

د راسة طبوغرافية ومورفولوجية على معدة الجمل

عبد الله حفنى ، أحمد قناوى ، أسماعيل عبد العزيز

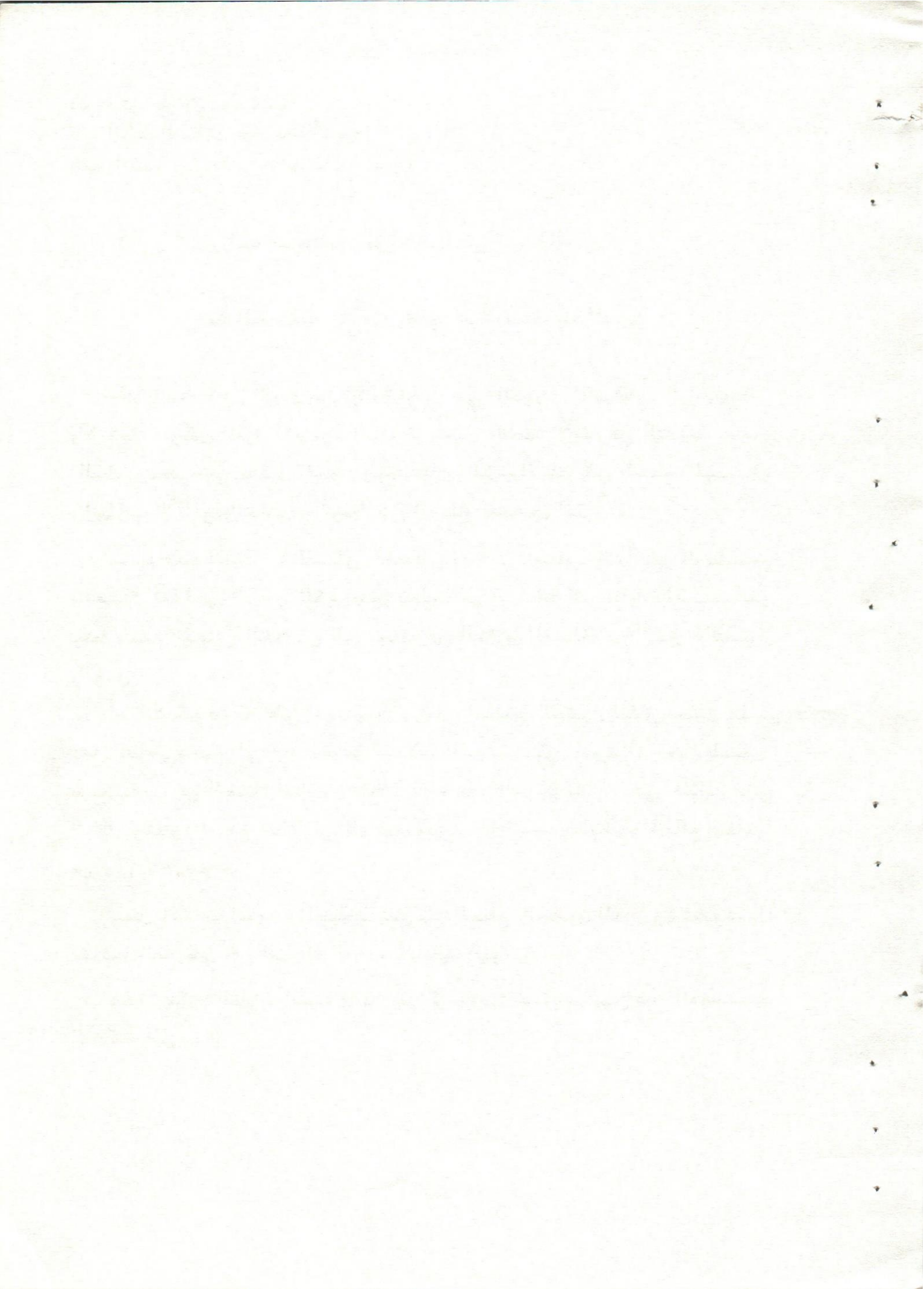
تتكون المعدة فى الجمل من اربعة غرف هى الكرش ، الشبكية ، الورقية ، والأنفة . ويكون الكرش أكبر غرف المعدة وتحتل النصف الأيسر من التجويـف البطنى ويمتد حتى مستوى الحوض ويوجد ميزاب الكرش الأيسر على السطح الوحش والميازيب الأمامى والخلفى والأوسط على السطح الحشوى للكرش .

وتتـمـيز هذه الميازيب الكيسان الغديان الأمامى السفلى والداخلى السفلى والغشاء المخاطى المبطن للكرش يتميز بخلوه من الحلـمـات القرنية وانه أملس بينما ينقسم الكيسان الغديان الى مجموعة من الخلايا المختلفة فى الطول والعرض والعمق .

