

التشوهات الخلقية

دراسة على بعض شذوذات واصابات الجهاز التناسلى لذكور البقر والجاموس فى مصر

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شملت هذه الدراسة عمل فحص اكلينيكى وباتولوجى لعدد ٧٠٠ عجل جاموس و ٢٠٠ عجل بقرى وكذا عدد ٢٠٠٠ عجل بقرى وجاموسى مدبوح بالسلكانة لمعرفة التشوهات الخلقية الشائعة والاصابات المرضية المختلفة التى تصيب الجهاز التناسلى لهذه الحيوانات ولقد كانت التشوهات الخلقية التى تصيب الجهاز التناسلى فى الجاموس تشتمل على :

وضع خاطىء لأحد الخصيات ، اختفاء لأحد الخصيات ، حويصلة فى رأس البربخ ، التحام جدارى الامبولتان وبقايا قناة مولر . أما التشوهات الخلقية الشائعة فى العجول البقرية فكانت تحتوى على حالة اختفاء أحد الخصيات فقط .

وكانت اصابات الجهاز التناسلى فى عجول الجاموس تشتمل : استحالة الخصية ، التهاب الخصية والبربخ ، جلاع مرضى للقسيب .

أما فى العجول البقرية فكانت الاصابات الشائعة هى التهاب الخصية والبربخ وكذا انقلاب الغلفة الخارجى .

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STUDIES ON SOME MALE GENITAL MALFORMATIONS AND AFFECTIONS OF CATTLE AND BUFFALO IN EGYPT

(with one table and 9 figures)

By

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SUMMARY

Clinical observation and pathological examination were carried out on 700 buffalo bulls, 200 Balady bulls, and 2 thousands slaughtered buffalo and Balady bulls, in order to record the common malformations and affections of their genital tracts. Unilateral testicular malplacement, unilateral cryptorchidism, cyst in the caput epididymis, fusion of the ampullae and remnants of Mullarian duct were the malformation recorded in buffaloes. Unilateral cryptorchidism was the only malformation recorded in Balady bulls

Among the genital affection observed in buffaloes were orchitis epididymitis and paraphimosis. The inflammatory process of the testicle and epididymis was the most commonly observed affections in Balady bulls as well as prolapse of the prepuce.

INTRODUCTION

As far as has been ascertain from the available literature, investigations on the male genital malformations and affections of cattle still appear a matter of continuous interest. Moreover, the introduction and expansion of artificial insemination technique in nearly all cattle breeding countries, lead many authors to study different aspects of reproductive disorders in the bull.

Cryptorchidism in cattle have been described previously by HURXTHAL & MUSULIN (1953), EHRLICH (1959) and SMETH, JONES & LAING (1970). EIK-NES (1966) and FAULKNER (1959) indicated that leydig cells of cryptorchid testicles secreted lower levels of testosterone than normal.

Remnant of mullerian duct on the dorsal surface of the urogenital fold and cysts affecting the epididymis of the bull were reported by BLOM & CHRISTENSEN (1947 & 1960), ROLLINSON (1955) and KANAGAWA, ISHIKAWA, KAWATA and FUJIMOTO (1960).

Pathological affections of the testicles and epididymis of cattle were described by HAQ (1949), LANCASTER (1956), and GALIOWAY (1961), and KONIG (1956). The different abnormalities of the penis and prepuce appeared also frequently in the work of LAING (1955), DONALDSON & AUBREY (1960), WALKER (1964), LAGOS & FITZHUGH (1970 and BOYD & HANSELKA (1972).

In Egypt, however, studies on the male genital abnormalities and affections of cattle and buffalo appear very rare, although OSMAN (1965) and HELMY, FOUAD; ISKANDER; FARRAG & SEUM (1965) have described certain isolated conditions.

The aim of the work was to study the clinical findings and the pathology of some male genital abnormalities and affections observed in our local Balady and buffalo bulls.

MATERIALS AND METHODS

Thorough clinical examination of 700 buffalo bulls, and 200 balady bulls was made during the last years to ascertain the presence of any genital abnormalities. The clinical examination included palpation and approximate measuring of the scrotum and its content, as well as the pelvic genitalia.

The clinical appearance of each abnormality was described with special attention to its position, shape, size and consistency. When available pathological specimens were obtained after the animal was slaughtered.

