A SPOROZOON (*SARCOCYSTIS*, SP.) FROM THE HEART OF A COW IN CALCUTTA.

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In searching for Pirosoma in a blood-smear from the heart of a cow killed in Calcutta, I lately found numerous sickle-shaped bodies which were at first sight very puzzling. These bodies took the Leishman stain, with which the smear was stained, very well. One end, however, took no stain, this end being pointed. The other end was rounded and stained deeply, taking the blue stain. In this end a not very definite nucleus could be made out, and a number of red-stained chromatic dots. The middle of the body stained red deeply. The appearance of these bodies suggested that they were spores of some Coccidium, and on referring to Minchin's (A) account of the Sporozoa in Lankester's *Treatise on Zoology*, the resemblance between them and the spores of *Sarcocystis tenella* (*op. cit.*, p. 305, fig. 122) was at once evident.

In part of the smear a considerable number of straight forms were seen, and in addition to these, two varieties of spores could be made out, being differentiated from one another by the arrangement of the chromatic dots. In a few cases the capsule was found to have burst and the contents were escaping.

On making a section of the heart muscle of the same animal as that from which the smear had been made, and on staining this section with thionin and eosin, my supposition that the bodies were spores of some Sporozoon was confirmed, for numerous cysts were found occupying the substance of the muscle. These took the blue stain, while the rest of the tissue took the eosin. On examining the sections under a high power, I found that the cysts occupied the substance of the muscle fibres, displacing the nucleus. A distinct capsule was a noticeable feature of the cyst. No fine radiation, however, such as is found round the capsule of *Sarcocystis tenella*, could be detected. The identity between the spores, numbers of which occurred in each cyst, and those seen in the smear was evident. The spores were found grouped in loculi, but no distinct alveolar partition could be made out. All the cysts were in the same stage of development, and no intermediary stages were found.

Representatives of the Sarcosporidia are not very uncommonly found in the striated muscle-fibres of Mammals, especially in those of the pig and the sheep. That found in the sheep goes by the name of *Sarcocystis tenella*. One has been found by Hessling in the skeletal muscle of *Bos taurus*. Vuillemin (B) reports a case of

infection in the muscle of a man and is of the opinion that the parasite was *S. tenella.* Von Linstow (C) has described a form (*Balbiana* (*Sarcocystis*) *siamensis*) from the tongue of a buffalo in Lower Siam, and Shipley (D) has figured this form. Shipley (E) has also described another form from the muscle of a cow in Ceylon, regarding it as identical with *S. tenella.* Willey, Chalmers and Phillip (F) report frequently infection in the voluntary muscles of buffaloes which are apparently healthy. They found the parasite in 5·8 per cent. of the individuals slaughtered in Colombo.

Regarding the classification and nomenclature of the Sarcosporidia found in different animals, there is a great deal of confusion, as an illustration of which I cannot do better than quote Minchin's remarks (*op. cit.*, p. 308) on the subject. "*Sarcocystis,* Ray Lankester, 1882," he says, "represents the characters of the order. A great number of forms have been seen in different animals, many of which are probably distinct species, but only a few have received specific designation: such are *S. miescheriana* (Kühn) from the pig; *S. tenella,* Raillet, from the sheep; *S. platydactyli,* Bertram, from the gecko; *S. muris,* Blanchard, from the mouse, etc."

21st February, 1907.

LITERATURE.

A. Minchin on the Sporozoa in Lankester's *Treatise on Zoology,* part i, fasc. ii, 1903.

B. Vuillemin, *Compt. Rend. de l'Acad. des. Sci. Paris,* cxxxiv, No. 20, p. 1132, noted in Baumgarten's *Jahresbericht* for 1905.

C. Von Linstow, "Parasiten, meisten Helminthes, aus Siam," *Archiv. f. Micr. Anat.,* Bel. lxxii, 1903.

D. Shipley, on the Ento-parasites collected by the Skeat Expedition in the year 1899-1900, *Proc. Zool. Soc.,* 1903 (2).

E. *Idem,* "Some Parasites from Ceylon," *Spolia Zeylanica,* vol. i, 1903.

F. Willey, Chalmers and Phillip, "Report on parasites in the carcases of buffaloes at the Colombo Slaughter-house," *Spolia Zeylanica,* vol. ii, 1905.

MISCELLANEA.

MAMMALS.

THE APPENDICULAR SKELETON OF THE DUGONG (*Halicore dugong*).—In a recent note on the Dugong of the Gulf of Manaar (*Journ. Asiat. Soc. Bengal*, 1905, p. 238) I expressed an intention of dealing with certain anatomical points in a subsequent communication. As, however, most of these points have since been elucidated in a series of memoirs by Messrs. H. Dexler and L. Freund (see Wiegmann's *Archiv fur Naturgeschicte* for 1906, vol. i, p. 77, and the *American Naturalist*, vol. xi, pp. 49 and 567, 1906), further descriptions are unnecessary: these authors' observations were made on Australian specimens, but I cannot detect any constant difference between the races of *Halicore* found in Australian and in Indian seas. There are two features in the skeleton, however, to which I would like to invite attention, namely (*a*) the presence of three distinct bones in the pelvic girdle, and (*b*) the variability of the manus.

(*a*) In recent accounts of the vestigial pelvic girdle of the species two bones are said to be present (see Weber's *Die Saugetiere*, p. 732, fig. 526). In a large Australian ♂ skeleton, however, and in an individual of the same sex and approximately the same size dissected by myself on the Madras coast, I find that there is a third bone, which lies at the distal extremity of the lower of the two

FIG. 1, × ⅙.

already recognized. It is compressed and nail-shaped, measuring about 15 mm. in length and 6 mm. at the proximal end in breadth. The relations of the three bones to one another are represented in the accompanying diagram (fig. 1). There is probably a considerable amount of variation as regards the form and size of the three bones, but this is a question on which the material at my disposal affords little information.

(*b*) I have examined the manus of the two specimens already referred to, as well as that of several other individuals in which it is imperfect, while I am indebted to Sir William Turner and Prof. D. J. Cunningham for photographs of a specimen in the Anatomical Museum of the University of Edinburgh and to Dr. A. Willey for a sketch (fig. 4) of the hand of an adult female in the Colombo Museum. An examination of this material proves, as is well shown in figs. 2, 3 and 4, that the bones vary in number and relative development