أما الشبكية فتوجد على الجانب الأيمن من السطح الحشوى للكرش وتحتوى على غشاء مخاطى ينقسم الى ١٢ صف من الخلايا الشبكية وتتكون الورقية من جزء علوى متسع ينفصل عن الغشاء التامورى للقلب بالحجاب الحاجز وجزء سفلى أنبوسى الشكل ويتميز السطح الداخلى للورقية بوجود ٤٠ - ٥٠ من الطيات البالغ ارتفاعها من ١٠ - ٢ سم .

وتمثل الأنفة المعدة الحقيقية وتقع على السطح الحشوى للكرش ويشتمل غشائها المخاطى على المنطقة القاعية والمنطقة البوابية .

هذا ويتكون الميزاب المعدى من جزء كرش وجزء شبكى وينتهى عند الفوهة الشبكية للورقية .



Dept. of Anatomy and Histology,

Faculty of Vet. Med., Assiut University,
Head of Dept. Prof. Dr. H. Badawi.

TOPOGRAPHY AND MORPHOLOGY OF THE STOMACH OF CAMEL (With 7 Figs.)

By
A. HIFNY; A.K. AHMED and I.A. IBRAHIM
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SUMMARY

The camel possesses a multilocular compound stomach which occupies the whole left half of the abdominal cavity and extends a little to the right of the median plane. The stomach comprises the rumen, reticulum, omasum and abomasum.

The rumen extends from a level with the cranial border of the 7th rib till the pelvic inlet. Its parietal surface related to the left abdominal wall, spleen and left kidney and presents the faint left ruminal groove. The visceral surface is related to the other compartments, liver, transverse and descending colon and presents the cranial, middle and caudal right ruminal grooves. These grooves demarcate the medio- and cranio-ventral glandular sacs. The reticulum and omasum are situated in the right side of the intrathoracic part of the abdominal cavity from the level of the 7th till the 9th rib. The reticulum is separated from the diaphragm by the omasum, while the omasum comes into relation with the liver and diaphragm laterally and the rumen medially. The abomasum is situated in the right side from the level of the 9th till the 12th rib and related laterally to the liver and medially to the rumen. The gastric groove is represented by a ruminal and reticular parts extending from the cardia till the reticulo-omasal-orifice.

INTRODUCTION

The stomach of dromedary camel was formerly studied by LESBRE (1903), LEESE (1927), HEGAZI (1945), HANSEN/ NIELSEN (1957) and PUROHIT/ RATHOR (1962) and IBRAHIM (1983).

The stomach of the bacterian camel was described by NEURAND/ APPEL/ WISSDORF (1969) as consisting of a sac-like part which represents the rumen and a tubular like part which comprises the reticulum, omasum and abomasum.

The aim of this work is to study the topographical relations and the morphological features of the compartments of the stomach of the camel.

MATERIAL and METHODS

The present study was carried out on eight adult healthy camels, five males and three females aging 8-12 years. The animals were bled and injected through the common carotic artery by a mixture of 10% formalin solution, 2% phenol and 1% glycerine. Additional 5 examined stomachs were obtained from Assiut slaughter house.

RESULTS**RUMEN :**

The rumen (1/2, 2/1) is a large laterally compressed sac which occupies the whole left side of the abdominal cavity and extends from the diaphragm cranially at a level with the cranial border of the seventh rib till the pelvic inlet. The examined specimens have an average length of 85 cm and 65 cm width, its capacity ranges from 70-100 litres and its average weight is about 5kg.

The parietal surface (1/2) is related to the left abdominal wall, spleen, left kidney and presents a faint left ruminal groove (1/3). The visceral surface (2/1) is related to the liver, reticulum, omasum, abomasum, pancreas, transverse and descending colon and presents a cranial, middle and caudal right ruminal grooves. The cranial groove (2/6) demarcates the right ventral part of the cranioventral glandular sac (2/2), while the caudal groove (2/5) demarcates the medioventral glandular sac (2/4).

The cranial extremity of the rumen (2/2) is situated within the intrathoracic part of the abdominal cavity and is separated from the pericardium by the diaphragm. This extremity represents the left dorsal part of the cranioventral glandular sac. The caudal extremity (2/3) is large and situated at the pelvic inlet in relation to the ascending colon.

The mucosa of the rumen in camel is smooth except in two areas where the mucosa is subdivided by musculomembranous folds to form the cells of the medioventral and cranioventral glandular sacs. The ruminal grooves which demarcate the two glandular sacs externally are represented internally by the left, as well as, the cranial and middle right ruminal pillars. The short abdominal part of the esophagus terminates by the wide esophageal opening into the dorsal portion of the rumen at a level with the 10th intercostal space.

The medioventral glandular sac (2/4) has bean-shaped out line and reaches about 40-43 cm in length and 8-10 cm in width. Its mucosa presents 12-13 sagittally placed musculomembranous bands (3/4) which originate from the caudolateral aspect of the middle right ruminal pillar. These bands range from 8-16 cm in length and 0.3-1.5 cm in thickness and are demarcated externally by corresponding faint grooves.

