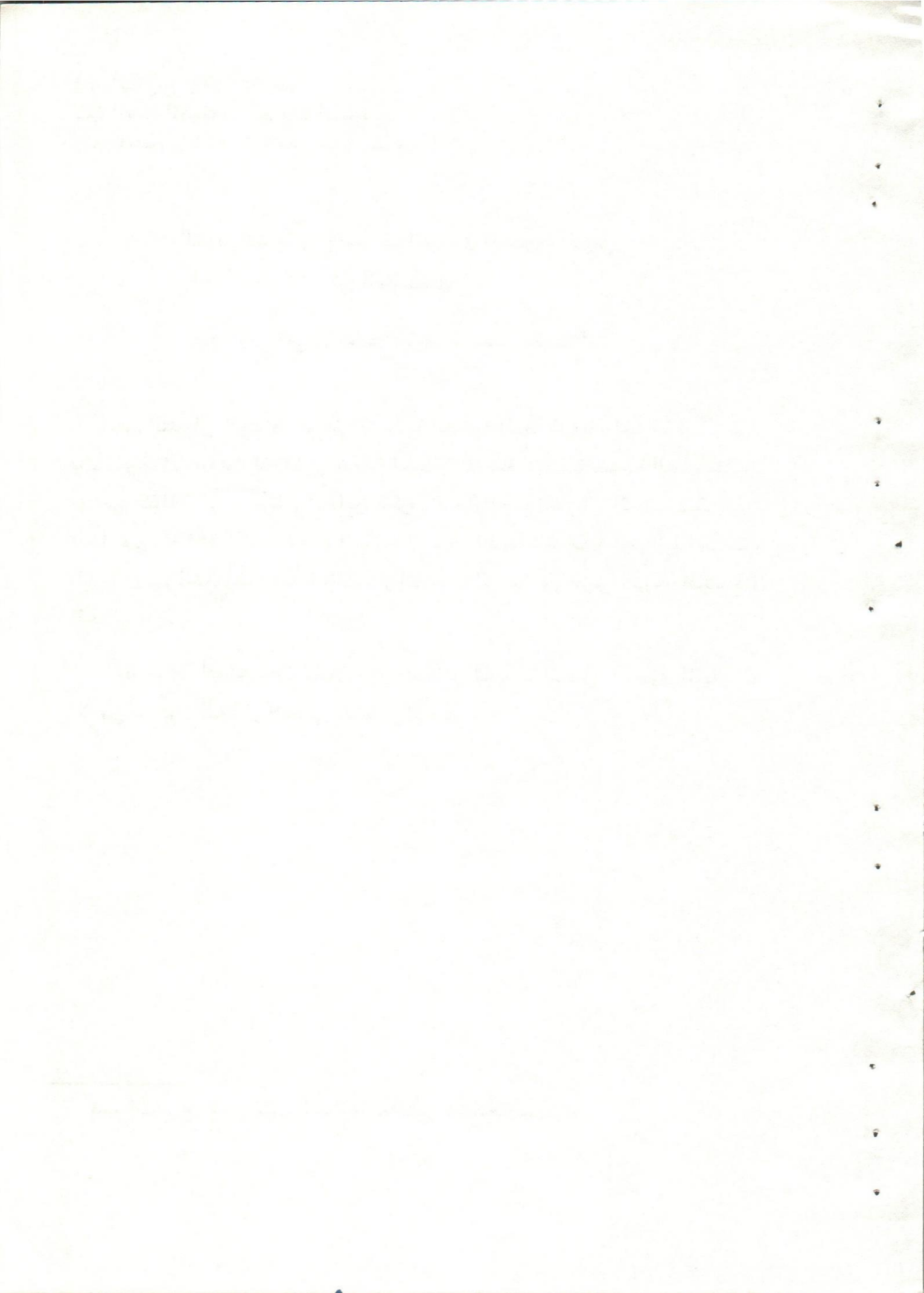


المدد الشريانى والتصريف الوريدى للتجويف الانفى
فى البفـل

عبدالله حفى ، أحمد قناوى ، محمد عطية*

يقوم الشريان الودى الحنكى بتغذية الغشاء المخاطى للحاجز الانفى والتجاويف الانفية وكذلك تكوين ضفيرة المحارة الانفية البطنية وضفيرة الحاجز الانفى وكذلك يقوم الشريان السابق ذكره بالاشترك مع الشريان المصفاوى الخارجى بتغذية وتكوين ضفيرة المحارة الانفية الظهرية . هذا ويتم التصريف الوريدى من التجاويف الانفية والصفائر الوريدية الانفية عن طريق الوريد الودى الحنكى فقط .

