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**Hermann Dexler's "Beiträge zur Kenntnis des feineren Baues
des Zentralnervensystems der Ungulaten." ¹**

**An Annotated English Translation of the
Original German Article**

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Part III: Mesencephalon, Diencephalon

(with Dexler's Figures 15-18, 45-46)

Abstract

The main structures of the Mesencephalon, i.e., Lamina quadrigemina and Crura cerebri, are described, with special attention to the delineating grooves and features of surface architecture. In the description of the Diencephalon, major attention is paid, for example, to the Corpus geniculatum laterale et mediale, Thalamus opticus, Habenula, Stria terminalis, Tuberculum anterius et laterale, Epiphysis on the dorsal and lateral sides; on the ventral side, the Fossa interpeduncularis, Corpus mamillare and Tuber cinereum are highlighted. The Regio hypothalamica is described in terms of its structural and topographical relationship with the Hypophysis. In the latter, a so-called Medullary Part and a Glandular Part are distinguished.

The anatomy of the third ventricle and the adjacent structures are explained in great detail, beginning, in a first step, with a meticulous description of the structures that shape the inner surface of the ring-like formation and its various recesses, i.e., Recessus suprapinealis, Recessus infrapinealis, cavity of the Infundibulum, Recessus opticus, Recessus hypophyseos; this description is further elaborated, in a second step, with reference to metal casts.

The description is supplemented with measurements of some of the most prominent structures.

Keywords: Brain, Horse, Lamina quadrigemina, Crura cerebri, Thalamencephalon, Hypophysis, Ventriculus tertius

¹ first published in: Gegenbaurs Morphologisches Jahrbuch **32**, pp. 288-389 (1904)

Introduction

Part I of the English translation² comprised the first pages (i.e., pages 288-290) of Dexler's article, presenting his general remarks on the problems and challenges of neuroanatomical descriptions of the brain, while Part II (i.e., pages 290-322) dealt with the Rhombencephalon³.

Technical Notes: This English translation does not aim to transfer the characteristic rhetorical style of early 20th century German language into idiomatic English. Rather, it attempts to present Dexler's anatomical descriptions, interpretations and discussion in plain modern English. Dexler's personal rhetorical style has been maintained whenever necessary in order not to omit relevant information. Whenever any German wording or term could not be appropriately translated into adequate contemporary English, the text or a footnote presents the *German words in italics* together with equivalent English synonyms and/or relevant explanations, or the term is replaced by the current version according to the Nomina Anatomica Veterinaria [N.A.V.] (2017). Dexler's Latin nomenclature has been maintained in the text, even though it does not always conform to the current version of the N.A.V..

Dexler's original article contained only a small number of keywords that indicated a thematic division of the text; there were no true chapter headings. The following short list of topics has been compiled in order to give the readers of this translation at least a brief overview beforehand for better orientation (not all of them are headings that can be found in the text):

Isthmus and Midbrain	
Lamina quadrigemina, Colliculi, Brachia	3
Crura cerebri, Substantia perforata posterior ...	4 (bottom)
Aquaeductus cerebri	5 (bottom)
Diencephalon	
Dorsal and lateral surfaces, Thalamencephalon ...	6
Third ventricle I	8
Base of the Diencephalon	8 (bottom)
Hypophysis	9
Third Ventricle	10
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² Lang et al. (2018a)

³ Lang et al. (2018b)

Contributions to the Knowledge of the Fine Structure of the Central Nervous System of Ungulates

By Prof. Hermann Dexler

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Part III now continues with pages 322-333 of the original article.

ISTHMUS AND MIDBRAIN

The part of the brain stem that we sum up under the terms Isthmus and Mesencephalon is approximately 2.5 cm long in the horse. It is separated by a distinct lateral groove, SULCUS LATERALIS MESENCEPHALI, into a dorsal part, comprising the Lamina quadrigemina (*Vierhügelplatte*) and the region of the Tegmentum (*Haubenregion*), and a ventral part comprising the Pedunculi cerebri (*Großhirnschenkel*).

The COLLICULI ROSTRALES (*Vordere Vierhügel*) of the horse are approximately 14 mm long and 12-14 mm wide, quite flat, evenly rounded and, in the fresh specimen, and have a grey appearance at the external surface. They are much larger than the whitish COLLICULI CAUDALES (*Hintere Vierhügel*) that protrude 4-5 mm in the caudal direction from underneath the former. Ventral to the Colliculi caudales, the Pedunculi cerebellares rostrales (*Bindearme*, Brachia conjunctiva), coming from the Cerebellum, disappear in the Mesencephalon.

In the region of the Mesencephalon, each Brachium conjunctivum is laterally covered by a flat, wide strand of fibres that comes from the rostral border of the Pons, extends obliquely upwards in the direction of the Colliculus caudalis and disappears underneath the latter without a clear delineation. This is the LEMNISCUS (*Schleife*) of which the dorsal border is quite prominent. In some individuals, the centre of the area of the Lemniscus protrudes spherically as a small, clearly delineated elevation. It contains the NUCLEUS LEMNISCII LATERALIS.

