

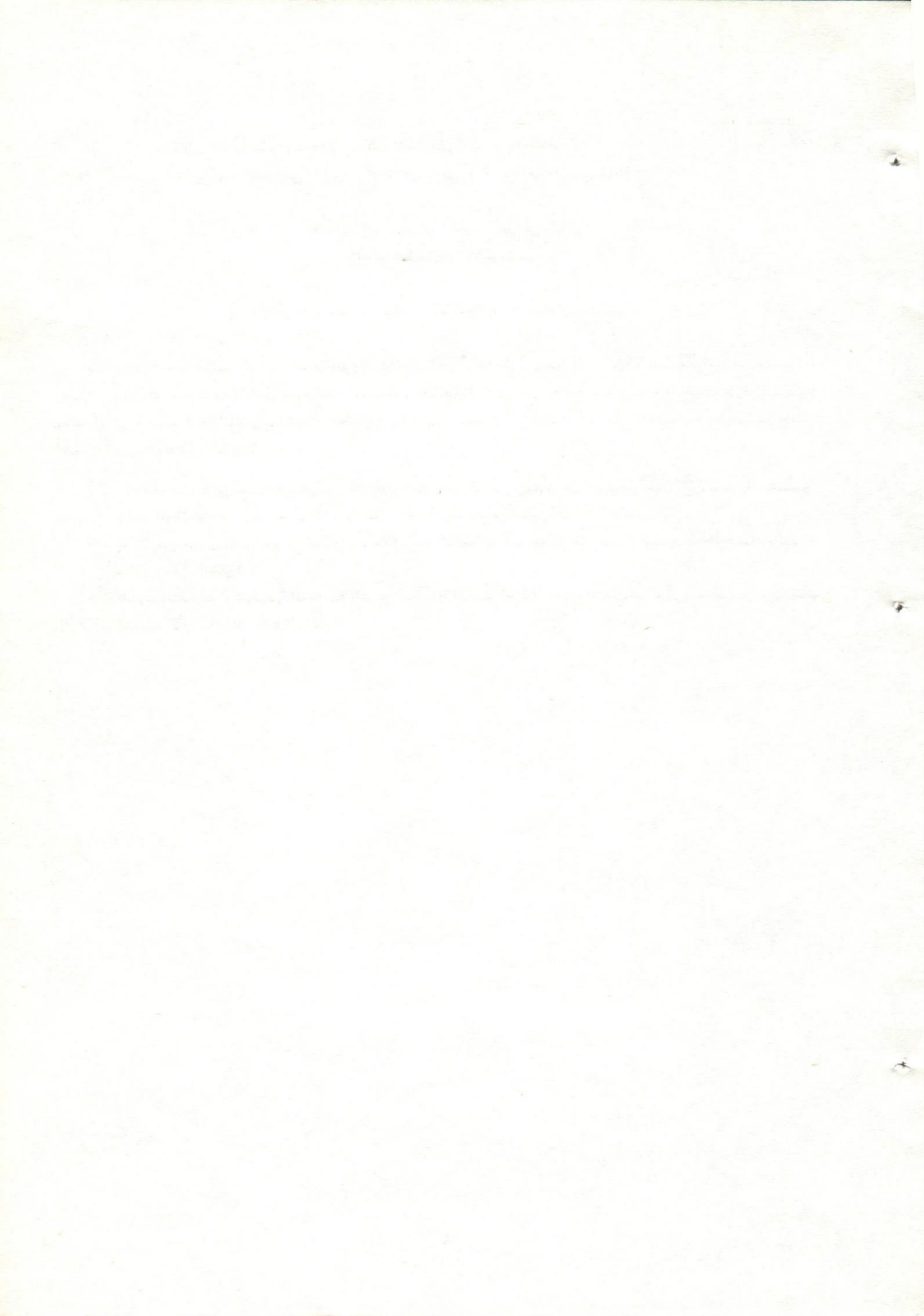
أقسام : طب الحيوان والجراحة والباثولوجيا - كلية الطب البيطرى - جامعة أسيوط  
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الانسداد التجريبي لمجرى البول فى الكباش  
٢- الصورة الكيميائية والباثولوجية