وقد وجد أنه يتم فقط اتصال بين الصفائر الوريدية اليمنى واليسرى للحاجز الانفى من وراء الجدار الخلفى للحاجز الانفى .



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**ARTERIAL SUPPLY AND VENOUS DRAINAGE OF CAVUM NASALE
IN THE MULE
(*Equus hinus*)
(With two Figs.)**

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SUMMARY

The sphenopalatine artery and its branches form the arterial plexus situated in the septum nasi and the ventral nasal concha. However, both of the sphenopalatine and the external ethmoidal arteries share in the formation of the arterial plexus of the dorsal nasal concha. The corresponding venous plexuses are formed by the tributaries of the sphenopalatine vein only.

The right and left venous nasal septal plexuses join each other just caudal to the free border of the nasal septum, however, there is no connection between the other plexuses. The abundant quantity of vascular plexuses present within the nasal cavity of the mule, is possibly to accommodate the inspired air to the body temperature especially in hot atmosphere and chilling tempests.

INTRODUCTION

The vascular arrangements of the nose were described in cat, dog, pig, sheep, goat, rabbit and rat by DAWES/ PRICHARD (1953). Moreover, LE ROUX (1959) and SCHNORR/ HEGNER (1967) mentioned that the venous plexuses is formed by the sphenopalatine vein in cattle and small ruminants. The present study was carried out to describe the vasculature of the nasal cavity in mule and the arterial and venous plexuses formed within it, concerning the nature of this animal as hard worker specially in hot and cold atmospheres.

MATERIAL and METHODS

The work was carried out on 20 heads of adult mules of the species *Equus hinus*. Ten of them were prepared for the examination of the arteries by injecting red coloured gum milk (Latex) through the common carotid arteries, while the rest were injected with the blue coloured Latex through the mandibular labial veins.

The nomenclature of the arteries and veins is that adopted by the NOMINA ANATOMICA VETERINARIA (1973).

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RESULTS

The arterial supply of the nasal cavity comes essentially from the sphenopalatine and external ethmoidal arteries, while the venous blood is drained by the corresponding veins.

A. sphenopalatina:

The sphenopalatine artery (1/5) originates from the dorsal aspect of A. palatina descendens just before the latter enters the Canalis palatinus major. It passes through the For. sphenopalatinum and continues in a rostradorsal direction as A. nasalis lateralis after detaching the septal and caudal nasal arteries.

The A. nasalis septalis (1/6) arises at the rostral margin of the sphenopalatine foramen. It passes in the Lamina propria of the nasal septum forming a sort of arterial plexus.

The A. nasalis caudalis (1/7) courses caudoventrally in the lateral wall of the Fundus nasi and is distributed in the floor of the Choanae. It also detaches a considerable branch for the pharyngeal surface of the soft palate which anastomose with the A. palatina minor.

A. nasalis lateralis:

The lateral nasal artery (1/8) ascends in the lamina propria of the ventral nasal concha where it detaches 4-5 Rr. ventrales and continues in a rostradorsal direction as R. dorsalis. In addition, the lateral nasal artery detaches 2-3 twigs for the Conchae ethmoidales.

The most caudal group of the ventral branches of the lateral nasal artery (1/9) descend in a rostral direction to distribute in the floor of the nasal cavity, they anastomose with twigs from A. palatina major which ascend through the accessory palatine foraminae. The other ventral branches extend rostrally to form the arterial plexus of the ventral nasal concha together with twigs from Aa. palatina major and labialis maxillaris. The plexus is situated in the Lamina propria deep to its corresponding venous plexus. It supplies the floor and roof of the middle and ventral nasal meatuses.

The dorsal branch (1/10) forms the continuation of the lateral nasal artery and ascends in a rostral direction to reach the caudal part of the dorsal nasal concha where it distributes. It also anastomoses with the branches of the external ethmoidal artery to form the plexus of the dorsal nasal concha.