Also from different local slaughter houses, the genitalia of one thousand male cattle and one thousand male buffaloes, were looked for their gross morphological appearance. Any abnormal organ of these genitalia was taken to the laboratory for further detailed gross and histopathological investigation. Tissue specimens not more than 1.5×10 cm and 0.5 cm in thickness were fixed in 10% neutral buffered formaline and embedded in parafin. Sections of about 7 microns thickness were stained by hematoxylin and eosin for reviewing the histopathological picture of the specimen.

RESULTS

The parameter results and incidences of the genital abnormalities and affections which were met with during the course of the present investigation are summarized in table 1.

TABLE 1. Survey of the male genital abnormalities and affections as well as their parameter results of alive and slaughtered cattle and buffalo

Different abnormalities and affections of male genitalia	Number of case		Species and Breed	Age years	Size of abnormal organ (average value when more than one animal)				Ratio of Abno. organ to the normal side (size)	Side of Abno. or Aff.
	Alive	Slaughtered.			Length cm	breadth cm	Thick cm	Volume or weight cm or gm		
<i>Abnormalities :</i>										
Unilateral misplaced testicles . . .	3	—	Buffalo	0.5—1.0	6.2	3.1	3.0	29.2c.cm	1 : 102	2R. 1L. L.
Unilateral cryptorchidism . . .	1	—	Buffalo	1.5	—	—	—	—	—	1R. L.
	—	3	Buffalo	1—3	—	—	—	—	—	—
	—	3	Balady	1—2.5	4.5	3.1	2.9	27.5g	1:2.5	2L. L.
Cyst in caput epididymides	—	3	Buffalo	1.05—1.5	5.0	3.3	3.1	31.8g	1:3.2	—
Fusion of ampullea	12	—	Buffalo	1.5—5.0	3.4	—	0.6	—	—	—
	—	11	Buffalo	2—3	3.9	—	0.5	—	—	—
	—	1	Buffalo	1.5	4.0	—	0.3	—	—	—
<i>Affections :</i>										
Testicular degeneration :										
Unilateral	1	—	Buffalo	4.5	5.9	3.5	3.4	37 c.cm	1:2.4	R.
Bilateral	—	2	Buffalo	2.5	5.3	3.2	3.0	36.0g	1:1.1	—
	—	1	Balady	2—0	6.4	3.3	3.1	42.5g	1:1.2	—
Orchitis and epididymitis :										
Unilateral	—	1	Buffalo	3.5	14.5	8.2	8.0	386. g	1:0.2	R.
Bilateral	6	—	Balady	2—8	14.4	7.5	7.5	433 c.cm	—	—
	—	—	Buffalo	1.5	14.0	7.6	7.2	401 c.cm	—	—
Paraphimosis	1	—	Buffalo	—	—	—	—	—	—	—
Prok pse of the prepuce	3	—	Balady	2—3	—	—	—	—	—	—

1 — Genital abnormalities :

a — Unilateral malplaced testicle :

The testicle was inclined in a semi-horizontal position, close to the inguinal region. The cauda epididymis was directed caudally and above the level of the normal side. The spermatic cord of the malplaced testicle was short and could not be measured clinically by the calipers. The scrotum showed slight asymmetry.

b — Unilateral cryptorchidism :

In an alive buffalo, the scrotum was small in size and contained only one normal testicle (right). The ventral pole of the left cryptorchid testicle with its comparatively small sized cauda epididymidis could be hardly palpated, at the external inguinal ring.

In the slaughtered subjects, the cryptorchid testicles were present at different levels inside the inguinal canal, and were surrounded by its normal connective tissue fascia. Their epididymis were much smaller in size than normal and their spermatic cords were shorter and undeveloped.

Microscopical examination revealed that the seminiferous tubules were markedly smaller than normal. They were mostly lined by Sertoli cells on a thickened hyalinized basement membrane. The few present spermatogonia showed vacuolar dystrophy and were desquamated into the luminae of the seminiferous tubules (Fig. 1). The process of spermatogenesis was completely stopped. Fibrosis of the interstitial stroma was demonstrated in the testicle.

The epididymal convolutions were smaller in size, lined by normal low epithelium with empty luminae. Wide spread interstitial fibrosis were demonstrated in the head, body, and tail of the epididymis.

c — Cysts in the caput epididymis :

There were 3 small sized cysts, located at different areas in the caput epididymidis. They were slightly raised up from the surface and contained few amount of watery serous fluid.

Microscopically the wall of the cyst was composed of connective tissue capsule lined by flattened epithelial cell.