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استهدف البحث دراسة الصورة الكيميائية والباثولوجية فى أربعة كباش بعد الانسداد التجريبي التام لقناة مجرى البول وقد جمعت عينات من دم هذه الحيوانات قبل بداية التجربة وكل ١٢ ساعة بعد التجربة حتى النفوق وعند النفوق أجريت الصفة التشريحية لهذه الحيوانات كما أخذت عينات من الأحشاء الداخلية لفحصها ميكروسكوبيا وقد أظهرت الدراسة النتائج التالية :

- ١ - زيادة مضطربة فى مستوى نيتروجين اليوريا والنيتروجين الغير بروتينى فى الدم ومستوى الكرياتينين والبوتاسيوم والفوسفور الغير عضوى فى مصل الدم واستمرت هذه الزيادة حتى النفوق .
- ٢ - لم يتأرجح مستوى الصوديوم فى مصل الدم خلال مدة التجربة غير أن مستواه نقص معنويا فى نهاية التجربة بالمقارنة بنتائج ما قبل التجربة .
- ٣ - ظهرت التغيرات الباثولوجية المصاحبة للتسمم البولى وذلك عند اجراء الصفة التشريحية أو عند الفحص الميكروسكوبى لعينات الأحشاء الداخلية المنتقاه .



## URETHRAL OBSTRUCTION IN RAMS (EXPERIMENTAL STUDY)

### II. CLINICOPATHOLOGICAL PICTURE

(With 2 Tables & 6 Figures)

By

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(Received at 15/1/1981)

#### SUMMARY

The urethra of four rams were completely occluded to study the possible biochemical changes of blood and blood serum following this operation. Samples were collected before and at every 12 hours post-operation (P.O) till death. Necropsy was performed and vital organs were examined histopathologically.

The study revealed:

1. Progressive increase of B.U.N., B.N.P.N., serum creatinine, potassium and inorganic phosphorus levels. The increase was proportional to the time elapsed post operation.
2. Changes in serum sodium levels were not significant.
3. Characteristic lesions of uraemia were observed macro and microscopically.

#### INTRODUCTION

In a previous report (MISK, ALLAWY, SALEM and AMER, 1979), it was concluded that experimental ligation of the urethra in four rams raised the pulse and the respiratory rates in relation to time post-operation (P.O). Experimental animals demonstrated lowered blood haemoglobin and haematocrit values. The present work investigated, in addition, the effect of experimental urethral ligation on some biochemical changes of blood and serum. Morphological changes of vital organs of dead rams were also studied.

#### MATERIAL AND METHODS

Surgical technique for experimental obstruction was previously described by MISK *et al.* (1979) and after-care of the animals was also stated. Whole anticoagulated blood and blood samples, for serum, were collected before operation and at the first 24 hrs.P.O. then every 12 hours till time of death where urine samples were collected, necropsy was performed and vital tissues were collected for histopathological examination.

Whole anticoagulated blood samples were used for blood urea nitrogen (B.U.N.) and non-protein nitrogen (B.N.P.N.) as described by Ratiska, (1970). Serum creatinine was estimated by the method of Folin and Wu, (1920). Serum sodium and potassium were determined by the use of EEL, flame photometer.

The serum inorganic phosphorus concentration was evaluated by the method of Antonova and Plinova, (1971). Reaction and specific gravity of urine were estimated. Semiquantitative determination of protein, sugar and ketones in the urine was evaluated (Coles, 1974).

#### RESULTS

The time of death post-operation was ensured at 132 hrs. for animals No. 1 & 2 and at the 8<sup>th</sup> day for the third animal and at the 9<sup>th</sup> day for fourth animal. Results of biochemical studies and the picture of histological sections are demonstrated in tables 1 & 2 and figures 1-6.

