he would have appreciated my company for long periods, but I hope h would have suffered me now and again. To have travelled and conversed with him would have been great pleasure; what a lot there would have been to talk about. We could have shared many storie everything from the debilitating effects of suppurating tropical ulcers (while he conquered his throug rest, mine landed me in a sex-change hospital in Singapore needing plastic surgery), the woes of bein "often up to our knees in mud and much annoyed by the leeches," to the many times each of u thought we had arranged an early morning departure from a village but had to change plans when th expected guides or paddlers didn't turn up. I think we would have agreed that our frustrations we rooted in our failure to appreciate the different pace and priorities of village life; a life where th concepts of urgency and materialism don't translate easily.

I would have liked to talk about the excitement and fascination that we both feel when climbin mountains in tropical Asia, and which Wallace describes so well. The higher one goes, the smaller an more gnarled the trees become with heavier loads of dripping moss and exquisite orchids, and th more the plants become reminiscent of those found in the cooler parts of the Himalayas, Europe an even North America—with rhododendrons, hypericums, gentians, primulas, violets, buttercups an many other familiar garden plants. The best description he gives is of Mt Gede-Pangrango to the sou of Bogor in West Java which is very accessible to the reasonably fit, but a climb up any of the man mountains in Sumatra, Java, Sulawesi, Maluku or Papua is enormously rewarding.

I would love to have squatted on a roadside with Wallace, sticky-fingered, with an ever-growin pile of empty durian skins in front of us. We completely agree on the supremacy of this fruit which h called the "King" and "Emperor" of fruits, suggesting it was "worth a journey to the East, if only taste of its fruit." By contrast, Professor J.W. Purseglove, a renowned agriculturalist, botanist an author of the two-volume horticulturalist's "bible", *Tropical Crops*, held the view that the ripe fru "gives off an abominable stench of over-ripe cheese, rotten onions, turpentine and bad drains. Malay and other people in the Far East are very partial to it, as are some Europeans who have managed overcome the odour. The fruit taste is difficult to describe but it is sweet, aromatic, persistent and wi a touch of garlic; it has also been described as French custard passed through a sewer".

Wallace was born in 1823 in Usk, Monmouthshire. The family moved to Hertford when he wa six, and moved frequently within that area over the next seven years, a peripatetic pattern he was continue throughout his life. He left school at 13 moving to join first one brother and then anothe Always inquisitive, he read books on mathematics and geometry and, at 16, his first book on botan He continued to move around Britain, trying different jobs, but nothing lasted very long. At 21 he m the great British naturalist and explorer, H.W. Bates, and four years later the two of them set off to th Amazon to collect plants and animals. After four years he returned to England, but his enti collection was lost in a fire at sea. Back in London he was unemployed but wrote his first boo *Narrative of Travels on the Amazon and Rio Negro*. He then set off again, this time alone, and heade for the Malay Archipelago.

Wallace had the right temperament to work in Southeast Asia for he rarely seems to have boile over in frustration. Even when some of his writings were lost, he seems to have been able to take deep breath and get on with life rather than have the loss gnaw at him. For example, he made a amazing (and still useful) vocabulary of 117 useful words in 59 languages which is included in th

book's appendix. Well, it would have been 59 languages had a friend not lost the sheets of paper wit 26 of them when moving house. As a result only nine words are shown in all 59 languages. Wallac tells this story without any hint of rancour but only sympathy for the movers who must have assume that the papers had no significance.

Wallace was a delightful naturalist, not a specialist in any one branch of biology and there ar times, modern regulations apart, when I would love to have the same freedom to wander as him. Nev rich, he made his living by collecting animals and selling them, through an agent in London, to publ and private museums. He took great joy in the environment around him, and could wax lyrical abo the pitcher plants which "continually excited our admiration," and when local helpers brought hi birds they had caught, it kept him "in a continual state of pleasurable excitement." The agent se money out to Wallace to sustain him, and it was not until he got back to England that he discovere the agent had also been putting aside a sum for when he returned. He was not a scholar, having le school at 14, and despite attempts, was never successful in getting what one might call a "proper job"

Returning to London after nine years in Asia, he lived with his mother, sister and brother-in-la and during this time he met with all the elite in the exciting world of natural history—people lik Charles Darwin, Charles Lyell and Thomas Huxley. He also sorted his collection of 3000 bird skin and 20,000 butterflies and wrote descriptions of many of the previously unknown species. Over th years he applied unsuccessfully for many positions, including Director of the Bethnal Green Museum Assistant Secretary of the Royal Geographical Society and Superintendent of Epping Forest. He als challenged "flat earth" believers in print, but was attacked for his views.