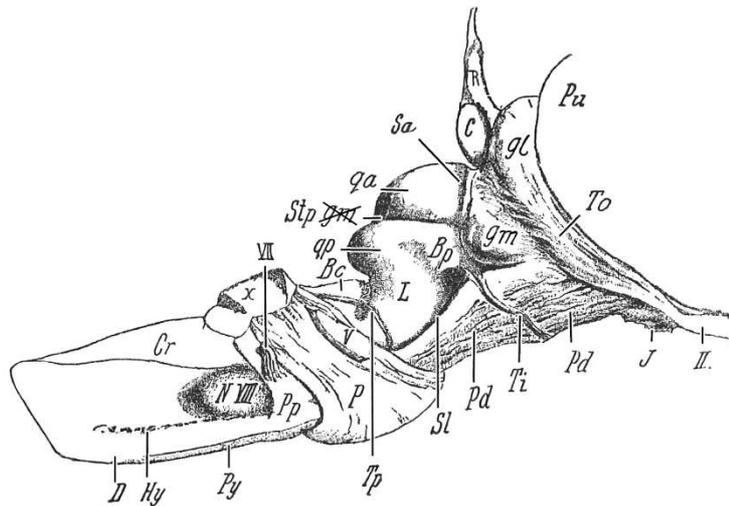
The left Colliculi are separated from the right ones by means of a deep Sulcus medianus quadrig.; the rostral Colliculi are separated from the caudal ones by means of a Sulcus transversus quadrig., which is positioned perpendicularly to the aforementioned Sulcus medianus. Furthermore, the rostral Colliculi are sharply delineated from the steeply ascending caudal area of the Thalamus and from the Corpus geniculatum mediale, respectively; similarly, the Colliculi caudales are separated from the Brachia conjunctiva. If we regard these limitation lines as grooves, the Lamina quadrigemina is divided by a rostral, a caudal and by an

⁴ k.k.: imperial and royal (Austrian and Hungarian)

intermediate, proper transverse sulcus. The latter is the most distinct one and the longest; running towards the Corpus geniculatum mediale (*medialer Kniehöcker*), its branches vanish, forming the SULCUS INTERBRACHIALIS between the arms of the Lamina quadrigemina (*Vierhügelarme*). The Nervus trochlearis exits from the brain stem at the site where the caudal border of the Colliculus caudalis is, and the dorsal area of the Brachium conjunctivum and the dorsal edge of the Lemniscus meet. From every Colliculus laminae quadrigeminae, a strand of fibres originates, i.e., the rostral and the caudal *Vierhügelarm*, BRACHIUM CORPORUM QUADRIGEMINUM NASALE ET CAUDALE. Part of the former one continues towards the Tractus opticus, while another part of it runs underneath the Corpus geniculatum mediale (*medialer Kniehöcker*). The Brachium (corporum quadrigeminum) caudale is separated into two vague (often not clearly delineable) parts of which the rostral one runs towards the Corpus geniculatum mediale, while the caudal one runs towards the Sulcus lateralis mesencephali.

Fig. 15. Brain stem of a six-year-old horse; fixed inside the cranium, lateral view, original size.

Bc Brachium conjunctivum; **Bp** *hinterer Vierhügelarm* (arm of the Colliculus caudalis laminae quadrigeminae); **C** Conarium; **Cr** Corpus restiforme; **D** Decussatio pyramidum; **gl, gm** *äußerer, innerer Kniehöcker* (Corpus geniculatum laterale, mediale); **Hy** *Hypoglossuslinie* (hypoglossus line); **J** Infundibulum; **L** Lemniscus; **N VIII** Tuberculum faciale ventrale; **P** Pons; **Pd** Pedunculus cerebri; **Pp** Propons; **Pu** Region of the Pulvinar thalami; **Py** Pyramis; **qa, qp** *Vorderer, hinterer Vierhügel* (Colliculus rostralis, Colliculus caudalis laminae quadrigeminae); **R** *Epiphysenschlauch* (Recessus suprapinealis), relatively small in this specimen; **Sa** Sulcus transversus frontalis; **Sl** Sulcus lateralis mesencephali; **Stp** Sulcus transversus proprius (labelled "gm" in Dexler's original legend); **Ti** Tractus peduncularis transversus; **To** Tractus opticus; **Tp** Taenia pontis; **x** Sectional area of the Pedunculi cerebellares; **II** Chiasma opticum; **VII** *Fazialisstamm* (stem of the Nervus facialis).



The CRURA CEREBRI are approximately 12 mm wide at their origin from the rostral border of the Pons; after a course of 2.5 cm, they disappear underneath the Tractus optici. Their rope-shaped surface architecture⁵ is not as distinct as it is in humans; in particular, one cannot distinguish a crossover of medially located fibres to the lateral side as it is the case in the human brain. The divergent, very weakly

⁵ caution: not to be mistaken with the rope-shaped Corpus restiforme (Pedunculus cerebellaris caudalis)

recognisable borders of the Crura leave the area occupied by the SUBSTANTIA PERFORATA POSTERIOR empty. This area represents the base of the third ventricle. This space is homologous to the TRIGONUM INTERCRURALE HOMINIS; however, it can hardly be designated as such in the horse, but must rather be named FOSSA INTERPEDUNCULARIS because the borders of the Crura do not diverge and, hence, do not include a triangle. In the median plane, the space is separated into two halves by means of a clear SULCUS MEDIANUS VENTRALIS MESENCEPHALI; rostrally, it reaches the Corpus mamillare.