#### DISCUSSION

##### 1. Nitrogenous constituents:

Progressive increase of B.U.N. & B.N.P.N. levels in experimental animals, following urethral obstruction, was evident (Table 1). This was closely related to time elapsed after urethral obstruction. Thus a range of 74.7-106.6 mg% for B.U.N. and 126.6-134.8 mg% for B.N.P.N. recorded. Progressive daily increase of 50-150 mg% of B.U.

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The kidneys revealed gelatinous transformation of the perinephric adipose tissue together with the superficial petechial haemorrhages. Their texture was more softer than normal and on longitudinal cut section, they showed pale areas in the cortex and dilated pelvis which contained gelatinous mass. The urinary bladder of the four rams was very distended with urine and showed superficial haemorrhagic patches.

The serosa of ureters of the four rams were congested. Opening of the chest cavity showed congested thoracic muscles. Larynx, trachea and bronchi had congested blood vessels and the trachea of the third case was filled with frothy serous exudate. All the lobes of the lung were rigid, enlarged and uniformly discoloured purplish red. On cut section, frothy serous exudate oozed by pressure. Features of oedema and congestion of bronchial and mediastinal lymph nodes were also present.

The heart was enlarged and had hydropericardium and its muscles were flabby. Opening of its chambers showed clotted blood in the left ventricle and pulmonary artery. There were petechial haemorrhages subendocardially specially in the left ventricle.

#### Micromorphological Changes:

In the kidney some tubules showed necrotic changes of epithelial lining, while others were dilated with flattened epithelial cells. Scattered ruptured tubules, hyaline casts and occasionally albuminous material in another tubules were also observed. Glomerular changes in the form of widely dilated Bowman's capsules with atrophied tufts in some parts (Fig. 1,2,3) and severe congestion in other were found.

The livers showed centrilobular necrosis with well developed fatty change (Fig. 4) thrombosis in the central portal veins and hepatic and lymphocytic infiltration in portal triad were sometimes observed.

The lungs revealed changes related to slight catarrhal bronchitis. Hyperaemia of the capillaries surrounding the alveoli was accompanied by occasional neutrophilic infiltration. Small amounts of oedematous fluid with the presence of some red cells was observed in alveoli (Fig. 5). Areas of collapse surrounded by areas of compensatory emphysema was a common finding (Fig. 6). Destruction of bronchial epithelium with the presence of lymphocytes and macrophages were observed in some cases.

In the heart, the muscle fibers were degenerating with small haemorrhages inbetween the bundles.

Patchy necrosis and slaughting of the glandular epithelium in the abomasum were observed. In this region, there was haemorrhages and numerous inflammatory cells with congested blood vessels. The intestinal mucosa showed necrotic and shredding in its villar epithelium.

No characteristic changes in the spleen were observed.

Pathological lesions observed in liver, kidney, heart muscles, abomasum and intestine consisted mainly of degenerative and necrotic changes which can be attributed to the toxic effect of increased urea in the blood (uraemia) and liberation of ammonia in the gastrointestinal tract. Lesions in the kidney, liver, heart and abomasum were comparable to the lesions that have been reported by other investigators in cases of uraemia following renal failure. Vacuolation of the hepatocytes around central vein was recorded by SMART and FLETCH (1972) in dogs.

Patchy necrosis in renal tubules was recorded by CAPPELL and ANDERSON (1975) in man. While degenerative changes have been described by ANDERSON and SCOTTI (1968). Dilatation of renal corpuscles and atrophic glomerular tufts were stated by SMART and FLETCH (1972). Degenerative changes in the outer portion of myocardium have been described by ANDERSON and SCOTTI, (1968). The presence of serofibrinous exudate into the alveolar tissue of the lungs was described by CAPPELL and ANDERSON (1975) and WALTER and ISRAEL (1961). Pulmonary haemorrhages was reported by ANDERSON and SCOTTI (1968).

Haemorrhagic alteration and pseudomembranous enterocolitis were observed by CAPPELL and ANDERSON (1972) in uraemic person. Slaughting of the glandular epithelium was observed by SMART and FLETCH (1972) in dogs.