Between 1845 and 1846 he wrote *The Malay Archipelago* and was awarded the Royal Medal by th Royal Geographical Society. The book was well received and at last earned him some mone Continuing to move around southern England, he wrote several other books: *Contributions to th Theory of Natural Selection*, *Miracles and Modern Spiritualism*, *Geographical Distribution Animals*, and *Tropical Nature and Other Essays*. Sadly he invested the proceeds badly and lost muc of his money. In desperation he wrote for *Encyclopaedia Britannica.*

I am deeply envious of the huge sense of discovery in the time in which Wallace lived. At one sit he collected some 1000 species of Longicorn beetles with long antenna of which at least 900 were ne to science. Mind you, I am enormously grateful to him and others of his ilk who have helped document so much of the region's biodiversity. And there are still many new and fascinating specie to discover if one goes to the right places with the sharp eyes and the right degree of diligence.

Some parts of his work and life do not sit easily today. He reports shooting a dozen or s orangutans in Borneo, and this section of the book is rather ghoulish by today's standards. He di however adopt a baby orangutan for three months and took great delight in it until it died, having ha no milk. He was a man of his times, and if alive today he would have been an ardent and practic conservationist.

Wallace was a great traveller and nowadays would more likely be seen at a hostel or homesta than in a hotel—in part because most "nice" hotels would baulk at the pickled animal corpses an drying skins which surrounded him at his many stops. Wallace had one or two assistants but unlik Raffles, who travelled through Sumatra with dozens of bearers and others to transport the chair French wine, and other "necessary" accoutrements, he didn't travel with the entourage normal for th Victorian traveller. Wallace was content with the bare essentials—clothing, bedding, and of course th collecting boxes, the pins to lay out his specimens, the preserving spirit, and knives for skinning th mammal and bird specimens.

I've been able to see many wonderful places but I agree totally with Wallace in his view that "Jav

may fairly claim to be the finest tropical island in the world, and equally interesting to the touri seeking after new and beautiful scenes; to the naturalist who desires to examine the variety and beau of tropical nature; or to the moralist and the politician who want to solve the problem of how man ma be best governed under new and varied conditions." Visitors to Jakarta or Yogyakarta seem to rus away to other islands, but the highways and byways of Java bring all sorts of surprises. It is certain densely populated in places, but elsewhere one can walk for a day and meet barely a soul, and th landscapes are breathtakingly stunning. Wallace was also struck by the relatively dry, austere north c Bali and I wonder what he would have written had he gone to the verdant and even more beautif southern part where the people were so vehement in their stand against Dutch colonial rule.

His sections on the distribution of animals and plants among the islands are a continuous them through the book, and he poses questions about, for example, why there are peacocks in Java but not Sumatra or Borneo, while there are other species of pheasants which are found on those two islan but not on Java. These magnificent birds with their hugely long tails can be seen at Alas Purw National Park and to see them flying is a great thrill, as Wallace describes.

But it was other writing which pushed him reluctantly towards the limelight. Darwin is usual given credit for formulating the theory of evolution by natural selection, but the primary reason h was encouraged to write down his thoughts was because Wallace had written to him from Ternate i 1858 enclosing a manuscript for Darwin's "perusal" showing that he had reached more or less th same conclusions as Darwin. Both men had been stimulated by what they had seen while travellin and the interpretation of their observations did not match with the contemporary wisdom concernin the creation of the world. The thoughts of these two men on the distribution and evolution of speci turned modern thinking upside-down and Wallace's contribution should not be underestimated eve though he was always self effacing about his contribution, always passing any praise and hono towards Darwin, the wealthy and establishment figure.

Wallace was of the view that the Indonesian archipelago was inhabited by two distinct faunas, on found in the east, one in the west. The following year he defined these two regions, based on th distribution of birds, by placing the boundary between Lombok and Bali and between Borneo an Sulawesi. He was struck that Borneo and Sulawesi should have such different birds and yet h separated by no major physical or climatic barrier. He believed that Borneo, along with Java an Sumatra, had once been part of Asia, and that Timor, Maluku, New Guinea and perhaps Sulawesi ha once been part of a Pacific-Australian continent. The fauna of Sulawesi seemed so peculiar that h suspected it might have been connected with both the Asian and the Pacific-Australian continents. H insisted that an explanation of the origin of the fauna of Sulawesi would have to accept that there ha been vast changes in the surface of the earth, a concept which challenged the established view b which we now know to be true. The line that Wallace drew east of the Philippines, through th Makassar Straits and between Bali and Lombok came to be known as Wallace's Line. In 1910, thre years before he died, Wallace decided that the predominance of Asian forms on Sulawesi should b reflected in the Line being moved east of Sulawesi. Since then other people have examined th placement of the lines and almost every permutation now exists based on different groups of anima and plants. To be sure, "Wallace's Line" does not work very well for many groups of organisms bu the principles are still valid and in fact almost any neat line or definition in biology tends to h criticized by someone.

