The British Foundation of Indian Entomology

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By

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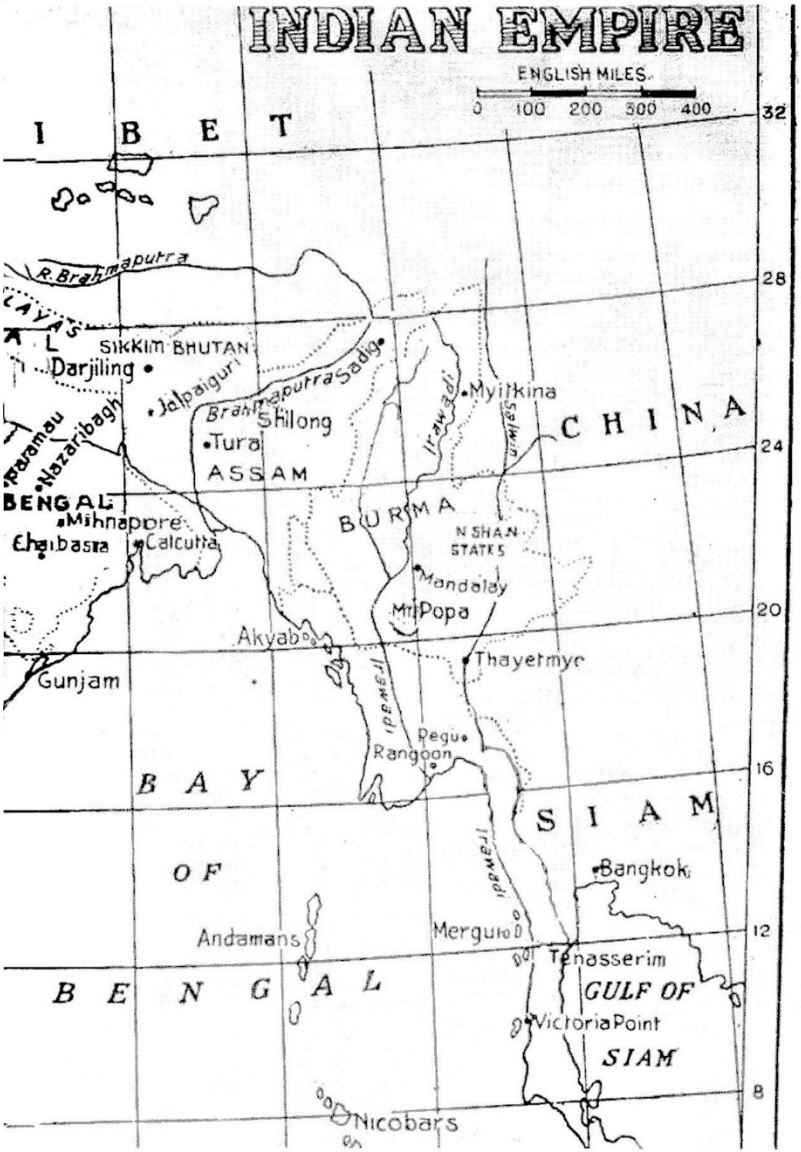
“India, the land of sunshine, is a land of butterflies”

Marshall, F.L. & de Nicéville, L. *The butterflies of India, Burmah and Ceylon. A descriptive handbook of all the known species of Rhopalocerous Lepidoptera inhabiting that region, with notices of allied species occurring in the neighbouring countries along the border.* Published in 3 parts. Calcutta, Central Press, 1882-1890.

CONTENTS

LIST OF PLATES

Map of India drawn for The Bombay Natural History Society's Mammal Survey, 1855


INDIAN EMPIRE
ENGLISH MILES.
0 100 200 300 400
I B E T
R. Brahmaputra
SIKKIM BHUTAN
Darjiling
Jalpaiguri
Brahmaputra
Sadiya
Shilong
Tura
ASSAM
Irawadi
Myitkina
Salween
C H I N A
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Nazaribagh
BENGAL
Mihnapore
Chaibasia
Calcutta
BURMA
N SHAN STATES
Mandalay
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Akyab
Thayetmyo
Gunjam
IRRAWADI
Pegu
Rangoon
B A Y
O F
B E N G A L
S I A M
Bangkok
Andamans
Merguio
Tenasserim
GULF OF
SIAM
Victoria Point
Nicobars
32
28
24
20
16
12
8

GLOSSARY OF TERMS

As they appear here (ie. not always in modern usage). Does not include *Fauna of British India* titles which are listed in Appendix B.