At the medial border of the Crura cerebri, the cranial nerve III appears bilaterally as an irregularly formed line of bundles. These extend from the median line in an oblique caudo-lateral direction. Having united to form a band-like stem, the latter continues 4-5 mm in the same direction, but then turns at a sharp angle to run rostrally.

In some individuals, one can see (especially in specimens fixed in chromium compound/chromate⁶) a 3 mm wide bundle protruding slightly beyond the surface at the border line between the Substantia perforata posterior and the Crus cerebri. It appears at the rostral border of the Pons and disappears at the exit site of the Nervus oculomotorius. In very fresh brains, one can still recognise two other, delicate bundles medial to the former, at the bottom of the Fossa interpeduncularis. Their traces vanish after a course of 4 mm at the rostral border of the Pons. The rest of the area of the Substantia perforata is delicately indented by sagittally oriented vascular branches or superficially bears fine, longitudinal fibre bundles.

The TRACTUS PEDUNCULARIS TRANSVERSUS begins in a shallow groove located in the rostral third of the Sulcus lateralis mesencephali, close to the site where the Brachium corporum quadrigeminum caudale (*caudaler Vierhügelarm*) runs underneath the Corpus geniculatum mediale (*mittlerer Kniehöcker*); the tract is approximately 3 mm wide and turns in a ventro-rostral direction, running across the base of the Pedunculus cerebri towards the Substantia perforata posterior. The further it proceeds in its course, the more fibres it emits in-between the strands of the Pedunculus; consequently, the tract disappears completely from the surface prior to reaching the medial border of the Pedunculus.

Inside the Mesencephalon, the connecting canal between the third and the fourth ventricle, i.e., the AQUAEDUCTUS CEREBRI, is located. Its shape (as recognised from a metal cast⁷) is bow-like. The cast is approximately 2 cm long and shows a ventral, sparsely developed, longitudinal crest, i.e., the rostral continuation of the Sulcus medianus fossae rhomboidalis, and two better developed lateral crests. The arched cast has thickening in two places, i.e., some thickening in its middle part: The rostral, slimmer and higher thickening represents the cast of the part that lies

⁶ not specified; probably Müller's or Zenker's solution

⁷ Casts of the ventricular system (Fig. 45 and Fig. 46) are displayed on pages 386-387 of Dexler's original manuscript, i.e., on pages 35 and 37 of Part V of the translation, see: Lang et al. (2018c); for the readers' convenience, they are also shown on page 12 of this part of the translation

ventral to the pair of the Colliculi rostrales laminae quadrigeminae; the wider and flatter thickening represents the part ventral to the Colliculi caudales or its ampulla-like enlargements. The caudal end of the arched cast, located ventral to the insertion of the Velum medullare rostrale, shows transverse impressions at its dorsal surface representing the imprints of some lobules of the Lobus centralis cerebelli. The rostral end of the arch forms a vertical, 2 mm high, barely 0.5 mm thick wall and then continues into the cast of the third ventricle. Here lies the narrowest section of the entire ventricular system of the Cerebrum.

DIENCEPHALON

The relatively large CORPUS GENICULATUM MEDIALE lies dorsal to the rostral end of the Sulcus lateralis mesencephali, just at the site where the Sulcus transversus proprius laminae quadrigeminae and the Sulcus transversus rostralis laminae quadrigeminae strive to unite. The Corpus geniculatum mediale is a spherical prominence with a diameter of approximately 1 cm; rostrally, it is vaguely delineated from the caudal wall of the Diencephalon and from the Tractus opticus. Delicate, wavy strands (*Stränge*) run towards the latter. Rostral to the mentioned ganglion, the rear wall of the Thalamencephalon ascends steeply to form a bulgy, laterally oriented protrusion that continues ventro-rostrally into the band-like Tractus opticus; medially, it continues into the area of the Thalamus that slopes gently towards the midline. This marginal bulge (*Randwulst*) represents, for the most part, the CORPUS GENICULATUM LATERALE. Its medial region is perhaps homologous to the PULVINAR hominis. At any rate, a Pulvinar cannot be externally distinguished from the Corpus geniculatum laterale in the equine brain.

The white, dorsal surface of the Thalamus opticus is covered by a thin fibrous layer, i.e., the STRATUM ZONALE; this area has the shape of a right-angled triangle, the base of which lies caudally, while the tip lies rostrally next to the midline. Medially, at the margin which bends towards the medial surface of the Thalamus, the triangular dorsal surface is lined by the white, barely 3 mm wide HABENULA, STRIA MEDULLARIS or TAENIA THALAMI; laterally, it is cut off by a deep groove, which separates the Thalamus and the Nucleus caudatus from each other: This is the SULCUS THALAMO-STRIATUS. This groove begins far rostral at the Foramen interventriculare, encircles the Thalamus in three quarters of a bow up to the tip of the Lobus piriformis, then incorporates the Plexus lateralis and the margin of the Fimbria, and contains at the bottom a white medullary band (*Markstreifen*), which is the STRIA TERMINALIS or TAENIA SEMICIRCULARIS; the latter does not protrude superficially as much as it does in humans. At the rostral tip of the dorsal area of the Thalamus lies a distinct, bean-shaped TUBERCULUM ANTERIUS. Often, there can be another small protrusion between this Tuberculum and the Corpus geniculatum laterale, i.e., the TUBERCULUM LATERALE; however, it may be absent equally often. A third, little eminence that one could perhaps assume to see at the site where the sides of the triangle meet, i.e., lateral to the Epiphysis, is just as inconstant.

