to consider the organon vomeronasale as a special senseorgan of which the function is unknown, while the duality seen in the central tracts belonging to the rhinencephalon finds its source in the anatomical independence between the system of the olfactory nerves and the system of nerves belonging to the organon vomeronasale.

My thanks to Prof. J. W. LANGELAAN under whose direction these researches were made.

Anatomy. — *"Note on the Innervation of the Trunkmyotome".* By J. W. VAN BISSELICK. (From the Anatomical Institute at Leiden). (Communicated by Prof. T. PLACE).

These researches form a sequel to professor LANGELAAN's first communication "On the Form of the Trunkmyotome" [1]), and were performed under his direction in the anatomical institute at Leiden.

The aim of this research was to know if one single spinal nerve innervates only one single myotome.

The method followed, existed in dissecting a spinal nerve and to see if the different territories to which the nervestrands can be followed, belonged to one and the same myotome. To this purpose an Acanthias or a Mustelus was cut through along the mid-sagittal plane and treated with a one tenth percent solution of osmic acid. The nerves stained black and were easy to follow with the naked eye or with a magnifier.

As a first result it was found, that all nerves passed through the connective tissue laying between the myotomes; therefore a minute dissection of this tissue was necessary.

The myotome itself is covered by a very thin layer of a fibrous tissue which constitutes a perimysium. This perimysium extends between the muscular fibres of the myotome forming an endomysium. It affords a continuous investment for every muscular fibre and forms in this way a frame for the muscular tissue. Where this muscular tissue is broken off the framework is continuous and enables us to recognize parts of the myotome belonging together. The myotomes covered by their perimysium are separated by a coarser and denser fibrous tissue. This intermyotomal tissue forms lamellae which have only a very loose connection with the perimysium, so that it is possible to dissect these lamellae as discrete formations. These intermyotomal septa pass over in the fibrous tissue of the skin and form a continuous formation with the latter. Where the myotome

[1]) Proc. K. Akad. W. Amsterdam 28 May 1904.

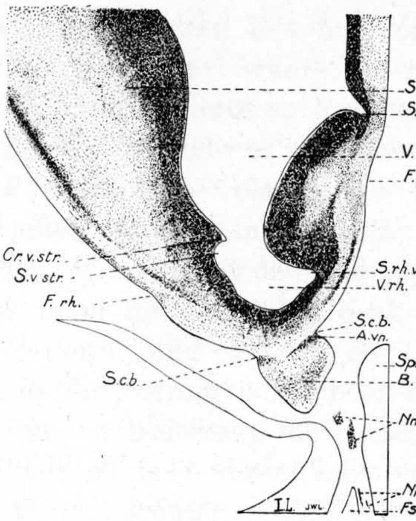

Fig. 1.

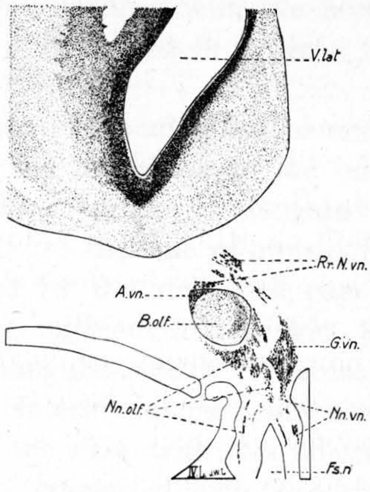

Fig. 4.

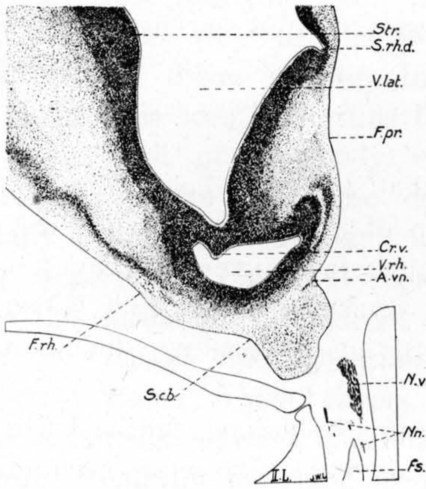

Fig. 2.