Achetidae – crickets
Aculeata – bees, wasps and ants
Anopheles – mosquitoes
Anoplura – lice
Athyrei – dung beetles
Auchenorrhyncha – cicadas, leafhoppers,
Balboceridae – dung beetles
Blattodea – cockroaches
Bombycidae – moths
Buprestidae – jewel beetles
Calopterygidae – damselflies
Carabidae – ground beetles
Cerambycidae – longhorn beetles
Cetoniidae – scarabs
Chalcididae – parasitic insects
Chironomidae – gnats, midges
Chrysomelidae – flower beetles
Cicindelidae – tiger beetles
Cimicidae – bed bugs
Coccidae – scale insects
Coccinellidae – ladybirds
Coleoptera – beetles
Culicidae – mosquitoes
Curculionidae – weevils
Dermaptera – earwigs
Diptera – flies with two wings
Ephemeroptera – mayflies

Forficulidae –earwigs
Formicidae – ants
Gryllidae – crickets
Harpalidae – ground beetles
Heliconiidae – butterflies
Heterocera – moths
Heteroptera – shield bugs
Hymenoptera– bees, wasps, ants and sawflies
Jassidae – leafhoppers
Lamellicornia – chafers
Lampyridae – glow worms
Lepidoptera – butterflies and moths
Locustidae – locusts
Lucanidae – stag beetles
Lycidae – net-winged beetles
Mallophaga – lice
Mantidae – praying mantises
Mecoptera – scorpionflies
Muscidae – houseflies
Odonata – dragonflies
Orthoptera – grasshoppers, crickets, locusts
Paussinae – ant nest beetles
Phasmidae – stick insects
Platypodidae – wood boring beetles
Ptiliidae – featherwing beetles
Rhopalocera – butterflies
Rhynchota – bugs
Satyrinae – butterflies
Scolytidae – wood boring beetles
Staphylinidae – rove beetles
Syrphidae – hoverflies
Symphyta – sawflies, horntails
Thysanoptera – thrips
Tineidae – moths
Trichoptera – caddisflies

INTRODUCTION

This small volume cannot claim to be more than an introduction to what is a vast topic. I was prompted to write it after the discovery (during research for my *The Coleopterists, Biographies, Collections, Sources,* 2022) of how many British entomologists had worked on Indian material before Independence in 1947 but whose contribution to the natural history of the subcontinent appeared to have been unrecognised. Recent works, including Ray Desmond's *The European Discovery of the Indian Flora* (1992) and Deepak Kumar's "The Evolution of Colonial Science in India, Natural History and the East India Company" (1990), and Mildred Archer's earlier "India and natural history; the role of the East India Company 1785-1858" (1959) make no mention of insects.

Given the quantity of material available (particularly on butterflies) I had to set some parameters for the research and opted not to include material at the generic and species levels unless of relevance. I have also excluded most European entomologists. Although many visited India and wrote papers on Indian insects, they were few compared with the British, largely because of the latter's military presence deriving from the East India Company. The concentration of the research as far as the UK is concerned has been on individuals rather than institutions; the holdings of Indian material in museums outside London and Oxford, therefore have not been extensively explored.

During the period covered by this book (1750-1947) "India" was used to encompass what we now refer to as the Indian subcontinent. Accordingly, entomologists working in India, Ceylon, Burma and the islands in the adjacent part of the Indian Ocean are included.

Many names of countries, cities and administrative areas in the Indian subcontinent have changed since 1947 and the original names have been

preserved to avoid confusion. All references to the British Museum (Natural History) have been changed to the Natural History Museum.

The text follows a broadly chronological approach but, inevitably, people will appear more than once in different chapters. This particularly applies to members of the military and medical staff who collected in Ceylon and Burma as well as in India.

The reader might have expected that the names of many more Indians would have been included but, largely because of religious and social conventions, Indians, with one or two exceptions, did not become seriously involved in entomology until the 20th century and then only in small numbers.

As this is an introduction to the subject further research into specialist archives and military records will undoubtedly prove fruitful, in particular the holdings of India Office material in the British Library.

The illustrations have all been taken from contemporary books and journals and from *Wikimedia Commons* (https://www.commons.wikimedia.org) and *Wikipedia* (https:/www.wikipedia.org) where the images are in the public domain.

