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## الجهاز التناسلي في ذكور الماعز البلدى

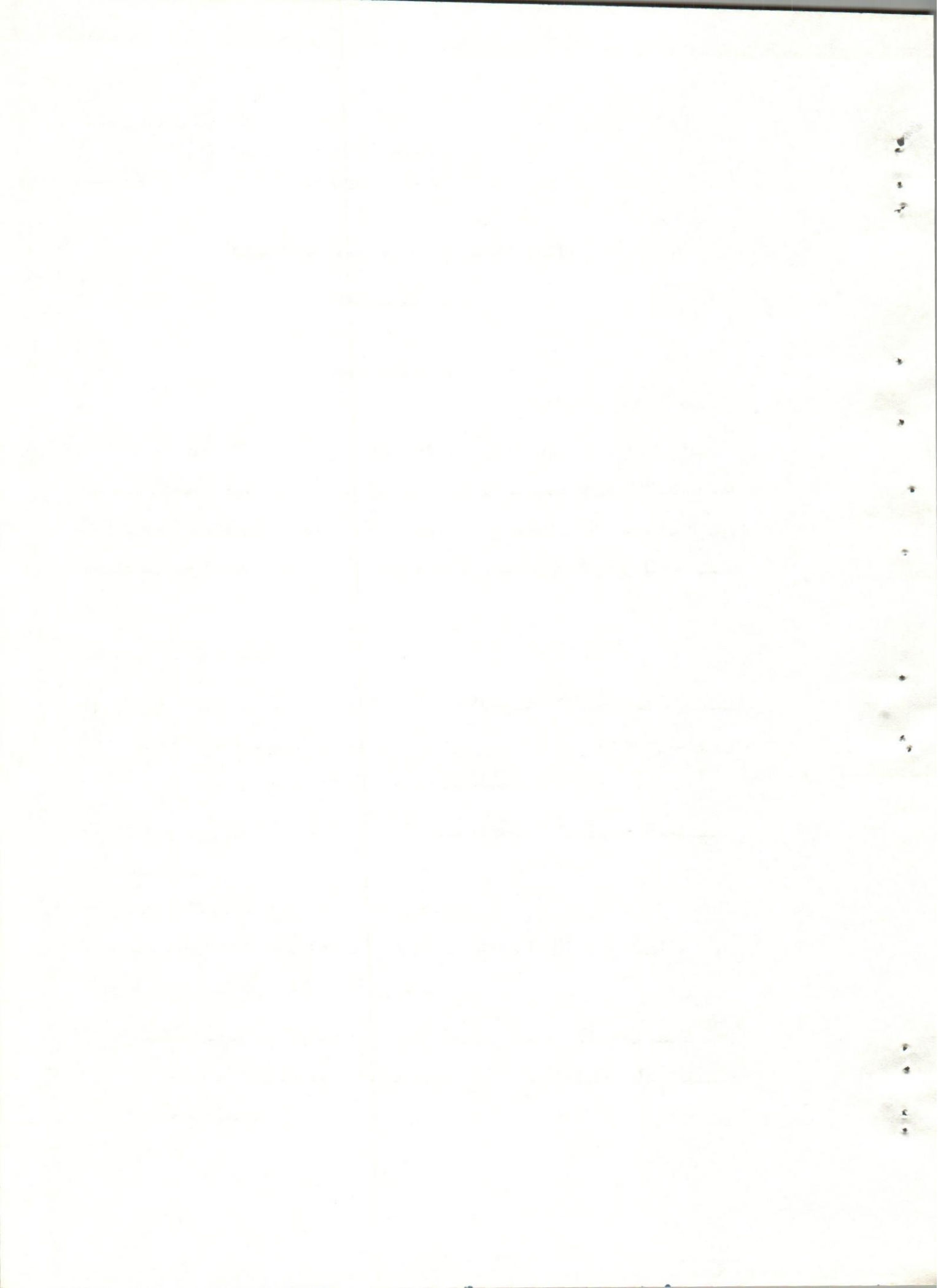
### المصري

#### نبيل حميد

اجريت هذه الدراسة على الجهاز التناسلي لعدد ٢٦ من ذكور الماعز البلدى مكتملة النمو . حيث تم تقدير أوزان ومقاسات جميع الاعضاء التناسلية . وكذا دراسة هستولوجية للغدد التناسلية لتعيين نوعها . بالاضافة لما سبق ، تم تحديد نوع ونسبة التغيرات المرضية بالجهاز التناسلي الذكري للماعز البلدى .