The Malay Archipelago is neither pure travelogue nor a truly scientific tome for his real scien and scientific descriptions were written in other books and papers. *The Malay Archipelago* is mo like a long letter written to an interested friend who would be intrigued by not only what animals an plants he had encountered, but also by the stories of the travels by land, river and sea, and by th

conversations he had with local villagers or the kings, princes, rajahs and sultans alike.

A word has to be said about certain rather offensive passages relating to the character of the peop he meets and his gross extrapolations from individual conduct to racial traits. Wallace was a man o his age—but he was generally sympathetic to everyone he met. He was concerned about the labo endured by women and saw that the advance of civilization (or development as we would call it nov required that the situation of women be ameliorated. Indeed, some of the passages describing h village conversations are delightful. I have certainly also experienced the persistent enquiries as to m purposes for being in a forest area and my careful explanations have been met with disbelief, s foreign did they seem. I was reminded how aberrant my behaviour must seem when blowing my no on a handkerchief made one group of people, struggling to understand my odd habits, conclude that wrapped up the snot to take back to England!

The abundance of wildlife was very different in the mid nineteenth century. Wallace tells us tha there were always a few tigers running around Singapore, and they killed on average "a Chinama every day." Similarly, in 1861, just after he arrived in Wonosalem in East Java, a young boy had bee pulled off a bullock cart, dragged into the forest and eaten by a tiger. Some 700 men with spears wer after the tiger and killed it. Of course the forest edge has also progressively pushed back since his da and many of the areas he visited, especially in the western regions, are now covered with plantation of oil palm Acacia trees, sugar cane, and rubber.

While it would a privilege to bring him up to date on the condition of the natural ecosystems think it would take him a long time to absorb the rate and extent of the loss of natural ecosystems an the biodiversity within them. He saw things I would give my eye teeth to see. Imagine, that while h noted that elephants were, by the 1860s, some way distant from Palembang in South Sumatra as result of human disturbance, Sumatran rhinoceroses abounded and he "continually saw its tracts an its dung." The lucky man even glimpsed one feeding until it crashed away into the undergrowth. Th same species is now critically endangered with scant hope of a future in fractured and sma populations in Sumatra, Borneo, the Malay Peninsula and possibly Myanmar. Those in the foothills o the Himalayas to Indochina are long gone, prey to hunters seeking to benefit from the demand for th horn for Chinese traditional medicine and for Arab daggers.

When Wallace was 41 he proposed to 18-year-old Annie Mitten and they married the next year, i 1865. At this time he became involved in spiritualism and séances and also wrote on the subject. At 5 he moved yet again and wrote *Land Nationalisation*, having become very interested in the soci issues of his time—even if he was unable to find any regular work. Influential friends finally procure Wallace a small Civil List pension of £200 per annum, which must have been very welcome. Th following year Darwin died and at the grand funeral at Westminster Abbey ten years later Wallac acted as one of the pall bearers. Wallace never ceased to give the greater honour to Darwin for th "discovery" of evolution by natural selection and the dedication page of *The Malay Archipelago* testament to this.

In 1886, at 63, he embarked on a year-long American lecture tour presenting his travels an thoughts, illustrated with lantern slides. In 1889 he received an honorary degree from Oxfo University and published yet another book, *Darwinism.* His enormous (and continuing) contributio to science were recognized when he was made a Fellow of the Royal Society. Between the ages of 7 and 84 he published seven more books including his autobiography, *My Life*, and at 85 gave a maj lecture at the Linnean Society of London, from the spot where his and Darwin's papers on evolutio had been read 50 years before. He was awarded a variety of other honours and medals, including th Order of Merit. He did not receive it directly from King Edward VII on the grounds of old age and i health, but given that he was never one for pomp and ceremony he probably preferred to get his fro

one of the King's equerries in his own home.

In his final years his thoughts turned more to social concerns and he engaged with the Prin Ministers of the time, Asquith and Lloyd George, on the matters. He continued to write, and his la book, *Social Environment and Moral Progress,* was published in 1913, the same year that he die aged 90. What an amazing life!