The musculomembranous bands divide the medioventral glandular sac into 11-12 parallel rows. Each row is subdivided into 3-7 cells by transverse mucosal folds (3/3). These cells are found filled with food materials and range from 1-4.6 cm in length, 1.2-4.2 cm in width and 0.5-4.5 cm in depth.

The cranioventral glandular sac (2/2) forms the cranial extremity of the rumen and is separated from the pericardium by the diaphragm. It comprises a left dorsal portion (1/4, 4/2) and a right ventral one (4/3) which are separated by a smooth mucosal fold (4/4). This fold was absent in two examined cases and the two portions fused with each other. The left dorsal portion reaches about 20-25 cm in length and 10-12 cm in width and presents about 10 sagittal musculomembranous folds (4/6). These folds originate from the left ruminal pillar (4/1) and ranges from 5-12 cm in length and 0.2-0.8 cm in thickness. The folds divide the left dorsal portion into 9 rows of cells (4/5) which range from 1.3-5.5 cm in length, 1.1-5.8 cm in width and 1.2-8 cm in depth.

RETICULUM :

The reticulum (2/7) is situated in the right side of the intrathoracic part of the abdominal cavity and extends from the level of the 7th to the 10th rib. It is the smallest compartment of the stomach and measures about 25-40 cm in length, while the width reaches about 5-8 cm at either ends and 15-20 cm at the middle. Its capacity is about 0.5 litre and the average weight about 600 gm.

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The reticulum is separated from the diaphragm by the omasum and does not reach the abdominal floor, the ruminoreticular opening lies dorsal to the medioventral glandular sac at the level of the 10th thoracic vertebra, while the reticuloomasal one is situated at the level of the 7th thoracic vertebra.

The cavity of the reticulum presents 12 circular parallel musculomembranous ridges (5/1) which divide its interior into 11 rows of reticular cells (5/2) which further subdivided by short transverse ridges. The resulting cells are responsible for the thickness of the reticular mucosa and the spongy consistency of the reticular wall. The cells are found always filled with fine food materials which are difficult to be evacuated.

OMASUM :

The omasum (2/8,8') is situated on the right side of the intrathoracic part of the abdominal cavity from the level of the 7th rib till it continues with the abomasum without external demarcation at the level of the 10th rib. It reaches about 90-110 cm in length, 1.5 kg in weight, and its capacity is about 8-12 litres. It can be divided into wide proximal part (2/8) and a narrow distal one (2/8'). The omasum is related laterally to the liver and diaphragm and medially to the rumen, the diaphragm separates the proximal part of the omasum from the pericardium. The mucosa of the omasum is thrown into 40-50 thin omasal lamellae (6/1) of nearly equal height (1.5-2 cm).

These lamellae are 1.5-2 cm apart in the proximal part of the omasum and 0.5 cm in the narrow part. Some of these lamellae continued caudally with the abomasal folds (6/2, 7/1).

ABOMASUM :

The abomasum (2/9) is situated in the right side and extends from the 10th to the 12th rib and reaches about 30-35 cm in length. Its capacity ranges from 2-4 litres and its weight is about 2.5 kg. Its parietal surface is related to the visceral surface of the liver, duodenum and jejunum, while its visceral surface lies in contact with the medioventral glandular sac. The lesser curvature presents a deep notch in its middle, in addition to the torus pyloricus internally (7/4), while the greater one is related to the jejunal coils and never reaches the abdominal floor.

The abomasal mucosa presents two macroscopically distinct fundic and pyloric regions. The fundic region has 18-20 thick mucosal folds (7/2) which occupy the proximal 2/3 of the abomasum, while the pyloric region is smooth (7/3) and lines its distal third.

GASTRIC GROOVE :

The gastric groove of the stomach of camel extends from the cardia through the rumen and reticulum to the reticuloomasal orifice and comprises only a ruminal and reticular parts.

The ruminal part is guarded by a strong right and weak left folds which terminate at the ruminoreticular orifice. It runs in a spiral manner and the groove is directed at first to the left, ventrally then to the right and reaches about 30 cm in length and 4-5 cm in width. The reticular groove is guarded by two folds which continue along the lesser curvature of the reticulum in a cranioventral direction to terminate at the reticuloomasal orifice. It reaches about 20 cm in length and 2-3 cm in width.

