

des Hydrotropismus, oder eigentümliche, bei gleichmäßiger Abkühlung der Plasmodien eintretende, einer Deutung schwer zugängliche Erscheinungen, bezüglich welcher auf die Originalarbeit verwiesen werden muss. Bei diesem Anlass spricht Stahl die Vermutung aus, dass geotropische Eigenschaften bei den einfacheren, nicht festgewachsenen Organismen überhaupt fehlen dürften, und teilt zur Rechtfertigung dieser Anschauung die vollständig negativen Ergebnisse einiger hierauf bezüglicher Versuche mit Euglenen und Oscillarien mit.

In den Schlussbetrachtungen weist der Verfasser darauf hin, dass die nächste Ursache der beschriebenen Gestaltveränderungen der Plasmodien in der schon von de Bary angenommenen wechselnden Ausdehnung und Zusammenziehung bestimmter Stellen des peripherischen Plasmas zu suchen sei. Warum nun aber in einem bestimmten Falle das eine oder das andere der Fall ist, und weshalb die nämlichen äußeren Faktoren auf verschiedene Entwicklungszustände der Plasmodien entgegengesetzt wirken, das entzieht sich gegenwärtig noch einer wahrhaft wissenschaftlichen Erklärung. — Schließlich wird die biologische Bedeutung der geschilderten Erscheinungen kurz beleuchtet und gezeigt, wie die Plasmodien als zarte, eines jeglichen äußeren Schutzes entbehrende Organismen dennoch vermöge ihrer feinen Reaktionsfähigkeit auf äußere Einflüsse „ihre so leicht gefährdete Existenz zu fristen vermögen“.

K. Wilhelm (Wien).

On the structure and development of the nasal rays in *Condylura cristata*¹⁾.

by H. Ayers in Freiburg i. B.

The structure and development of the rays encircling the end of the snout in *Condylura* have not, so far as I am informed, been described. However, in the related genus *Talpa*, Eimer²⁾ has studied the structure of the snout of the common European mole and considers it to be a highly developed tactile organ on account of the characteristic nerve endings found in the numerous rounded papillae covering

1) Gegen unsern sonstigen Gebrauch und nur auf ganz besondern Wunsch des Herrn Verfassers haben wir diese Arbeit in englischer Sprache zum Abdruck gebracht und bemerken ausdrücklich, dass wir auch in Zukunft alle in fremden Sprachen geschriebenen Artikel ins Deutsche übersetzen lassen werden, wenn dem nicht eben ganz besondere Wünsche der Verfasser entgegenstehen.

Die Redaktion des Biol. Centralblatts.

2) Eimer, Die Schnauze des Maulwurfs als Tastwerkzeug. Arch. für mikr. Anatomie. Bd. VII. 1871. S. 181–191 Taf. XVII.

the surface of the end of the nose. This flexible snout is sharply marked off from the rest of the nose by the entire lack of hair and hair follicles.

In *Condylura* the snout is much longer than in *Talpa* and carries at its distal end a varying number of finger-shaped processes which bound a cup-shaped or flat terminal disc (Fig. 2) perforated on either side of its center by the oval nostrils (*c. n.*).

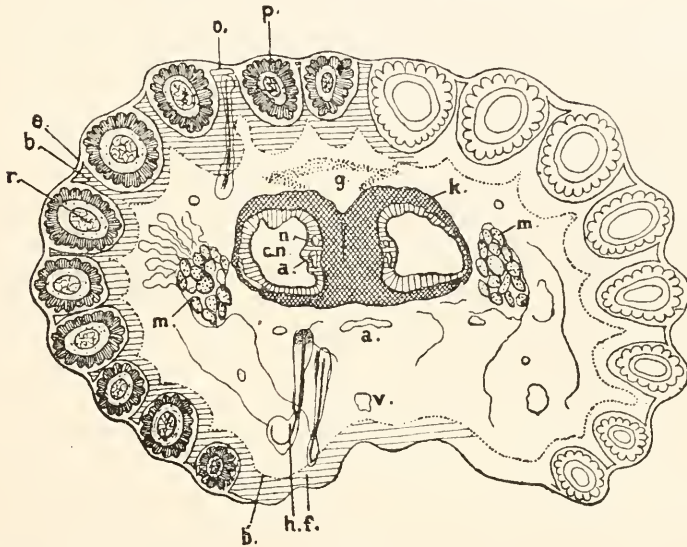


Fig. 1.