As always, I owe a special debt of gratitude to my colleagues at the Natural History Museum for their support, in particular Max Barclay for his continual encouragement and for reading through an early draft of the text. I must also thank the compilers of the web-based *Biodiversity Heritage Library (https://www.biodiversityheritagelibrary.org)* without which it would not have been possible to write this book. I also owe a special debt of gratitude to my wife Dr Elisabeth Darby for her comments on the manuscript.

CHAPTER ONE

COLLECTING IN INDIA

To the late 18th-early 19th century entomologist, with his cabinets full of British specimens, tropical countries such as India were a Pandora's box waiting to release a cloud of brightly coloured butterflies and jewelled beetles. The Indian prints of William Hodges and of Thomas and William Daniell, the rare plants carried back by botanists, and the presence of the East India Company, all brought India closer to home. And, if the country was still too distant for the entomologists to visit themselves, there were now Company employees, many in the army, some medical, together with professional collectors who could be persuaded to send back specimens.

The East India Company was founded in 1600 as a joint-stock company to trade in the Indian Ocean region and later with East Asia. It seized control of substantial parts of the Indian subcontinent becoming the largest corporation in the world with its own armed forces totalling about 260,000 soldiers, twice the size of the regular British army at the time. From the mid-18th to the early 19th century, the company accounted for half of the world's trade particularly in commodities such as silk, indigo dye, sugar, salt, spices, tea, and opium. In India it oversaw the establishment of British rule following the Battle of Plassey in 1757 until the Indian Mutiny in 1857, exercising military control and assuming administrative functions.

The East India Company bought thirty sets of the Daniell prints. Some were probably displayed on the walls of its impressive building at East India House in London, possibly in the museum there. This was not only a museum of Indian fine and decorative art, but also included many entomological specimens, for the soldiers and medics not only collected for others, but for themselves too, and many deposited specimens in the

collections. This book is full of their names. Indeed, throughout most of the 19th and into the 20th century, soldiers and medics outnumber all other collectors.

Postings were organised for most of the soldiers so that means of transport, meals and overnight accommodation were not their individual concern. This was not the case for the private collectors who had to make their own arrangements. The wealthy Sir Joseph Hooker's journey to the Himalayas came close to a military operation with a party of "Fifty-six persons. My tent and equipments […] instruments, bed, box of clothes, books and papers required a man for each. I carried myself a small barometer, a large knife and digger for plants, notebook, telescope, compass and other instruments; whilst two or three Lapecha lads carried a botanising box, thermometers, sextant and artificial horizon, measuring tape, azimuth compass and stand, geological hammer, bottles and boxes for insects, sketch book, etc …"[1]

Hooker rode on an elephant when the terrain allowed, but in Burma Charles Bingham and his companion, after leaving their servants to load and bring on their baggage on carts, "started on foot with a light empty cart and a fast pair of bullocks following close behind in case we found the sun hot and decided to ride".[2] In south India John Nietner travelled "by foot, carriage and palequin"[3] while in Burma Colonel Burton hired a cart with bullocks at a cost of 350 rupees but rode himself on a pony which cost 275 rupees.[4] Poor Charles Nurse had a fall from his horse and fractured his skull but was still able to keep working.[5]

Given the need to transport all the equipment needed for collecting, overnight stops and food stores, pack animals were essential for longer journeys. Burton was also accompanied by a lad who carried their daily requirements "slung at either end of a bamboo carried over his shoulder. It

[1] Hooker (1855): 179-180.
[2] *Journal of the Bombay Natural History Society*, 1894, 8: 346.
[3] Nietner (1856): 381.
[4] *Journal of the Bombay Natural History Society*, 1931, 35: 106
[5] *Entomologist* 1934, 67: 23.

was wonderful how silently he kept us in sight throughout our wanderings". He also employed an older tracker who carried "a *dah* with a razor-sharp blade about two feet in length, with which he often silently sliced off obstructing twigs and bamboo shoots."[6]

Problems with the sepoys and coolies were not uncommon. The Bhutan coolies Hooker hired stole food and complained about the weight of their loads. William Doherty also had difficulties with those he hired. Hooker was fortunate to have translators to hand, and Doherty was a linguistic genius, but much of the communication between the collectors and their hired workers had to be carried out using sign language.