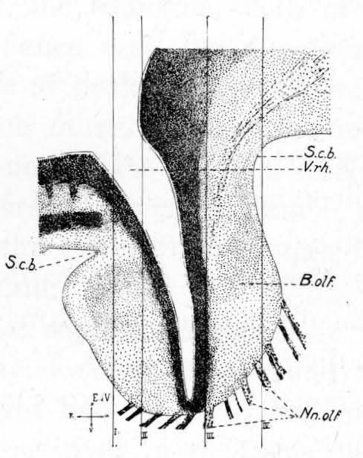

Fig. 5.

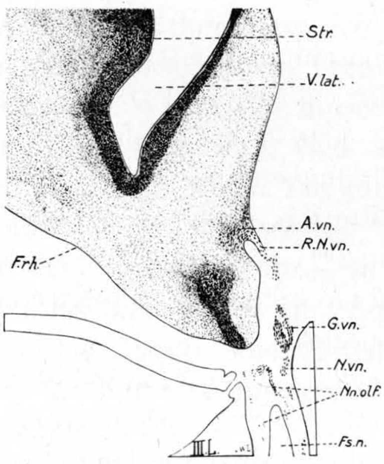

Fig. 3.

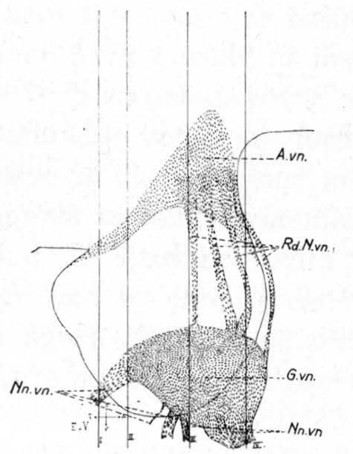

Fig. 6.

has a simple form, this line of insertion coincides with the border of the myotome; where the myotome is elongated in a peak, this line of insertion crosses this peak.

Figure I reproduces the external surface of the myotome extended in a plane. The black line indicates the transition of the intermyotomal septum in the skin; where the myotome is elongated in a peak, it has distended the septum, because the line of transition is fixed upon the skin. The peak is covered by this distended part of the septum, and as far as the peak is adjacent to the skin, this part of the corium is doubled by this triangular sheath. Whereas on the line of transition the passage of the intermyotomal septum into the corium is a direct one, this is not the case with this adjacent part of the septum, which is only loosely connected with the corium by means of some fibres of connective tissue. This makes it possible to dissect these triangular slips from the corium.

In the same way as the myotomes, the triangular slips of the intermyotomal tissue overlap. In concordance with the direction of the peaks it is seen, that slips belonging to peaks directed towards the caudal end of the body cover each other, so, that the more caudal slip covers the more cranial one. If the peak is directed cranially the mode of overlapping is reversed, the more cranial slip being uppermost. Figure II reproduces the intermyotomal tissue as far as this formation is adjacent to the skin.

On the mesial side the intermyotomal septum goes over in the connective tissue which covers the axial skeleton and beyond this forms a lamella between the left and right half of the dorsal musculature. Ventrally the same formation goes over in the fascia transversa covering the abdominal cavity.

Figure III gives the line of passage of the intermyotomal septum. As can be seen there are two places where the muscular tissue is broken off, the myotome becoming thinner from outside to inside. The lamellae, where the muscular tissue is interrupted, cover each other and in this way two strong continuous septa are formed. The distance over which the muscular tissue is discontinuous in the neighbourhood of the sagittal plane amounts to four myotomes in the first septum and to three in the second. In agreement with this, the lamellae are built up resp. by four and by three sheaths of intermyotomal tissue. The dotted fields in figure III belong therefore together, forming one myotome, as can easily be verified by dissecting the myotome.

Each spinal nerve springs from the cord with two roots, which separately leave the spinal canal through two foramina (*AR* and

PR fig. IV). When they have quitted the canal each root separates into two filaments, one of these filaments is ascending (Asc. f.) and one is descending (Desc. f. fig. VI). Both ascending root filaments unite to form a nerve, the internal branch of the posterior division (fig. VI), the filaments of which pass over in the intermyotomal septum at the places indicated by 3 *D*—5 *D* fig. IV, and leave the septum to go over in the skin at the places indicated in the same way in fig. V. Before these filaments go over into the corium they each give off a small twig innervating the distended part of the intermyotomal septum, which is adjacent to the skin.

