public servants, attached as naturalists to various missions, or had been given by gentlemen of the civil and military services to the Court of Directors. Amongst the contributors to the East India Museum, it will be sufficient to mention the names of Dr. F. Buchanan Hamilton, Dr. Horsfield, Sir T. Stamford Raffles, Col. Sykes, Dr. Wallich, Mr. M'Clelland, Dr. Falconer, Mr. Griffith, and Mr. Hodgson, to prove that the collection was one of no ordinary merit. The Zoological importance of the East India Company's Museum was further augmented by the preparation and publication by, or under the superintendence of, the late Dr. Horsfield, of several catalogues. Of these may be particularly mentioned that of the Mammalia, published in 1851, and that of the Birds in 1854 and 1858, the second part of which bears likewise the name of Mr. Frederick Moore, then assistant-keeper of the Company's Museum, as joint author, on its title-page.

When the East India Company became extinct, and the premises in Leadenhall Street were vacated, the Museum was removed to Fife House, Whitehall, but was very imperfectly exhibited there, a large portion of the contents (the more bulky specimens in particular) being kept stowed away in boxes. When naturalists who wanted to consult specimens remonstrated at their inaccessibility, they were told that this was a mere temporary arrangement, and that when the magnificent buildings of the new India Office were completed, special accommodation would be assigned to the Museum, and there would be ample space for everything. At length the time arrived. The new India Office, with its suites of *salons*, assembly rooms, waiting rooms, and apartments of every description, was finished and opened. Fife House was demolished, and everything that it contained was removed to the new establishment. But when space was required for the Museum it was discovered that the only rooms assigned to this purpose were three or four chambers in the uppermost story, which would not contain a tenth part of the collection. Dr. Forbes Watson, the present chief of this department, has thought it right to devote these to the exhibition of a fine series of specimens illustrative of the arts and manufactures of British India, and we are by no means disposed to find fault with his decision on this subject. But it is the duty of the Government, we maintain, either to provide proper space for the Zoological collections also in the New India Office, or to transfer them to some other Institution, where they may be at least accessible to the scientific student. These Zoological collections contain a large number of typical specimens, without reference to which it is impossible in many cases to ascertain the identity of the species. Some of these typical specimens have, we believe, been handed over to the British Museum, but a number of them still remain in the collection, packed away, we are told, in the same cases in which they were originally removed from Leadenhall Street. This is, we maintain, a great and crying scandal, though as only a few working Zoologists are injured thereby, it is difficult to excite popular feeling upon the subject. In taking over the goods and chattels of the former Company, the India Office must certainly be held to have accepted the corresponding liabilities. Amongst these, it cannot be denied, was that of keeping, at least safe from destruction and in a state accessible to the scientific student, the specimens which the servants of the former Company amassed at such an expenditure of time and toil. If, as we are told, the new India Office is already so short of space that it is not possible to find room for them within its precincts, it is very simple to obtain the necessary accommodation elsewhere. We have good reason to know that Naturalists working on various branches of Indian Zoology are frequently brought to a standstill by the impossibility of access to this important collection, and we trust, therefore, that some steps will be taken to remedy the evil P. L. S.

*THE METAMORPHOSES OF INSECTS**

THIS very handsomely got-up volume is illustrated by 40 full-page engravings, many of which are exquisite landscapes as well as representations of insects in their various stages; and by about 200 excellent woodcuts in the text, from which we have selected a few specimens as samples of the rest. The subject of insect transformations presents us with so many curious examples of instinct, and such strange eccentricities of structure and habits, as to be especially adapted to attract the attention of the young, and to lead them to study this most fascinating branch of Natural History. The name of M. Emile Blanchard, and the high scientific reputation of Prof. Duncan, are a sufficient guarantee that the facts are accurately stated. In the introductory portion of the work, the main features of the external structure and internal anatomy of insects are exhibited by such large and clear illustrations as to be easily comprehended, the changes in the nervous system, from the larva to the perfect insect, being particularly well shown. The nature of metamorphosis and its different kinds are then explained, and a series of chapters is devoted to each order of insects, beginning with the Lepidoptera and ending with the Crustacea.

Among the more remarkable forms in the first-named order are the Psychidæ, small moths the females of which are not only without wings, but have neither legs nor antennæ. The female *Psyche* is, in fact, a mere helpless egg-bag, which never quits the case or covering in which it was bred. The males are small delicate moths with bodies covered with long silken hairs, and with dusky semi-transparent wings. The larvæ live in cases made of silk or vegetable tissue, bits of straw, stick, or leaves, and they carry these cases just as snails do their shells.