A. ethmoidalis externa:

The external ethmoidal artery (1/1) is given off the external ophthalmic artery after the latter detaches the lacrimal artery. It pierces the periorbita medially and leaves the orbit by passing through the For. ethmoidale, then leaves also the cranial cavity via an opening in the cribriform plate to gain the nasal cavity. Here it detaches 2-3 Rr. septales (1/2) for the caudodorsal portion of the nasal septum and continues rostrally along the dorsal aspect of the concha nasalis dorsalis to terminate in the nasal vestibule close to the straight fold. The external ethmoidal artery detaches several branches which anastomose with the R. dorsalis of A. nasalis lateralis to form the arterial plexus of the dorsal nasal concha. The plexus supplies the roof of the Meatus nasi dorsalis, in addition to the roof and lateral wall of the Meatus nasi communis.

V. sphenopalatina:

The sphenopalatine vein (2/7) forms the direct continuation of V. palatina descendens after detaching V. infraorbitalis. It passes through For. sphenopalatinum to gain the caudal portion of the nasal cavity where it detaches the V. nasalis septalis and continues as V. nasalis lateralis.

ARTERIES AND VEINS OF NASAL CAVITY

The septal nasal vein (2/8) divides into two branches which enter the Lamina propria of the nasal septum where they break down into several branches forming the venous plexus of the septum nasi. The plexus is separated from its fellow of the other side by the cartilagenous and osseous parts of the nasal septum, however, the two plexuses communicate with each other through 7-9 branches along the free caudal border of the septum. It drains the roof of the nasal cavity, medial wall of the Meatus nasi communis and detaches 2-3 twigs for the Conchae ethmoidales.

The lateral nasal vein (2/9) passes in a rostradorsal direction in a gentle curve to continue as R. dorsalis after detaching five considerable ventral branches (2/10). Two of these branches ramify and anastomose to form the venous plexus of the floor of the nasal cavity (2/11) which drains the floor and the lateral wall of the ventral nasal meatus. The other three branches anastomose with each other forming the venous plexus of the ventral nasal concha (2/12).

The plexus detaches the caudal nasal vein (2/13) which courses caudoventrally on the floor of the choanae to reach the nasal aspect of the soft plate where it distributes near the palatine arch. The caudal nasal vein detaches a R. pharyngeus to the pharyngeal plexus, twigs to the choana and soft palate and anastomoses with its fellow of the other side.

The dorsal branch of the lateral nasal vein (2/14) enters the Concha nasalis dorsalis to form the venous plexus of the dorsal nasal concha (2/15). The plexus detaches several branches which run rostrally in the straight fold to anastomose with a branch from V. lateralis nasi.

V. ethmoidalis externa:

The external ethmoidal vein arises from the dorsomedial aspect of the ophthalmic plexus. It passes through the For. ethmoidale to reach the ethmoidal fossa where it divides into several twigs which pass through the cribriform plate to distribute in the caudal portion of the Conchae ethmoidales. The branches of the V. ethmoidalis externa anastomose with the branches of V. ethmoidalis interna.

DISCUSSION

The origin of the sphenopalatine artery described in mule was mentioned also in camel by BADAWI/ EL-SHAIEB/ KENAWY (1977) and in buffalo by EL-AYAT (1977), however, BRADLEY/ GRAHAME (1947) in horse and ABD EL-MOATY (1980) in donkey recorded its origin from A. maxillaris.

The sphenopalatine artery divides in mule into three terminal branches as stated also in horse by GHOSHAL (1975), however, it divides into only two branches in donkey (ABD EL-MOATY, 1980), ox (RAGHAVAN/ KACHROO, 1964) and camel (BADAWI, et al. 1977).

The arterial plexuses found in the nasal cavity of mule simulates those described in small ruminants by SCHNORR/ HEGNER (1967) and in buffalo by NAWAR/ EL-AYAT/ IBRAHIM (1975).

The origin of the sphenopalatine vein in mule simulates that reported in buffalo by EL-AYAT (1977) and in camel by HIFNY/ AHMED/ HASHEM (1981), however, the same vein was considered as one of the tributaries of V. profunda faciei by SISSON/ GROSSMAN (1969) in horse and ABD EL-MOATY (1980) in donkey.

The sphenopalatine vein forms a rich venous plexus on the nasal conchae and septum nasi as stated by SISSON/ GROSSMAN (1969) in horse and by WILKENS/ MUNSTER (1981) in domestic animals. LE ROUX (1959) described two strong venous plexuses formed by the branches of the sphenopalatine vein in cattle, moreover, SCHNORR/ HEGNER (1967) found three erectile bodies

in the wall of the nasal septum in sheep and goat.