DISCUSSION

The stomach of ruminant animals was completely described by RAGHAVAN/ KACHROO (1964), EL-HAGRI (1967), SISSON/ GROSSMAN (1969), NICKEL/ SCHUMMER/ SEIFERLE (1973) and LABEL (1975). The general morphological features of the stomach of the camel are apparently the same

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as those of the stomach of ox, however, there are some striking differences between the two stomachs. The ruminal grooves and pillars of the rumen of camel are not well developed and demarcate only the medioventral and cranioventral glandular sacs. The ruminal mucosa is not studied with ruminal papillae, while its glandular sacs are divided by musculomembranous folds into regular rows of cells. Moreover, the cranial extremity of the rumen of camel is separated from the pericardium by the diaphragm, while in ox the pericardium is separated from the reticulum by the diaphragm. SHAHRASBI/ RADMEHR (1974) stated that the water sacs of the rumen consists of two groups of cavities with total capacity of 3 litres and each cavity is surrounded by a strong muscular sphincter. NEURAND/APPEL/WISSDORF (1969) described similar glandular sacs in the sac-like part of the stomach of the bactrian camel. HANSEN/NIELSEN (1957) stated that the histological structure of the ruminal mucosa outside the sac areas resembles that of the ruminal wall in a typical ruminant but without any visible papillae. The same authors added that the mucosa of the rumen changes abruptly above the bottom of the sacs into simple columnar epithelium with tubular glands. Similar results were also described by PUROHIT/RATHOR (1962).

The exact function of the glandular sacs is not quite clear. LEESE (1927) and HEGAZI (1945) considered the water sacs as a store place for water which can be brought up into the mouth cavity whenever the animal wants.

The glandular sacs may help in the prevention of thirst sensation for long periods in camel through the storage of moist food materials, the secretion of their glands may help the partial digestion of the food materials. The glandular sacs may absorb some easily digested food components, in addition to the quick absorption of water in the thirsty conditions.

The reticulum of camel lies to the right of the median plane and in contrary to that of the ox it has no relation with the pericardium. The reticular cells of camel are more deep than that of ox and give the reticular wall a spongy consistency.

The omasal lamellae have the same height along their length, while in ox they have a special pattern in arrangement.

The abomasum of camel is situated in the right side and never reaches the abdominal floor. Its mucosa is divided macroscopically into fundic and pyloric regions as described also by HANSEN/NIELSEN (1957) and PUROHIT/RATHOR (1962). However, HEGAZI (1945) divided the abomasal mucosa of camel into fundic, intermediate and pyloric regions. The cardiac gland region of the abomasal mucosa of ox was not demonstrated in that of camel.

The gastric groove in ox consists of reticular, omasal and abomasal part, while that of the dromedary camel is represented by a ruminal and reticular parts as described also by NEURAND *et al.* (1969) in the bactrian camel.

