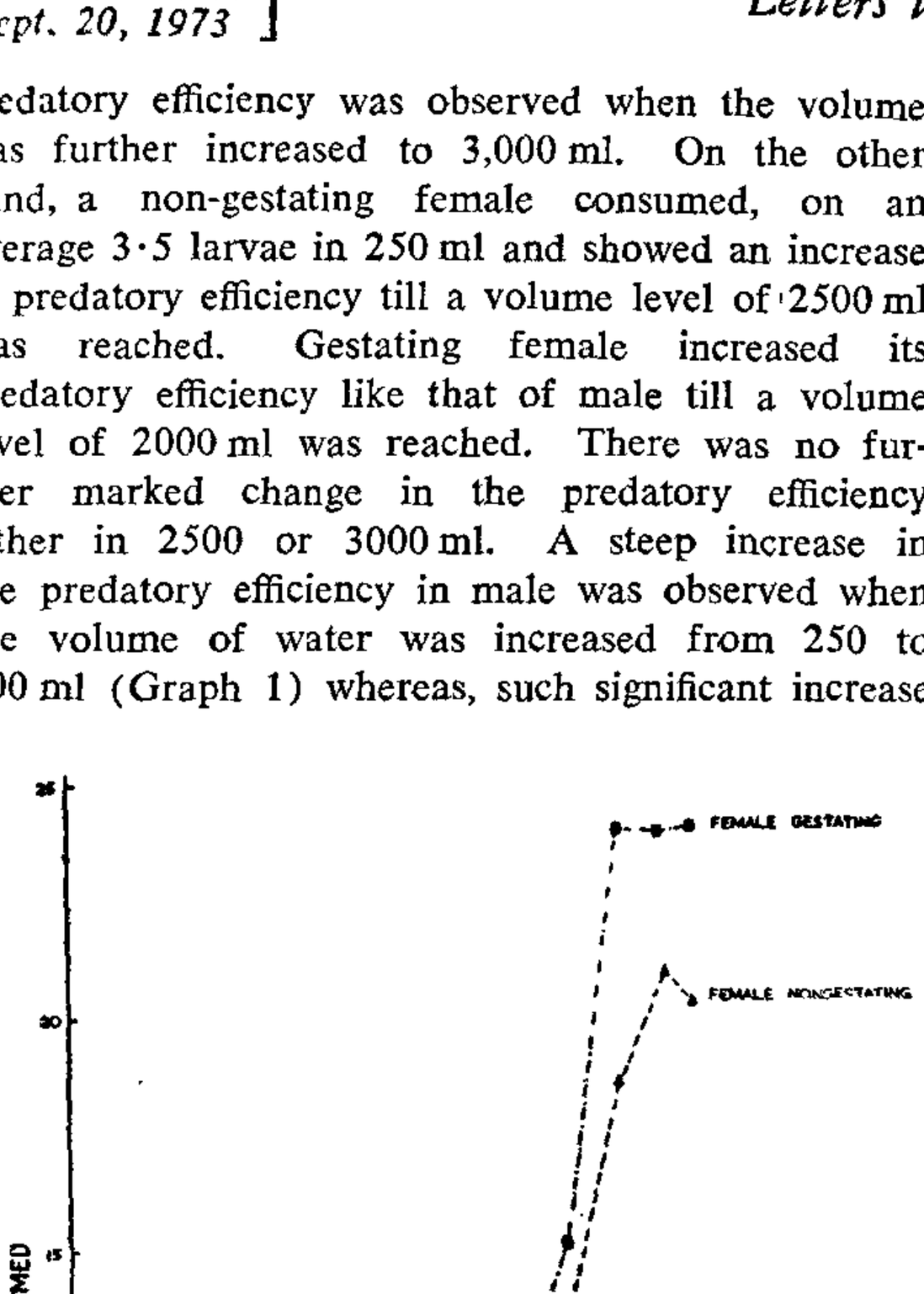
predatory efficiency was observed when the volume was further increased to 3,000 ml. On the other hand, a non-gestating female consumed, on an average 3·5 larvae in 250 ml and showed an increase in predatory efficiency till a volume level of 2500 ml was reached. Gestating female increased its predatory efficiency like that of male till a volume level of 2000 ml was reached. There was no further marked change in the predatory efficiency either in 2500 or 3000 ml. A steep increase in the predatory efficiency in male was observed when the volume of water was increased from 250 to 500 ml (Graph 1) whereas, such significant increase