Instead of a general distribution of the tactile papillae over the surface of the snout itself, such as occurs in *Talpa*, one finds them confined, for the most part, to the flexible finger-shaped processes (Fig. 2). The papillae, which are plainly visible to the unaided eye, appear, under a low magnifying power, as uniformly rounded prominences disposed in more or less regular rows, extending in the direction of the long axis of the ray.

It is evident from the anatomical relationships of the two animals that *Condylura* is only a highly modified form of *Talpa*. The lengthened tail, the elongated snout with its remarkable tactile organs, together with the extended skull and the increased number of teeth are conditions indicating greater specialization; but still easily derivable from the more primitive talpine form. It is quite apparent that the increase in the extent of the tactile surface and its more definite localization in the case of *Condylura* are only expressions of the existence of a higher functional activity than is possessed by the homologous tract in *Talpa*.

It would be interesting to know more of the habits of *Condylura* in order to learn in what respects they differ from those of *Talpa*,

and by this means to ascertain the immediate causes of this remarkable sensorial adaptation. Since *Talpa* may be considered the more primitive form of the two, it becomes a matter of considerable interest to trace the development of these finger-shaped processes in *Condylura*. One would naturally expect that in their first stages of development, they would simply resemble the rounded elevations of the papillated tactile surface of the snout of such a form as *Talpa europea*; the parts of the snout most frequently brought in contact with foreign bodies ultimately developing the papillae to a far greater extent than the remaining portions of the surface.

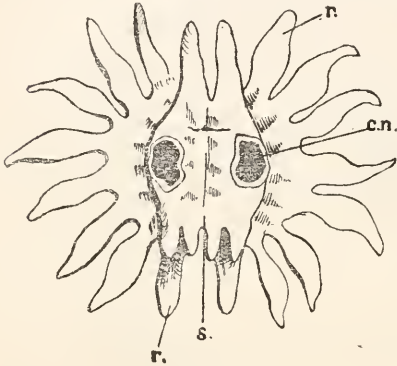


Fig. 2.

By a gradual elongation of such elevations, to be accounted for on the principle of adaptation to environment, they would acquire the finger-like form present in *Condylura*. Their arrangement on the edge of a subreniform disc receives its explanation in the fact that the nerve endings are in this manner placed in a position most advantageous for the exercise of their special function.

When we trace the development of the snout in *Condylura* we find that the assumed method of growth is very nearly an expression of what actually takes place. In the course of the development there arises an interesting complication of the simpler process, the evident meaning of which is the shortening, in point of time of the growth of the papillae, i. e. it is an economic adaptation. This modification I shall now describe.

At birth the Star-nosed Mole is nearly destitute of visible hair and the tactile bristles of the facial region have not made their appearance at the surface. The snout of the young *Condylura* lacks all the distinctive characteristics of that of the adult, and the entire body resembles that of *Talpa* much more than it does its parent. On a close examination of the distal end of the snout of such a newborn animal (Fig. 1) one can distinguish a tract of skin which covers four fifths of the circumference of the organ (the part not specially marked off is the median ventral fifth). This dermal tract extends

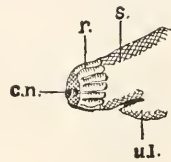


Fig. 3.

for three millimetres toward the base of the snout and is marked off from the remaining surface by a series of furrows running parallel to the long axis of the body. A series of parallel ridges is thus formed, each ridge being bounded on either side by a furrow. At their anterior and posterior ends these ridges pass gradually into the neighbouring smooth surface. By a gradual ingrowth of the bottoms of the furrows each groove is deepened and each ridge suffers a correspondingly increased definition of form, while at the same time the posterior end of each groove grows toward its neighbour on either side. When the grooves have all united, there is formed by their union a common groove which nearly encircles the snout and separates the tactile from the remaining surface of that organ.

Commencing at the posterior margin of the tactile surface and advancing toward the tip of the snout, the grooves deepen and grow toward each other in their bottom portions until they finally coalesce underneath the ridges. The result of this process is the production of free, finger-shaped processes composed exclusively of ectoderm, attached to the anterior end of the snout in the manner already described for the adult.