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Table (1): Biochemical Changes of Blood and Serum with  
Experimental Urethral Obstruction

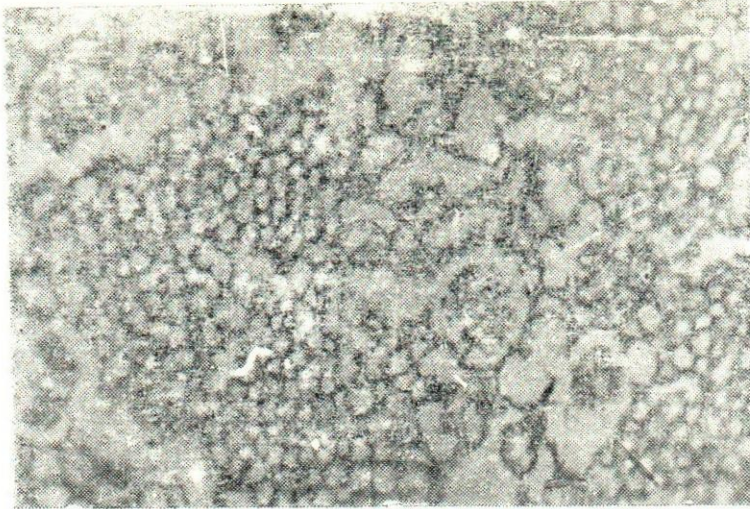
Indices	Anti- ml No.	Pre- Opera- tion	Time post - operation (hours)																		
			24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216		
Blood Urea nitrogen (B.U.N.) mg%	1	44.0	90.6	101.4	106.6	101.4	104.0	101.4	85.3	85.3	80.6	74.7	7								
	2	50.0	80.0	86.0	90.6	95.0	91.4	100.0	102.2	103.0	102.0	106.0									
	3	35.0	90.7	95.3	96.0	101.4	103.5	104.0	100.0	100.8	106.0	104.0	103.2	105.0	104.0	100.0	104.0				
	4	46.0	80.0	82.7	90.7	95.3	101.4	104.0	106.0	106.6	112.0	106.6		105.6	105.0	105.0	104.0	107.0	105.0		
Blood Non nitrogen (B.N.P.N.) mg%	1	64.0	110.6	121.4	126.6	121.4	124.0	121.4	125.4	125.4	100.0	134.8									
	2	65.0	96.0	106.0	110.6	115.0	116.0	120.0	122.2	117.0	123.0	126.6									
	3	54.0	105.4	115.4	116.0	121.4	123.6	124.0	120.0	120.8	116.0	126.0	128.6	125.0	130.0	130.0	130.6				
	4	66.0	100.0	102.8	110.8	115.4	121.8	124.0	126.0	132.6	126.6	132.0	125.6	125.6	130.8	130.8	130.0	132.6	130.6		
Serum Creatinine mg%	1	0.6	1.2	1.6	1.8	2.0	2.1	2.6	2.6	2.8	2.8	3.0									
	2	0.9	1.9	1.8	1.8	2.0	2.1	2.0	2.4	2.0	2.6	2.9									
	3	0.9	1.0	3.0	3.0	3.2	4.0	4.1	4.0	3.9	3.8	3.8	4.1	4.2	3.6	3.8	3.8				
	4	0.6	2.0	3.0	3.2	3.2	3.4	3.8	4.1	4.1	4.0	4.0	3.8	3.8	4.0	3.8	3.2	3.6	3.8		
Serum potassium mEq/L	1	5.1	5.6	6.8	7.4	8.0	9.1	9.2	9.6	9.9	10.2	10.7									
	2	5.0	5.2	6.9	7.1	8.1	8.6	8.8	8.9	9.0	9.6	9.6									
	3	4.8	5.1	5.4	7.1	9.2	10.0	11.5	11.0	11.2	10.0	10.8	10.9	11.0	11.2	11.0	11.2				
	4	4.0	5.3	5.8	6.1	6.6	7.0	7.5	7.8	8.5	9.3	9.8	10.1	10.7	10.7	10.1	10.6	10.0	10.8		
Serum Sodium MEq/L	1	190.2	140.5	110.6	140.1	130.3	130.7	170.6	170.0	100.5	130.0	170.0									
	2	180.2	150.0	116.6	130.0	130.3	130.7	150.6	150.0	130.8	130.0	130.6									
	3	160.6	120.5	100.6	110.6	106.0	108.0	100.5	110.0	110.5	120.5	100.0	108.0	110.6	118.0	122.6	132.0				
	4	160.0	128.6	103.3	110.0	170.5	126.2	130.7	120.5	140.1	110.2	120.5	170.3	130.3	130.0	130.6	136.0	132.0	130.3		
Serum Inorganic phosphorus mg%	1	6.0	7.5	7.6	8.1	8.8	9.2	9.7	10.0	10.9	11.3	12.0									
	2	6.8	6.8	8.6	9.0	10.5	10.8	11.4	11.8	13.1	13.1	13.6									
	3	5.1	7.5	8.6	10.0	11.8	12.1	13.6	13.0	13.1	12.0	13.1	12.5	13.0	12.0	12.0	12.0	12.2			
	4	6.5	8.0	8.1	8.5	8.5	8.9	9.1	9.7	9.9	10.0	10.5	10.5	10.5	11.8	12.1	10.5	10.8	11.0	11.9	