GRAPH 1. Effect of volume of water on the predatory efficiency (number of 4th instar larvae consumed in 10 hr period) of *Gambusia affinis*.

in predatory efficiency in non-gestating female was observed only when the volume was increased from 1000 to 1500 ml. Gestating female showed such a change when the volume was increased from 750 to 1000 ml. Average live body weights of males and non-gestating females used in the present experiment was 132·4 mg. It was observed in the present experiment that the male *G. affinis* displayed higher feeding rate till a volume level of 1000 ml was reached and only beyond this volume level, the female showed increase in its feeding rate. Katre[6] observed that the male *G. affinis* had a lower feeding rate when compared to females of similar body size. The total volume of water seems to determine the predatory efficiency of *G. affinis*. Further experimental work on the behaviour of prey-predator system is in progress.

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THE NATURE OF THE LYMPHOID TISSUE IN THE CAECUM OF THE DOMESTIC FOWL

IT is recognized that in the chicken there are two types of lymphoid tissue, the bursa-dependent one, responsible for humoral immunity and the thymus-dependent one, related to cellular immunity[1]. It is assumed that a similar dualism in lymphoid tissue exists in mammals too[2]. Cooper *et al.*[3,4] have shown by surgical bursectomy and/or thymectomy followed by irradiation that the chicken spleen consists of both bursa-dependent lymphoid follicles and plasma cells and thymus-dependent diffuse lymphocytes.

