CHAPTER I

A SURVEY OF THE FIELD

THERE are certain days of the year when the immense wealth of spider industry going on all around us is revealed in a way calculated to strike even the least observant. We all know—and derive no peculiarly pleasant thrill from the knowledge—that we can, if so minded, find abundance of cobwebs and their occupants by visiting the cellar or the tool-house; and probably we have all at times noticed, with a languid interest, large circular webs on our favourite rose-bushes, with a spider motionless in the centre.

But some spring or autumn morning, when the night has been foggy and the sun has only just succeeded in dispersing the mists, every bush and hedge is seen to be draped, every square foot of lawn and meadow to be carpeted with spiders' silk. There has been no special activity in the domain of these creatures, but every silken line is beaded with drops perhaps fifty times its diameter, and what yesterday

required careful observation to detect is now visible yards away, and we realise for once something of the prodigious activity constantly going on though ordinarily unnoted.

And it never entirely ceases. True hibernation, if it ever occurs, is not the rule among spiders, and there is no time of the year when some species may not be found at work. Beat trees or bushes over an old umbrella, or sweep grass and herbage with a sweeping net in summer, and you will never draw a blank—some spiders are sure to be found. In winter such measures are profitless, but if you take the trouble to grub among ground vegetation, or shake fallen leaves over a newspaper, or search under stones or logs of wood you will have no difficulty in finding spiders enough, and by no means dormant. I have even seen an enthusiastic collector remove inches of snow and disinter rare species from among the roots of the grass beneath!

Spiders, then, are plentiful enough, and it is not only individuals that are numerous but there are vastly more kinds or species than most people dream of. The Rev. O. Pickard-Cambridge, in a book under the modest title of *The Spiders of Dorset* indispensable to all British collectors, quaintly observes that most of his friends claim acquaintance with three kinds of spiders—the garden spider, the harvest spider and the little red spider—two of which, as it

happens, are not spiders at all. Yet the British List contains about five hundred and fifty species, and the spiders of the world, though only very partially investigated, already include many thousands of known and described forms.

In this little work we shall not at all consider the spider tribe from the collector's point of view. We shall concern ourselves rather with habits and modes of life and such structural modifications as are correlated therewith. Certain well-defined groups of spiders we shall recognise, but specific names will interest us little. And we might do worse than step out on such a spring morning as we have imagined and rapidly survey the field which lies open for our investigation.

First, then, examine a little more closely one of the garden bushes in which the spiders have been so busy, and the chances are that three different types of snare will be readily distinguishable. There are sure to be some of the familiar wheel-like snares of *Epeira*, but note also the fine-spun hammocks of *Linyphia* with stay-lines above and below, and the irregular labyrinths of *Theridion*, its lines crossing and recrossing without apparent method. These are sedentary spiders, and always to be found at home. All spiders spin for some purpose or other, but these—or at all events *Epeira*—have brought the art to its highest perfection. Leave them for the present

and examine a sunny wall or fence. You may chance to see a little zebra-striped, flat-bodied spider exploring the surface and directing its opera-glass-like eyes in all directions in search of prey. This is one of the Attidae or jumping spiders—few and sober-coloured in this country, but extraordinarily abundant and often extremely beautiful in tropical regions. Pause at the iron railing before leaving the garden and observe how the topmost bar and the knobs which crown the uprights are alive with spiders, mostly very small, and obviously of many different kinds, extremely busy about something that it may be worth while to investigate later; then go on into the lane, and note, in the banks of the hedgerows the great sheet-webs and tubes of *Agelena*, a near relative of the house-spider, but with a cobweb, thanks to its situation, comparatively free from accumulations of dust and filth.

The creatures skipping, dry-shod, on the surface of the river or pond, though often called water-spiders, are true insects. The real water-spider, *Argyroneta*, which, though air-breathing, spends most of its time below the surface of the water, is not to be found everywhere, but there are many riparian species which are semi-amphibious in their habits and have no objection to a wetting.