The architecture of the normal epididymis around the cyst was greatly distorted. The interstitial periductular connective tissue was greatly expanded and divided the parenchymal structures into pseudolobules. The epididymal duct convolutions in some of these pseudo-lobules were atrophied, lined with low epithelium and some of the lumenae were collapsed. A dense background of connective tissue were observed between the convolutions of the epididymal duct. The epididymal ductal convolutions at certain other areas of the pseudo-lobules were markedly dilated and its epithelium was thrown into papilloferous projections (Fig. 2). The periductal stroma was not active in this area. In other areas the epididymal ductal convolutions were cystically dilated and lined by flattened epithelium or connective tissue.

The rest portion of the epididymal duct convolutions far away from the area of cyst was normal and lined by high pseudo-stratified ciliated columnar epithelium. The epididymal ductal convolutions were totally free from sperms all over the epididymis.

d — Fusion of the ampullae :

This abnormality was observed in the alive and slaughtered buffaloes. The fusion was occurred between the walls of the two ampullae for a varying distances, before they passed through the corpus prostatica. On cross section the two lumenae of the fused ampullae were separated from each other a relatively thinner wall. The diameter of the fused portion of the ampullae was larger than that of a single organ.

Microscopically, each ampulla has its own epithelium covering and lamina glandularis. The epithelium was pseudo-stratified ciliated cells. The lamina glandularis was composed of the usual tubulo-saccular apocrine glands, opening into collecting central sinuses.

The fusions between the two ampullae occurred through the muscular layers at the medial aspects, where there was one layer of circular muscles separating the mucosa of both ampullae (Fig. 3). The muscularis along the rest of the circumference of the two ampullae was composed of interwoven layers of circular and longitudinal smooth muscles. Loose connective tissue adventitia circumscribed the fused ampullae.

e — Remnants of Mullerian duct :

Within the meshes of the plica-urogenitalis of a young buffalo calf, there was a relatively long narrow whitish duct which was connected caudally with the pelvic urethre between the terminal portions of the two ampulla. On cross section, the duct appeared rounded in shape with a very narrow lumen.

Microscopically the wall of duct revealed a general resemblance to the wall of a female reproductive tube. It was formed externally of a connective tissue adventitia, then an outer longitudinal and inner oblique smooth muscle layers. The musosa was rich with embryonic vessels, while its lining epithelium was absent.

II — *Genital Affections* :

a — Testicular degeneration :

In the alive buffalfo bull, the left testicle showed marked decrease in size to be half that of the right one. Its consistancy was markedly flabby as felt through the scrotum. The epididymis of the left testicle was of a normal size as that of the right one but of a softer consistancy.

In the other slaughtered buffalo and balady bulls, the two testicles were involved. Both tesicles demonstrated marked flabiness and decrease in size. The covering fascia more or less normal. The epididymes of these teticles were within normal size but of softer consistancy.

Microscopically, different grades of failure in spermatogenesis were demonstrated. In areas of severe spermatogenic failure the semineferous tubules were lined by one or two layers of degenerated spermatogonia. The lumenae of the tubules were empty. Some tubules were denuded to the basement membrane. In other areas of moderate failure (Fig. 4), 2-4 layers of degenerated spermatogonia, spermatocytes and some spermatid gaint cells were observed lining the tubular lumenae. In the rest affected areas, the spermatogonia were differentiated to the stage of spermatid, formation, but mature spermatozoo were not observed.

The ductus epididymis was empty and lined with normal epithelium in many places. Some other areas were lined by degenerated epithelium and their lumens Contianed degenerated spermatogonia and spermatids (Fig. 5).

b — Orchitis and epididymitis :

The orchitic testicles of balady bulls were of various dimensions and shape. The scroti were assymetric, with disorted shape. The weights given in table I. represent the summation of the diseased testicles and epididymis in each side of the slaughtered animals as they were hardly separated from each other.

The scrotum of the buffalo bull was stretched, pendulus and showed clear assymetry. The orchitic right testicle was hard in consistency and not movable. It was rather more rounded than ovoid in shape, with undifferentiated epididymis and enlarged spermatic cord.

Grossly, the testicles were abnormal in shape, relatively smaller in size and of indurated consistency. In cut section, greyish gretty fine spots of necrosis can be demonstrated. The tunics were thickened by yellowish greyish fibrinous exudate.