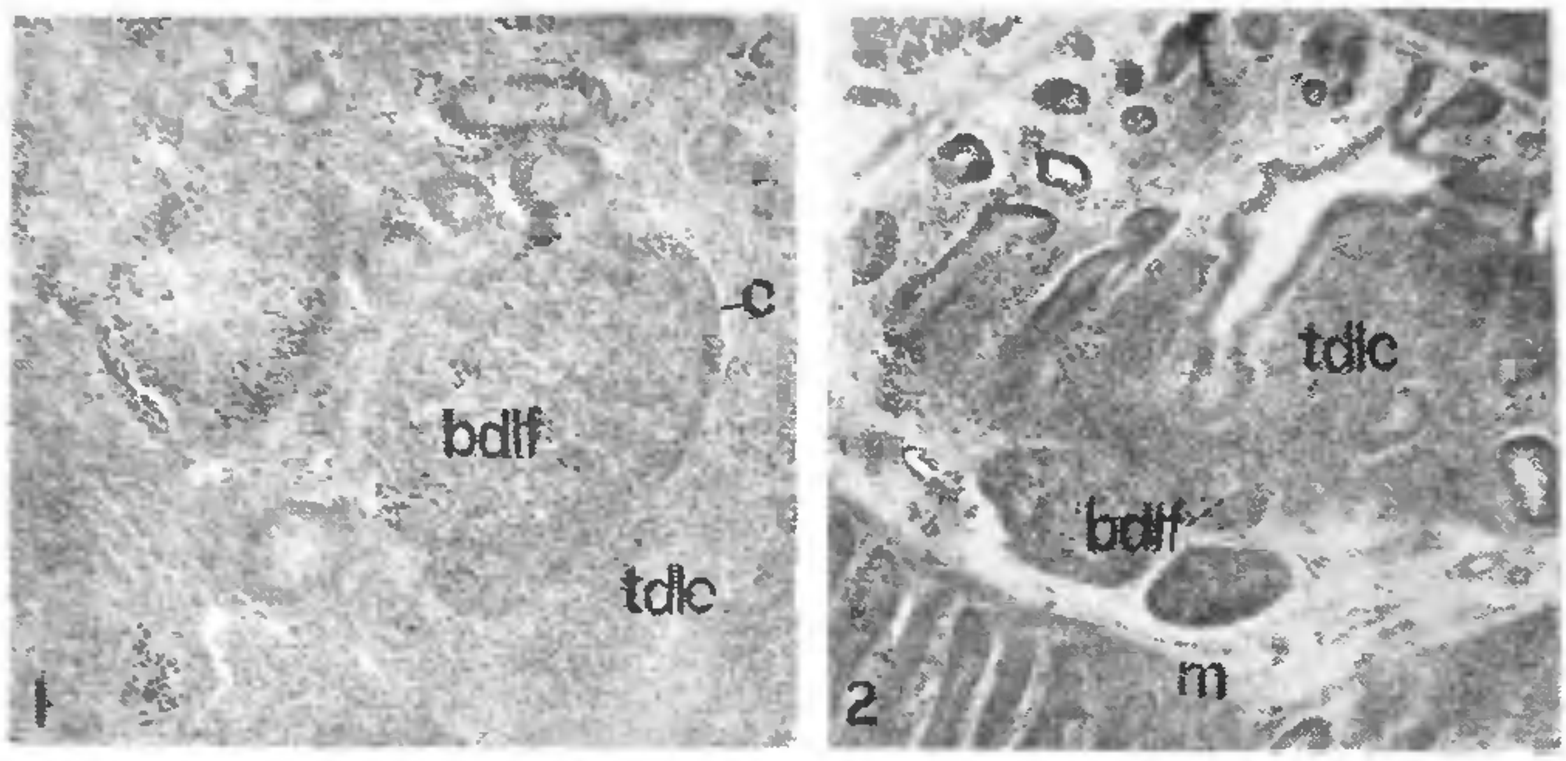
In a study of the morphology of the caecum of birds[5], it was found that as a rule, the intestinal caecum in the gallinaceous birds is well developed and consists of a capacious cavitied region in the middle with a long narrow region at the base and a blind knob at the terminus. In the domestic fowl which is derived from the wild jungle fowl, lymphoid tissue occurs at the terminal end as well as at the base of the caecum ; the latter has been described and termed "caecal tonsils" by Hill[6]. However, the nature of the lymphoid tissue met with in the caeca of the fowl has not been studied in detail so far. This paper deals with the attempts made to recognize histologically the two types of lymphoid tissue present in the caecum of the domestic fowl.

The caecum of the chick embryos as well as of chicks of different age groups was sectioned and

stained with haematoxylin and eosin. Some caeca were fixed in Carnoy's fluid and the sections were stained with methyl green-pyronin according to the method described by Opstad[7] to distinguish the thymus-dependent lymphoid tissue from the bursa-dependent follicles as suggested by Cooper *et al.*[3]. For purposes of comparison, the bursa of Fabricius, thymus and spleen were also sectioned and stained with methyl green-pyronin.

is a short region with a very narrow lumen, short villi and numerous crypts of Lieberkuhn. In this region also the lymphoid tissue is located in the mucosa as well as submucosa.

Detailed examination of the lymphoid tissue of the caecum in the domestic fowl has revealed that at both these locations, *i.e.*, the caecal tonsil region and the blind end, two types of lymphoid tissue can be distinguished.



FIGS. 1–3. Fig. 1. T.S. of the caecum of the domestic fowl at the region of caecal tonsils showing the bursa-dependent lymphoid follicles (bdlf) and the thymus-dependent diffuse lymphocytes (tdlc). A number of crypts of Lieberkuhn are seen. *c*—connective tissue covering of the follicle. Methyl green-pyronin, × 40. Fig. 2. T.S. of the caecum of the domestic fowl at the terminal part showing the bursa-dependent lymphoid follicles (bdlf) and the thymus-dependent diffuse lymphocytes (tdlc). Note the enlargement of the submucosa with numerous blood vessels. *m*—muscularis mucosa. Methyl green-pyronin, × 24. Fig. 3. T.S. of the spleen of the domestic fowl showing the bursa-dependent lymphoid fellicle (bdlf) and the thymus-dependent diffuse lymphocytes (tdlc). *a*—artery ; *c*—connective tissue covering. Methyl green-pyronin, × 80.