* * * * *

It has been my enormous good fortune to have travelled and worked in most of the places Wallac visited and even to have seen in the wild many of the things he saw, but on re-reading *The Mal Archipelago* I was reminded of the concept of ecological amnesia or "shifting baselines." This refe to the phenomenon by which succeeding generations expect to see less nature because their experien has been of a depleted world. We laugh at the old fisherman who tries to convince us that in his da the fish were so much larger and so much more abundant—but in most cases he is probably right. W expect Sumatran rhinoceros to be rare because they have always been rare. No, they haven't. The used to "abound."

I have related above how *The Malay Archipelago* produces an affinity with Wallace because of th similar things we have witnessed and enjoyed. But in fact anyone with some time and an adventuro spirit can share a great deal of this even today—and with the comforts of malarial prophylactics an mobile phones. There are still Rajas on small islands in Maluku, there are still plenty of leeches, the are still innumerable butterflies to enjoy, and unique sights like the mating displays of the extravaga Wallace's Standard Wing are still there to be seen in the forests of Halmahera. Your patience an good humour in the Malay archipelago will often be rewarded with sights and experiences which wi be remembered for the rest of your life—just as Wallace did.

Tony Whitte

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The Ecology of Sulawes
The Ecology of Java and Bali, and *Wild Indones*

Preface to the First Edition

MY READERS WILL NATURALLY ask why I have delayed writing this book for six years after my retur and I feel bound to give them full satisfaction on this point.

When I reached England in the spring of 1862, I found myself surrounded by a room full packing-cases, containing the collections that I had from time to time sent home for my private us These comprised nearly three thousand bird-skins, of about a thousand species; and at least twen thousand beetles and butterflies, of about seven thousand species; besides some quadrupeds and lan shells. A large proportion of these I had not seen for years; and in my then weak state of health, th unpacking, sorting, and arranging of such a mass of specimens occupied a long time.

I very soon decided, that until I had done something towards naming and describing the mo important groups in my collection, and had worked out some of the more interesting problems variation and geographical distribution, of which I had had glimpses while collecting them, I wou not attempt to publish my travels. I could, indeed, at once have printed my notes and journals, leavi all reference to questions of natural history for a future work; but I felt that this would be unsatisfactory to myself as it would be disappointing to my friends, and uninstructive to the public.

Since my return, up to 1868, I have published eighteen papers, in the Transactions or Proceedin of the Linnæan Zoological and Entomological Societies, describing or cataloguing portions of m collections; besides twelve others in various scientific periodicals, on more general subjects connecte with them.

Nearly two thousand of my Coleoptera, and many hundreds of my butterflies, have been alread described by various eminent naturalists, British and foreign; but a much larger number remai undescribed. Among those to whom science is most indebted for this laborious work, I must name M F. P. Pascoe, late President of the Entomological Society of London, who has almost completed th classification and description of my large collection of Longicorn beetles (now in his possessio comprising more than a thousand species, of which at least nine hundred were previously undescribe and new to European cabinets.

The remaining orders of insects, comprising probably more than two thousand species, are in th collection of Mr. William Wilson Saunders, who has caused the larger portion of them to be describe by good entomologists. The Hymenoptera alone amounted to more than nine hundred species, amo which were two hundred and eighty different kinds of ants, of which two hundred were new.

The six years' delay in publishing my travels thus enables me to give what I hope may be a interesting and instructive sketch of the main results yet arrived at by the study of my collections; a as the countries I have to describe are not much visited or written about, and their social and physic conditions are not liable to rapid change, I believe and hope that my readers will gain much more tha they will lose, by not having read my book six years ago, and by this time perhaps forgotten all abo it.

I must now say a few words on the plan of my work.

My journeys to the various islands were regulated by the seasons and the means of conveyance visited some islands two or three times at distant intervals, and in some cases had to make the sam voyage four times over. A chronological arrangement would have puzzled my readers. They woul never have known where they were; and my frequent references to the groups of islands, classed accordance with the peculiarities of their animal productions and of their human inhabitants, wou

have been hardly intelligible. I have adopted, therefore, a geographical, zoological, and ethnologic arrangement, passing from island to island in what seems the most natural succession, while transgress the order in which I myself visited them as little as possible.

I divide the archipelago into five groups of islands, as follow:—

I. The Indo-Malay Islands: comprising the Malay Peninsula and Singapore, Borneo, Java, a Sumatra.

II. The Timor Group: comprising the islands of Timor, Flores, Sumbawa, and Lombok, wit several smaller ones.

III. Sulawesi: comprising also the Sula Islands and Buton.

IV. The Maluku Group: comprising Buru, Seram, Bacan, Halma-hera, and Morotai; with th smaller islands of Ternate, Tidore, Makian, Kayoa, Ambon, Banda, Gorong, and Watubelu.

