atrium, which was stuffed with tumour that extended through a valvular foramen ovale into the left atrium. Tumour emboli were present in the pulmonary arteries, but there were no metastatic deposits in the lungs, liver or kidneys.

We gratefully acknowledge the permission of Dr D. F. Lawson to use the clinical details of his patient. The photographs are the work of Miss M. Johnson, and Mrs Creek typed the manuscript.

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A BENIGN GIANT-CELL SYNOVIOMA IN A CAT

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PLATE LVI

SYNOVIOMAS, both benign and malignant, are rare in animals (Cotchin, 1956; Innes, 1958). Cotchin (1954) studied six synoviomas in the dog: these all arose from tendon sheaths and at least three were malignant. A further case of a malignant synovioma in a dog was reported by Lieberman (1956). A malignant giant-cell synovioma arising from tendon sheaths in a cat was described by Nielsen (1952) and a malignant synovioma, apparently arising from a tarsal or metatarsal joint in a Swiss mouse, was reported by Llambes and Mendez (1954). More recently, there has been a report of a malignant synovioma in a cow (Dungworth *et al.*, 1964). Two tumours described as giant-cell sarcomas, one in a mule (Danks and Olafson, 1939) and one in a dog (Olafson, 1939) may have been synoviomas.

The apparent rarity of these tumours, and particularly of the benign variety, in animals, prompts the present report.

CASE REPORT

The tumour occurred in a castrated male tabby cat. It was first noted in 1963, when the animal was 6 yr old, as a small oval swelling on the extensor aspect of the right fore-limb, just proximal to the paw. This was surgically removed in June 1963 when it was about 2·5 cm. across. Difficulty was experienced in dissecting all the tumour tissue from the extensor tendons, and the tumour was noticed to have recurred 7 mth later. By July 1964 a further recurrence was impeding movement a little and it was decided to make a further attempt at removal. A radiograph taken at that time (fig. 1) shows that the tumour, which was on the extensor

aspect of the wrist joint, had not invaded bone. The tumour was removed as completely as possible, but it recurred about 4 mth later and, by January 1965, it was again impeding movement. Surgery was again contemplated, but in the interim the cat was killed by a motor vehicle and further examinations were not possible.

The specimen removed in July 1964 consisted of a hard tumour and a small portion of attached skin. The tumour was roughly ovoid in shape and measured approximately $3{\cdot}0 \times 1{\cdot}8 \times 1{\cdot}5$ cm. The greater part of the surface was smooth and obviously encapsulated, but the deep surface was lobulated and showed a few papillary processes. The cut surface of the formalin-fixed specimen was white in colour and delicately whorled (fig. 2).

Histology

The tumour is a typical benign synovioma (figs. 3 and 4). The tumour cells have rather basophilic cytoplasm and large vacuolated nuclei with prominent nucleoli. In the part of the tumour where they are gathered together in groups they are polygonal in shape or irregularly oval, but in the many areas where they are set in hyalinised connective tissue they are elongated and not unlike fibroblasts in shape. Large multinucleated giant cells are present in most parts of the tumour and are very numerous in the more cellular parts; their nuclei and cytoplasm are very similar to those of the tumour cells. Numerous clefts and cyst-like spaces lined by tumour cells and giant cells are scattered throughout the tumour.

Frozen sections do not reveal any fat. Perls' stain shows that haemosiderin is present but in only very small amounts. The picro-Mallory stain demonstrates the collagenous nature of the tumour and with Herovici's (1963) picro-polychrome stain the hyalinised connective tissue stains red, presumably indicating its greater maturity.

Discussion

Benign synoviomas are not rare in man. They are the second most common subcutaneous tumour of the hand and occur most frequently between the ages of 20 and 60 (Wright, 1950–51; Phalen, McCormack and Gazale, 1959). To judge from published reports both benign and malignant synoviomas are very rare in animals. However, tumour incidence can be properly assessed only if a large enough number of animals are allowed to reach old age: the incidence of tumours at the Philadelphia Zoological Gardens increased when better nutritional and environmental care led to increased longevity (Lombard and Witte, 1959). Thus tumours are most likely to be seen in pets and in animals kept in laboratories that are concerned with the longevity of their stocks. It is not surprising, therefore, that the species in which synoviomas have mainly been seen are the dog, the cat and the mouse. In the present case the tumour started when the cat was 6 yr old. Comfort (1956) states that cats are the longest lived of the small domestic mammals and quotes attested ages ranging from 21 to 33 yr. Thus 6 yr might be said to correspond with the lower part of the human age-range for benign synoviomas quoted above.