Histopathologically, in Balady bread, it was evident that the inflammatory process involved all the testicle. The shape of the seminiferous tubules were evenly distorted by the greatly expanded inter-tubular connective tissue. Some tubules were lined with necrosed epithelium and their luminae contained a relatively large mononuclear and polyhydral cells, the cytoplasm of which either took the acidophilic stain or unselectively stained. The reaction in these localities was mainly peritubular and was expressed by heavy lymphocytic infiltration on an oedematous back ground (Fig. 6).

In other tubules, the lining epithelium was totally denuded, while their luminae were distended by masses of necrobiosed cells, intermingled with infiltrated lymphocytes (Fig. 7). Calcification of the necrosed contents and bacterial colonies were observed occasionally beside other tubules that were affected with sperm stasis. The lymphocytic reaction around these tubules was moderate. The blood vessels were congested and showed haemosedrin crystals.

In the testicle of buffalo, the polymorphnuclear leucocytes were present in a large proportion among the other inflammatory cells. Moreover, the oedema in the intertubular connective tissue was markedly distinct than the other affected testicles.

The epididymis of each diseased testicle was idvolved in the process of inflammation. The ductus epididymidis was collapsed in many areas and its lining epithelium was either degenerated or necrosed. Some lumenae contained aggregation of necrosed cells with varying degrees of spermstasis and calcification. The reaction was mainly periductular, where the connective tissue stroma was greatly expanded, fibrosed and infiltrated by mononuclear cells and lymphocytes. The epithelial lining of the duct at certain other areas showed evidence of metaplasia from nonstratified ciliated columner to stratified epithelium (Fig. 8), with extensive fibroses of its wall. The ductus epididymidis was cystically dilated, occasionally at different locations.

The serous surface of the tunica epididymidis was covered by a thick layer of fibrinous exudate, which was infiltrated by lymphocytes. The connective tissue lamina was converted into fibrous granulation rich in bacterial colonies and infiltrated by lymphocytes and plasma cells. The latter were aggregated and predominated around the blood vessels.

c — Paraphimosis :

A case of paraphimosis was met with a young buffalo bull (1.5 years of age). When the animal tried to mount his neighbour, the penis was protruded with a large portion of the prepuce out of the relatively small preputial orifice. After the erection had been subsided, the flaccid free portion of the penis remained paraphimosed since the outside folded prepuce hindered its withdrawal. The other environmental conditions, dirt and infections caused inflammation and necrosis in the protruded greatly curved penis, with a consequent sloughing of the galea glandis (Fig. 9).

During micturition, the urine of this animal passed forcibly between the hind limbs. It is worthy to mention that, even after surgical widening of the preputial orifice, the protruded penis could not be permanently withdrawn within the prepuce. The animal was slaughtered due to his negative response to the treatment.

d — Prolapse of the prepuce :

This abnormality was observed in 3 Balady bulls. The inner lining of the prepuce was found protruded ventrally for 2-3 cm out of the relatively wide preputial orifice. The protruded prepuce was rose pink in colour and was formed of several annular folds with some dirt externally. It was observed that the animal could retract spontaneously this prolapsed portion. On such occasions, the prepuce appears normal. The sexual behaviour and semen picture of these animals were quite normal.

DISCUSSION

From our observation, the incidence of testicular malplacement in Egyptian buffaloes was low. The condition was observed in the right as well as in the left side, and in young animals. COUTTIE and HUNTER (1956) recorded two bulls with malplaced testicles lying at an angle of 30° and the bulls were found to be sterile. From the available literature, this abnormality appeared very rare in domestic animals. Such observation, together with the fact that testicular malplacement was observed in young animals may point to its hereditary nature.

The very low incidence of cryptorchidism in our native cattle and buffaloes as well as their patho-morphological characters appear comparable with those published by MILLER and RAS (1952), ROBERT (1956), CARROLL, BALL and SCOTT (1963) and FAULKNER (1969) in other breeds. The histopathological picture of the cryptorchid testicles resembled that of the underdeveloped one. The seminiferous tubules were lined mostly by Sertoli cells and degenerated spermatogonia. A fact which coincides with the severe degree of testicular hypoplasia given by LAGERLOF (1938).

