SUMMARY.

SECTION - A.

Haematoloechus almorai (Pande, 1937) common lung fluke of Rana cyanophlyctis in Kashmir.

CHAPTER 1. of this section deals with a brief review of the lung-flukes of amphibians. Haematoloechus Looss, 1899, is considered to be the valid generic name. Pneumonoeces Looss, 1902, is accordingly suppressed as a synonym of Haematoloechus.

CHAPTER 2. deals with the material and methods used for the study of the parasite. General morphology of the fluke is given in CHAPTER 3. Variations in the distribution of vitelline follicles and position of genital pores are discussed. On the basis of body-size, two morphological types are recorded. In one the pre-acetabular region is narrow and well developed and in other type this region is relatively reduced. Both the types are, otherwise, similar in the body characters and importance. Comparative measurements of ten selected specimens also recorded.

CHAPTER 4 deals with the study of Cuticle, musculature and parenchyma of the fluke. Cuticle is of homogenous nature not differentiated into the usual two layers. The sub-cuticular cells are immediately inside the
dermal muscle layer. The cells are spherical or pear-shaped. Sub-cuticular cell-processes are also recorded. Longitudinal muscle-fibres are seen immediately inside the cuticle. The circular fibres are reduced. Few nucleated cells are seen infiltinating to the area immediately inside cuticle also. Diagonal muscles could not be seen. The parenchymal musculature is formed by dorso-ventral fibres in the form of ropes, bands and solitary fibres. Fibres running obliquely and longitudinally are also present. Myoblasts are recorded in parenchyma. These are nucleated and unipolar cells. Muscles of the oral-sucker were studied in detail. Besides radial fibres numbering 46-52 as seen in longitudinal section and forming the main thickness of the sucker, there are circular and longitudinal muscle-fibres towards the inner and outer margin of the sucker. Thick muscular bands of circular fibres at anterior end of oral sucker are also recorded and presumed to act as a sphincter.

CHAPTER 5 deals with alimentary system. Musculature of pharynx shows the presence of closely-packed radial fibres. The lumen has a cuticular lining. On outside is a thin layer of circular muscle-fibres. Musculature of Oesophagus and intestine have been recorded. The
muscle-fibres of intestine are weakly developed. Glandular cells surrounding the Oesophagus have been recorded and are presumed to be salivary gland-cells. In nervous system under Chapter 6, two cerebral ganglia having Uni, bi and multipolar cells, dorsal commissure and a ventral double nerve-cord were recorded. Dorsal and lateral cords could not be located. Bulb-shaped nerve-ending in oral sucker are recorded. These apparently act as tangoreceptors. General pattern of the excretory system is found to be similar to other plagiorchiids. As recorded in Chapter 7, there is a Y-shaped excretory bladder with two short cornua.

Reproductive system (Chapter 8) has been worked out in some details and variations recorded in the disposition of Vitellaria. Cirrus-pouch with seminal vesicle, the testis, Ovary, Mehli's gland, receptaculum seminis, vitellaria and course of uterine coils have been studied.

SECTION 'B'.

NEMATOTAENIA KASHMIRENSIS, Fotedar, 1966.

Common cestode parasite of Bufo viridis in Kashmir.

Chapter 9. deals with the previous records of Cestodes in amphibians in India and other parts of the world. Material$ and methods used in the study of the
cestode are given in Chapter 10 and followed by a table (I) giving the seasonal infection of the parasite in the host.

General Morphology of *Nematotaenia Kashmirensis* is discussed in Chapter 11. Distinct body divisions of the parasite have been determined. Table II gives the comparative measurements of ten selected specimens showing variations. Chapter 12 deals with the histology of body wall, Cuticula and Sub-cuticula have been described.

The musculature of the Cestode is given in Chapter 13. Muscles of Scolex, Suckers and strobila have been described. Scolex musculature is found to be nearer to that of *Ophiotaenia filaroides* (La Rue, 1909). Arrangement of musculature at different levels of scolex have been recorded. Details of the muscles of sucker have been described. In the sub-cuticular region, only longitudinal muscle-fibres are seen along the basement-membrane. Only a few traces of Circular fibres are recorded.

In the Parenchyma only a single layer of longitudinal muscle fibres is present. The fibres are not seen in groups. As seen in transverse section twenty to thirty longitudinal muscle fibres are counted. Myoblasts are not seen in scolex. Bipolar muscle-
elements or myoblasts are seen in medullary region, more abundant in immature region.
Large number of calcareous Corupscles are seen in the parenchyma.

CHAPTER 14 deals with the excretory system. A ventral and dorsal excretory canal is present on each side. Histology of the excretory canal reveals the presence of a few layers of circular muscle-fibres surrounding the lumen. Epithelial cells near the canal are connected by fibrilla. Flame-cells are recorded and found connected by capillary vessels.