By any standards William Doherty was the most intrepid explorer, never staying in one place, or even one country, for any length of time. Travelling alone was less expensive, but also led to some hair-raising experiences. In Doherty's case these included: being robbed, arrested, lost, suffering from scurvy and other illnesses, drifting out to sea in a canoe, being nearly shot by mistake, hunted by a tiger when collecting moths, rescuing a girl being carried off by Christians, and many more.[7]

The quantity of equipment that had to be carried meant that using pack animals was not always possible in the dense jungle, so that luxuries such as reference books had to give way for essentials. This caused Nietner to write a long justification for naming new species based largely on experience and instinct.[8] Doherty, too, regretted that it was impossible to take with him the books he needed to write his papers and several times took time off on his extraordinary travels to visit Calcutta so that he could refer to the library and collections in the museum there.[9] Charles Bingham also commented on his difficulties, explaining that he had been collecting bees and wasps in lower Burma over a period of four years, but had only been able to identify a very few of the species because he did not have access to

[6] *Journal of the Bombay Natural History Society*, 1931, 35: 106.
[7] Hartert (1901): 495-503.
[8] Nietner (1856): 383-84.
[9] Hartert (1901): 496-498.

the relevant literature.[10] And Edgar Layard ruefully commented about Ceylon "no library on the island possesses a single volume on Oriental entomology".[11]

Perhaps the worst fear of all was the possibility of losing collections entirely. Doherty wrote of the "Loss of all my collections, money, journals and scientific notes at Surabaya in Java" in 1887, and in the following year he reported the loss of his papers on Perak butterflies.[12] James Anderson lost a proportion of the collections made on his expedition to the Mergui Archipelago in 1888.[13] There was also the danger of loss at sea. John Abott lost collections that way as did George Lewis. Alfred Wallace had been at sea for twenty-six days when his ship caught fire and sank in the middle of the Atlantic. He was only able to save his watch, drawings of fishes, and a portion of his notes and journal, and was fortunate to be rescued after spending ten days in a leaking lifeboat.

Adequate packing of specimens was important in these situations. Hooker carried bottles and boxes for insects and Edward Meyrick also recommended pinning into boxes for his favourite microlepidoptera.[14] The Royal College of Surgeons wrote to the *Madras Journal of Literature and Science* in 1835 that insects being sent to them "should be pinned down upon a board or piece of cork, or upon wax which has been melted and poured along the bottom of a flat box, the pin should be greased or oiled, to prevent rust, which would render it difficult to take off the insect. If the pins were pointed at both ends they would more readily admit of being turned. The pin must be made so fast in either of these substances as to allow of the motion of the box in all directions […] Beetles may be put into a bottle altogether. Butterflies, moths, bees should be kept by themselves".[15] Nine

[10] *Journal of the Bombay Natural History Society*, 1894, 8: 346.
[11] "Sketches in the Natural History of Ceylon", *Journal of the Ceylon Branch of the Asiatic* Society, 1848-55, 2: 53.
[12] Hartert (1901): 497.
[13] Anonymous (1914): 7, and *Journal of the Linnean Society* 1888-1889, 21: 29-60.
[14] "Descriptions of Indian Micro-Lepidoptera", *Journal of the Bombay Natural History Society*, 1905, 16: 580.
[15] *Madras Journal of Literature and Science*, 1837, 5: 190.

years earlier George Samouelle published *General Directions or Collecting and Preserving Exotic Insects and Crustacea* which was specifically "designed for the use of residents in foreign countries, travellers, and gentlemen going abroad". Earlier, James Petiver's contact with travellers abroad led him to produce several pamphlets containing instructions for those collecting for him. These included the novel suggestion that on ocean voyages butterflies "might be preserved by thrusting a pin in their body and s[t]ick[ing] them in yr ha[t] until you get aboard then pin them to yr wall of your cabin or yr inside lidd of any Deal Box so yet they may not be crushed."[16] In relation to "Beetles, Spiders, Grasshoppers, Bees, Wasps, Flies &, these may be Drowned, as soon as caught in a little wide mouth'd Glass or Vial, half full of Spirits, which you may carry in your pocket. But all Butterflies and Moths, as have mealy Wings, whose colours may be rub'd off, with the Fingers, these must be put into any small Printed Book, as soon as caught." But the usual method for coping with Butterflies and Moths was to preserve them in folded paper envelopes, and Major Harry Peile provided advice on how this should be done.[17]