However, overall, the dorsal area of the Thalamus is much flatter than in the human brain. It also lacks a Sulcus chorioideus.

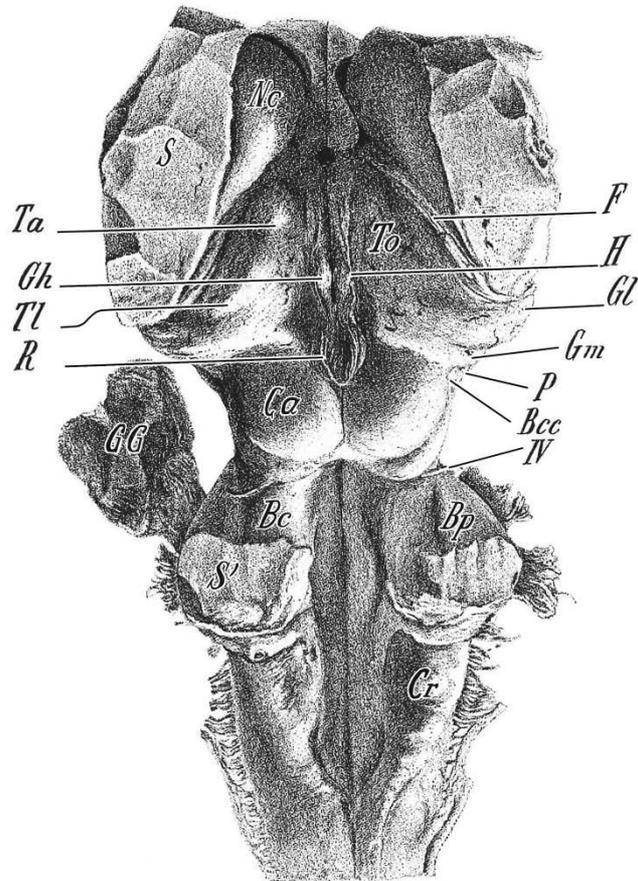
Fig. 16. Brain stem of a one-year-old horse; drawn from a photograph, dorsal view, original size.

Bc Brachium cerebelli nasale;

Bcc Hinterer Vierhügelarm (arm of the Colliculus caudalis laminae quadrigeminae); **Bp** Brachium cerebelli mediale; **Ca** Vorderer Vierhügel (Colliculus rostralis laminae quadrigeminae); **Cr** Corpus restiforme; **F** Sulcus thalamostriatus; **GG** Ganglion Gasseri; **Gh** Ganglion habenulae; **Gl** Ganglion geniculatum laterale; **Gm** Ganglion geniculatum mediale; **H** Habenula; **Nc** Head of the Nucleus caudatus; **P** Dorsal border of the Pes pedunculi; **R** Detachment line of the *Epiphysenschlauch* (Recessus suprapinealis) at the Conarium;

S Sectional area between Telencephalon and Diencephalon; **S'** Sectional area in the Pedunculi cerebellares;

Ta Tuberculum anterius thalami; **Tl** Tuberculum laterale thalami; **To** Thalamus opticus; **IV** Nervus trochlearis.



At the rostral border of the Lamina quadrigemina, the dorsal Sulcus medianus mesencephali continues into a funnel-shaped depression. The cone-shaped, relatively large EPIPHYSIS reaches protrudes from this pit. If one tears off the membranous roof of the third ventricle, one recognises two thin medullary plates (*Markplatten*) at the rostral surface of the Epiphysis; these descend towards the gap between the right and left parts of the Diencephalon (*Zwischenhirnspalte*⁸) and, there, continue into two small spindle-shaped nodes. The nodes continue without any disruption into the aforementioned medullary crest (*Markleiste*) that we have got to know as the Stria medullaris or Habenula next to the separating edge between the dorsal and medial surfaces of the Thalamus. These white, 3 mm long, approximately 2 mm thick neuronal nodes represent the GANGLIA HABENULARUM; the medullary crests (*Markleisten*) descending from the nodes towards the Epiphysis represent the PEDUNCULI HABENULARUM (*Zirbelstiele*).

The totally even medial surface of the Thalamus descends vertically from its medio-dorsal edge and is connected to the contralateral one by means of the wide

⁸ explained below (page 8)

MASSA INTERMEDIA. The barely 1 mm wide gap between the right and left parts of the Diencephalon (*Zwischenhirnspalt*) is thus given the shape of a ring-like canal, representing the third ventricle (*Zwischenhirnkammer*).