In scolex the four canals are connected by a simple ring-vessel with no loops or branches.
In Capter 15 dealing with the nervous system, two cerebral commissures are recorded close to each other. Four nerves run anteriorly and posteriorly around the sucker.

The reproductive system described in detail under Chapter 16 gives an account of the morphology of various organs and the developmental stages of paruterine organs and their ultimate transformation into egg-capsules.

The genital pores are irregularly alternate.
Each segment has two testes in dorsal medulla and one ovary in ventral half of medulla. The cirrus-pouch is mainly in cortical region. Vitellaria forms a
compact mass adjacent to ovary. A double rosette of par-uterine organs at an early stage is recorded, each rosette having eight to ten par-uterine organs. Before the formation of egg-capsules, arranged in two irregular rows in posterior gravid segments, the par-uterine organs are spread out in parenchyma. Each egg-capsule contains two to four rarely five uterine capsules, each containing a single egg.

Table III gives the Comparative measurements of eggs, egg-capsules and par-uterine organs in four selected specimens. Chapter 17 deals with the taxonomy of Nematotaeniid Cestodes. Previous work on the group is reviewed. Genus Baerietta Hsu, 1935, is regarded as a synonym of Distoichometra DICKEY, 1921. The family Nematotaeniidae is divided into two sub-families—Nematotaeniinae Lopez—Neyra, 1944, and Cylindrotaenianae Jewell, 1916. The two sub-families are revived but their diagnosis is emended. Under the former sub-family are placed the genera Nematotaenia and Distoichometra, having two testes and under the latter sub-family the genus Cylindrotaenia Jewell, 1916, having only one testis.

All the known species of the said three nematotaeniid genera are listed SECTION 'C'.


COSMOCERCA KASHMIRENSIS, FOTEDAR, 1959 - Common nematode parasite of *Bufo viridis* in Kashmir.

Previous records of nematode parasite from anurans in India are briefly reviewed in Chapter 18.

Generic diagnosis and the species of the genus *Cosmocerca* are also given along with their distinguishing features in the Chapter. Table I gives the incidence of infection of the parasite in the toads.

In Chapter 19 the external morphology of the nematode and range of body measurements are given.

The histology of cuticula and sub-cuticula (hypodermis) of the body-wall is described in Chapter 20. The cuticle shows differentiation in eight layers, including the basal lamella. Cortex, matrix and fibre layers are found to be three main regions of the Cuticle. Views on the nature of Cuticle and its origin are briefly given at the end. The sub-cuticula and its chords have also been described.

Somatic musculature has been described in Chapter 21. The number of muscle-cells in each sector is found to vary from six to twelve. Although the number is more than the typical number of meromyarian forms, the cells are by and large of platymyarian type in being shallow with their fibrillar portions limited to basal
region. However, a limited part of intestine shows muscle-cells to be of shallow Coelomyarian type. Thus an intermediate stage between meromyarian and polymyarian forms is seen in the present worm. Nematode musculature is also briefly reviewed in the light of musculature of the present form.

Pseudocoel of the worm is also described in this Chapter.

In the digestive system (Chapter 22) the details of the Oesophagus with the arrangements of nuclei in its corpus and bulb are given. In corpus there are six marginal nuclei in one group and twelve radial nuclei in one group and twelve radial nuclei in two groups of six each. In the bulb the marginal nuclei are six and radial twelve. Three large gland-nuclei are also present here. The histology of intestine and rectum is also described.

The excretory system is briefly described in Chapter 23. The system is of simple Oxyuroid type. The terminal duct is reduced to a vesicle. The two excretory canals do not have any nuclei. The excretory pore is in front of the Oesophageal bulb. Above studies have been made of the female worm only. Chapter 24 deals with the reproductive system. The female system is primarily amphidelphic and didelphic. The vulva
is more or less equatorial. The histological account of ovary, Oviduct, uterus and vagina is briefly given. In the male system variations are recorded in the number of simple male caudal papillae and the plectanes. The body-papillae have also been recorded.

SECTION 'D'. deals with the life-cycle of COSMOCERCA KASHMIRENSIS. The introductory Chapter (25) deals with the previous work on the life-cycle of some Oxyurids of anurans. Chapter 26 deals with the material and methods used in the study of present work. The culture media used for the development of larval stages were prepared from rat faeces and host faeces. Tap-water and normal saline solutions were also used.

CHAPTER 27 deals with the first larval phase, the infective stage and the parasitic stage. Mode of infection is described in Chapter 28. Various experiments to determine the mode of infection are described. Successful infection was carried out by allowing the infective stage larval to penetrate the host skin.

The young adults in the intestine and lung stages were also obtained by injecting the infective stage larvae sub-cutaneously.
Visceral migration is found to be necessary for the infective stage larvae before reaching the normal site in the rectum.

In CHAPTER 29 the data pertaining to the effect of temperature, moisture and dessication of eggs and larvae and the longevity of adults outside the host and larvae are given.