Problems also arose because of cultural and religious differences. Buddhism taught that insects were "sentient beings" and that punishment awaited in the next existence for anyone taking their lives in the present. Jainism also opposed the taking of insect life, and Hinduism acknowledged that the killing of insect pests was sometimes unavoidable but was nevertheless regarded as a sin. This caused H. Maxwell-Lefroy, the economic entomologist determined to improve conditions in the horticultural and agricultural industries, utter despair. "The intelligent cultivator [native Indian] growing sugar cane under irrigation […] believes the cane borer [moth] comes with the well water used for irrigation. He has no conception of the life history but he regards the whole thing as a mystery […] he will as likely or not, call in a priest to check it; and the priest will perhaps write

[16] *Brief Directions for the Easie Making, and Preserving Collections of all Natural Curiosities* n.d. [c.1690].

[17] "The packing of Papered Butterflies for safe keeping or despatch by post", *Journal of the Bombay Natural History Society*, 1917, 25 (2): 309-312. For more information about Piele see Appendix C.

four texts from holy writings, place them one at each corner of the field to confine the evil influence and then remove one to let out the influence which the texts have recommended. Or, he will pay a man of a certain caste to plough a line across the field at night, the man having to be stark naked […] It is difficult for entomologists in counties such as ours to realise the almost impossible task of overcoming such long inherited and deeply ingrained instincts and religious beliefs."[18] At the Indian Museum the illiteracy "of the vast majority of the visitors" caused the staff to have to pay careful attention to the drafting of the labels for the exhibits.[19]

These were mostly practical problems but there were others affecting collectors which concerned general comfort and ill health. Charles Rothschild loved fleas and collected many in Ceylon but they did not appeal to most other collectors and complaints about them, and about peepsas [wasps], gnats, midges and mosquitoes, lice, ticks and bed bugs, are frequent in the literature. Hooker regarded these insects as a "constant irritation" and wrote "we daily arrived at our camping-ground, streaming with blood and mottled with the bites."[20] He was equally disapproving of the insects which invaded his tent (blankets stretched over a pole) at night after rain, "countless swarms; large and small moths, cock-chafers, glow worms, and cockroaches, made my tent a Noah's ark when the candle was burning; together with winged ants, May-flies, flying earwigs, and many beetles, while a large species of *Tipula* (daddy-long-legs) swept its long legs across my face as I wrote my journal."[21] Rain also concerned Margaret Fountaine collecting in Sikkim with her beloved Khalil. She was "horribly tormented by mosquitoes" and getting "soaked through every day was part of the programme […] the jungle is full of restless life, the trees move uneasily, and the jungle birds utter wild cries, while the butterflies, though still flying in the transient gleams of burning sun, are flurried and anxious."[22]

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[18] *Indian Museum Notes*, 1, 1889-1891: 92

[19] Anonymous (1914): 82.

[20] Hooker (1855), 2: 18.

[21] *Ibid*. 2: 8.

[22] Fountaine (1980): 194. She gave 5 butterflies and 3 pupa from India, Ceylon to the Natural History Museum, 1913.

But not all that dripped from the trees was rain. While collecting insects on Paresnath Hill in western Bengal Nelson Annandale "was surprised on more than one occasion to feel what I thought to be rain dripping from a clear sky through the foliage of the trees, until a careful search revealed the fact that the apparent rain fell directly from the leaves, and was produced by enormous numbers of Jassidae".[23] The leafhoppers had been feeding on the sap and exuded it from the tips of their abdomens every three or so minutes as honey-like drops.

For Richard Hingston the onset of rain on his favourite Manjha, a flat area of river valley outside Fyzabad, cleansed it. "The preliminary showers […] freshen the foliage and purify it of its dusty shroud. Quickly the deluge inundates the earth and in a few days it is clothed in a verdant garb and its semi-arid wastes support a soft carpet of grass […] It is the insects which feel the full force of the moisture and emerge in a living swarm […] this is the wonderful vision of the rains."[24] His was one of many accounts of the beneficial effect on insect life of the onset of the monsoons[25]. But he had problems when picking up a hairy caterpillar of the butterfly *Euproctis icilia*. "I happen to take one in my hand, […] soon I begin to feel an itching it commences on the neck, just a slight irritation, nothing more than a mosquito bite. I scratch it. The discomfort increases. The tingling spreads round the neck and down and along the front of the chest. Then the forearms begin to smart… I examine the tingling patch. An intense erythema is rapidly developing. The skin is bright red and beginning to swell… Fresh crops appear in different places. Soon the whole chest and abdomen are involved. New eruptions develop on the legs and back and soon the whole body burns madly with one incessant itch. It becomes impossible to refrain from tearing at it though this, of course, intensifies the torture […] Fortunately there is a river handy. Throwing off my clothes, I rush into the