اتضح من الدراسة مايلي :

- (١) أوزان (متوسط  $\pm$  الانحراف المعياري) الخصيه ، البربخ ، غدة الحويصلة المنوية ، وعدة كوبر كانت كالآتي :  $8.094 \pm 1.511$  ،  $16.764 \pm 4.8$  ،  $6.723 \pm 3.41$  ،  $20.8 \pm 0.11$  جم بالتناوب .
- (٢) تناسق وزن ومقاسات وشكل الاعضاء التناسلية لكلا الناحيتين اليمنى واليسرى .
- (٣) طول القضيب :  $33.79 \pm 3.50$  سم .
- (٤) غياب الجزء الخارجى لغدة البروستات كما هو الحال في الخراف ، وان اختلفت عنها في التركيب الهستولوجي .
- (٥) اشتملت التغيرات المرضية على ضمور الخصى وحدوث تكلس في بعضها ( $57\%$ ) ، التهاب مزمن بالبربخ ( $39\%$ ) وكذا التهاب مزمن بغدة الحويصلة المنويه ( $39\%$ ) .



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## **THE REPRODUCTIVE TRACT OF THE CAPRINE EGYPTIAN BALADY BUCKS**

(With 8 Figures)

By

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(Received at 16/10/1984)

### **SUMMARY**

Reproductive tracts of twenty-six mature Balady bucks were utilized in this investigation. Weights of the testis, epididymis, vesicular gland and bulbo-urethral gland averaged  $80.94 \pm 15.11$ ,  $16.64 \pm 4.18$ ,  $6.73 \pm 3.41$  and  $2.08 \pm 0.11$  gm respectively. Penis was  $33.79 \pm 3.50$  cm long. Measurements of other reproductive organs were given. Right and left side organs were symmetrical in size and shape. Accessory glands were also examined histologically to study their microscopic structure.

Abnormalities of the reproductive organs in the Balady goat included testicular atrophy and calcification (5.7 %), chronic epididymitis (3.9 %) and chronic interstitial vesiculitis (3.9 %).

### **INTRODUCTION**

Despite the great amount of information now available on the reproductive tracts of domestic farm animals, little attention has been paid to the male reproductive tract of the goat. Anatomists have assumed for many years that the male caprine reproductive tract was almost similar to the ovine species (SISSON, 1921; NICKEL, SCHUMMER, SEIFERLE and SACK, 1973; GETTY, 1975).

Morphology of the male genital organs is essential for predicting their functional activity. Sperm production rates could be determined from the testicular measurements (FOOTE, HAHN & LARSON, 1970; LING, 1972; COULTER and FOOTE, 1976). However, information regarding morphology and biometrics of the testis and other genital organs of the goat is very sparse (YAO and EATON, 1954; LGBOELI, OPARCACHA and LEIGH, 1978; KUNDU, 1980). As yet, no data are available on similar aspects in the Egyptian Balady goats.

The objectives of the present study were a) to determine biometrics of the normal genital organs of the mature Egyptian Balady bucks, b) to study the microscopic anatomy of the accessory glands in order to consolidate the information regarding the similarity of the microscopic structure of the genitalia of ram and the caprine male, and c) to determine incidence and type of abnormalities in the genital organs of the Balady bucks.

### **MATERIALS and METHODS**

A total number of twenty-six healthy Balady bucks were utilized in this study. The age and body weight of the animal ranged between 2 to 4 years and 31 to 45 kg.

Gross examination of the reproductive organs and their dimensions and weights were recorded immediately after sacrificing the animals. Small pieces of both testes, epididymides,

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and ampulla ductus deferens, paired vesicular glands, pelvic urethra, paired bulbo-urethral glands and penis were fixed in Bouin's solution within 1 to 2 hours after slaughter. Tissues were dehydrated via graded alcohols, cleared in benzene and embedded in paraffin wax. Sections were cut at 6  $\mu$ m and stained with haematoxylin and eosin for histopathological examination.

Statistical analysis of the data was done according to SNEDECOR and COCHRAN (1976).