In our opinion, cryptorchid testicle is a true hypoplastic one and hereditary predisposition in buffaloes needs further study. WHEAT (1961) recorded that the inheritance of cryptorchidism in bulls was considered to be either due to a recessive gene action or to a dominant gene with variable expressivity. GAVEZ (1959) add that retraction of the gubernaculum testicle beside disproportion in the growth of the lumbar region, gubernaculum and abdominal wall were responsible for cryptorchidism. Deficiency of biotin as one of the growth promoting vitamin was recorded as causative agent or experimental induction of cryptorchidism in albino rats by MANNING (1950).

The rarity of occurrence of the cyst in the epididymis of buffaloes and its variable size lies within the scope of those reported by BLOM and CHRISTENSEN (1956, 1960). In the present materials, the large cysts, filled with serous fluid and found in the head of the epididymis may be of mesonephric origin. According to BLOM and CHRISTENSEN (1958) cysts in the male genital tube had two origins. It may be as remnants of Mullerian ducts and these are usually located in the genital folds, or it may be as remnants of mesonephric tubules. The epididymal cysts are of the last variety.

The histopathological picture of the rest of the epididymis showed an extensive fibrosis, which lead to cystic dilatation of some epididymal convolutions and the collapse of others. A third variety of tubules showed papilloferous growths. This process was an indication of chronic irritation rather than a congenital malgrowth, although the cysts were discovered in bulls up to one year old and the epididymis were free from sperm.

A relatively high incidence was noticed for fusions of the ampullae in Egyptian buffaloes. Previous observations on ampullar fusions in buffaloes was dated by OSMAN (1965) in Egypt and MAURYA, BHALLA and SONI (1969) in India. This abnormality was not recorded either in Balady bull or in other foreign breeds of cattle as shown from the literature of BLOM and CHRISTENSEN (1947) and CARROLL, *et al.* (1963), who studied a very large numbers of slaughtered animals.

Histologically, the fusion occurred through the musculosa with two separate luminae, through one thin layer of circular muscles. This appears as a weak point in the muscular ring. In our opinion, this may have weakened the peristaltic conveying capacity of the semen, during ejaculation as the musculosa in a separate ampullae is formed of a circular and longitudinal interwoven muscle layers. The presence of such abnormality in young and old buffaloes as well as its histological configuration might throw some evidence about its hereditary origin.

The diagnosis of testicular degeneration in a live buffalo bull was somewhat difficult, since the breeding history could not be available. Because of the unilateral affection of the left testicle, without any signs of local inflammation or injury and because of the complete soundness of the right testicle the condition was diagnosed clinically at first as hypoplasia. The normally sized epididymis of that case raised our suspicion in such diagnosis.

Histopathologically, the degenerative nature of the process was confirmed. The size of seminiferous tubules were that of normal developed ones, but their lining cells were degenerated. Different degrees of spermatogenic failure were demonstrated. The presence of under developed tubules of hypoplasia were absent. The formation of giant cells hints that seminal epithelium having tried to develop into full spermiogenesis but an arresting moment has counteracted their development.

The occurrence of testicular degeneration in buffaloes seems to be much lower than that reported in cattle by Mc ENTEE (1958), EHRLICH (1959), CALLOWAY (1961), JACOB (1963), and WOHANKA (1963).

Histopathologically orchitis and epididymitis; in the presented material; was characterized by necrosis, mononuclear cellular reaction and connective tissue proliferation. The chronicity of the process was evident by fibrosis and metaplastic changes of epididymis. In buffaloes, the process of inflammation was lesser in chronicity. The degree of alteration was slighter. These morphological characters of orchitis are in general agreement with the findings of DEAKIN (1943), TEUNISSEN (1946), KONING (1955) and HELMY *et al.* (1965). The incidence of this affection in buffaloes appeared very meagre. This might be due to the higher resistance of buffaloes to such pathological affection than cattle.

Paraphimosis in buffalo as appeared from the available to us literature, to be the first recorded case in this species. It is evident that stenosis of the preputial orifice was the main cause. The chronicity of the condition and the necrotizing process, was responsible for the detachment of the galea glandis which render the bull to be completely sterile.

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The literature at our disposal, specially those of WILLIAMS (1947), ROBERT (1956), CARROLL *et al.* (1963) and WALKER (1964) showed that related abnormalities and affections of the penis in cattle were not frequently encountered.

The condition of prolapsed prepuce in our native bulls nearly similar those reported by DONALDSON and AUBREY (1960) and GRUNERT (1967). It seems possible that a relatively wider preputial orifice associated with marked weakness in the preputial muscle might play a role in the occurrence of such abnormality. However, although the fertility of the affected animals appeared quite normal, such prolapsed prepuce have a great possibilities to acquired infection and inflammations with serious complications.