## URETHERAL OBSTRUCTION IN RAMS

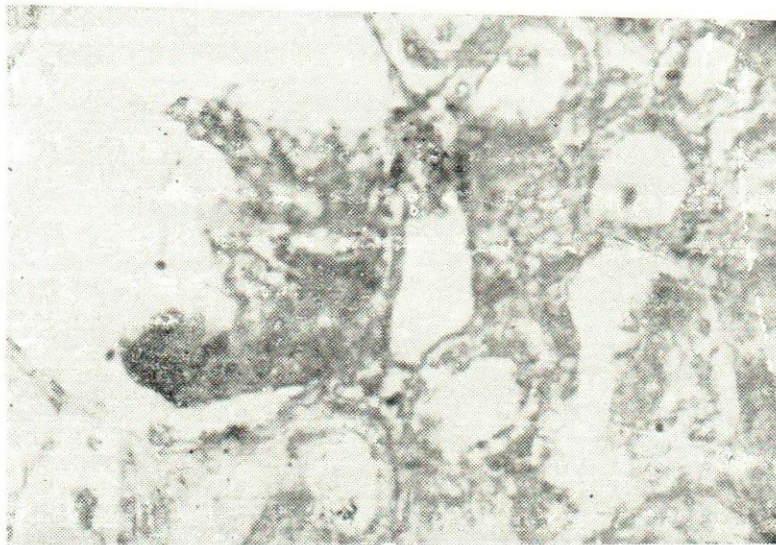
TABLE (2)  
URINE CHARACTERISTICS OF EXPERIMENTAL RAMS

No. of Animal	1	2	3	4
Indices				
Quantity ml	450	480	530	9000
Colour	Pink	Slight bloody	Yellow	Straw yellow
Appearance	Turbid	Turbid	Turbid	Turbid
Specific Gravity	1.019	1.017	1.010	1.010
Reaction (ph)	7.0	7.0	7.0	6.8
Protein	+ve	+++ve	+ve	++ve
Sugar	-ve	-ve	-ve	-ve
Ketones	-ve	-ve	-ve	-ve