**RESULTS****Testes:**

The testicles of the Balady goat were elongated and ovoid (Fig. 1). The longitudinal axis was vertical and the attached border being posterior. Left and right testes measured (mean  $\pm$  SE)  $6.77 \pm 0.42$  and  $6.75 \pm 0.39$  in length,  $4.32 \pm 0.48$  and  $4.38 \pm 0.52$  in width and  $4.76 \pm 0.47$  and  $4.80 \pm 0.46$  cm in the anterior-posterior diameter. Testis weight for both left and right sides averaged  $80.77 \pm 18.27$  and  $81.15 \pm 19.80$  gm respectively. Differences in testis dimensions and weight between left and right sides were not statistically significant.

Testicular abnormalities were reported in 3 out of the 52 testes examined (5.7%). They included testicular atrophy, sperm stasis and calcification. The two atrophied testicles were smaller and firmer than normal on gross examination, fibrosed and lacked turgidity when incised (Fig. 2). Testis tunic was thickened and accompanied by adhesions with the surrounding. On histopathology, many of the seminiferous tubules disappeared leaving abundant interstitial fibrous tissue with accumulations of plasma cells. The few seminiferous tubules left showed advanced stages of degeneration.

The calcified testis showed whitish deposits in the parenchyma when incised (Fig. 3). In histological examination, the testis showed an extensive fibrosis of the interstitium and sperm stasis and calcification of the seminiferous tubules (Fig. 4).

**Epididymis and Ductus Deferense:**

Left and right epididymides weighed  $16.56 \pm 4.90$  and  $16.70 \pm 4.62$  gm respectively, with no significant difference between both sides. Caput, corpus and caudal portions comprised 45.4%, 17.5% and 37.0% respectively of the total epididymal weight.

Ductus deferense total length and diameter averaged  $37.57 \pm 8.92$  and  $0.32 \pm 0.10$  cm. Ampulla ductus deferense was  $8.26 \pm 3.04$  cm long and  $0.70 \pm 0.20$  cm in diameter.

Chronic epididymitis was noted in 2 goats comprising an incidence of 3.9%. The inflamed epididymides were hard and approximately five times the weight of the normal epididymis. On histopathology, epididymal lumen was filled with neutrophils, lymphocytes and proteinaceous materials. Marked cellular infiltration, sperm granulomas and fibrosis were also seen in the interstitial tissue.

**Vesicular glands:**

The vesicular glands of the Balady goats were relatively very large paired compact glandular organs with a lobulated surface (Fig. 5). They measured  $3.6 \pm 0.4$  in thickness, the right and left glands were symmetrical in shape and size.

Histologically, the vesicular gland was divided into large and small lobules by thick fibromuscular septa. The gland was found to be of the compound tubular type. Secretory tubules

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were lined by simple columnar epithelium. Columnar cells of variable height, were occupied by spherical nuclei in their basal half.

Chronic vesiculitis was recorded in one buck comprising an incidence of 3.9 %. Inflamed vesicular glands were not noticeable grossly, but histological examination revealed marked cellular infiltration of the interstitial tissue and fibrosis. Lymphocytes, plasma cells and histiocytes predominated. Neutrophil leucocytes were also scattered in moderate numbers in the interstitial tissue.

### Prostate gland:

The prostate gland in the goat was represented only by pars disseminata, the corpus prostate was lacking. The disseminated prostate gland formed a layer completely surround the pelvic urethra, which was  $7.1 \pm 0.8$  cm in length and  $1.5 \pm 0.1$  cm in width. The thickness of the glandular tissue increased toward the mid-dorsal region of the pelvic urethra.

Histologically, the prostate gland was found to be branched tubular in type. The interlobular tissue, made of a large amount of smooth muscle, demarcated the prostatic tissue into incomplete lobules. Secretory units showed a progressive decrease in size toward the posterior part of the pelvic urethra. The units were also widely separated by increasing amount of connective tissue posteriorly. The secretory lining of the prostate tubules was made of simple columnar or cuboidal epithelium.

### Bulbo-urethral glands

The bulbourethral glands of the Balady bucks were large, dense, spherical organs,  $1.50 \pm 0.06$  cm in diameter and  $2.08 \pm 0.11$  gm in weight. They were situated on either side at the ischial end of the pelvic urethra (Fig. 5). Histologically, the bulbo-urethral gland was compound tubulo-alveolar in type (Fig. 8). The secretory tubules and alveoli were lined with cuboidal to columnar cells and possessed wide to narrow lumina. The secretory-cell cytoplasm was lightly stained and vacuolated. The nuclei were oval and basally situated.