Finally, turn into the wood and look carefully on the ground, especially where last year's leaves are

still lying. You are certain to see a few—and may very likely see countless myriads—of sober coloured, rapidly moving "wolf-spiders" (Lycosidae), roaming in quest of food. No stay-at-homes, these, but rovers, trusting to speed and agility, and not to guile, for their food supply.

All the spiders we have observed so far are in active pursuit of their daily business, but if we turn over stones, or logs, or look under sheets of loose bark, we shall find others, quiescent for the moment, but waiting for nightfall to begin their operations.

But we have probably seen enough to show that a pretty wide field for investigation lies immediately at hand, and that a detailed study of what we have cursorily glanced at will occupy us so long that we shall have little time for considering the spiders of other lands. In the first place, however, we had better make quite sure of what is meant by a spider.

CHAPTER II

WHAT IS A SPIDER?

Not many years ago the group Insecta was held even by Zoologists to include numberless small creatures—centipedes, spiders, mites, etc.—which further study has shown to present essential differences of structure, and in popular language

any fairly minute animal is still an insect, just as any insect is popularly a "fly"—or, in the United States, a "bug." Scientifically the use of the term Insect is now much restricted, though still extensive enough in all conscience, since it includes many more than a quarter of a million known species. Zoologists recognise a large group of animals characterised by having no internal skeleton but a more or less firm external coating of a peculiar substance called *chitin*, often strengthened by calcareous deposits, which necessitates the presence of joints in their bodies, and especially in their limbs if they are to move freely, just as medieval suits of armour required to be jointed. These are the Arthropoda. One subdivision of this group consists of aquatic animals, breathing by gills, and known as Crustacea. Crabs, lobsters, shrimps and "water-fleas" are familiar examples, and with the exception of the so-called land-crabs the only Crustaceans habitually found on land are wood-lice.

The other Arthropoda are air-breathing, and since their characteristic breathing organs are branching tubes known as *tracheae*, the term Tracheata is sometimes used to include them all. They fall naturally into three divisions, the Myriapoda, the Insecta and the Arachnida, and it is in this last-named division that we shall find the spiders.

The Myriapoda are the centipedes and millipedes,

and having said this we may dismiss them, for insects and arachnids are strictly limited as to legs; and no myriapod can ever be mistaken for a spider.

The Arachnida are so varied in structure that it is not easy to give characteristics common to them all, and to any general statement there are bound to be exceptions, but for practical purposes it may be said that while an insect, when mature, has only six legs, and a pair of feelers or antennae of quite different structure, Arachnids have normally eight legs, and their feeling organs are not antennae but leg-like "pedipalps."

Most insects are distinguishable at once by the possession of wings, which are never found among the Arachnida, and they generally undergo a marked transformation or metamorphosis in their progress from the egg to maturity, taking on at first the form of a caterpillar or grub and then that of a chrysalis; but as there are many wingless insects and many in which the metamorphosis is very slight, the test supplied by these characteristics is only of partial application, and we shall do better to rely on the number of legs, and the nature of the feeling organs If, therefore, we find a small wingless animal with eight legs and a pair of feelers which are not thread-like but much of the same character as the legs, though not used for locomotion, we may be sure that we are concerned with an Arachnid.

But is it a spider?

Now some groups of the Arachnida may be put out of court at once as having an appearance so characteristic that no confusion is possible. Such are the Scorpions, and the minute Chernetidea or "False Scorpions," but this cannot be said of the Phalangidea or "harvestmen" or of the Acarina or "Mites," members of which groups not only may be, but frequently are popularly taken for spiders. In fact the Phalangidea are very commonly spoken of as "harvest spiders" and the "red spider" is a mite. A very brief inspection, however, with a pocket lens will settle the matter without the least difficulty.