Synoviomas can arise from joints or from tendon sheaths, but those so far reported in both cats and dogs, including the present case, have arisen from tendon sheaths. Histologically the present tumour has all the characteristics of a benign synovioma. The tumour cells line synovial spaces and are set in a connective tissue that is often hyalinised. The giant cells have all the appearance of having been formed from the fusion of the synovial cells. Lipid and haemosiderin are common in human benign synoviomas, but the present tumour contains no lipid and little haemosiderin. This is perhaps hardly surprising, for feline movements are characteristically precise and accurate, so that trauma to the tumour, which Wright regards as the cause of lipid and haemosiderin deposition, is much less likely to occur in the cat than in man.

BENIGN SYNOVIOMA IN CAT

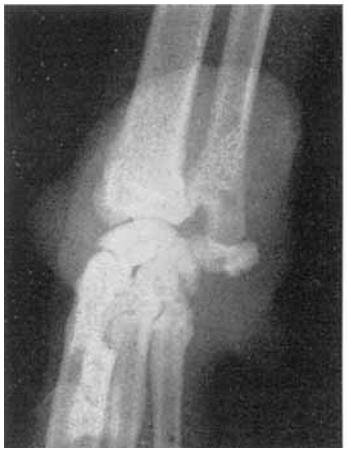

FIG. 1.—X-radiograph of right forelimb, showing the position of the tumour and the lack of bone involvement.

FIG. 2.—Cut surface of the tumour and overlying skin. *c.* natural size.

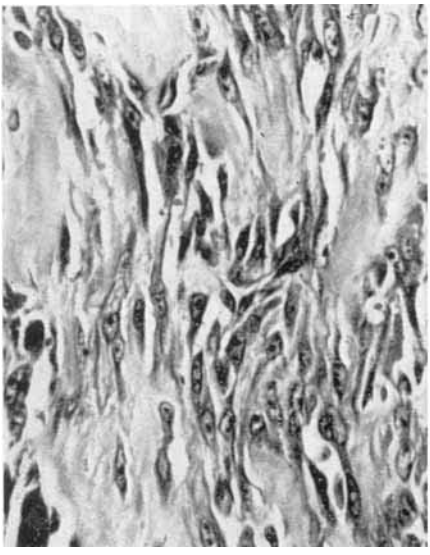

FIG. 3.—Typical tumour cells, synovial spaces and hyalinised connective tissue. Haematoxylin and eosin. ×350.

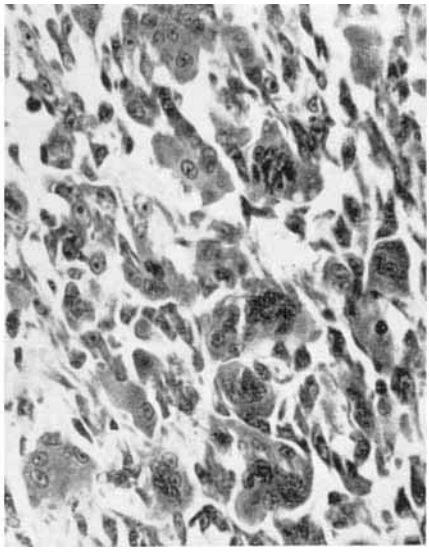

FIG. 4.—Highly cellular portion of tumour. Giant cells, typical tumour cells and synovial spaces. HE. ×350.

SUMMARY

A benign giant-cell synovioma in a cat is described. Such tumours are exceedingly rare in animals, and the benign variety has previously been reported only in dogs.

I wish to express my thanks to Dr R. J. Munson, who drew my attention to the tumour, and to Mr K. E. Brown, who kindly provided me with the surgical specimen. I am also indebted to Mr E. J. Lucas for the photographs and to Mr M. J. Corp for the X-radiograph.

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REVIEW OF A CASE PREVIOUSLY REPORTED AS SHOWING AN ASCARID LARVA IN THE BRAIN

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PLATE LVII

IN 1951 two of us (Beautyman and Woolf) published a report of a case in which an encapsulated larva—identified by one of us (J.J.C.B.) as probably *Ascaris lumbricoides*—was found in the thalamus of a child with clinical and pathological evidence of poliomyelitis. Although the diagnosis of *A. lumbricoides* was favoured at the time, one of us (J.J.C.B.) in his original report considered the possibility of an ascarid larva from a dog or cat.