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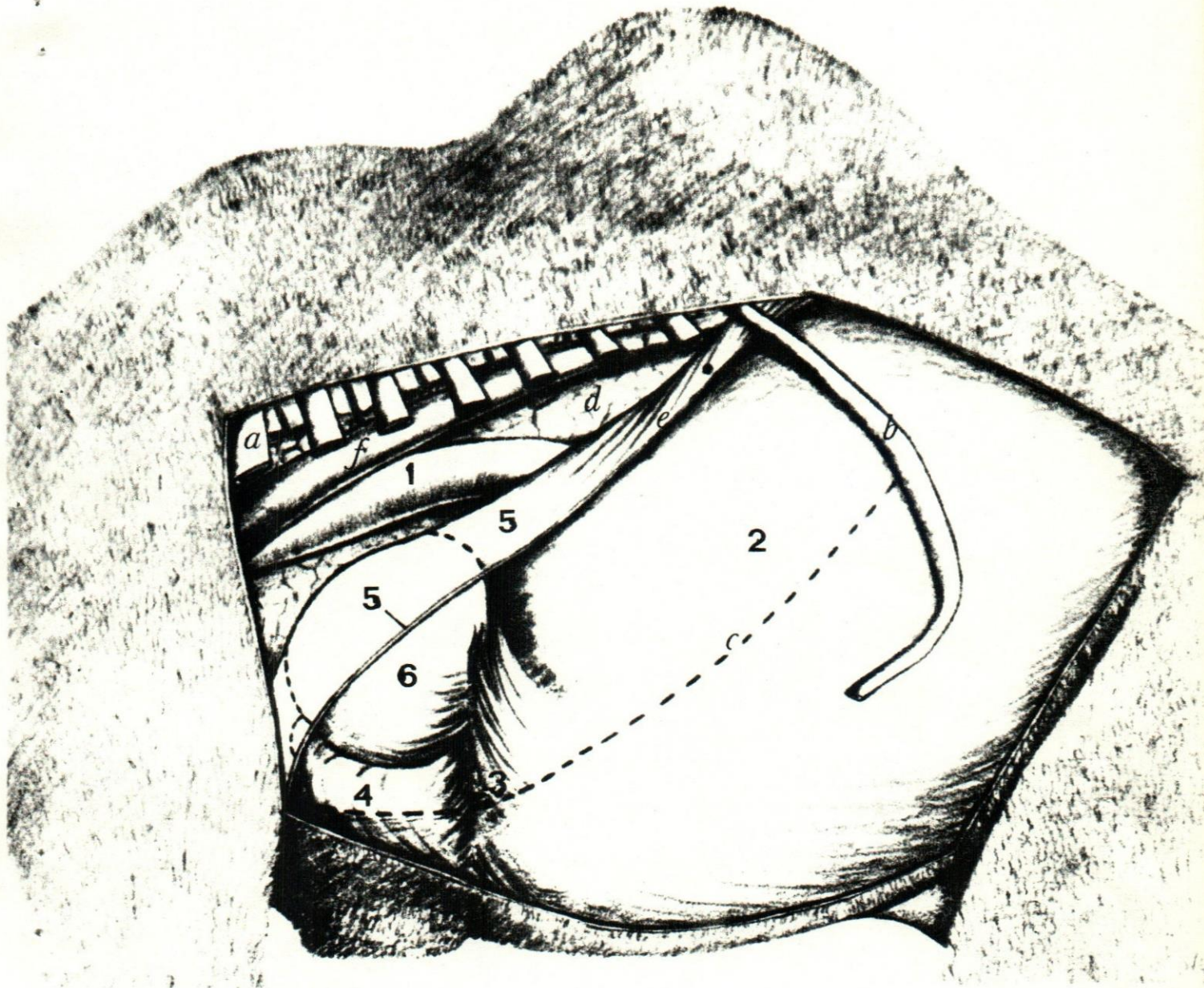
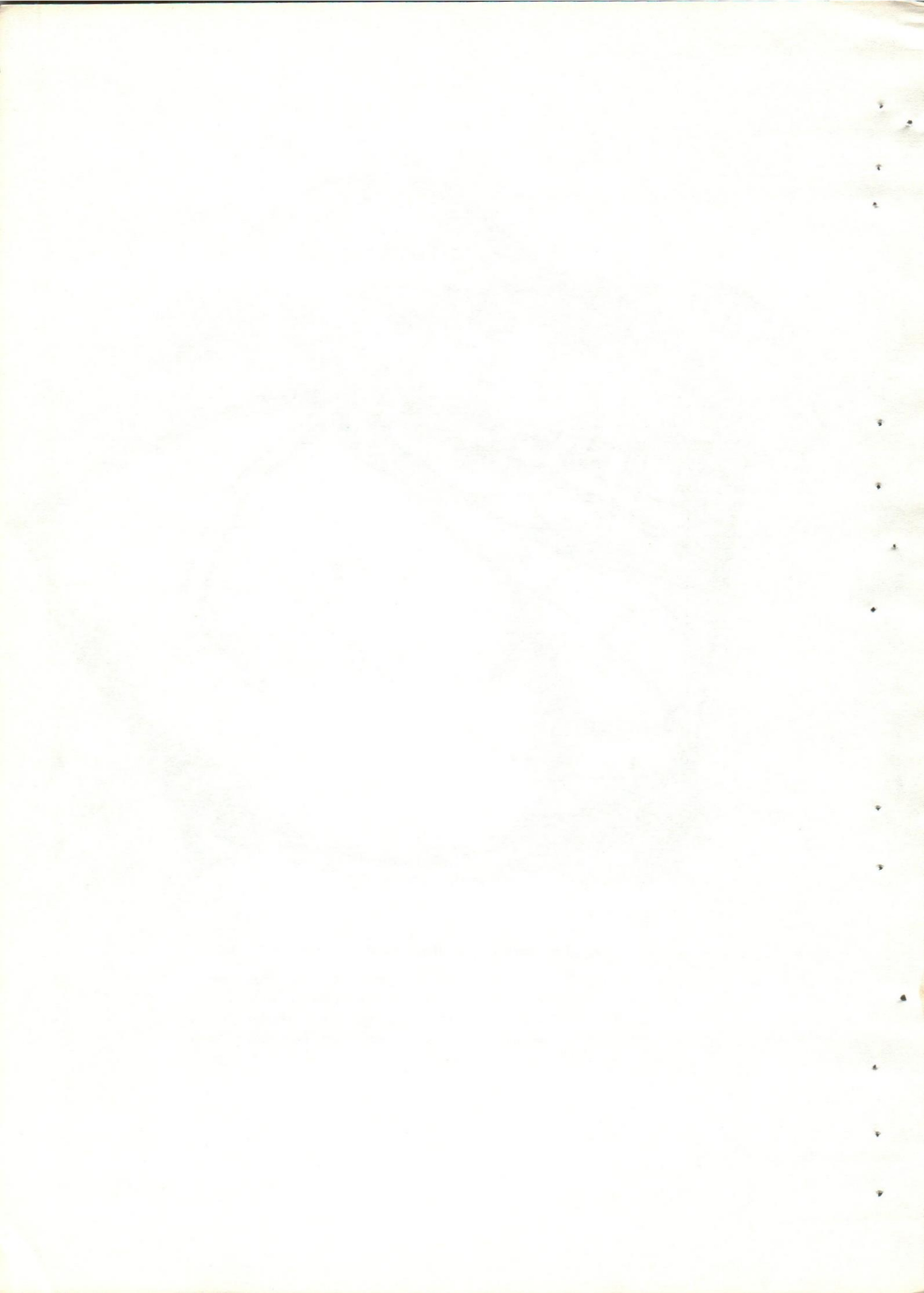