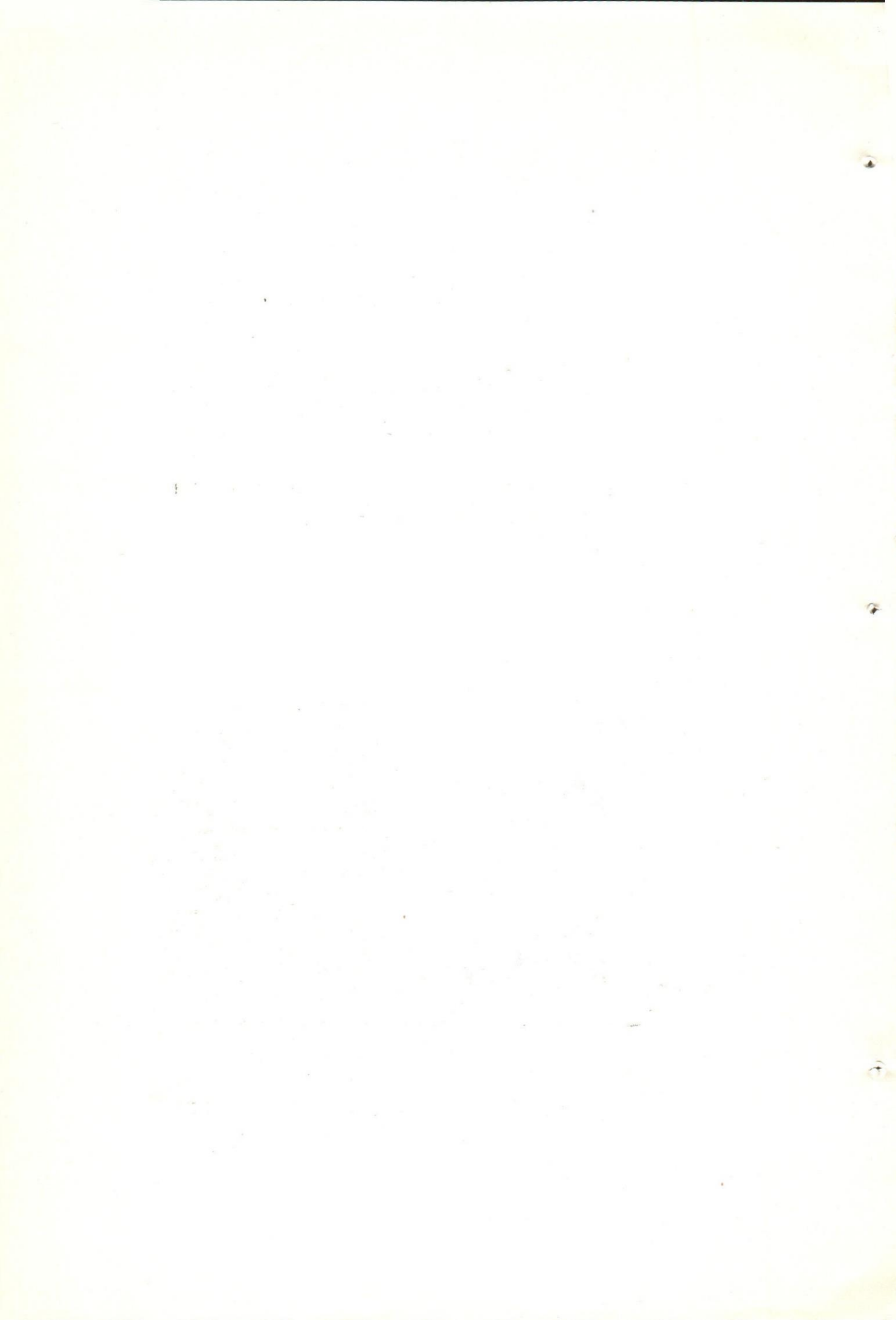


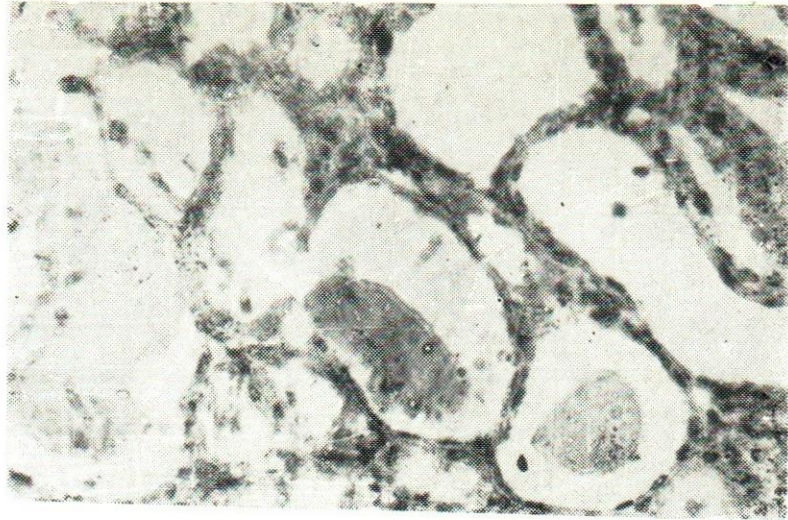


**Fig. 1 :** Kidney : glomeruli with very dilated capsule, shrunken tufts, others with ruptured capsule (10 X)



**Fig. 2 :** Kidney : Enlarged glomeruli, shrunken tufts Tubules are dilated, with flattened epi. and contain casts (40X)

