tenden Unregelmäßigkeiten fallen weit außerhalb der normalen Schwankungsbreite. Es wurde 10 verschiedenen *Zilla*individuen 36mal Pervitin gegeben. Dabei wurde 32mal der charakteristische Effekt beobachtet. Zum Vergleich dienten die Normalnetze derselben Tiere vor und nach den Versuchen.

Gestört sind: 1. die Regelmäßigkeit der von der Peripherie nach dem Zentrum hin fortschreitenden Fadenabstände, 2. die Regelmäßigkeit ihres Kurvenverlaufes und 3. finden sich zahlreiche Verklebungen. Die beigefügten Abbildungen zeigen eindrucksvoll die Unterschiede.

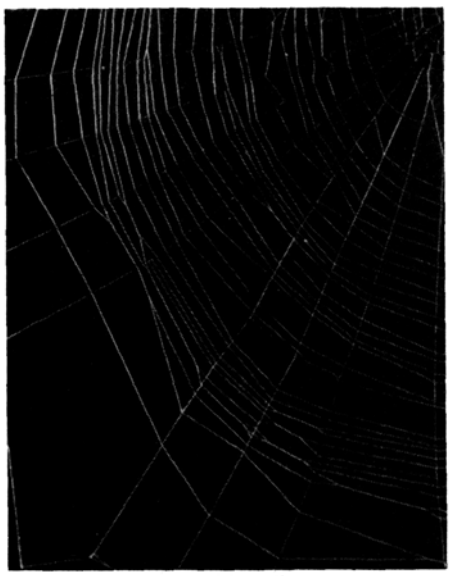

Abb. 2. Ausschnitt aus einem Netz des gleichen Tieres nach Verabreichung eines Tropfens wäßriger Pervitinlösung 1:100 (ca. 0,075 mg), etwa 6 Stunden vor dem Netzbau.

Die Beobachtung während des Netzbaues deutet darauf hin, daß die Störung nicht sosehr in einer Beeinträchtigung der Motorik als vielmehr im Sensorischen zu suchen ist. Die Klebfäden werden von außen nach innen in Rundgängen gezogen. Dabei bestimmt die Spinne vor der Anheftung von neuen Fäden die Abstände durch Tasten mit einem Bein nach dem jeweils letzten Umgang. Nach Pervitin scheint die Kontrolle an den bereits hergestellten Fäden stark herabgemindert. Wieweit überhaupt noch Tastreize in die Motorik der Spinne eingreifen, versuchen wir mit Hilfe der Filmanalyse zu klären.

H. M. PETERS und P. N. WITT

Zoologisches Institut und Pharmakologisches Institut der Universität Tübingen, den 26. November 1948.

Summary

The cobweb of geometrical spiders enables us to examine the effect of substances on instinct movements of animals. It seems possible to separate the different fundamental functions co-operating in the production of the cobweb by experiment. The effect of Pervitin, mentioned in this report, is characterized by a considerable disturbance of the regular arrangement of the concentric sticky threads.

Schallreaktionen bei Nachtfaltern

An zahlreichen Vertretern der Noctuiden und Geometriden sind eindeutige Schallreaktionen zu beobachten, wenn sie von Schallwellen des Frequenzbereiches von etwa 10000 bis 200000 Hz getroffen werden. Die niedrigste Schwelle scheint bei etwa 40000–80000 Hz zu liegen. Die Reaktionen selbst sind sofortige Fluchtbewegungen oder Totstellreflexe und äußern sich verschieden, je nachdem, in welchem Zustand sich das Tier befindet, wie schon EGGERS beobachten konnte. Im Fliegen führen die Tiere entweder eine sofortige seitliche Ausweichbewegung unter Beschleunigung des Fluges aus oder sie stoppen den Flug sofort ab, lassen sich fallen und verkriechen sich. Das kriechende Tier fliegt entweder sofort auf oder stoppt momentan jede Bewegung ab und duckt sich. Das sitzende Tier läuft entweder fort oder unterbricht die vor einem etwaigen Abflug erfolgenden zitternden «Anheizbewegungen» der Flügel. Im Schlafzustand sind die Tiere auch durch größte Schallintensitäten nicht zu wecken; trifft sie der Schall dagegen vor dem Einschlafen, so erfolgt ruckweises Zurücklegen der Flügel und der Fühler bis zur völligen Schlafstellung. Die Schallreaktionen müssen als Ausdruck eines echten Hörens angesehen werden, denn erstens bleiben sie nach Durchstechung der Trommelfelle aus und zweitens kommen sie an dekapitierten Tieren nicht zustande – die Reize werden also nicht reflektorisch beantwortet, sondern müssen erst zentral verarbeitet worden sein. Da die Frequenzen mit der niedrigsten Reizschwelle in demselben Gebiet liegen wie die von Fledermäusen erzeugten Orientierungstöne (GRIFFIN, DIJKGRAAF), ist anzunehmen, daß die Nachtfalter mit ihren Tympanalorganen in erster Linie Fledermäuse hören und dadurch eine relative Schutzmöglichkeit gegen diese ihre Hauptfeinde besitzen. Daß die Tympanalorgane zur Erkennung von Artgenossen dienen, ist unwahrscheinlich, weil durch die Schallreize nur Flucht- oder Totstellreflexe ausgelöst werden.