Fig. (1): Topography of the ruminant stomach (left side)

- a 6th rib, b last rib, c Line of attachment of the diaphragm,
- d right lung, e left crus of diaphragm, f aorta
- 1 esophagus, 2 parietal surface of rumen, 3 left ruminal groove,
- 4 cranioventral glandular sac, 5 diaphragm, 6 proximal part of omasum



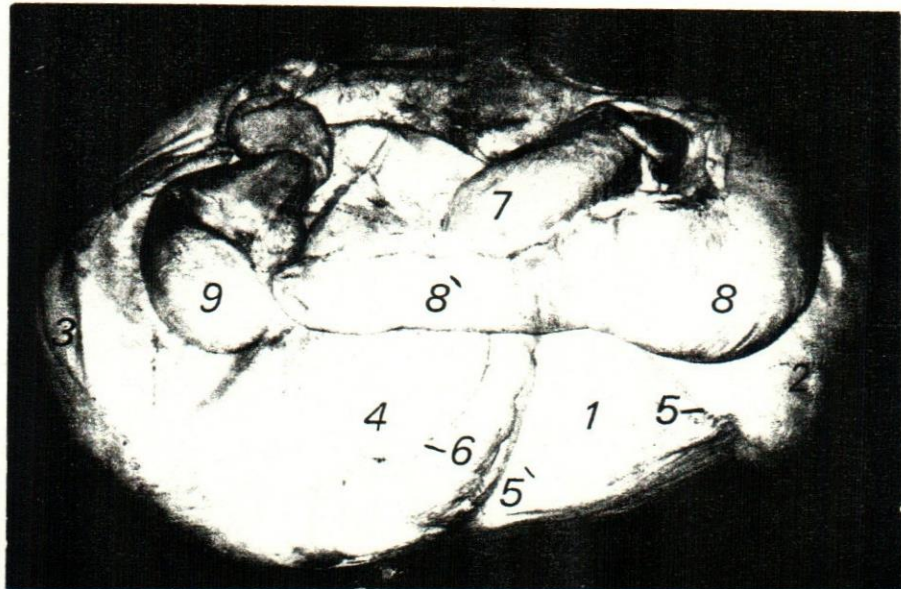


Fig. (2): Stomach of camel (visceral surface)

1 visceral surface, 2 cranial extremity (cranioventral glandular sac),
 3 caudal extremity, 4 medioventral glandular sac, 5 cranial right ruminal groove,
 5' middle, 6 caudal right ruminal groove, 7 reticulum, 8 proximal part,
 8' distal part of omasum, 9 abomasum

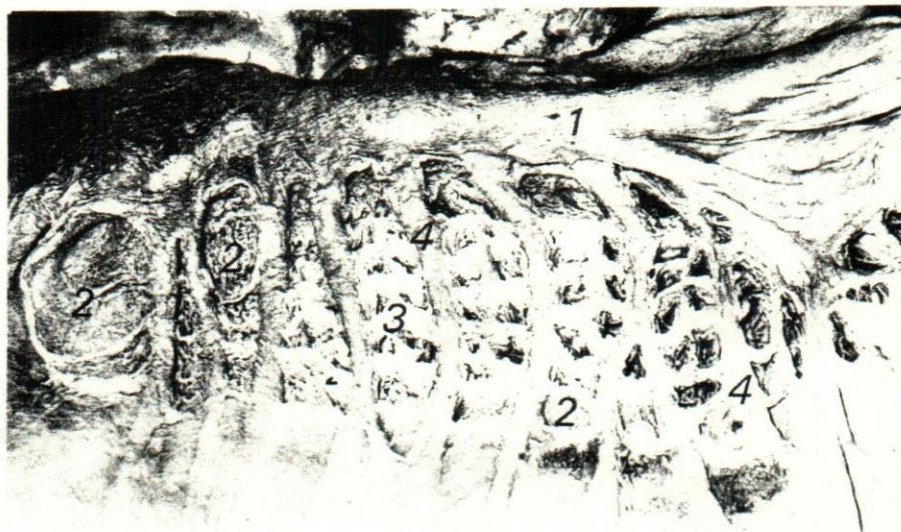


Fig. (3): Interior of the medioventral glandular sac

1 middle right ruminal pillar, 2 cells of the sac,
 3 transverse mucosal folds, 4 musculomembranous bands



Fig. (4)
Interior of the cranioventral glandular sac

1 left ruminal pillar, 2 left dorsal part,
3 right ventral part, 4 smooth mucosal fold,
5 cells of the sac,
6 musculomembranous band

