

**PRACTICAL
LESSONS ON
INSECT LIFE**

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Practical Lessons on Insect Life by Theodore Wood

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BY

THEODORE WOOD, M.E.S.,

Joint Author of "The Field Naturalist's Note-Book," and "Hughes's Illustrated Anecdotal Natural History."



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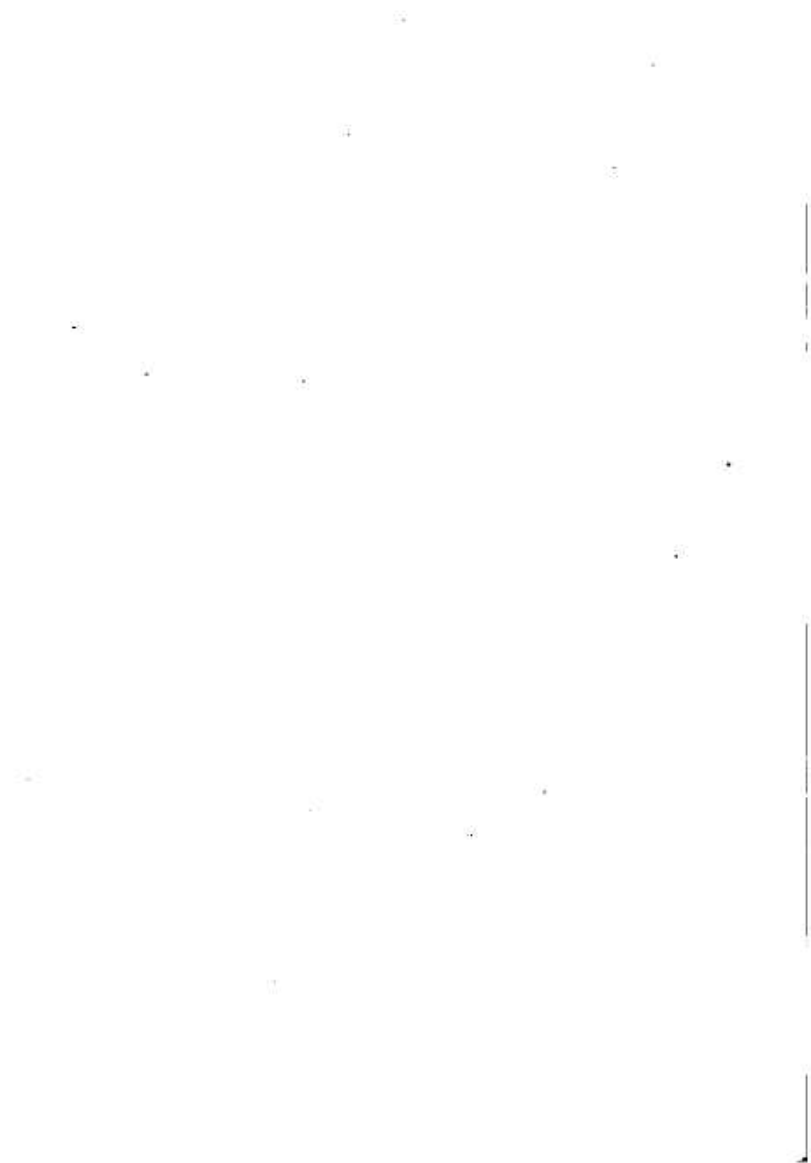


Figure 1. Percentage of total population in various age groups, 1950-2050.

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Joint-Author of 'The Field Naturalists' Handbook.'

I.—WHAT IS AN INSECT.

AT the commencement of these papers on Insect Life, it will be as well that we should have a settled idea as to what an insect is, and I shall therefore, in this opening article, endeavour to point out the chief characteristics of insects, and show how they may be distinguished from other classes of animals.

In the first place, insects belong to the great group of animals which are known as *Annulata*, or those whose bodies are composed of a number of rings, or 'segments.' In the insects, the number of these segments is invariably thirteen.

Each of these segments is composed of two half-rings, placed one above the other, and connected by an elastic membrane, which is capable of considerable expansion. The reason for this structure we shall presently see.

