CHAPTER V
SUMMARY

Cats and monkeys have been used as experimental animals for the present study. Number of animals have been varying from group to group and the details are given elsewhere in the chapter of results. Changes in cardiovascular, respiratory, body temperature, gastrointestinal, metabolic, endocrinal and other autonomic and somatic activities were recorded before, during and after stimulation of different limbic regions both in anaesthetised and unanaesthetised animals and before and after production of lesions.

Stimulation and ablation (surgical and electrolytic) techniques and other techniques used for recording different responses have been described in details. Cardiovascular and respiratory activities and gastrointestinal motility were recorded kymographically and electronically. To study
the gastric secretory activity gastric juice was collected either by aspiration or through gastric pouches. Chemical methods were used for assessment of metabolic and certain endocrinial activities.

Both facilitatory and inhibitory responses could be recorded to a certain degree from a particular region while in each group of study majority showed either facilitation or inhibition. Occasionally reversal of response was noted with increase of voltage. Variable results during anaesthetised and unanaesthetised states were also obtained. The details and possible significance of all these factors have been discussed.

A rise of blood pressure was generally recorded on stimulation of different frontal lobe structures while there was fall from stimulation of the different regions of temporal lobe except the temporal tip, stimulation of which in unanaesthetised animals led to rise of blood pressure in cats and fall in monkeys. Lesions of frontal lobe structures produced fall in blood pressure in majority of the animals whereas lesions of temporal lobe showed rise of blood pressure. Changes observed in heart rate on stimulation of different limbic regions have been variable. On the other hand, lesions of frontal regions produced fall in heart rate whereas increase in heart rate was recorded after lesions of temporal lobe. In general vasoconstriction was observed in majority of the frontal lobe stimulation and fall on stimulation of temporal lobe
structures. No consistent relationship between blood pressure, heart rate and changes in vasomotor tone could be seen in majority of the animals. Possible explanations for these variable responses and inconsistent relationships have been advanced.

A generalised inhibition of respiration was recorded on stimulation of all the temporal lobe structures, both in anaesthetised and unanaesthetised animals. Stimulation of posterior orbital gyrus led to increase in respiration in unanaesthetised and decrease in anaesthetised animals, whereas stimulation of anterior cingulate produced increase both in anaesthetised and unanaesthetised animals. Lesions of different frontal and temporal limbic structures showed decrease in respiration in majority of the animals.

In general fall in rectal temperature was registered both after frontal and temporal limbic structures. Some of these animals also showed fall of blood pressure. The possible significance of this correlation has been discussed.

Stimulation of amygdala and posterior orbital surface have in majority of the animals with gastric pouches produced a significant increase in volume, free and total acidity and pepsin contents of the gastric juice. Temporal tip stimulation resulted in increase in gastric secretion but no appreciable change could be obtained on stimulation of anterior cingulate and hippocampus. Results of aspiration series have been quite variable.

Stimulation of posterior orbital gyrus produced
increase in gastric motility in majority of the animals. Both increase and inhibition in motility were observed from Amygdala. Other limbic structures of temporal lobe in general led to inhibition of gastrointestinal motility. Hyperaemic and ulcerative changes were observed in the gastrointestinal mucosa after lesions of certain limbic structures.

Stimulation of the limbic structures studied produced an eosinopenic response of varying degrees in all the animals except in some of the cats who on stimulation of hippocampal formation showed increase in eosinophils 1 hour after start of stimulation. The maximum eosinopenic response was observed from amygdala and posterior orbital gyri. Ablations of different areas did not abolish the eosinopenic response in general. There was, however, no fall observed in eosinophils in 1 hour count following stress in those animals who had involvement of amygdala. 4 hour's count showed the usual eosinopenic response.

Quite a number of animals developed hypersexuality after lesions of amygdaloid and periamygdaloid regions, pyriform cortex and temporal tip. Such a response persisted after castration done in some of these animals.

Variable changes were produced in the blood chemistry of animals both after stimulation and ablation of different limbic structures. In general a rise in blood sugar was obtained both on stimulation and ablation of frontotemporal regions. Ablation of these areas produced a rise in blood
sodium while stimulation of temporal lobe structures showed fall in sodium and rise in potassium content of the blood. Frontal lobe structures registered a rise in serum sodium with no change in serum potassium on stimulation. Changes in serum proteins and their albumin: globulin ratios have been too variable both after stimulation and ablation.

Various somatic movements involving facial and limb responses muscles and other autonomic-like pupilledilatation, lachrymation, piloerection, salivation, urination and defecation were observed during the course of stimulation of these different limbic structures.

The possible mechanisms and the pathways involved, leading to such diverse results have been discussed in detail in the corresponding sections dealing with the particular response.