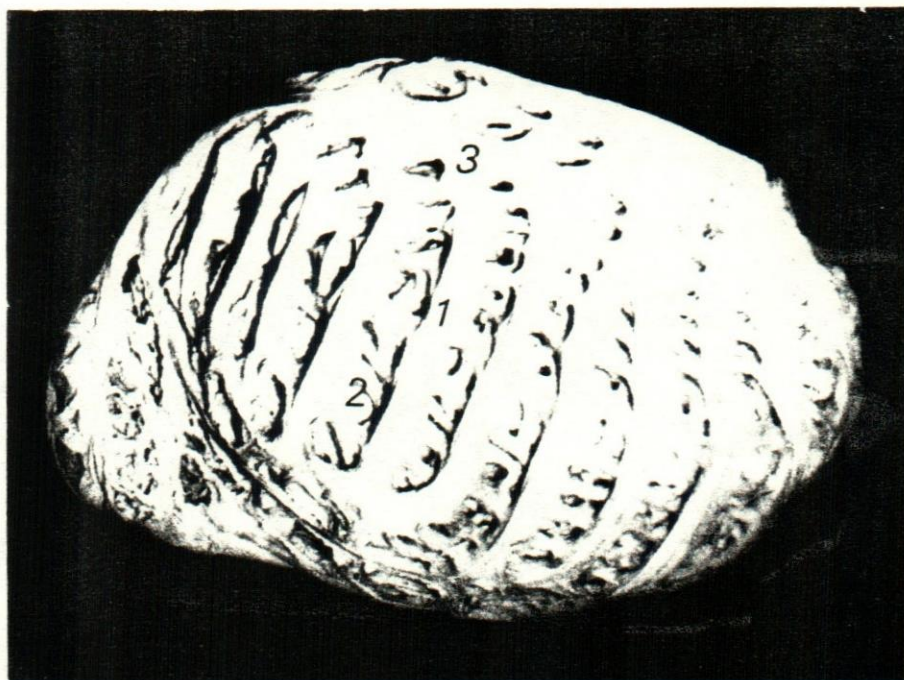
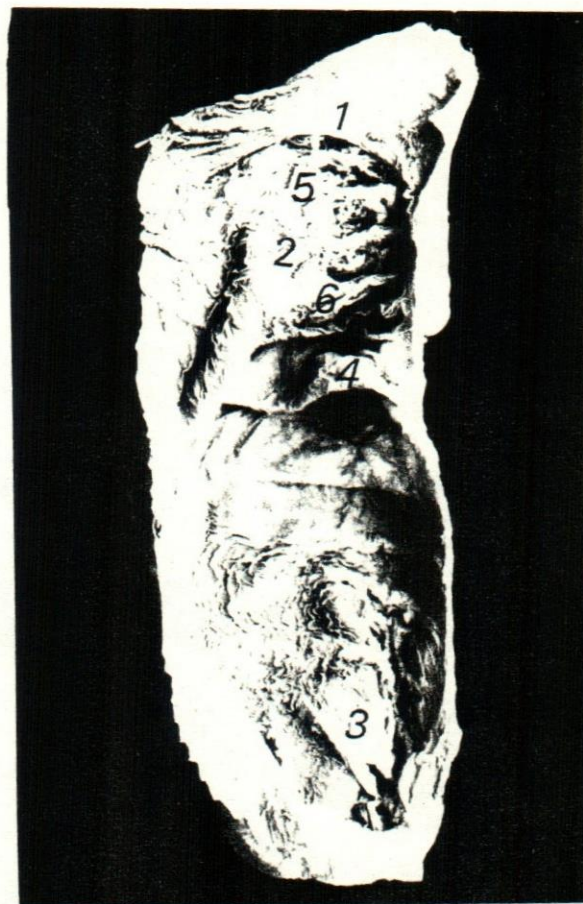
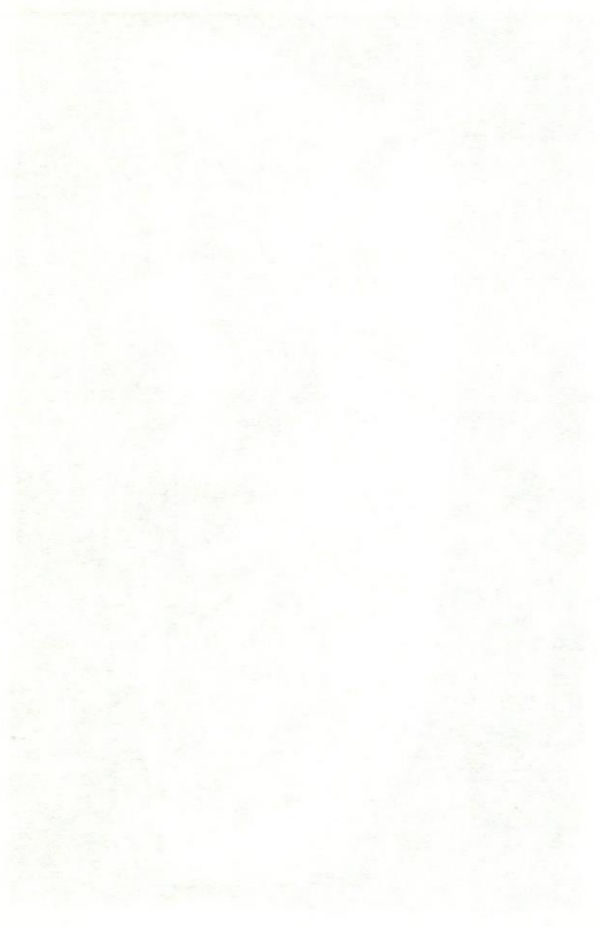