[23] Annandale, N. (1909), "Field notes on Indian Insects", *Records of the Indian Museum*, 3: 293.
[24] Hingston (1923): various pages.
[25] For example. F. Fraser, "Influence of the Monsoons on Insect Life in India", *Journal of the Bombay Natural History Society*, 1918, 25: 511.

water. Some relief is given, only a little." And the solution? "To rub in some methylated spirit and in fifteen minutes the irritation subsides."[26]

The caterpillar of *Eupterote mellifera*, a commonly occurring moth in southern India, was so poisonous that Thomas Bainbrigge Fletcher advised against even approaching the tree on which it occurred.[27] Nettle stings and razor-sharp grasses caused similar anxieties for some. For William Saunders the problem was more with the adults than the larvae. He was bitten by the longhorn beetle *Lamia rubus* "the mandibles of the insect possess great strength a fact of which I am particularly aware from having been bitten […] it made its jaws meet in the flesh and causing a wound which […] I shall long bear the mark of."[28].

The prospect of illness was a perpetual concern for all collectors. Both Doherty and Nietner died of dysentery caught during their travels, and Ernest Green had to return to travel back to England from Ceylon after several bouts of malaria. Maxwell-Lefroy also had to return after the death of his son possibly from typhoid. Entomologists working at the Agricultural Institute at Pusa in 1917 were quarantined for three months because of plague, cholera and smallpox in the surrounding villages. William Griffith, his health undermined by repeated attacks of fever, and recognising that his days were numbered, wrote despairingly "Wherever I turn the question suggests itself what business have I here collecting […] How am I living! alone, without a table, chair, wine or spirits, with a miserable beard and in native clothes! But one thus saves much time; how unfortunate that mine is not worth saving."[29] Some remedial help was available but the state of medicine at the time did not offer longer-term aid with the most serious illnesses.

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[26] Hingston (1923).

[27] Fletcher (1914): 405.

[28] W.W. Saunders "On The habits of some Indian Insects", *Transactions of the Entomological Society of London*, 1836, 1: 61.

[29] From a letter quoted by Archer (1959).

Despite these problems, the painters, the botanists, and the entomologists remained undeterred. While Hodges and the Daniells explored India from the Himalayas in the north to Madurai in the south in search of subjects for their paintings, the botanists and entomologists did the same for plants and insects. But these few references are sufficient to make clear that working in the subcontinent, particularly when it involved more than a few days and time spent in the jungle, was not a matter to be treated lightly, but one which required careful planning and expense, and a certain amount of bravery.

1.1 Hunting for the bee *Apis dorsata* on the Kadiar Rocks in the Shevaroy Hills. Photograph taken by Thomas Bainbrigge Fletcher

CHAPTER TWO

BOTANISTS AND INSECTS

Botanical studies in India pre-date those in other branches of natural history. Interest in plants as a branch of medicine was already well established by the Middle Ages, but the activity was disorganised and mostly academic. Better organised was the study of plants for culinary and other uses. From the end of the 17th century, it was in these that the East India Company took a particular interest, realising the possibilities for commercial gain. The work of many botanists was then expanded to cover the growing of cinnamon, coffee, tea, rubber, and other plants.

Meanwhile, botanists not connected to the Company, both amateur and professional, explored the country, fascinated by the multitude of different species and their aesthetic qualities. Encouraged by the publications of Carl Linnaeus (1707-1778) the first *Floras* with systematic classifications were written including: Nicholaus Burman's *Flora Indica* (1768), based on an earlier work of 1755, another with the same title by William Roxburgh (from 1820), and Alexander Moon's *Catalogue of Ceylonese plants* (1824). Plant specimens became the subject of jealously guarded collections in museums both public and private. The comment of the eminent botanist John Ray (1627-1705) about Malabar: "Who would believe that there is a botanical Europe in the middle of tropical India,"[1] might just have well been turned round to read botanical India in the middle of Europe.

[1] Ray (1688), 2: preface.