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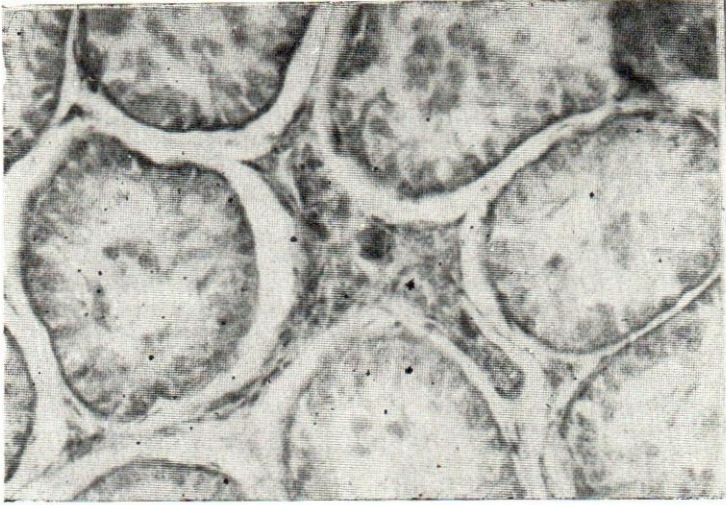


Fig. 1.—Testicular cryptorchidism. seminiferous tubules lined mostly by sertoli cells and few spermatogonia on hyalinized basment membrane. Some cells were vacoulated. H. and 10×12.5

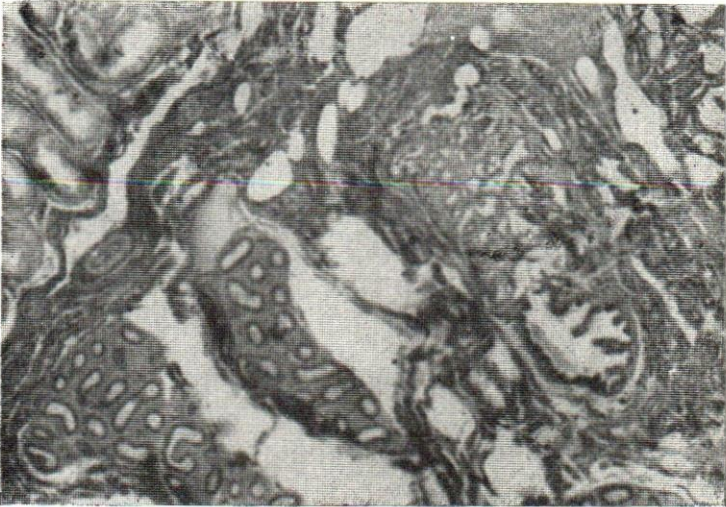


Fig. 2.—Cyst in the caput of epididymis. collapse, cystic dilatation and papilliferous growth of the caput epididymal tubules. H. and E. 2.5×12.5

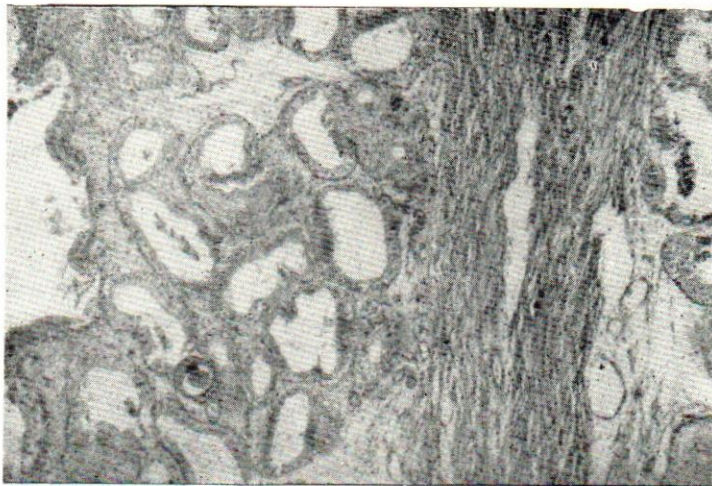


Fig. 3.—Fusion of the two ampullae. A layer of longitudinal muscles separating the two mucosal tunics. H. and E. 10×12.5