Besides the division into thirteen segments, the body of an insect is boldly divided into three chief portions, known as the *head*, containing the mouth and organs of sensation; the *thorax*, bearing the organs of locomotion; and the *abdomen*, containing the vital organs. This division into three portions constitutes

one of the chief characteristics of the insect, and the word In-sect, *i.e.* cut-into, refers to this division. The Greek word *entomos*, from which is formed the word entomology, has the same signification. All insects, too, after being hatched from the egg, pass through two preliminary stages, viz. the larva, caterpillar, or grub, and the chrysalis or pupa, before attaining their perfect condition. These stages, which are technically termed *metamorphoses*, will be more fully described in the succeeding paper.

Another important distinction is that all insects have six legs, neither more nor less, though in some cases they are not all fully developed. It is thus easy to see why spiders do not rank as insects, in spite of the popular notion to the contrary; for, in the first place, the body is divided into two chief portions only, the head and thorax being fused into one, called the *cephalo-thorax*, or head-thorax, which combines the functions of both parts. Besides this, they have eight legs instead of six, as well as several other minor differences.

Of the thirteen segments which make up the body of an insect, the HEAD is the first, and contains the mouth and the organs of the various senses, which we will examine in turn.

The mouth is found in various forms, each being most suitable to the food which the insect consumes. The beetles and many other insects, for instance, are provided with a pair of powerful horny jaws, often more or less toothed, which invariably work from side to side, instead of up and down, as is the case in the higher animals. Placed beneath these jaws is a pair of lesser size, known as the *maxilla*.

Some insects, such as the butterflies and moths, are furnished with a flexible tube, which can be inserted into flowers, and their juices sucked up into the

mouth by its means. This organ is usually known as the trunk or *proboscis*, and is not merely a simple tube, as might perhaps be imagined. In reality, it is formed by two separable half-tubes, composed of innumerable joints, and connected to each other by means of a series of small hooks, the two portions thus forming a complete tube, through which liquid nourishment can be imbibed. While not in use, the proboscis is usually coiled away beneath the head. Its structure may be readily examined by procuring a recently-killed moth or butterfly, and drawing the organ out with a pin or other instrument. If care be taken, the two portions may be separated, and their structure investigated by means of a microscope or powerful magnifying-glass.

Many insects, besides being furnished with a proboscis (which, in these cases, is not capable of being coiled up), have a further apparatus, consisting of a series of lancets, for the purpose of piercing the skin before proceeding to imbibe the blood. In the common gnat this structure is strongly exemplified.

Connected with the mouth are two pairs of feelers, varying greatly in size and form, which are termed *palpi*; the first pair, situated upon the maxillæ, or lesser jaws, being termed in consequence the maxillary palpi; and the second pair, placed on the labium, or lip, the labial palpi. Their use is supposed to consist in investigating the substances upon which the insect feeds. In many insects they are very imperfectly developed.

The eyes of insects are of two kinds, simple and compound, both forms being generally found in the same insect. The compound eyes, two in number, are placed one upon each side of the head. They are always more or less convex, and are composed of a considerable number of lenses, varying from twenty-

five in each eye in certain species of ants, to about eighteen thousand in some of the butterflies. Each of these eyes is hexagonal in form, and possesses a perfect visual apparatus, so that some insects are furnished with the astonishing number of thirty-six thousand distinct eyes. Of course, it is not to be supposed that each of these eyes produces a separate impression upon the optic nerves; and as the eyes are immovable, it is probable that one only, or at any rate a very small number of the facets are in focus with any given object at the same time. Hence the want of moveability is compensated for by the number of lenses, each of which points in a different direction, and commands a separate field of vision.

The simple eyes are usually very few in number, and are generally situated upon the upper surface of the head. Though both forms are generally found in the same insect, this is not always the case, sometimes the one and sometimes the other being alone found. Some few insects, indeed, among them several of the beetles and exotic ants, are entirely without eyes of either description.

Though it is undoubtedly the case that many, if not all insects, possess the sense of smell, it is yet unknown where the organs of scent are placed. The various carrion-feeding insects, for example, evidently detect the presence of their food by its odour; moths, and many other insects, which feed upon the sweet juices of flowers, must do the same; yet, although many theories have been advanced upon the subject, we have still to detect the organs devoted to the sense.

Neither have the organs of hearing been satisfactorily identified, unless, perhaps, the antennæ perform those functions. Yet the sense must be there, for many insects—as, for instance, the grasshoppers and crickets