The roof of the Diencephalon, representing the dorsal closure of the third ventricle (*Zwischenhirnkammer*), remains at the (developmental) stage of the embryonic wall of the brain vesicle for the horse's entire life; it is composed of the usually one-layered cubic epithelium that bilaterally continues into the medio-dorsal border of the Thalamus at the Stria medullaris. The epithelial layer is supported by the Tela chorioidea, which reaches the surface of the Thalamus via the brain's transverse slit (*Querschlitze*)⁹ and covers the surface of the Thalamus the whole length of its contour up to the region of the Foramen interventriculare, thus forming the VELUM TRIANGULARE. The medial strip of the Velum triangulare bears large, brush-like vascular villi at its ventral side; pushing the Ependym forward, these protrude into the lumen of the third ventricle (*Zwischenhirnkammer*); this is the PLEXUS MEDIALIS. Its caudal portion, lying dorsally and rostrally to the Epiphysis, widens to form a diverticulum of individually varying size; usually, it is 2 cm long and has a very thin wall which includes the rostral surface of the Epiphysis: This is the RECESSUS SUPRAPINEALIS (*Epiphysenschlauch*). Beginning at the Epiphysis, it ascends dorsally in a flat bow towards the Sinus sagittalis dorsalis (*Längsblutleiter*), running inside the fibrous septum which contains the Sinus rectus and its side branches that come from the brain stem. Barely ventral to the Epiphysis, there is a second, small diverticulum of the ventricular wall; this is the RECESSUS INFRAPINEALIS, which is separated from the entrance into the Aquaeductus Sylvii by the COMMISSURA POSTERIOR.

The largest part of the BASE OF THE DIENCEPHALON, Regio hypothalamica, is covered by the well-developed Hypophysis. If one removes the Hypophysis, one can recognise that the Fossa interpeduncularis ends rostrally at a heart-shaped, large body; it protrudes between the rostral ends of the Crura cerebri and the caudal border of both Tractus optici, which join here. This body's caudal portion, i.e., the CORPUS MAMILLARE, is often externally undivided, slightly rounded and often slightly flattened at its tip. In many individuals, it is pressed so far into the brain's base by the Hypophysis that it does NOT protrude externally, but is rather flattened and continues smoothly into the Tuberculum cinereum¹⁰. In other brains, however, it is quite prominent and vaguely separated into two bilateral parts. The rostral portion (of the above-mentioned body¹¹) is the TUBER CINEREUM. It is almost completely flat and has in its centre, closely caudal to the Chiasma nervorum opticorum, an opening that is surrounded by grey matter; this opening resulted from the removal of the Hypophysis. These are the remnants of the INFUNDIBULUM (*Trichter*), which is relatively large in the horse. In a lateral view of the base of the Diencephalon, after

⁹ unclear

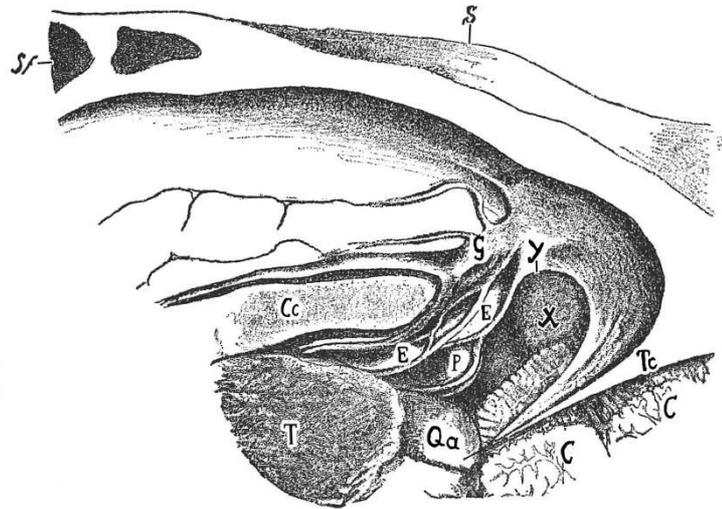
¹⁰ later in the text, Dexler uses the term Tuber cinereum instead of Tuberculum cinereum

¹¹ its caudal portion is the Corpus mamillare

slight dislocation of the Hypophysis, the Infundibulum appears as an 8 mm long tube that narrows rapidly and extends from the caudal border of the Chiasma backwards across the dorsal surface of the Hypophysis; it joins the latter only at the level of the tip of the Corpus mamillare. Here, the floor of the Diencephalon is thinnest, i.e., barely 1 mm thick. The median part of the region caudal to the Corpus mamillare is also formed by a wall of white matter only a few millimetres thick; however, at the lateral sides, this region is substantially reinforced by the Thalamus.

Both TRACTUS OPTICI arise from the Chiasma as rounded strands. However, they become flat as soon as they disappear underneath the Uncus; their fibre bundles, already visible with the naked eye, turn towards the Corpus geniculatum laterale and, to a smaller extent, also towards the Corpus geniculatum mediale.

Fig. 17. Region of the *Epiphysenschlauch* (Recessus suprapinealis) and of the Tentorium cerebelli of a horse of which the skull was cut approximately 1 cm left of the sagittal plane after prior fixation of the brain *in situ*; slightly reduced in size.



C, C Cerebellum; **Cc** Corpus callosum; **E, E** *Epiphysenschlauch* (Recessus suprapinealis) dilated and covered by numerous venous blood vessels; **G** Sinus rectus; **P** Epiphysis; **Qa** *Vorderer Vierhügel* (Colliculus rostralis laminae quadrigeminae); **S** Crista parietalis; **Sf** Sinus frontalis; **T** Fracture area of the left Thalamus opticus; **Tc** Tentorium cerebelli; **V** Rostral pole of the Vermis of the Cerebellum (there is no such label in Dexler's original figure); **x** Site at the medial wall of the occipital part of the brain where, in the horse, adhesions with the contralateral cortex areas occur frequently because the Falx cerebri does not protrude in-between them; the Falx cerebri ends with a curved (caudal) border at the site labelled **y**.