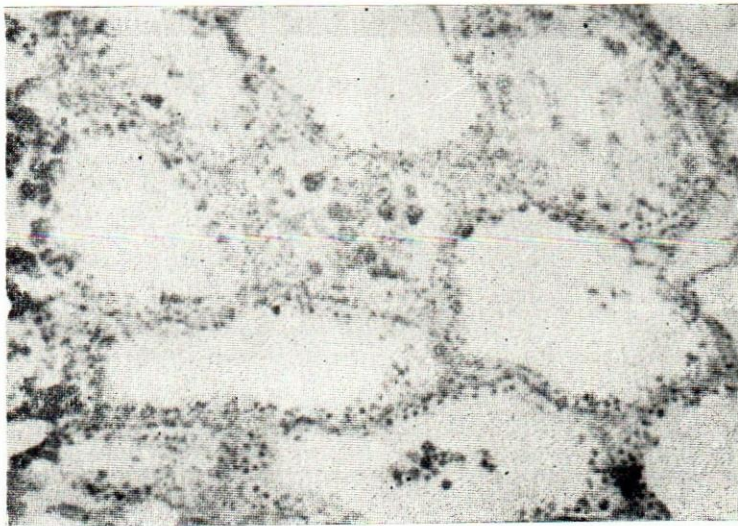


Fig. 4.—Unilateral testicular degeneration. Spermatid giant cell formation. H. and E. 20×12.5



Fig. 5.—Degeneration of ducts epididymis H. and E. 20×12.5 .

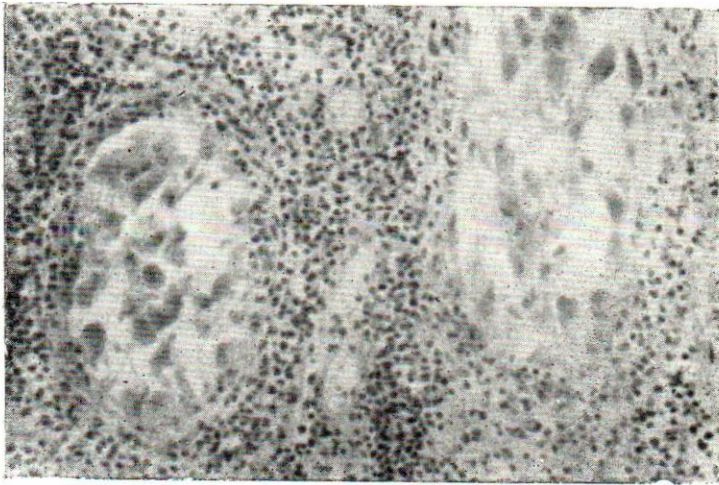


Fig. 6.—Orchitis bulla. Desquamation of the seminiferous epithelium. The lumina contain relatively large polyhydral, mononuclear cells with acidophilic cytoplasm. The lymphocytic reaction is mainly interstitial. H. and E. 25×12.5 .

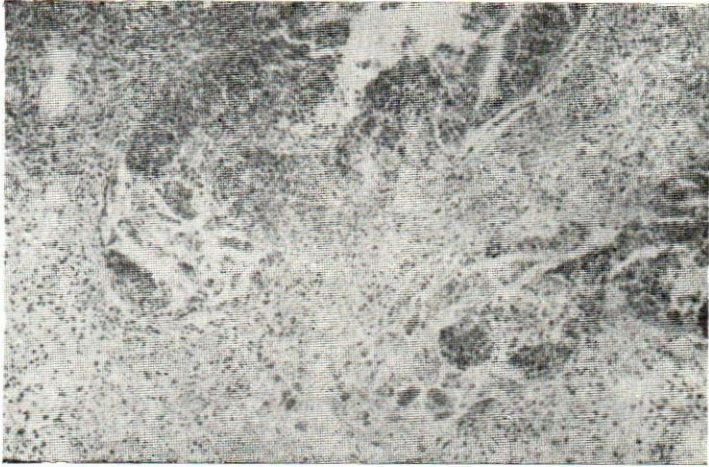


Fig. 7.—Orchitis bull. The seminiferous tubules are distended with necrosed cells, mingled with heavy lymphocytic infiltration. The intertubular connective tissue is oedematous and moderately infiltrated by lymphocytes. H. and E. 25×12.5 .



Fig. 8.—Epididymitis. Metaplasia of the epithelial lining, infiltration and fibrosis of the ductal wall. H. and E. 25×12.5 .



Fig. 9.— Paraphimosis of a young buffalo bull.