V. The Papuan Group: comprising the great island of New Guinea, with the Aru Island Misool, Salawati, Waigeo, and several others. The Kai Islands are described with this group o account of their ethnology, though zoologically and geographically they belong to Maluku.

The chapters relating to the separate islands of each of these groups are followed by one on th Natural History of that group; and the work may thus be divided into five parts, each treating of one the natural divisions of the archipelago.

The first chapter is an introductory one, on the Physical Geography of the whole region; and th last is a general sketch of the Races of Man in the archipelago and the surrounding countries. Wi this explanation, and a reference to the Maps which illustrate the work, I trust that my readers wi always know where they are, and in what direction they are going.

I am well aware that my book is far too small for the extent of the subjects it touches upon. It is mere sketch; but so far as it goes I have endeavoured to make it an accurate one. Almost the whole o the narrative and descriptive portions were written on the spot, and have had little more than verb alterations. The chapters on Natural History, as well as many passages in other parts of the work, hav been written in the hope of exciting an interest in the various questions connected with the origin species and their geographical distribution. In some cases I have been able to explain my views detail; while in others, owing to the greater complexity of the subject, I have thought it better confine myself to a statement of the more interesting facts of the problem, whose solution is to b found in the principles developed by Mr. Darwin in his various works. The numerous illustration will, it is believed, add much to the interest and value of the book. They have been made from my ow sketches, from photographs, or from specimens; and such subjects only have been chosen as wou really illustrate the narrative or the descriptions.

I have to thank Messrs. Walter and Henry Woodbury, whose acquaintance I had the pleasure o making in Java, for a number of photographs of scenery and of natives, which have been of th greatest assistance to me. Mr. William Wilson Saunders has kindly allowed me to figure the curiou horned flies; and to Mr. Pascoe I am indebted for a loan of two of the very rare Longicorns whic appear in the plate of Bornean beetles. All the other specimens figured are in my own collection.

As the main object of all my journeys was to obtain specimens of natural history, both for m private collection and to supply duplicates to museums and amateurs, I will give a general stateme of the number of specimens I collected, and which reached home in good condition. I must premi that I generally employed one or two, and sometimes three Malay servants to assist me; and for thr

years had the services of a young Englishman, Mr. Charles Allen. I was just eight years away fro England, but as I travelled about fourteen thousand miles within the archipelago, and made sixty seventy separate journeys, each involving some preparation and loss of time, I do not think that mo than six years were really occupied in collecting.

I find that my Eastern collections amounted to:

310	specimens of Mammalia
100	— Reptiles
8,050	— Birds
7,500	— Shells
13,100	— Lepidoptera
83,200	— Coleoptera
13,400	— other Insects
125,660	specimens of natural history

It now only remains for me to thank all those friends to whom I am indebted for assistance information. My thanks are more especially due to the Council of the Royal Geographical Societ through whose valuable recommendations I obtained important aid from our own Government a from that of Holland; and to Mr. William Wilson Saunders, whose kind and liberal encouragement the early portion of my journey was of great service to me. I am also greatly indebted to Mr. Samu Stevens (who acted as my agent), both for the care he took of my collections, and for the untiri assiduity with which he kept me supplied, both with useful information, and with whatever necessiti I required.

I trust that these, and all other friends who have been in any way interested in my travels a collections, may derive from the perusal of my book some faint reflection of the pleasures I myse enjoyed amid the scenes and objects it describes.

Preface to the Tenth Edition

SINCE THIS WORK was first published, twenty-one years ago, several naturalists have visited th archipelago; and in order to give my readers the latest results of their researches I have adde footnotes whenever my facts or conclusions have been modified by later discoveries. I have also mad a few verbal alterations in the text to correct any small errors or obscurities. These corrections an additions are however not numerous, and the work remains substantially the same as in the earl editions. I may add that my complete collections of birds and butterflies are now in the Britis Museum.

Parkstone, Dorset

October, 1890

CHAPTER 1:
Physical Geography

IF WE LOOK AT A GLOBE OR a map of the Eastern hemisphere, we shall perceive between Asia ar Australia a number of large and small islands, forming a connected group distinct from those gre masses of land, and having little connection with either of them. Situated upon the Equator, ar bathed by the tepid water of the great tropical oceans, this region enjoys a climate more uniformly h and moist than almost any other part of the globe, and teems with natural productions which a elsewhere unknown. The richest of fruits and the most precious of spices are here indigenous. produces the giant flowers of the *Rafflesia*, the great green-winged *Ornithoptera* (princes among th butterfly tribes), the man-like Orangutan, and the gorgeous Birds of Paradise. It is inhabited by peculiar and interesting race of mankind—the Malay, found nowhere beyond the limits of this insul tract, which has hence been named the Malay Archipelago.