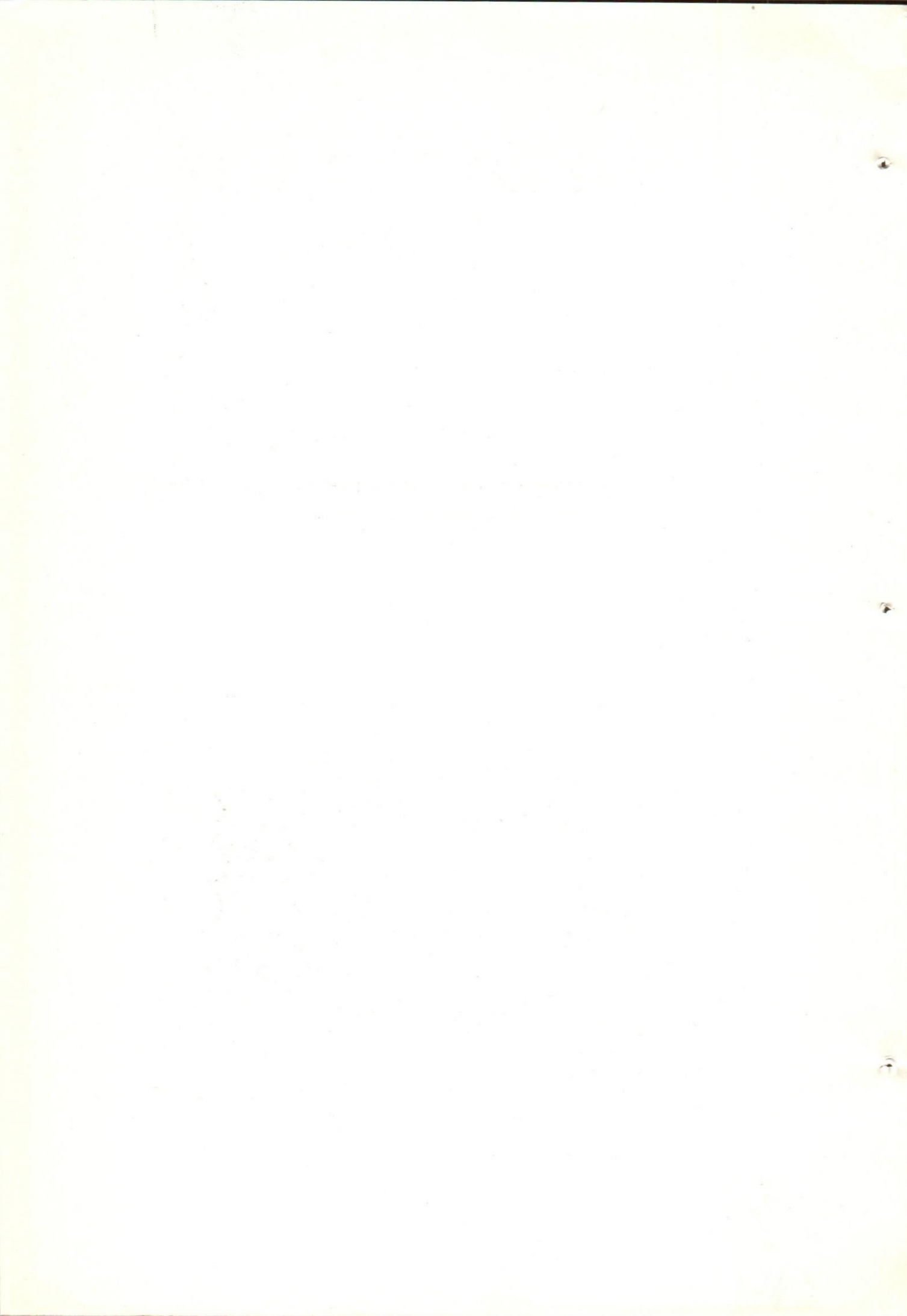




**Fig. 3 : Kidney : Dilutation of the tubules and the luminis  
contain albuminous matterial (40X)**



**Fig. 4 : Liver : Fatty change with congestion of central  
vein (40 X)**