A spider's body consists of two parts, a cephalothorax (head + thorax) and an abdomen. There is a waist, but no neck. The eight legs are attached to the cephalothorax, and the abdomen is not segmented or ringed like that of an insect, but entire, and bears at its extremity or on its under surface a little group of spinnerets or finger-like projections from which the spider's silk proceeds. For the moment these three characteristics will suffice—the "waist" behind the leg-bearing portion of the body, the unsegmented, legless, abdomen, and the spinnerets (fig. 1 *B*). A harvestman, for instance, lacks the waist, and its abdomen is segmented. Mites are of very varied form and in some the body is more or less divided into two portions, but at least two pairs of legs will be found

to be attached to the hinder portion; and neither harvestmen nor mites possess the spinnerets which

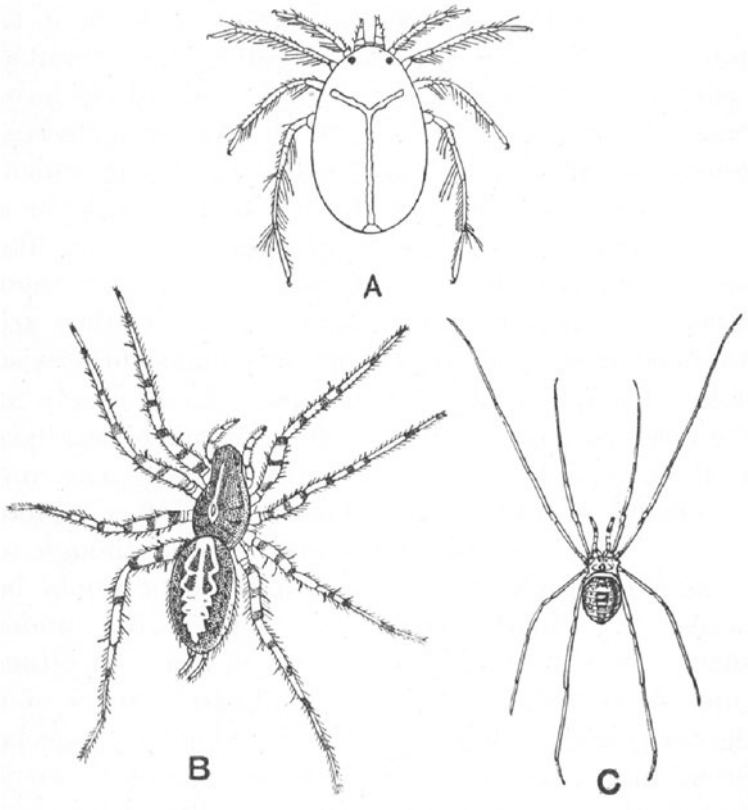

Fig. 1. *A*, a Mite; *B*, a Spider; *C*, a Phalangid.

are the most striking characteristic of the spider; some mites—like the "red spider"—can spin, but

the mechanism by which that operation is performed is of quite a different nature.

Having, then, very readily determined our specimen to be a true spider, we may as well use it to note some further structural points the detailed examination of which may be deferred till we have considered their functions. Note the jaws or *chelicerae*, consisting of a stout basal part and a fang which, when not in use, is shut down like the blade of a knife; note the pedipalps or feelers, exactly like small legs, but showing by their action that their function is sensory and not locomotor. If they are knobbed at the end, the specimen is a male, otherwise it is a female or as yet immature. Look closely at the front part of the cephalothorax, and several eyes will be visible—probably eight. They are not compound—divided into innumerable facets, like those of insects—but simple and smooth, though to make sure of this the use of a microscope would be necessary. Finally, obtain a view of the under surface of the abdomen, and note in front, on either side of the middle line, two semilunar patches of a lighter colour. These are the "lung-books,"—special breathing organs peculiar to these animals; two is the usual number, though certain spiders possess a second pair behind the first.

But the spinning mammillae or spinnerets are still more characteristic and more easily seen, though,