Fig. (5): Interior of the reticulum

1 musculomembranous ridges, 2 reticular cells, 3 lesser curvature



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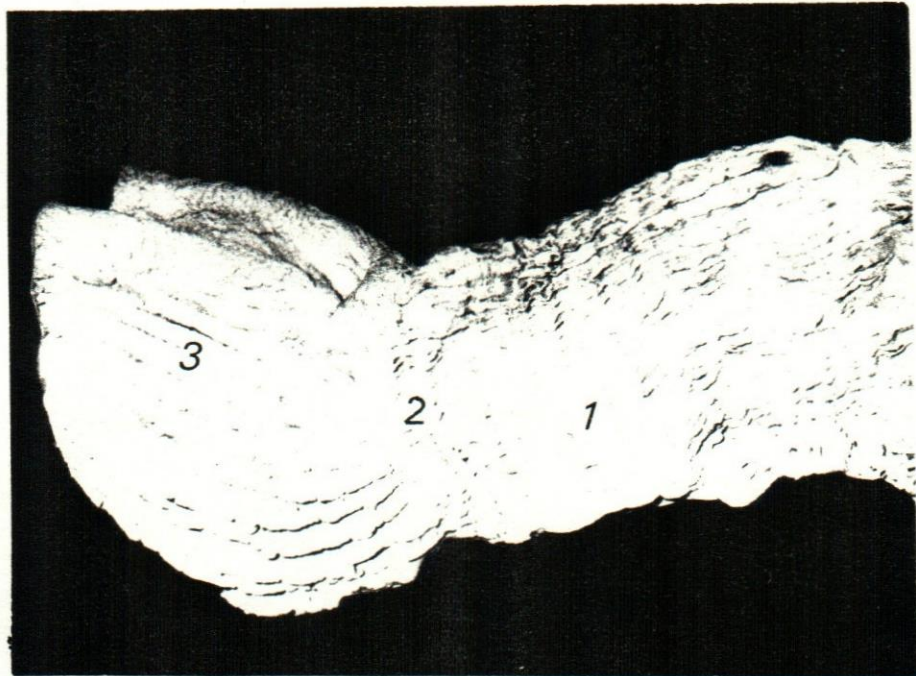


Fig. (6): Omasoabomasal junction

1 omasal lamellae, 2 omasoabomasal junction, 3 abomasal folds

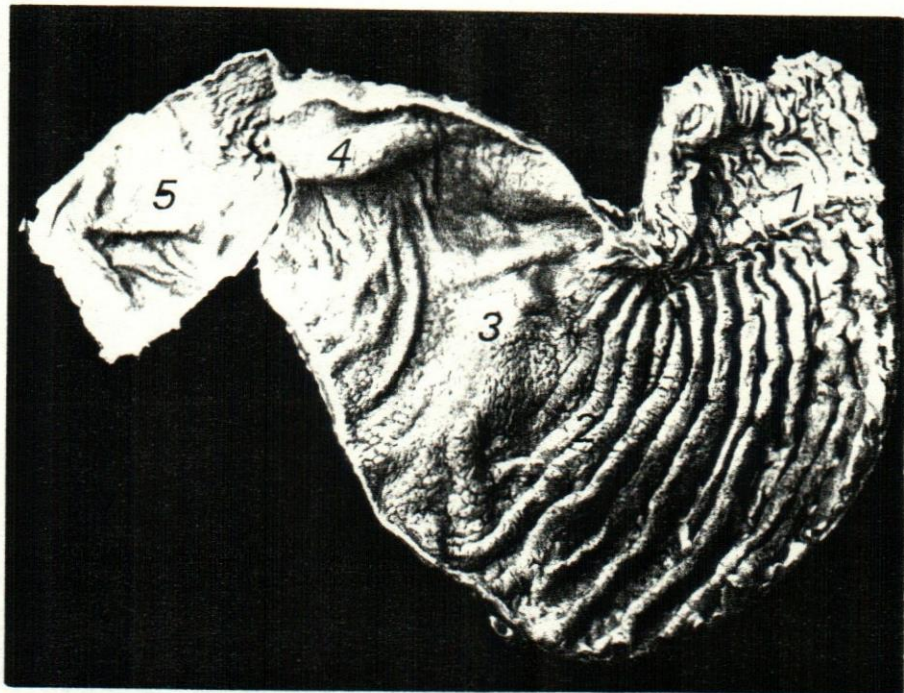


Fig. (7): Interior fo abomasum

1 omasoabomasal junction, 2 abomasal folds, 3 pyloric region, 4 Torus pyloricus, 5 duodenum