Before the two ascending rootfilaments join, they each give off a small branch, which also unite to form a small nerve, the first external branch of the posterior divisions (fig. VI) entering the septum at 2*D* fig. IV and leaving the septum to pass over in the skin at the corresponding place of fig. V.

Both descending rootfilaments before joining each give off a small branch, which form together a small nerve, the second external branch of the posterior division (fig. VI), which enters and leaves the intermyotomal septum at the places indicated by 1*D* in fig. IV and V.

The nerves described, all together, innervate the dorsal part of the myotome and the intermyotomal septum, and form the posterior primary division of the spinal nerve.

The descending rootfilaments also unite to form a nerve which pretty soon divides into two branches, one of these innervating the lateral part of the myotome and the intermyotomal septum; the other is, the continuation of the maintrunk, crosses the lateral part of the myotome and innervates the ventral part of the myotome and the intermyotomal septum. The branch innervating the lateral part of the myotome divides into two branches, an external and internal branch of the lateral division (fig. VI). The external branch splits up into two filaments one of which is recurrent (recurrent br. fig, VI) and innervates the top of the lateral part of the myotome. The external branch enters the septum at *L* 1. 2. fig. IV and leaves the septum at 1*L*, 2 *L* fig. V. The internal branch gives off several branches passing over in the skin at 3 *L*—6 *L* fig. V.

The branch innervating the ventral part of the myotome and the intermyotomal septum shows the same arrangement as the branch for the lateral part of the myotome. It divides into two branches one being the external branch of the anterior division, the other the internal branch (fig. VI). The external branch passes over in the septum at V 1. 2. fig. IV, splits up into two smaller branches of

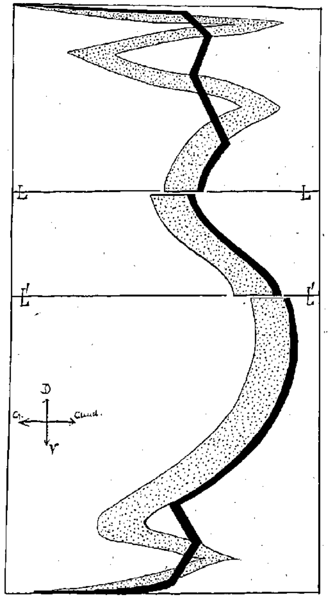

Fig. I. External surface of the myotome extended in a plane.
The blackline indicates the transition of the intermyotomal septum in the skin. Nat. Size.

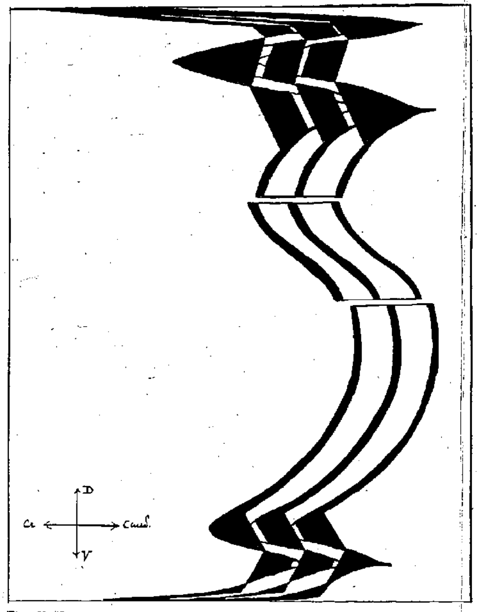

Fig. II. Form of the intermyotomal tissue adjacent to the corium. Nat. size.

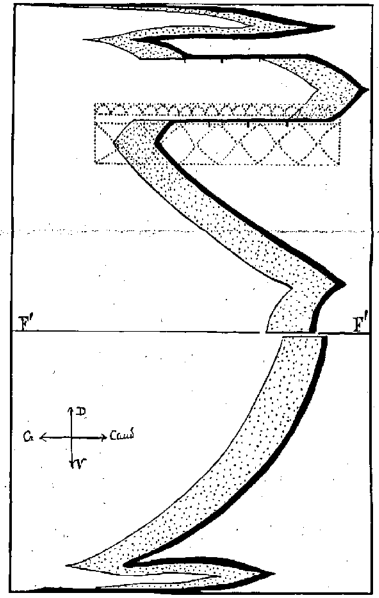

Fig. III. Mesial surface of the myotome, with the line of transition of the intermyotomal septum. Nat. Size.

