Order 19

HEMIPTERA (RHYNCHOTA: PLANT BUGS, ETC.)

Two pairs of wings usually present; the anterior pair most often of harder consistency than the posterior pair, either uniformly so (Homoptera) or with the apical portion more membranous than the remainder (Heteroptera). Mouthparts piercing and suctorial, palps atrophied; the labium forming a dorsally grooved sheath in which lie two pairs of bristle-like stylets (modified mandibles and maxillae). Metamorphosis usually gradual, rarely complete.

The Hemiptera or true bugs are most easily recognized by the form of the mouthparts. These are adapted for piercing and sucking, and this habit is prevalent throughout life except in male Coccoidea, where the adult mouthparts are atrophied. The wings and other body structures vary greatly within the Hemiptera so that no further general morphological definition of the order can be given.

The Hemiptera cause a vast amount of direct and indirect damage to plants and for this reason there are few other orders of insects so inimical to man’s welfare. Among the more destructive species are the Cotton Stainers (Dysdercus spp., Fig. 315), the Green Vegetable Bug Nezara viridula, the Chinch Bug Blissus leucopterus, various leaf-hoppers (Cicadellidae and related families), the white-flies (Aleyrodidae), the aphids or plant-lice (Aphidoidea) and the scale insects and mealy bugs (Coccoidea). Some Homoptera, notably among the Aphidoidea, are vectors of phytopathogenic viruses; the species Myzus persicae transmits over 50 such diseases, including mosaic and yellows of sugar-beet and leaf-roll of potatoes. Some Cicadellidae are also concerned in the transmission of aster yellows, ‘curly top’ of sugar-beet and ‘streak’ of maize.

Certain Heteroptera have developed a propensity for animal food, as in the predacious families Reduviidae, Nabidae and Anthocoridae, and in most Hydrocorisae. Both sexes of the Cimicidae, Polycntenidae, and some Reduviids such as Triatoma suck the blood of mammals or birds.

Hemiptera afford many instances of resemblance to insects of their own and other orders. Certain of the ant-like forms are very remarkable; thus the brachypterous form of the Coreid Dulichius inflatus closely resembles and
associates with the ant *Polyrachis spiniger* and is furnished with pronotal and other spines rather similar to those of the ant. Another Coreid, *Alydus calcaratus*, is often found in England in company with *Formica rufa* and other ants, which its nymph closely resembles. Further cases of resemblance to insects of other orders are found in the Reduviidae.

Aquatic Hemiptera display many structural and functional adaptations to their environment, particularly with regard to locomotion and respiration (Torre-Bueno, 1916; Weber, 1930). In the surface dwellers (Amphibicorisae) the adaptations are less pronounced, the antennae free and unconcealed, and the legs not highly modified. These insects are clothed with a velvety pile to prevent wetting, and their respiratory mechanisms are simple. The Hydrocorisae, on the other hand, have the antennae concealed, the long antennae of above-water forms obstructing the freedom of motion of submerged insects. The legs are highly adapted for swimming and complex respiratory modifications occur.

**External Anatomy**

General accounts of the external anatomy of the order are given by Ekblom (1926–30), Weber (1930), Kramer (1950), Pesson (1951), Poisson (1951) and Jordan (1972).

**The Head** — The head (Evans, 1938, 1968; Spooner, 1938; Parsons, 1959c–64) is very variable both in form and in the inclination of its longitudinal axis, being porrect in most Heteroptera and usually deflexed in the Homoptera. In most cases the sclerites are compactly fused (Fig. 316), but a more or less distinct frons is found in some Cercopids, Cicadellids, Cicadids and Psyllids; in the two latter it bears a median ocellus. The clypeus is subdivided, the post-clypeus being a large sclerite, frequently much swollen in the Auchenorrhynchan Homoptera but less conspicuous in the Heteroptera where it extends well back on the dorsal surface of the head and its posterior limits are not recognizable externally. A small ante-clypeus and labrum are also present, the latter often narrow and acuminate (Stys, 1969). At the sides of the head are two pairs of more or less distinct sclerites