OBSERVATIONS

HISTOLOGY OF DYSDERCUS KOENIGII (HEMIPTERA)

Just as in the other insects, the brain of Dysdercus koenigii consists of all the three principal association centres i.e., the protocerebrum, the deutocerebrum and the tritocerebrum. The details of the histology of this insect have already been reported by Satija and Sohal (1962) from this laboratory. In order to avoid repetition, only the essential features of this have been described here.

I. The neurilemma which surrounds the brain is syncytial and possesses a thickness of 7.5 μ.

II. The protocerebral lobes are two in number, an anterior main lobe and a posterior ventral accessory lobe in each hemisphere. The main
protocerebral lobes are flattened dorsally and they occupy the bulk of the protocerebrum. Ventrally they end in rounded projections which face anteriorly. These projections of the main lobes are connected together by means of commissural fibres. The accessory protocerebral lobes lie posterodorsally in the brain. They are situated dorsal to the deutocerebrum and ventrally they fuse with the latter. The posterior part of the accessory protocerebral lobe is fused with the medullary mass of the suboesophageal ganglion.

III The corpora pedunculata is well defined and consists of two lobes, one in each hemisphere of the brain. Each pedunculate body consists of a calyx, a stalk and two lobes. The calyx cup appears to be divided into two halves by a projection. The stalk at the point of emergence from the calyx cup has two limbs which later join to form a single structure. At the anteroventral end, the stalk gives two main lobes. Satija and Sohal (1962) termed them anteromedian lobe with many secondary branches and the posterodorsal lobe with two secondary branches instead of $\alpha$ and $\beta$ lobes.
IV. The organs of the central complex are constituted by a central body, an ellipsoid body and paired ventral tubercles. They are situated at the median position in between the stalks of the corpora pedunculata but posterodorsal to their anteromedian lobes.

V. The pars intercerebralis lies in between the calyces of the corpora pedunculata but posterior to the central complex in the dorsal median part of the brain. In the posterior region of the pars intercerebralis, there is a group of giant neurosecretory cells and in the median lateral region are situated the neurocytes which send the axons anteriorly in the neuropile mass of the protocerebral lobes.

VI. The transversely elongated pons cerebralis is represented by small masses of neuropile connected together by commissural fibres.

VII. A well differentiated corpora ventralis is present in each hemisphere on the ventrolateral side of the protocerebral lobes. Dorsally and medially the lobes of the corpora ventralia are continued with the medullary mass of the main protocerebral lobes.
VIII. The deutocerebrum is in the form of two antennary lobes which touch anteriorly the wall of the brain and posteriorly extend as far down as the sub-oesophageal foramen.

IX. The tritocerebrum is a triangular mass situated on the either side of the oesophageal foramen, but a little ventral and posterior to the deutocerebrum.

X. A distal lamina ganglionaris, a median medulla externa and a proximal medulla interna are present in each optic peduncle as optic centres. The medulla externa and medulla interna are joined by nerve fibres which partially decussate and form the chiasmata interna.

The fibrous commissures and tracts of different neuropile masses are described in detail by Satija and Sohal (1962). Their description is not given here because they are not dealt with separately in the account of histopathology.

THE CELLULAR ELEMENTS

The neurons in the brain of *Dysdercus koenigii* form a peripheral cortex that surrounds the central neuropile mass. These neurons, according to their size and location,
have been categorized into the following types:

**THE CELLS OF THE PARS INTERCEREBRALIS (A₁, B₁)**

Most of the space of the pars intercerebralis is occupied by large cells measuring 33 μ in diameter. Most of them are the neurosecretory cells as revealed by the aldehyde fuchsin test (Fig. 1). These neurosecretory cells are present in the form of two lateral groups, one in each hemisphere. The axons of the neurosecretory cells form the nervis corporis cardiaici, that connect the perikaryons of these cells with those of corpora cardiaca. These cells have been designated as A₁ type cells.

The second type, B₁ cells, are of moderate size with relatively a large amount of chromatin material, arranged along the periphery of the nucleus. They possess less cytoplasm than the A₁ cells and measure about 15 μ in diameter (Fig. 1).

**THE GLOBULI CELLS**

The neurons present in the cups of the calyces of the corpora pedunculata are the globuli cells. These cells measure approximately 6 μ in diameter. They possess little cytoplasm. Their nuclei possess chromatin material in the form of granules, distributed at random (Fig. 1).
THE OPTIC CELLS

The optic cells are present around the optic ganglia. They measure 5 μ in diameter. Like the globuli cells, they too have very little cytoplasm and their nuclei contain granular chromatin.

THE CELLS SURROUNDING THE DEUTOCEREBRUM

The cellular cortex of the deutocerebrum is formed by one type of cells. These cells resemble the B₁ cells of pars intercerebralis in size and structure. They have been designated as B₂ cells. Like B₁ cells, they also possess little cytoplasm and measure approximately 15 μ in size. Their nuclei contain scattered chromatin granules.

THE CORPORA CARDIACA

The corpora cardiaca in Dysdercus koenigii is a paired structure present in the head region at a little distance behind the brain, one on either side of the dorsal aorta. Each lobe of the corpora cardiaca has nervous connection with the neurosecretory cells of the pars intercerebralis through the axons, that form the nervis corporis cardiacii. The axons of this nerve terminate in the middle of the gland. These nerve terminals are surrounded by large neurons measuring 25 μ in diameter. This gland is encapsuled by a thin layer of muscle fibres (Fig. 2).
THE CORPORA ALLATA

The corpora allata in this insect is an unpaired gland which lies medially but posterior to the lobes of the corpora cardiaca (Fig. 2). The corpora cardiaca and corpora allata are connected with each other by short axons. The nervis corporis allatii is indistinct because of the close association of the two glands. The corpora allatum consists of a mass of cells with distinct cell membranes. Their nuclei measure 6 µ in diameter. It is surrounded by a thin layer of muscle fibres. Some axons from the corpora cardiaca are seen terminating into this gland.