To the ordinary Englishman this is perhaps the least known part of the globe. Our possessions in are few and scanty; scarcely any of our travellers go to explore it; and in many collections of maps is almost ignored, being divided between Asia and the Pacific Islands.[1] It thus happens that fe persons realize that, as a whole, it is comparable with the primary divisions of the globe, and th some of its separate islands are larger than France or the Austrian empire. The traveller, howeve soon acquires different ideas. He sails for days, or even for weeks, along the shores of one of the great islands, often so great that its inhabitants believe it to be a vast continent. He finds that voyag among these islands are commonly reckoned by weeks and months, and that their several inhabitan are often as little known to each other as are the native races of the northern to those of the southe continent of America. He soon comes to look upon this region as one apart from the rest of the wor with its own races of men and its own aspects of nature; with its own ideas, feelings, customs, ar modes of speech, and with a climate, vegetation, and animated life altogether peculiar to itself.

From many points of view these islands form one compact geographical whole, and as such the have always been treated by travellers and men of science; but a more careful and detailed study them under various aspect, reveals the unexpected fact that they are divisible into two portions near equal in extent, which widely differ in their natural products, and really form parts of two of th primary divisions of the earth. I have been able to prove this in considerable detail by my observatio on the natural history of the various parts of the archipelago; and as in the description of my trave and residence in the several islands I shall have to refer continually to this view, and adduce facts support of it, I have thought it advisable to commence with a general sketch of such of the ma features of the Malayan region as will render the facts hereafter brought forward more interesting, ar their bearing on the general question more easily understood. I proceed, therefore, to sketch the limi and extent of the archipelago, and to point out the more striking features of its geology, physic geography, vegetation, and animal life.

Definition and Boundaries. —For reasons which depend mainly on the distribution of animal lif I consider the Malay Archipelago to include the Malay Peninsula as far as Tenasserim, and th Nicobar Islands on the west, the Philippines on the north, and the Solomon Islands beyond Ne Guinea, on the east. All the great islands included within these limits are connected together b innumerable smaller ones, so that no one of them seems to be distinctly separated from the rest. Wi but few exceptions, all enjoy a uniform and very similar climate, and are covered with a luxuria

forest vegetation. Whether we study their form and distribution on maps, or actually travel fro island to island, our first impression will be that they form a connected whole, all the parts of whi are intimately related to each other.

Extent of the Archipelago and Islands. —The Malay Archipelago extends for more than 4,0 miles in length from east to west, and is about 1,300 in breadth from north to south. It would stret over an expanse equal to that of all Europe from the extreme west far into Central Asia, or wou cover the widest parts of South America, and extend far beyond the land into the Pacific and Atlant oceans. It includes three islands larger than Great Britain; and in one of them, Borneo, the whole the British Isles might be set down, and would be surrounded by a sea of forests. New Guinea, thou less compact in shape, is probably larger than Borneo. Sumatra is about equal in extent to Gre Britain; Java, Luzon, and Sulawesi are each about the size of Ireland. Eighteen more islands are, the average, as large as Jamaica; more than a hundred are as large as the Isle of Wight; while the isl and islets of smaller size are innumerable.

The absolute extent of land in the archipelago is not greater than that contained by Western Europ from Hungary to Spain; but, owing to the manner in which the land is broken up and divided, t variety of its productions is rather in proportion to the immense surface over which the islands a spread, than to the quantity of land which they contain.

Geological Contrasts. —One of the chief volcanic belts upon the globe passes through t archipelago, and produces a striking contrast in the scenery of the volcanic and non-volcanic island A curving line marked out by scores of active and hundreds of extinct volcanoes may be trace through the whole length of Sumatra and Java, and thence by the islands of Bali, Lombok, Sumbaw Flores, the Sermata Islands, Banda, Ambon, Bacan, Makian, Tidore, Ternate, and Halmahera, Morotai Island. Here there is a slight but well-marked break, or shift, of about 200 miles to t westward, where the volcanic belt again begins, in North Sulawesi, and passes by Siau and Sangir the Philippine Islands, along the eastern side of which it continues, in a curving line, to their northe extremity. From the extreme eastern bend of this belt at Banda, we pass onwards for 1,000 miles ov a non-volcanic district to the volcanoes observed by Dampier, in 1699, on the north-eastern coast New Guinea, and can there trace another volcanic belt, through New Britain, New Ireland, and t Solomon Islands, to the eastern limits of the archipelago.