### Penis

The penis in the Balady goats measured  $33.79 \pm 3.50$  cm in total length and  $1.27 \pm 0.15$  cm in diameter at the level of the preputial reflections. The anterior tip of the penis was free of the prepuce for  $4.0 \pm 0.1$  cm and the galea glandis was  $1.97 \pm 0.10$  cm long. The urethral process was  $1.84 \pm 0.26$  cm long. Just behind the scrotum, about 1/3 of the penis ( $10.11 \pm 0.85$  cm) was folded up forming the sigmoid flexure.

## DISCUSSION

Weights and measurements of the testes and other reproductive organs reported herein for Balady goats were, in general, comparable to the values recorded for Billy, Saanen and Nubian goats (HEINEMANN, 1937; RICHTER, 1959; FIELDEN and BARKER, 1964; NICKEL *et al.*, 1973), but higher than those of Toggenberg, Sudanese and Jamnapari goats (YAO and EATON, 1954; EL-AZAB and IMBAL, 1979; KUNDU, 1980). However, much larger testis weight was reported in Billy bucks (SCHLUMPERGES, 1954). Differences in breed, age, body weight, season, inheritance and nutritional regimes could be responsible factors for such variations (YAO and EATON, 1954; DAVIES, MAN and RAWSON, 1957; VAN DEMARK and MAUGER, 1964; FOOTE, 1969; ABDOU, HASSUN and ELSAWAF, 1978; KUNDU, 1980).

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The finding that the left and right side organs were symmetrical in shape and size, was in accord with the observations of HEUMER (1942) in the same species, WEISGOLD and ALMQUIST (1979) in bulls, ABDOU *et al.* (1978) in rams and GEBAUER, PICKETT & SWIERSTRA (1974) in stallions. However KUNDU (1980) noted that in Jamnapari goats, the right vesicular gland was heavier and larger than the left one.

Histological examination of the accessory glands showed that the microscopic structure of the vesicular glands was similar in both Balady and Jamnapari goats (KUNDU, 1980). However, YAO and EATON (1954) in Toggenburg bucks and Aitken (1959) in rams observed two types of cells, chief columnar and few basal cells lining the secretory tubules. The finding that the disseminated prostate gland formed a layer completely surround the pelvic urethra was in accord with observations in the same species (NICKEL *et al.*, 1973; GETTY, 1975; KUNDU, 1980), whereas in rams it formed ventrally an incomplete ring in the urethral muscle (AITKEN, 1959; NICKEL *et al.*, 1973; GETTY, 1975). Despite this difference, the microscopic structure of the prostate gland in both species was similar (YAO and EATON, 1954; AITKEN, 1959; KUNDU, 1980). The observed variation in height of cells lining the secretory units of the bulbo-urethral glands could be attributed to their secretory activity (WROBEL, 1970).

Reports on pathology of the male reproductive organs in the goat are very few. The finding that testicular abnormalities averaged 5.7 % and that the commonest lesions were testicular atrophy, fibrosis and calcification was in good agreement with the incidence (2.3 to 10.4 %) and type of abnormalities reported in other breeds of goat (MATHEW and RAJA, 1979; VINHA, SANTOS and HUMENHUK, 1980). Among the goats studied herein, abnormalities in other reproductive organs were found to be chronic epididymitis (3.9 %) and vesiculitis (3.9 %). The histopathological changes observed herein were similar to those which have been described in other animals (LANCASTER, 1956; WATT, 1972; McENTEE, 1977).

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**DESCRIPTION OF FIGURES**

**Fig. (1):** Testis of a mature Balady buck.

**Fig. (2):** Testicular atrophy and chronic epididymitis.

**Fig. (3):** Incised calcified testis showing whitish deposits.

**Fig. (4):** Section of the calcified testis showing marked fibrosis, advanced degeneration of seminiferous tubules and calcium deposits in some tubules (H & E stain; 180 X).

**Fig. (5):** Accessory glands of an adult Balady goat.

**Fig. (6):** Section of the vesicular gland showing alveoli lined with columnar epithelium (H & E stain; 180 X).

**Fig. (7):** Section of the prostate gland in the posterior part of the pelvic urethra showing increased amount of connective tissue surrounding the glandular part (H & E stain; 180 X).

**Fig. (8):** Section of the bulbourethral gland showing alveoli lined with high columnar or cuboidal epithelium (H & E stain; 180 X).