The HYPOPHYSIS is a bean-shaped body of very varying size. The width varies between 1.5 and 2.2 cm, the thickness is between 1 cm and 1.6 cm, and the weight, accordingly, varies between 1.2 g and 3.5 g. Its ventral surface is even, whitish due to the coating of Dura mater, and sometimes bears at its rostral end a small, barely one millimetre high cone of which the tip ends blindly in the Os sphenoidale; it has to be regarded as the remnant of the peduncle of the hypophyseal protuberance according to MINOT. The dorsal surface is spherical, rostrally flattened, caudally blunt and bulgy, and generally is greyish-brown to greyish-red in colour. In its centre, it bears the insertion of the Infundibulum (*Trichter*), which extends in a caudal direction as a 3-4 mm long, whitish protrusion. From here, a greyish-white

band extends towards the caudal border (of the Hypophysis) and widens gradually; it can be traced up to the fusion of the Hypophysis with the Dura mater. This protrusion has an opening; via this opening one can proceed into a small, barely 3 mm wide and 2-5 mm long space containing Liquor cerebrospinalis (*Lymphspalt*¹²), i.e., the RECESSUS HYPOPHYSEOS VENTRICULI TERTII.

In transversal and sagittal sections, both parts (of the Hypophysis) can be distinguished much easier due to their colour. The whitish medullary part forms the seeming continuation of the Infundibulum (*Trichter*); its shape resembles a thick club or a drop. It begins at the Infundibulum and ends (with its thick head) ventro-caudally at the caudal enclosing by the Dura mater. The Dura is the dorsal boundary of the so-called Medullary Part (*Markteil*) of the Hypophysis, to which the dark-coloured Glandular Part (*Drüsenteil*) is attached (bi-)laterally.

The reddish-brown *Drüsenteil* encompasses the *Markteil* from a rostral direction like a plump horseshoe, forming a short arch. In other words: Coming from the dorsal and caudal direction, the drop-shaped *Markteil* sinks into the *Drüsenteil*. A lobed subdivision of the characteristic shape can hardly be deduced in the adult individual. The part that is referred to as the rostral (anterior) lobe – the derivate of the evagination (*Abschnürung*) from the developing mouth (*Mundbucht*) – almost completely encompasses the part originating from the brain.

The THIRD VENTRICLE (*Zwischenhirnkammer*) is a very slim, sagittally oriented space encircling the Massa intermedia in a ring-like manner. Peripherally, it has several openings and diverticula. I distinguish four quadrants, of which the two dorsal ones represent the ventricle's upper level (according to the reviewed authors¹³), the two ventral ones represent the lower level. The dorso-rostral quadrant is located dorsal to the Commissura anterior; it has an opening at its left and right sides (Foramen Monroi), which guide into the (left and right) lateral ventricle. The dorso-caudal quadrant has a large, dorsal pouch, i.e., the aforementioned Recessus suprapinealis (*Epiphysenschlauch*). Closely ventral to its entrance, one can proceed into a small diverticulum, i.e., the Recessus infrapinealis. Both openings, lying above each other, are separated by a thin, transverse band of fibres, which probably represents the COMMISSURA HABENULARUM.

Here, the ventro-caudal quadrant follows; ventral to the Commissura posterior, one can proceed into the ADITUS AD AQUAEDUCTUM. From here, the floor of the ventricle declines obliquely in a rostral direction towards the ventro-rostral quadrant. The latter extends between the Corpus mamillare and the Commissura anterior. It is the largest of them all, and has two ventral diverticula, i.e., the cavity of the INFUNDIBULUM and the RECESSUS OPTICUS. The remnants of the embryonic hypophyseal cavity branch off the cavity of the Infundibulum and form only a small, lentiform recess in the adult animal, i.e., the RECESSUS HYPOPHYSEOS. The RECESSUS

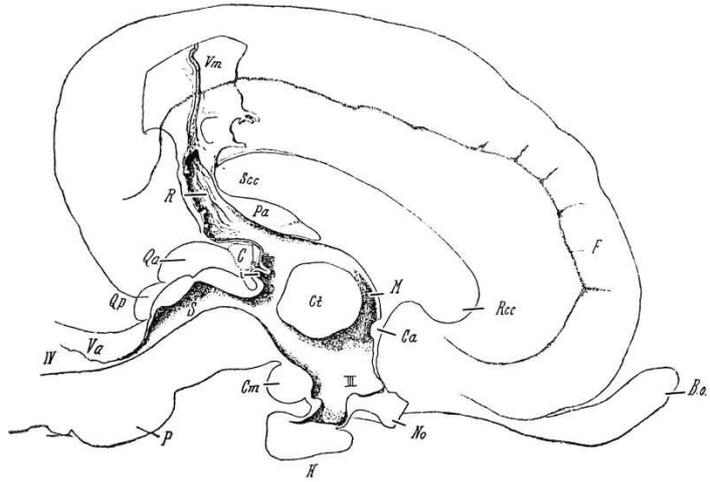
¹² lymph (*Lymph*) meaning Liquor cerebrospinalis

¹³ Dexler mentions authors; however, he does not give their names

OPTICUS lies directly rostral to the cavity of the Infundibulum, at the dorsal surface of the Chiasma nervorum opticorum; the recess ends in two pointed pockets that are located on the junction where the Nervi optici meet the Chiasma. Beginning at the Recessus opticus, the LAMINA TERMINALIS ascends to the Commissura anterior; it is the grey, terminal plate that forms the rostral wall of the ventro-rostral quadrant.