In the domestic fowl, the caecal tonsils (Fig. 1) and the blind ends (Fig. 2) of the caeca are conspicuous sites of lymphoid tissue. In sections, the caecal tonsil lymphoid tissue appears as a dense collection of lymphocytes in which are imbedded numerous lymphoid follicles in mucosa and submucosa. The extent of caecal tonsil region is about 1 cm from the junction of the caecum with the intestine. In contrast, the blind end of the caecum

The first type is made up of diffuse lymphocytes, some large but others small, often in dense collections. This type of lymphoid tissue makes its appearance in embryonic life at about 14th day of incubation, and is found located densely both in the caecal tonsil region and the blind end, and scattered in other parts of the caecum, in just-hatched chicks. From their lighter staining, loose occurrence and early development they can be

regarded as morphologically similar to the diffuse lymphocytes of the spleen (Fig. 3) which are reported to be thymus-dependent[3].

A second type of caecal lymphoid tissue comprises distinct masses of round or oval lymphoid follicles marked off from the surrounding diffuse lymphocytes by thin strands of connective tissue covering. The lymphocytes of these follicles are comparatively large with bigger nuclei and thin cytoplasm. With methyl green-pyronin, these lymphocytes stain more intensely than those of the diffuse type. In extent the follicular type of lymphoid tissue is much less than the diffuse type. Developmentally, these follicles make their appearance simultaneously both at the caecal tonsils and at the blind ends only about the second week of hatching. From their time of development, staining reactions and morphological appearance, these follicles are comparable to those of spleen (Fig. 3) which are described as bursa-dependent lymphoid tissue[3].

It may be mentioned here that the role of thymus and bursa of Fabricius is to bestow the immunological competence in the fowl through the lymphocytes released by them[1, 8-10]. Cooper *et al.*[3] have reported that the thymus-dependent lymphocytes of the chicken spleen appear earlier in embryonic life, occur loosely and stain lighter with methyl green-pyronin than the bursa-dependent follicles. Since the two types of lymphoid tissue, the diffuse and the follicular, met with in the caeca of the domestic fowl are comparable to those of its spleen in the time of their appearance, staining reactions and morphological features, it is concluded that as in the case of the spleen they are respectively derived from the thymus and the bursa of Fabricius. As the domestic fowl is an omnivorous bird in which the partially digested food undergoes bacterial decomposition in the cavitied portions of its caecum, the presence of the two types of lymphoid tissue both at its basal and terminal ends may serve specifically local immunological needs.

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BLOOD GROUPS AMONG SLENDER LORIS AND BONNET MONKEY*

THE subject of blood groups among animals has so far been studied only scantily[1,2]. Besides anthropological significance, the distribution of blood groups in animals has attracted much attention from the evolutionary point of view.

Many birds and mammals possess a highly complex series of blood groups and cattle in particular show a greater complexity than man. It has been discussed[2] that the more the complexity of blood groups the more the incidence of diseases. Several correlations are drawn between the incidence of diseases and blood group systems in man[3].

The four Landsteiner groups[4] make up the ABO system in man and these are associated with naturally occurring complementary antibodies. Local fluctuations in the ABO system are more than those in Rh and MNS systems. It is now being considered by several evolutionary biologists that the ABO system has a fair degree of potentiality of rapid natural selection and has some bearing on the environmental system[2].

Although the Landsteiner system has been studied in great detail in primates like monkeys and apes, the lower primates have not been investigated to the same extent[2], and hence this attempt is made.

Slender loris, *Loris tardigradus* and bonnet monkey, *Macaca radiata* of both sexes collected at random from Bangalore (South India) locale (about 70 km radius) showed the presence of AB group and Rh positivity. No other blood group was witnessed.

From these observations it was deduced that there was not much of complexity in the Landsteiner system of these animals as compared with other primates. Orangutan has all groups and chimpanzee has either A or O as in man. It is stated[2] that A-like and B-like antigens are found among the lower primates. It is discernible from our observations that loris being a lower primate was originally closely related to bonnet monkey, a higher