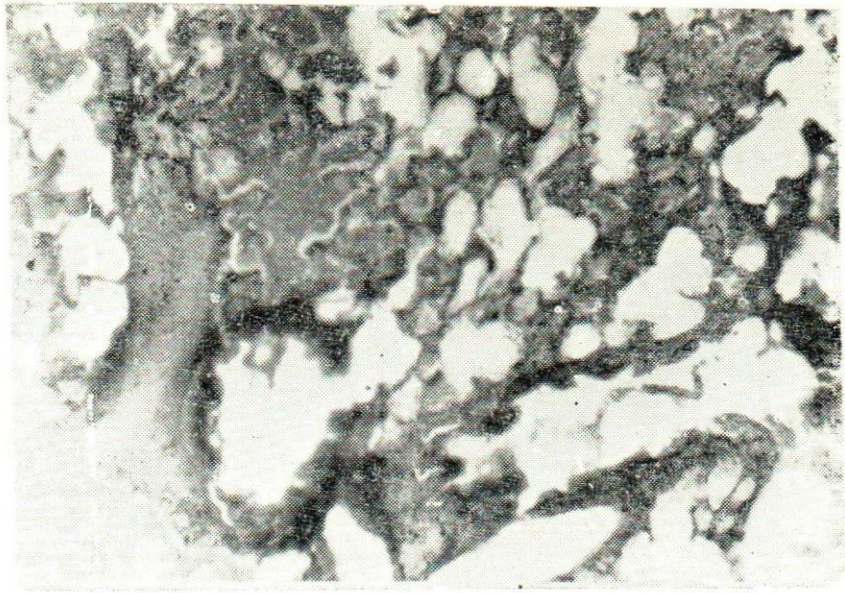


Fig. 5 : Lung : Oedematous fluid filling alveolar space.

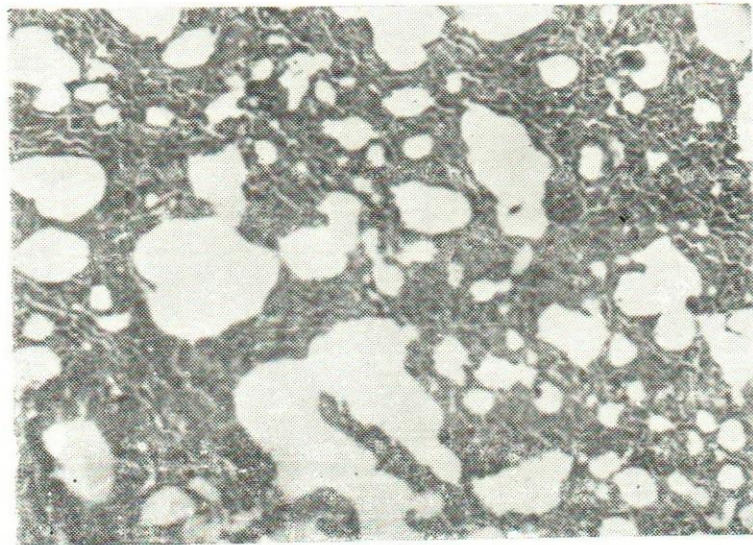


Fig. 6 : Lung : Atelectasis and compensatory emphysema.