Many of the first Indian insects to enter British collections resulted from the work of these botanists. Although recognised for their activities regarding plants, few have been acknowledged for their entomological interests. Most did not visit India and relied instead on building up collections, initially inspired by their botanising activities in the UK and on the continent, with gifts or purchases from others. Many of these informal exchanges are well documented by Desmond (1992) but he makes no mention of insects being included in the botanical parcels. A note by Hans Sloane regarding Edward Bulkley, (c.1651-1714), a surgeon with the East India Company in Madras, however, includes the sentence "I am again obliged for twenty books of dry Plants, some seeds and insects among them,"[2] makes clear that they occasionally were. Unfortunately, many other similar gifts and purchases are without documentation. Were insects included with the well-known botanical specimens sent to Leonard Plukenet and Charles du Bois? This book suggests this is likely.

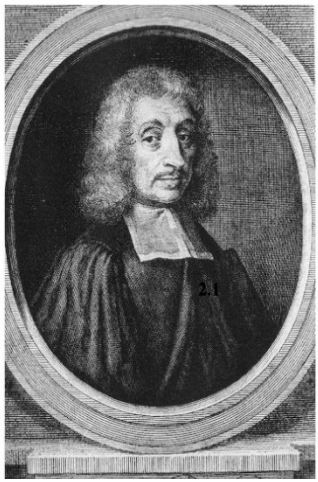

Fig. 2.1. John Ray (1627-1705)

The most famous of the early botanists, John Ray (1628-1704) (Fig. 2.1). found the attraction of butterflies irresistible. "You ask what is the use of butterflies. I reply to adorn the world and delight the eyes of men; to brighten the countryside like so many golden jewels. To contemplate their exquisite beauty and variety is to experience the truest pleasure."[3] Such was his interest in insects that he planned, but never completed, a companion volume to his well-known *Flora Plantarum* (1686-1704) which he proposed to title the *Historia Insectorum.* It was later published as an *opus posthumum* by the Royal Society in 1710 after being edited by Martin Lister who added an appendix on beetles.

[2] Dandy (1958): 108.
[3] Raven (1942): 407.

Sir Hans Sloane (1660-1753), the well-known collector and botanist, was a friend of Ray. He displayed his collections, later to become the foundation for the British Museum at Bloomsbury, in his house at Chelsea where they were available for viewing. Amongst the plants and numerous other items, (from Greek and Roman amphora to elaborately decorated furniture), was a large collection of insects which included specimens left to him by Ray. We know that this collection focussed particularly on butterflies and moths found in the neighbourhood of Ray's house in Essex, but it also included some exotic specimens which were commented on by the Swede Per Kalm, a compatriot of Carl Linnaeus, who visited it after Sloane's death. "We particularly devoted ourselves to the study and admiration of the great botanist and student of natural history, John Ray […] A very large collection of insects from all parts of the world, all of which were now preserved in four-sided boxes, with clear glass glued on both over and under, so that one could see them quite well, but these boxes or cases were so well stuck together and so tight that no worms or other injurious insects could get at them and spoil them […]Some of the East and West Indian Butterflies were far more showy than a peacock with its matchless variety of colour."[4]

John Ray had acquired some of his insects, in turn, from a variety of collectors including James Petiver (c.1644-1718) an apothecary, botanist and zoologist, who was born near Rugby in Warwickshire, the son of a haberdasher. Petiver was one of the few botanists apart from Ray whose interest in entomology was well known, particularly for his work on the British butterfly fauna, 48 of his names still being in common usage.

Petiver published regular accounts of additions to his collections in a series of "Centuries" under the general title which were included in the collection *J. Petiveri Opera, historiam naturalem spectantia* (1741, 1767), (Fig. 2.2). These make clear that many specimens were acquired directly or by gift from all over the world including India, and endorse the accuracy of Ray's remark: "Petiver, a man of greater correspondence in Africa, India and

[4] Dandy (1958). Sloane's collection was stated to include 5,394 insects though spiders were included, but by 1833 "not a vestige remained" Stearn (1981): 205.

America, than any one I know".[5] The pamphlet he printed, containing instructions for those collecting for him, has already been quoted.