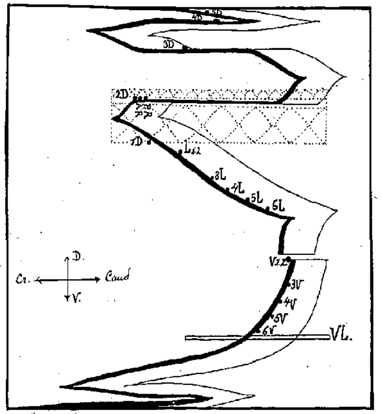

Fig. IV. Mesial surface of the myotome, projected on a sagittal plane, with the places where the nervebranches enter the intermyotomal septum. Nat. size.

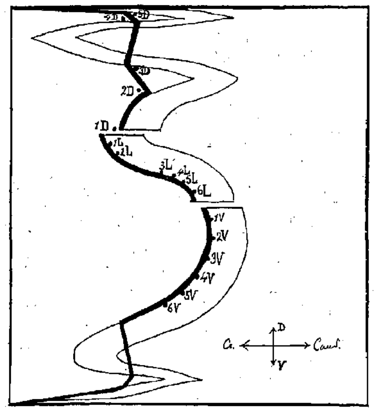

Fig. V. External surface of the myotome, with the places where the nervefilaments leave the septum. Nat. size.

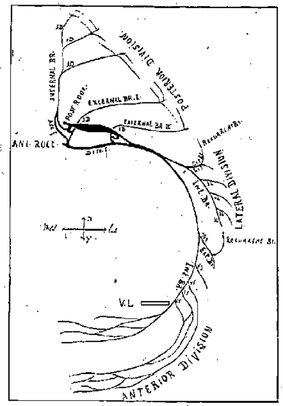

Fig. VI. Spinal nerve of Acanthias with omission of the rami sympathici. Nat. size.

which one is recurrent (recurrent br. fig. VI) and leaves the septum to go over into the skin at 1 *V* and 2 *V*. fig. V.

The internal branch can be followed up to the vena lateralis (*VL* fig. IV) and then goes over in a loose plexus. On its way to the vena lateralis the internal branch gives off several filaments, which reach the skin through the intermyotomal septum 3 *V*—6 *V* fig. IV and V. Before passing over into the skin these filaments form a loose plexus covering the most ventral part of the myotome.

The roots and mainbranches of the spinal nerve have a submyotomal position and are not bound in their course by the form of the myotome; these branches on the contrary, which go over into the septum to reach the skin, are in their course fixed by the form of the myotome. The final course of the branches in the corium was not traced out with enough accuracy to give results here.

The descriptions given in this note only apply to that region of the trunk which is situated between the thoracic and first dorsal fin.

Conclusions:

I. One single spinal nerve only innervates one single myotome and the intermyotomal tissue through which the nerves pass.

II. The roots and mainbranches of the spinal nerve have a submyotomal position; the branches never perforate a myotome, but run always in the intermyotomal septum to the skin. In general they are to be found between the perimysium and the intermyotomal septum.

III. The spinal nerve shows a primary division into three parts, a posterior, lateral and anterior division in agreement with the differentation of the myotome in a dorsal, lateral and ventral part.

IV. All larger branches are mixed nerves containing elements of the anterior and posterior roots.

Mathematics. — *"On linear systems of algebraic plane curves".* By Prof. JAN DE VRIES.

§ 1. The points of contact of the tangents out of a point O to the curves c^n of a pencil lie on a curve t^{2n-1} which I shall call the *tangential curve* of O. It is a special case of a curve indicated by CREMONA [1]). By EMIL WEYR [2]), GUCCIA [3]) and W. BOUWMAN [4]) it has been applied when proving the properties of pencils and nets.

[1]) CREMONA—CURTZE, Einleitung in eine geometrische Theorie der ebenen Curven (1865) p. 119.

[2]) Sitzungsberichte der Akademie in Wien, LXI, 82.

[3]) Rendiconti del Circolo matematico di Palermo (1895), IX, 1.

[4]) Nieuw Archief voor Wiskunde (1900), IV, 258.