Fig. 18. Brain of an adult horse; fixed inside the cranium, medial view, half the original size.

Bo Bulbus olfactorius; **C** Cornarium; **Ca** Commissura anterior; **Cm** Corpus mamillare; **Ct** *Mittlere Kommissur* (middle commissure); **F** Fissura callosomarginalis; **H** Hypophysis; **M** Foramen Monroi; **No** Chiasma nervorum opticorum; **P** Pons; **Pa** *Balkenwindung* (Gyrus callosus); **Qa**, **Qp** *Vorderer, hinterer Vierhügel* (Colliculus rostralis, caudalis laminae quadrigeminae); **R** Recessus suprapinealis; **Rcc** Genu corporis callosi; **S** Aquaeductus Sylvii; **Scc** Splenium corporis callosi; **Va** Velum medullare anterius; **Vm** Sinus rectus; **III** Ventral region of the Ventriculus tertius; **IV** Ventriculus quartus;



The major part of the cast of the third ventricle is represented by the cast of the Recessus opticus and of the infundibular portion, respectively. In the specimen at my disposal (Fig. 45¹⁴), the former attaches at the rostral part of the cast's ring; it appears as a 1.5 cm long, longitudinally grooved horn that is 6 mm wide at its base. The latter, i.e., the infundibular part, ends in a short tripod-like formation. The rostral, pointed branches represent the contents of the Recessus opticus; the caudal branch, together with its lentiform widening, represents the cavity of the Hypophysis (*Hypophysenhöhle*).

Ventral to the insertion of the cast of the Recessus suprapinealis (*Epiphysenschlauch-Ausguss*), a short wart-shaped projection protrudes in the caudal direction: This is the cast of the Recessus infrapinealis. The rest of the ring-shaped cast is evenly thick and shows a sharp crest at its medial border. A similar crest is found in the periphery of the ventro-caudal quadrant, i.e., in-between the Aditus ad aquaeductum and the Infundibulum. The ring is thickest at the site where the lateral ventricle is connected; its thinnest part is in the ventro-caudal quadrant. Ventral to the connection with the lateral ventricle, the ventro-rostral quadrant shows a short, transverse groove or cleft representing the impression of the Commissura anterior.

¹⁴ on page 12; see footnote 7 on page 5

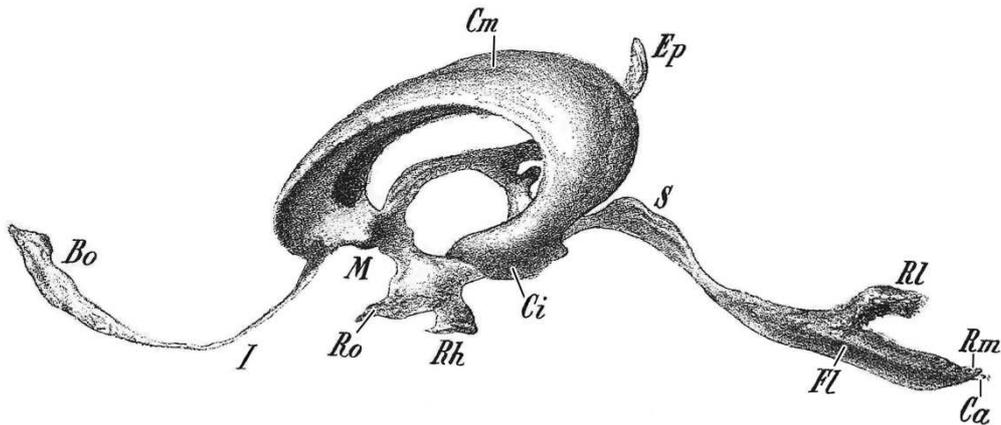


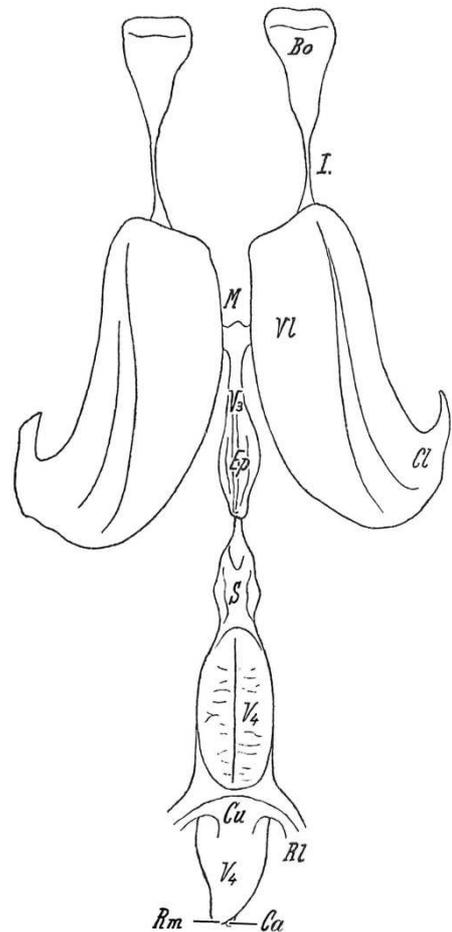
Fig. 45. Metal cast of the cerebral cavities of a 14-year-old horse; the cast was dissected from the fixed organ up to the median plane; natural size.