The position of the venous plexuses in the dorsal and ventral nasal conchae facing the nasal meatuses simulate those found in cat, dog, pig, sheep, goat, rabbit and rat described by DAWES/PRICHARD (1953).

The well developed venous plexus of the ventral nasal concha in mule resembles that described in man by BURNHAM (1935).

The connection between the nasal and palatine plexuses which takes place through the accessory palatine foramina was recorded also in camel by KHIDER (1980). A similar connection occurring through the palatine fissure was described in dog by RUMPLER (1967).

The origin of the external ethmoidal vein in mule simulates that stated by WILKENS/ MUNSTER (1981) in domestic animals except pig. However, PRINCE/ DIESEM/ EGLITIS/ RUSKELL (1960) and DIESEM (1968) reported its origin in horse from V. supraorbitalis.

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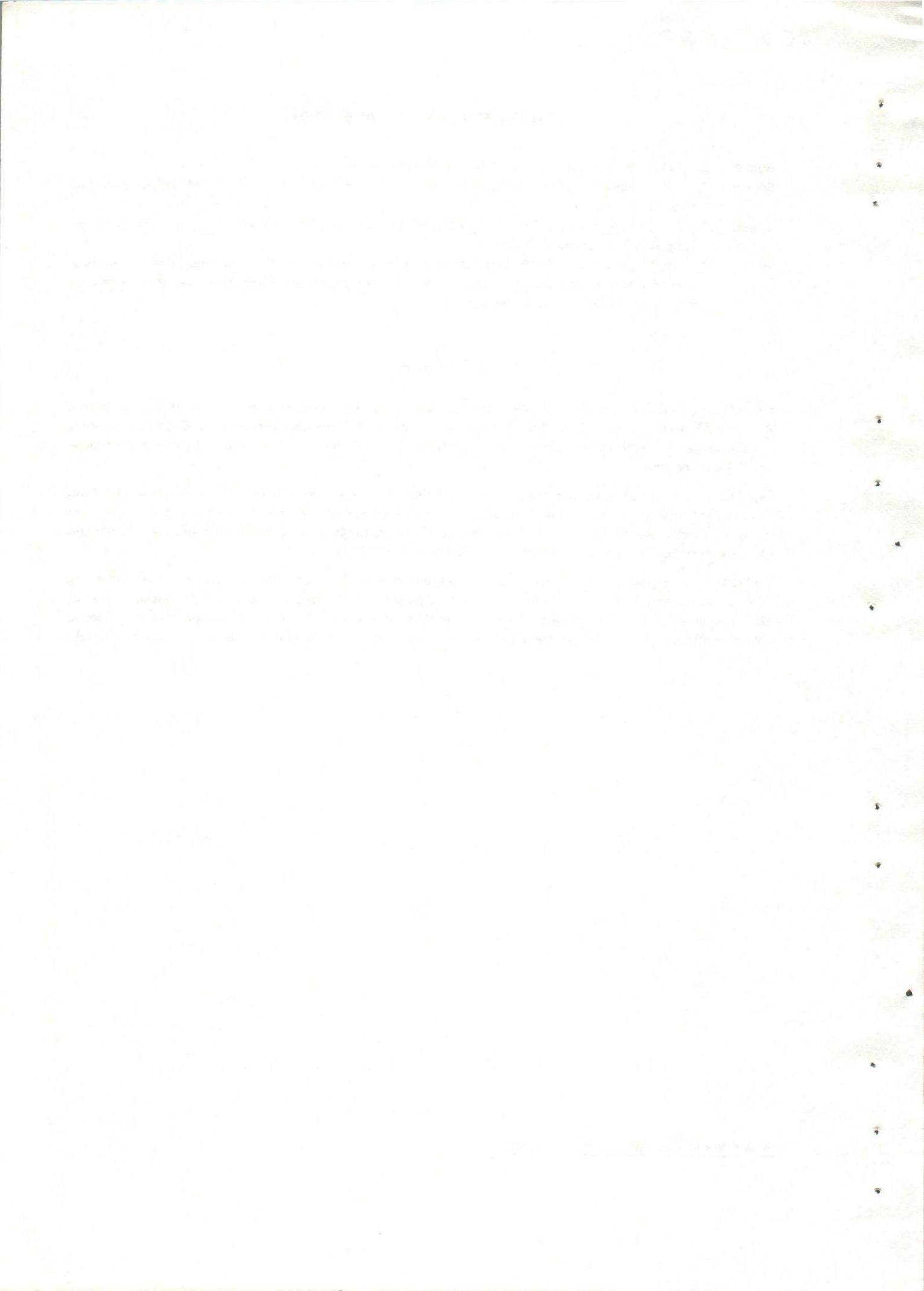
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LEGENDS