The British Isles and Borneo on the Same Scale.

In the whole region occupied by this vast line of volcanoes, and for a considerable breadth on eac side of it, earthquakes are of continual recurrence, slight shocks being felt at intervals of every fe weeks or months, whole more severe ones, shaking down whole villages, and doing more or less inju to life and property, are sure to happen, in one part or another of this district, almost every year. I many of the islands the years of the great earthquakes form the chronological epochs of the nativ inhabitants, by the aid of which the ages of their children are remembered, and the dates of mar important events are determined.

I can only briefly allude to the many fearful eruptions that have taken place in this region. In th amount of injury to life and property, and in the magnitude of their effects, they have not bee surpassed by any upon record. Forty villages were destroyed by the eruption of Papandayang in Jav in 1772 when the whole mountain was blown up by repeated explosions, and a large lake left in i place. By the great eruption of Tomboro in Sumbawa, in 1815, 12,000 people were destroyed, and th ashes darkened the air and fell thickly upon the earth and sea for 300 miles round. Even quite recentl since I quit the country, a mountain which had been quiescent for more than 200 years suddenly bur into activity. The island of Makian, one of Maluku, was rent open in 1646 by a violent eruption, whic left a huge chasm on one side, extending into the heart of the mountain. When I last visited it, in 186 it was clothed with vegetation to the summit, and contained twelve populous Malay villages. On th 29th of December, 1862, after 215 years of perfect inaction, it again suddenly burst forth, blowing u and completely altering the appearance of the mountain, destroying the greater part of the inhabitant and sending forth such volumes of ashes as to darken the air at Ternate, forty miles off, and to almo entirely destroy the growing crops on that and the surrounding islands.[1]

The island of Java contains more volcanoes, active and extinct, than any other known district equal extent. They are about forty-five in number, and many of them exhibit most beautiful exampl of the volcanic cone on a large scale, single or double, with entire or truncated summits, and averagi 10,000 feet high.

It is now well ascertained that almost all volcanoes have been slowly built up by the accumulatio of matter—mud, ashes, and lava—ejected by themselves. The openings or craters, however, frequent

shift their position; so that a country may be covered with a more or less irregular series of hills chains and masses, only here and there rising into lofty cones, and yet the whole may be produced b true volcanic action. In this manner the greater part of Java has been formed. There has been son elevation, especially on the south coast, where extensive cliffs of coral limestone are found; and the may be a substratum of older stratified rocks; but still essentially Java is volcanic; and that noble an fertile island—the very garden of the East, and perhaps upon the whole the richest, the best cultivate and the best governed tropical island in the world—owes its very existence to the same inten volcanic activity which still occasionally devastates its surface.

The great island of Sumatra exhibits in proportion to its extent a much smaller number volcanoes, and a considerable portion of it has probably a non-volcanic origin.

To the eastward, the long string of islands from Java, passing by the north of Timor and away t Banda, are probably all due to volcanic action. Timor itself consists of ancient stratified rocks, but said to have one volcano near its centre.

Going northward, Ambon, a part of Buru, and the west end of Seram, the north part of Halmahera and all the small islands around it, the northern extremity of Sulawesi, and the islands of Siau an Sangir, are wholly volcanic. The Philippine Archipelago contains many active and extinct volcanoe and has probably been reduced to its present fragmentary condition by subsidences attending c volcanic action.

All along this great line of volcanoes are to be found more or less palpable signs of upheaval an depression of land. The range of islands south of Sumatra, a part of the south coast of Java and of th islands east of it, the west and east end of Timor, portions of all Maluku, the Kai and Aru Islands Waigeo, and the whole south and east of Halmahera, consist in a great measure of upraised coral-roc exactly corresponding to that now forming in the adjacent seas. In many places I have observed th unaltered surfaces of the elevated reefs, with great masses of coral standing up in their natur position, and hundreds of shells so fresh-looking that it was hard to believe that they had been mo than a few years out of the water; and, in fact, it is very probable that such changes have occurre within a few centuries.