These processes of the ectoderm become the tactile rays of the adult. The nasal area from which the tentacular processes are formed, is not thereby denuded of skin, but remains covered by that portion of the primary surface which formed the bottoms of the grooves and which has so increased in extent, that at this stage the surface is entirely and uniformly covered by ectoderm. No traces are left either on the surface or in the corium of the extensive excision which have taken place.

The principal details of the process are readily seen on examining a section of the snout, such as is represented in Fig. 3. In this figure I have drawn, with the aid of camera-outlines and with diagrammatic shading, a transverse section of that part of the nose of a young *Condylura* indicated by the line *r*, Fig. 1. — The following is a short account of the most important histological details of the process. The entire circumference of the section is bounded by a thin layer of epidermal cells *e*, beneath which all the formative processes take place. In the stage of development represented in Fig. 3, this layer only loosely covers the snout in the region of the papillae, and later is entirely cast off; but it remains in intimate connection with the remaining surface and functions as the true epidermal layer, as at *f*. The letters *o. p.* designate respectively the epidermis of the tentaculiferous area and that of the sense rays. The rays are imbedded in a layer of fibrous tissue which however does not entirely cover the outer surface of the ray.

Sections of the ray present a crenate margin owing to their passage through the numerous tactile papillae which cover the surface

of the ray; there are three sharply marked concentric layers of tissue to be observed in each: an outer, cornified layer of the epidermis, the deeper Malpighian layer and a central rod of connective tissue within which the nerves and bloodvessels are imbedded.

There are no traces of hair follicles, sebaceous or sweat glands to be seen on the tentacles, but they occur in the proximal half of the tentaculiferous area, and only make their appearance on the surface of the snout after the tentacles have assumed their erect condition. At *i.*, and *h.*, are seen the hair follicles with the young hairs. The corium is an extensive layer filling all the space between the epidermis and the nasal cartilage. The small muscles of this part of the face appear to be entirely imbedded within this layer.

Explanation of Figures.

Fig. 1. The snout of a newborn *Condylura*, slightly enlarged seen obliquely from the left side.

Fig. 2. Front view of the snout of a full grown animal, natural size, copied from Schintz. *r. r.* tactile rays. *s.* The smooth surface of the snout. *c. n.* nostrils.

Fig. 3. Transverse section of the snout represented in Fig. 1 the plane of the section passing through the region indicated by the line. *a. a.* = arteries. *b.* = ridge-like remnants of the primitive ectoderm seen in section. *b.* boundary line between Rete Malpighii and Corium. *c. n.* = nostrils. *e.* = cornified layer of the epidermis. *g.* = cartilaginous tissue. *h.* = hair follicle and accessory gland. *k.* = nasal cartilage. *m.* = nasal muscles. *n.* = nerve supplying the mucous membrane of the nose. *o.* = the future outer surface of the snout. *p.* = papilla. *r.* = tactile ray; the line points to the central connective tissue *con*, through which the bloodvessels and nerves pass. *v.* = vein.

Vorläufige Bemerkungen über die Eizelle.

Von **Dr. von Wielowiejski** in Lemberg.¹⁾

Die interessanten Beobachtungen und Reflexionen, die in der letzten Zeit besonders auf die Reproduktionselemente höherer Tiere die Aufmerksamkeit der Biologen richteten, und die auffallenden Entdeckungen, die im Gebiete der feinsten Molekularstrukturen lebender Gebilde von hervorragenden Mikroskopikern gemacht wurden, haben mich veranlasst, bei der Gelegenheit anderweitiger Untersuchungen auch die Frage vom Baue und chemischer Reaktion der Eizelle zu berühren.

Hauptsächlich ist es der Kern des Eies, das von altersher als „Keimbläschen“ genannte, jetzt mit jedem Zellkerne des tierischen

1) Mit Genehmigung des Herrn Verfassers erlauben wir uns hier zu bemerken, dass derselbe vor dem Niederschreiben dieser Arbeit keine Gelegenheit gehabt hat, die vortreffliche, kürzlich erschienene Arbeit von Beneden's zu lesen: *Recherches sur la maturation de l'oeuf, la fécondation et la division cellulaire.* Paris 1883.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Biologisches Zentralblatt](#)

Jahr/Year: 1884-1885

Band/Volume: [4](#)

Autor(en)/Author(s): Ayers Howard

Artikel/Article: [On the structure and development of the nasal rays in *Condylura cristata*. 356-360](#)