Bo Cast of the Ventriculus bulbi olfactorii; **Ca** Cast of the Calamus scriptorius of the Ventriculus quartus; **Ci** Cornu temporale (*Ventralhorn*) of the cast of the Ventriculus lateralis; **Cm** Pars centralis of the cast of the Ventriculus lateralis; **Ep** Cast of the Recessus suprapinealis; **Fl** Cast of the Sulcus limitans fossae rhomboidalis; **I** Isthmus to the Cornu anterius of the cast of the left Ventriculus lateralis; **M** Connecting branch to the Ventriculus tertius; Canalis Monroi; **Rh** Cast of the Recessus hypophyseos; **Rl** Connecting branch between the Ventriculus quartus and the lateral recesses; **Rm** Cast of the Recessus medianus; **Ro** Cast of the Recessus opticus; **S** Cast of the Ventriculus mesencephali.

Fig. 46. Drawing of the outlines of a metal cast of the cerebral cavities of a horse; dorsal view, slightly reduced in size.

The casts of the lateral ventricles are slightly bent apart to allow inspection of the third ventricle; normally, they are 3 mm apart, depending on the thickness of the Septum pellucidum.

Bo Ventriculus bulbi olfactorii; **Ca** Calamus scriptorius of the Ventriculus quartus; **Ci** Cornu ventrale of the Ventriculus lateralis; **Cu** The highest elevation of the Ventriculus quartus next to the medullar body of the Cerebellum; **Ep** Recessus suprapinealis; **I** Isthmus to the Cornu anterius of the left Ventriculus lateralis; **M** Connecting branch to the Ventriculus tertius; Canalis Monroi; **Rl** Connecting branch between the Ventriculus quartus and the lateral recess; **Rm** Recessus medianus; **S** Ventriculus mesencephali; **Vl** Cella media; **V3** Ventriculus tertius; **V4** Ventriculus quartus; its cast shows a median groove and shallow transverse grooves caused by the lobules of the Vermis.



MEASUREMENTS:

Length of the Diencephalon, between the frontal plane of the Corpus geniculatum mediale and the Commissura anterior	3.5 cm
Greatest width, between right and left Corpus geniculatum laterale	5 cm
Greatest height, between Corpus geniculatum laterale and region of the Infundibulum	3.5 cm
At the dorsal, triangular area of the Thalamus opticus:	
Length of the transverse leg	2.4 cm
Length of the longitudinal leg	2.7 cm
Hypotenuse	3.5 cm
Width of the Epiphysis	0.7 cm
Length of the Epiphysis	1 cm
Width of the Stria medullaris	3 mm
Length of the Tuberculum anterius	1 cm
Width of the Tuberculum anterius	0.7 cm
Length of the Tuberculum laterale	1.4 cm
Width of the Tuberculum laterale	0.7 cm
Length of the Ganglion habenulae	0.6 cm
Thickness of the Ganglion habenulae	0.4 cm
Height of the Corpus geniculatum mediale	1 cm
Width of the Corpus geniculatum mediale	0.6 cm
Width of the Tractus opticus	
rostral to the Sulcus lateralis mesencephali	0.8 cm
caudal to the Chiasma	0.5 cm
Diameter of the Massa intermedia	0.5 cm
Width of the Tuber cinereum	1.5 cm
Length of the Tuber cinereum	1.8 cm
Width of the Infundibulum	0.8 cm
Length of the Infundibulum, up to its insertion at the Hypophysis	0.6 cm
Width of the Corpus mamillare	1 cm
Width of the Chiasma opticum	1.2 cm
Length of the Chiasma opticum	0.8 cm
Thickness of the Chiasma opticum	0.4 cm

----- End of Part III -----

To be continued: Part IV (pages 333-347 of the original article)

APPENDIX 1

Literature from Dexler's List of References:

In this part of Dexler's original article, no particular reference is made to one of the authors that are specified in Dexler's reference list at the end of his article (see Part V of the English translation¹⁵).

Only one author, i.e., MINOT, is mentioned in this part of the article; however, no bibliographical data concerning this author are presented in the mentioned reference list.

APPENDIX 2

List of References Cited by the Authors of this Translation:

LANG, A., F. SHERWOOD-BROCK and H. Gasse (2018a):
Hermann Dexler's "Beiträge zur Kenntnis des feineren Baues des Zentralnervensystems der Ungulaten." An annotated English translation of the original German article. Part I: General remarks.
University of Veterinary Medicine Hannover.
https://doi.org/10.15487/TiHo.2_2018.1/1

LANG, A., F. SHERWOOD-BROCK and H. Gasse (2018b):
Hermann Dexler's "Beiträge zur Kenntnis des feineren Baues des Zentralnervensystems der Ungulaten." An annotated English translation of the original German article. Part II: Rhombencephalon.
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https://doi.org/10.15487/TiHo.2_2018.1/2

LANG, A., F. SHERWOOD-BROCK and H. Gasse (2018c):
Hermann Dexler's "Beiträge zur Kenntnis des feineren Baues des Zentralnervensystems der Ungulaten." An annotated English translation of the original German article. Part V: Telencephalon – adult stages.
University of Veterinary Medicine Hannover.
https://doi.org/10.15487/TiHo.4_2018.1/5

¹⁵ see Lang et al. (2018c)