The ravages of the Tineidæ and the curious cases of *Coleophora* and *Gelechia* are illustrated by figures after Stainton; while the cut on p. 331 represents the beautiful pink or violet net-work cocoons in which some Brazilian species suspend themselves by slender threads.

The parasitic Hymenoptera forming the families Ichneumonidæ, Chalcididæ, and Proctotrupidæ are well described, and a quotation from this chapter will exhibit the style in which the book is written:—

"These parasites are very pretty and elegantly-formed insects when in the adult form, and are gifted with great agility and restlessness; but in their early condition they cannot move, having no locomotive organs, and their structures are so soft that they are destroyed with the greatest ease. The larvæ look like worms or maggots, and do not attain a great perfection of development during their growth. All the parasites seek out a caterpillar, a larva, or an insect which suits their purpose, in order to lay an egg within its body. The larva which is born from this egg is nourished by the blood and fat of the victim, whose vital organs it does not touch or injure in any way; for were it to die, the parasite would come to an end also. It is only when the larva is nearly full grown, and is about to undergo its metamorphosis into a pupa, that it appears to know that the life of the victim is not likely to be of much further use. It then devours the internal organs of the unfortunate insect, and undergoes its transformation. The skin of the victim protects some of the pupæ of its destroyers after all the inside has been eaten. Nearly all, if not quite all, insects are subject to the attacks of parasitic Hymenoptera. Fine, smooth, and brightly coloured caterpillars often have a black spot upon their skin, and this is the healed wound of the ovipositor of one of the parasites. Sooner or later the creature is sure to die, and

* "The Transformations or Metamorphoses of Insects (Insecta, Myriapoda, Arachnida, and Crustacea)." Being an adaptation for English readers of M. Emile Blanchard's "Metamorphoses, Mœurs, et Instincts des Insectes." By P. Martin Duncan, F.R.S., Professor of Geology in King's College, London. (Cassell, Petter, and Galpin)

it never reaches the stage of growth when it can lay eggs or reproduce its kind, for before this time the growing larvæ within destroy it, as it were, by slow consumption. Some affected caterpillars die soon, others nearly reach their full growth, and a few undergo their transformation into the chrysalis state before death. It is, therefore, not an uncommon thing for a butterfly-collector, who hopes to see a fine moth disengage itself from its pupal covering, to be disappointed by the appearance of several little parasitic Hymenoptera that had been living within the chrysalis he has been keeping."

One of the most curious recent discoveries among beetles is that which was published by Schiödte, in 1864, of viviparous Staphylinidæ. These are about the tenth of an inch long, and are found in the nests of the *Termites* of Brazil. They are distinguished by the swollen development of the abdomen, which is carried in a most peculiar manner, being turned up and allowed to rest on the back of the insect. The enormous distension of this part of the body is due to the fact that the beetles do not lay eggs, but produce living larvæ, and they are the only beetles that do so. It is supposed that the hairs which

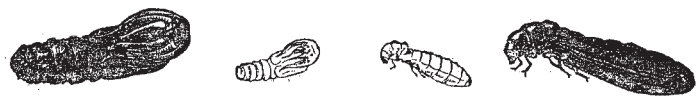

FIG. 1.—THE CHRYSALIS AND THE FEMALE PERFECT INSECT OF *Psyche graminella*.

FIG. 2.—ICHNEUMONS

Ephialtes manifestator. The male is flying on the left, and the female is introducing an egg into the body of a larva. Another *Ephialtes, Rhyssa persuasoria*, a female, is on the branch to the left hand.

cover some parts of the abdomen are furnished with a peculiar secretion that is liked by the white ants among which they live.

The extraordinary economy of many of the Diptera or flies is exhibited in a variety of beautiful cuts, one of the best of which represents the metamorphoses of *Stratiomys chameleo*. This fly frequents flowers in order to prey upon other insects, but its larva lives in stagnant water, and is a long, hard-skinned creature, whose small head is furnished with two minute hook-like mandibles. The terminal segments of the body are gradually narrowed, and can be elongated like a sliding telescope, and the slender extremity terminates in two small orifices crowned with hairs. This larva swims about in shallow water, and when it wants to breathe it sticks up the end of its body and respires through the two small holes at the apex. When the larva is mature it floats on the surface, the pupa being formed within the skin, which serves at once as a cocoon and as a boat, from which in due time the brightly-coloured and active fly escapes to its aërial existence.

In the last chapter a short but clear account is given of the recent discoveries as to the metamorphoses of Crustacea, from the works of Spence Bate, Fritz Müller, Darwin, and others.