Fig. (1) and Fig. (2): Diagrams showing the distribution of the arteries and veins in the nasal cavity. A Cavum cranii, B Sinus frontalis, C Sinus sphenoidalis, D Hamulus pterygoideus, E palatum durum, F Concha nasalis dorsalis, G Concha nasalis ventralis, H Plica recta, I Plica alaris, J Concha ethmoidalis, K Os incisivum.

Fig. (1): 1 A. ethmoidalis externa, 2 Rr. septales, 3 A. palatina descendens, 4 A. palatina minor, 5 A. sphenopalatina, 6 A. nasalia septalis, 7 A. nasalis caudalis, 8 A. nasalis lateralis, 9 Rr. ventrales of 8, 10 R. dorsalis of 8, 11 A. palatina major, 12 A. palatolabialis, 13 Terminal branch of A. dorsalis nasi, 14 Terminal branch of R. ventralis of A. labialis maxillaris.

Fig. (2): 1 V. palatina descendens, 2 V. palatina major, 3 V. palatina minor, 4 Plexus palatinus, 5 V. palatolabialis, 6 V. infraorbitalis, 7 V. sphenopalatina, 8 V. nasalis septalis, 9 V. nasalis lateralis, 10 Rr. ventrales of 9, 11 Venous plexus of the floor of Cavum nasi, 12 Venous plexus of the Concha nasalis ventralis, 13 V. nasalis caudalis, 14 R. dorsalis of 9, 15 Venous plexus of the Concha nasalis dorsalis.



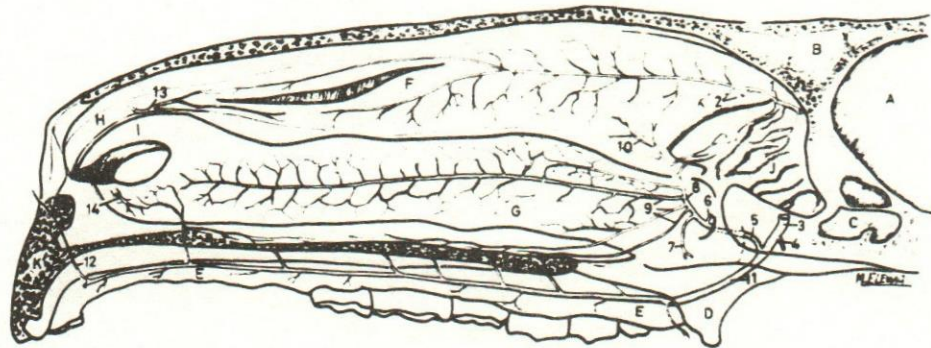


Fig. (1)

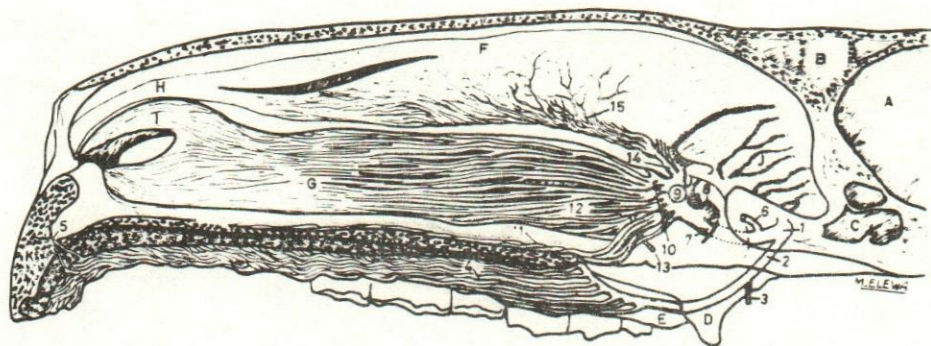


Fig. (2)