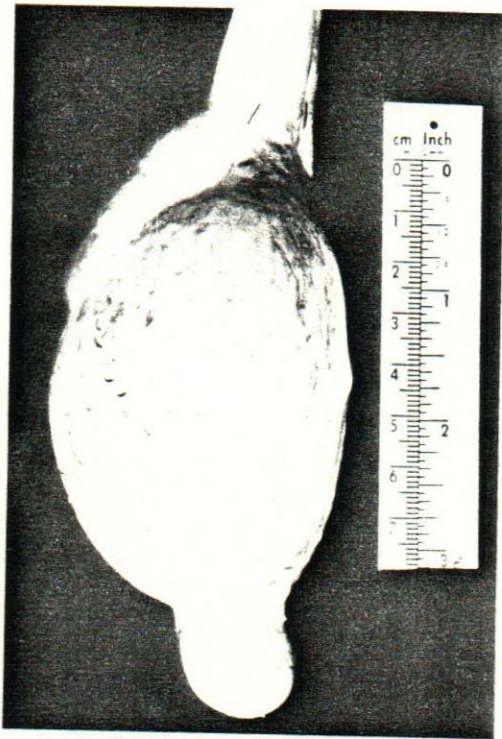


Fig. (1)

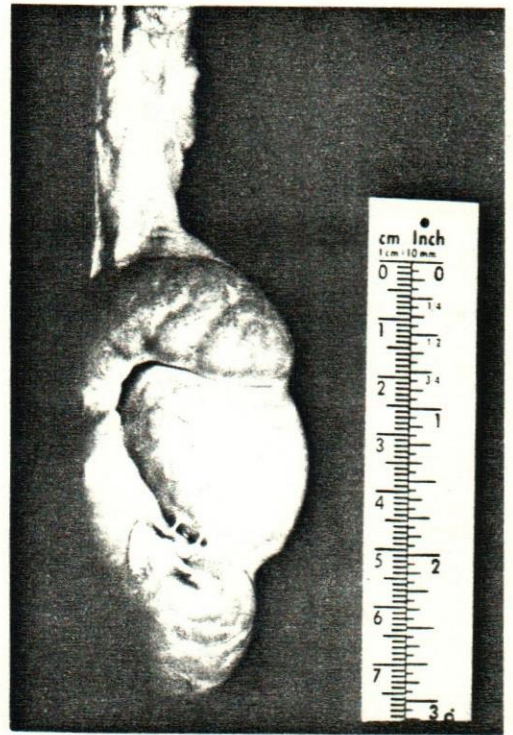


Fig. (2)