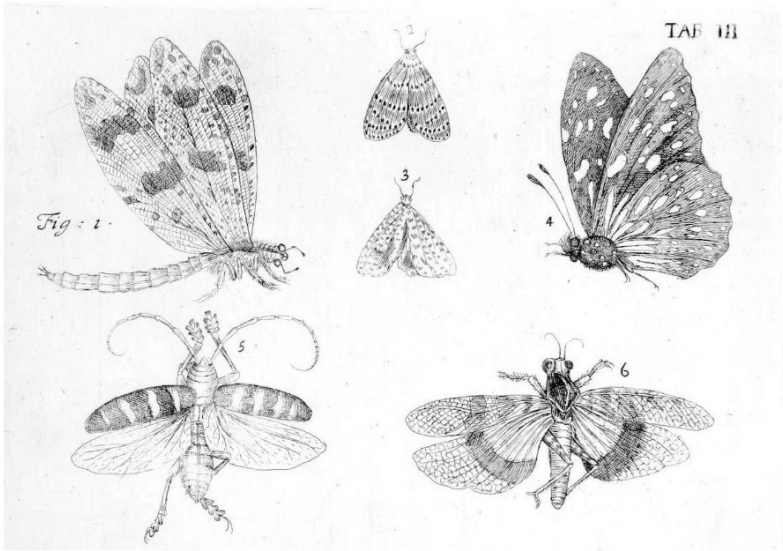

Fig. 2.2. *Palaena montepeleca* from India (in centre). J. Petiver, *Opera historiam naturalem spectantia* (1741, 1767)

Leonard Plukenet (1642-1706) was another botanist whose collections ended up with Sloane. Plukenet was a physician at Westminster who maintained a small botanic garden and received the appointment as Queen Mary's Botanist and Superintendent of the gardens at Hampton Court Palace. After his death his entire collection was purchased from the wife of Dr Moore, Bishop of Norwich in 1716 to become part of the Sloane Herbarium now in the Natural History Museum. The collection consisted mainly of pressed plants but also included some insects as is confirmed by a volume in the collection of manuscripts in the Museum. This large book of 141 pages contains pressed insects and is labelled *Insecta Plukenet* on the spine and *Insects iii* and *Collectio Pluknetiana* on the title page. The condition of most of the specimens is remarkably good considering the unusual method of preservation and several orders are represented including

[5] Gunther (1928): 281.

butterflies and earwigs. No associated material is in the Natural History Museum but Peter Hammond, who wrote up the collection, identified a notebook in the manuscript department of the British Museum which is clearly related.[6] Lettering on the spine suggests that this was James Petiver's but Hammond confirmed that the contents are in Plukenet's hand. The entries related to insects give the time, place, and circumstances of the observations, all seeming to fall in the period May 1696 to May 1697 and to be in the London area. Hammond records that two early pages, devoted to manuscript notes in Latin appear to derive from an earlier volume and it is tempting to surmise that it might have contained Indian material.

Some of the plants sent to Plukenet from India came via Charles du Bois (1656-1740) who had many contacts there because of his trade as a silk merchant and his position as Treasurer of the East India Company. He was of Huguenot descent and the owner of a country house estate at Mitcham in Surrey. A notebook of his, also in the Natural History Museum, contains some of the earliest surviving descriptions of British butterflies and moths.[7] Just as is the case with Plukenet, it is difficult to believe that he did not receive Indian insects too. Desmond (1992) mentions the names of several of his Indian suppliers of plants including Mr Randal, Mr Hynmers, Mr Gifford, Plukenet's stepbrother Daniel and his sister, all of whom collected in the Madras area.[8] The earliest records of Indian insects along modern scientific lines are those of Linnaeus (1707-1778) **(**Fig. 2.4**)** in the 10th edition of his *Systema Naturae* (1758). He includes some insects "in Indiis", although the precise number is difficult to calculate because many do not specify country of origin and the expression "in Indiis" is used for both the West and East Indies.[9] The figure of twelve has been calculated by one author.[10] After 1784 Linnaeus's collection was purchased by the botanist James Edward Smith (1759-1828), who presented it to the Linnean Society

[6] Hammond (1975): 261-268.

[7] Jessop, L. "Notes on Insects 1692 & 1695 by Charles du Bois", *Bulletin of the British Museum (Natural History) Historical Series*, 1989, 17 (1): 1-165.

[8] Desmond (1992): 35.

[9] Westwood (1837) later bemoaned the inaccuracy of Linnaeus and Fabricius's use of this expression.

[10] Wikipedia. (Accessed 18.2.2023).