In the original work reference is chiefly made to common French or Continental insects, some of which are natives of our own country, while many are not found here. In adapting the work for English readers, it would have been well to have stated in every case whether the insect mentioned was an English one. The great carpenter bee

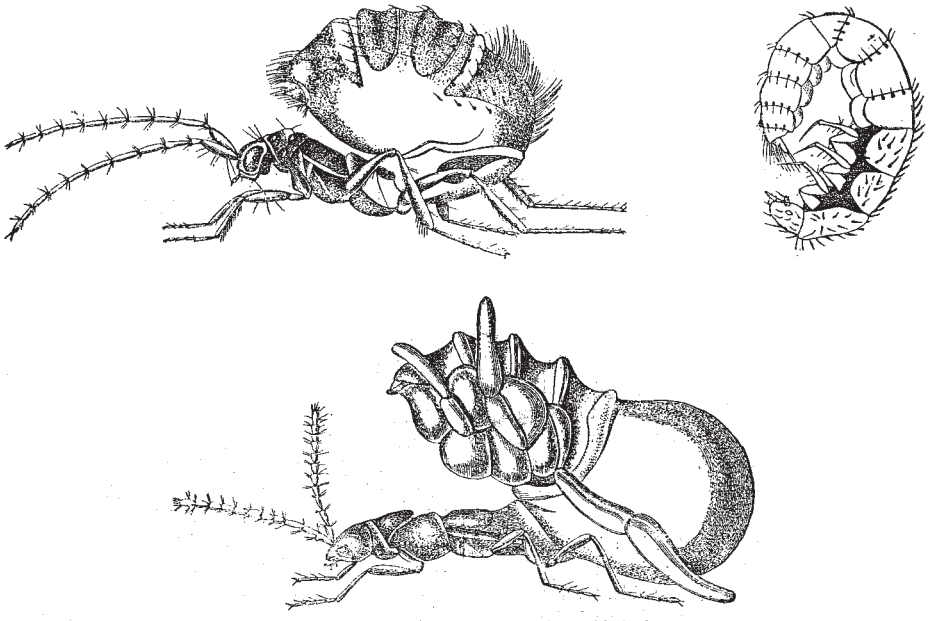

FIG. 3.—VIVIPAROUS *Staphylinidæ*. (After Schiödte.)

Corotoca melantho and larva. *Spiractha Eurymedusa*.

The upper figures are those of *Corotoca*. The turning up of the hinder parts of the body is very evident in the engraving.

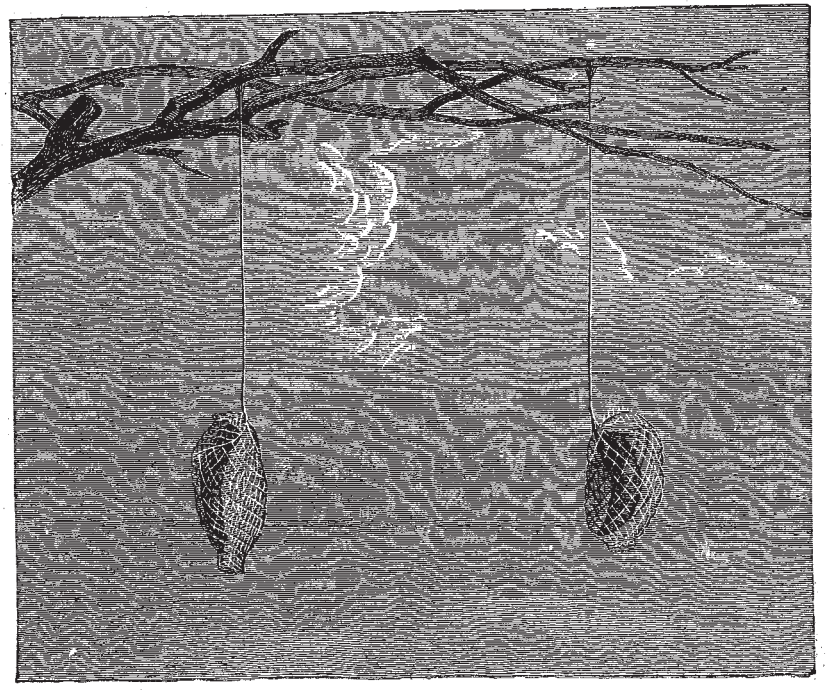

FIG. 4.—COCOONS OF BRAZILIAN *Tineina*.

(*Xylocopa violacea*), for example, is described as "not uncommon;" but the reader is not told that, although common in France, it is unknown in England. More simple and familiar language might also have been occasionally used; but these are small defects in so useful and attractive a work, which is just the thing for a present to an intelligent and inquiring country schoolboy.

ALFRED R. WALLACE