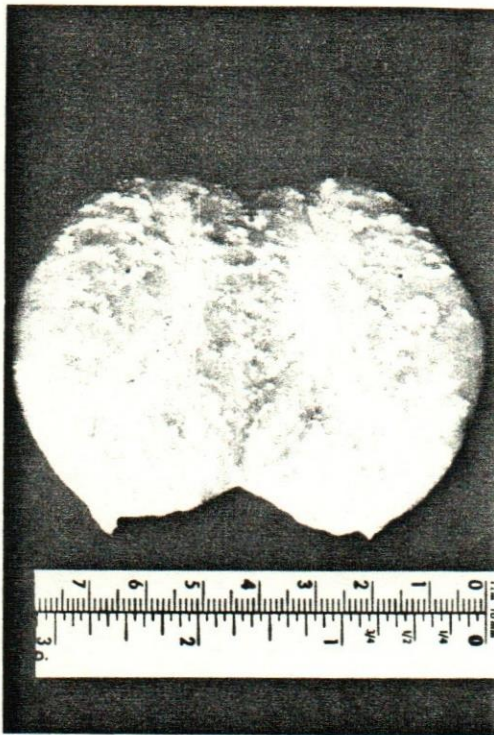
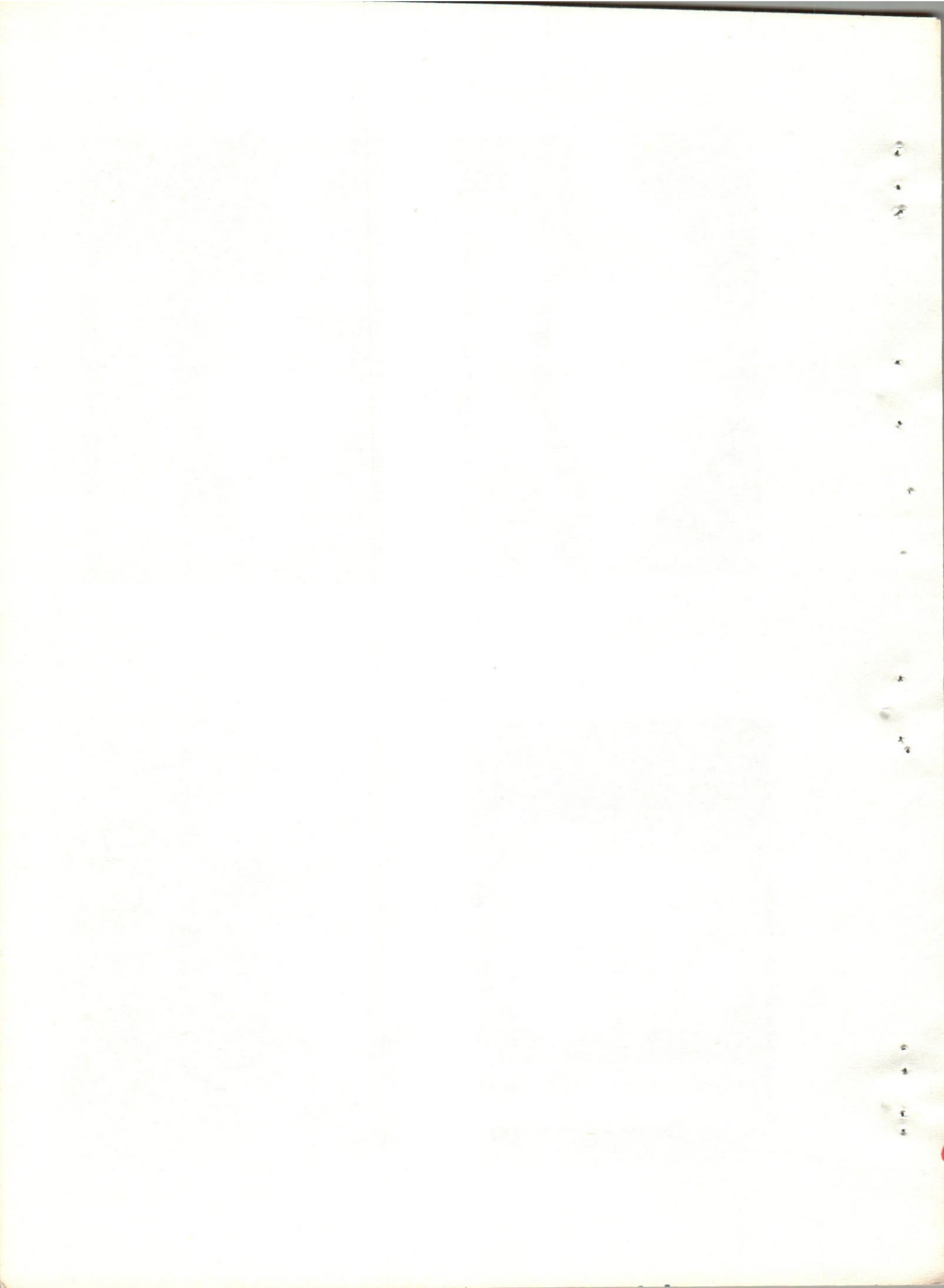


Fig. (3)



Fig. (4)



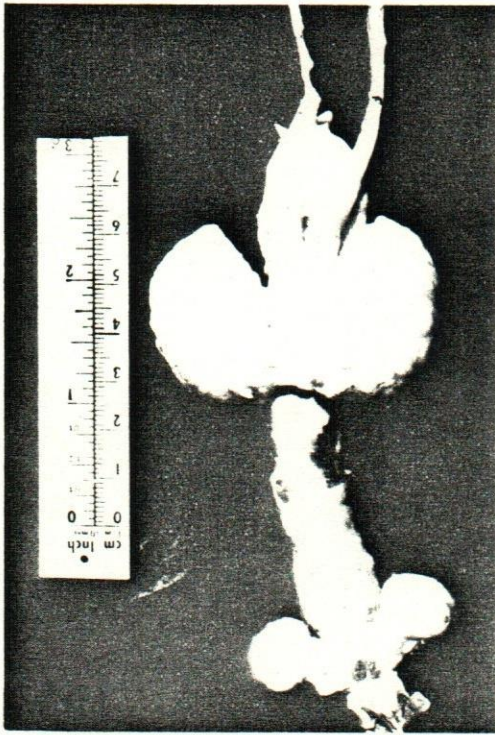


Fig. (5)



Fig. (6)



Fig. (7)



Fig. (8)