The united lengths of these volcanic belts is about ninety degrees, or one-fourth of the enti circumference of the globe. Their width is about fifty miles; but, for a space of two hundred on eac side of them, evidences of subterranean action is to be found in recently elevated coral-rock, or barrier coral-reefs, indicating recent submergence. In the very centre or focus of the great curve volcanoes is placed the large island of Borneo, in which no sign of recent volcanic action has yet bee observed, and where earthquakes, so characteristic of the surrounding regions, are entirely unknow The equally large island of New Guinea occupies another quiescent area, on which no sign of volcan action has yet been discovered. With the exception of the eastern end of its northern peninsula, th large and curiously-shaped island of Sulawesi is also entirely free from volcanoes; and there is son reason to believe that the volcanic portion has once formed a separate island. The Malay Peninsula also non-volcanic.

The first and most obvious division of the archipelago would therefore be into quiescent an volcanic regions, and it might, perhaps, be expected that such a division would correspond to son differences in the character of the vegetation and the forms of life. This is the case, however, to a ver limited extent; and we shall presently see that, although this development of subterranean fires is c so vast a scale—has piled up chains of mountains ten or twelve thousand feet high—has broken u continents and raised up islands from the ocean—yet it has all the character of a recent action, whic has not yet succeeded in obliterating the traces of a more ancient distribution of land and water.

Contrasts of Vegetation. —Placed immediately upon the Equator and surrounded by extensiv oceans, it is not surprising that the various islands of the archipelago should be almost always clothe with a forest vegetation from the level of the sea to the summits of the loftiest mountains. This is th general rule. Sumatra, New Guinea, Borneo, the Philippines and Maluku, and the uncultivated parts Java and Sulawesi, are all forest countries, except a few small and unimportant tracts, due perhaps, some cases, to ancient cultivation or accidental fires. To this, however, there is one importa exception in the island of Timor and all the smaller islands around it, in which there is absolutely n forest such as exists in the other islands, and this character extends in a lesser degree to Flore Sumbawa, Lombok, and Bali.

In Timor the most common trees are Eucalypti of several species, so characteristic of Australi with sandal-wood, acacia, and other sorts in less abundance. These are scattered over the country mo or less thickly, but never so as to deserve the name of a forest. Coarse and scanty grasses grow benea them on the more barren hills, and a luxuriant herbage in the moister localities. In the islands betwe Timor and Java there is often a more thickly wooded country, abounding in thorny and prickly tree These seldom reach any great height, and during the force of the dry season they almost complete lose their leaves, allowing the ground beneath them to be parched up, and contrasting strongly with th damp, gloomy, ever-verdant forests of the other islands. This peculiar character, which extends in less degree to the southern peninsula of Sulawesi and the east end of Java, is most probably owing the proximity of Australia. The south-east monsoon, which lasts for about two-thirds of the year (fro March to November), blowing over the northern parts of that country, produces a degree of heat an dryness which assimilates the vegetation and physical aspect of the adjacent islands to its own. A litt further eastward in Timor-laut and the Kai Islands, a moister climate prevails, the south-east wind blowing from the Pacific through Torres Straits and over the damp forests of New Guinea, and as consequence every rocky islet is clothed with verdure to its very summit. Further west again, as th same dry winds blow over a wider and wider extent of ocean, they have time to absorb fresh moistur and we accordingly find the island of Java possessing a less and less arid climate, till in the extrem west near Jakarta rain occurs more or less all the year round, and the mountains are everywhe clothed with forests of unexampled luxuriance.

Contrasts in Depth of Sea. —It was first pointed out by Mr. George Windsor Earl, in a paper rea before the Royal Geographical Society in 1845, and subsequently in a pamphlet *On the Physic Geography of South-Eastern Asia and Australia*, dated 1855, that a shallow sea connected the gre islands of Sumatra, Java, and Borneo with the Asiatic continent, with which their natural productio generally agreed; while a similar shallow sea connected New Guinea and some of the islands adjace to Australia, all being characterized by the presence of marsupials.

We have here a clue to the most radical contrast in the archipelago, and by following it out i detail I have arrived at the conclusion that we can draw a line among the islands, which shall so divi them that one-half shall truly belong to Asia, while the other shall no less certainly be allied Australia. I term these respectively the Indo-Malayan, and the Austro-Malayan divisions of th archipelago. (*See* Physical Map.)

In Mr. Earl's pamphlet, however, he argues in favour of the former land-connection of Asia an Australia, whereas it appears to me that the evidence, taken as a whole, points to their long-continue separation. Notwithstanding this and other important differences between us, to him undoubted belongs the merit of first indicating the division of the archipelago into an Australian and an Asiat region, which it has been my good fortune to establish by more detailed observations.

Contrasts in Natural Productions. —To understand the importance of this class of facts, and i bearing upon the former distribution of land and sea, it is necessary to consider the results arrived