F. SCHALLER und C. TIMM

Zoologisches Institut und Physiologisches Institut der Universität Mainz, den 11. November 1948.

Summary

Numerous Noctuides and Geometrides show quite mistakable reactions upon sound stimulations ranging from 10,000 to 20,0000 vib/sec (Hertz). The lowest limit range of perception seems to lie at 40,000 up to 80,000 vib/sec. The reactions of sitting or walking animals are instant movements of flight or catalepsy. Flying animals try evasion or stop their flight at once. Sleeping animals can not be roused by sound stimulation. There are no sound reactions if both tympani are pierced. The Noctuides and Geometrides seem to perceive the supersonic echolocation cries of bats by aid of their tympanal organs.

Preliminary Data on the Function of the Paraphysis cerebri in Urodela[1,2]

The paraphysis develops as a racemose tubular structure from the roof of the telencephalon and is

[1] An extensive bibliography concerning the paraphysis in Urodela will appear in a later paper.

[2] Aided by a grant from the Netherlands Organization for purely scientific Research.

intimately surrounded by venous sinusoids. It opens into the ventriculus impar telencephali, i. e. the anterior part of the 3rd ventricle. The exact function of the organ has never been known, although some theories are brought forward. These may be summarized as follows:—

(1) The paraphysis is to compare with the choroidal plexuses. This theory is hold by most of former authors. Some of these, however, did note some differences between the epithelium of the paraphyseal tubules and that of the plexuses. But mostly the function of the plexus and herewith that of the paraphysis is not analysed at all.

(2) The paraphysis is a rudimental or still functioning sense organ. Following SELENKA[1] to whom we owe the name "paraphysis" it should be probably a rudimentary auditory organ, following FRANCOTTE[2] a rudimentary eye. KRABBE[3] thinks that it may be a receptive organ for pressure or for sound.

(3) The paraphysis is some highly vascularized gland not immediately related to the plexus. This theory grounds in the morphologic appearance only.

Till now real secretion of the paraphyseal epithelium has never been demonstrated. SCHARRER[4] described meningocytes especially in the rostral part and dorsally to the paraphysis. These destroy erythrocytes owing to phagocytotic properties. This, however, may occur everywhere when histiocytes are present and has nothing to do with the function of the characteristic epithelium of the paraphyseal tubules itself.

It appears that there exist some clear cytological differences between the epithelium of the paraphyseal tubules and that of the choroid plexuses which will be summarized at the end of this paper. At first we will describe now the method and the results of an experiment for testing the function of the organ.

We injected a 5% suspension of Indian ink in physiologic Ringer's solution in the anterior part of the 4th ventricle of the cerebrum of *Triturus taen.* but especially of *Amblystoma mexicanum.* This was done after narcotizing the animals with MS 222, a very useful product of the Sandoz laboratories. In small specimens use was made of a binocular microscope, in larger ones of the naked eye. The oldest specimen of *Amblystoma* injected was 8·5 cm in total lenght and had five well-developed toes at the hind legs. The youngest specimens had only "anlagen" of the hind legs. The sections of the heads of 15 animals treated in this way were examined. In all operations the head was illuminated from below by a small lamp of 12 V and 0·8 A the light of which was concentrated by a lens magnifying 12 times. Only a very small quantity of the ink suspension was injected. In particularly favorable conditions it was possible to see a dark cloud spreading in the ventricular system. The animals were decapitated after intervals ranging from 3 minutes to 48 hours after the operation and the heads were fixed in 10% formol. Following the normal procedure including decalcification in 10% nitric acid of 50% they were embedded in paraffin and sections were cut at 10 μ. These were mostly stained with carmalum of Mayer. This stain forms a much better contrast to the black corpuscles of the Indian ink than hæmatoxylin-eosin does. In all specimens injected the result was the same. It was clearly visible how the black particulated matter adhered to the ependymal lining of the ventricles and to the epithelium of the choroid plexuses. It was spread in a more continuous layer on the former if enough ink was injected and held more in clusters by the latter. These clusters of black granules were amassed especially at those epithelial cells of the plexuses which had bundles of cilia. Probably these cilia function as catchers of corpora aliena in the cerebro-spinal fluid. The second result was that in all specimens no black granules were to be found at all in the paraphyseal tubules, although in all cases but one the orificium of the paraphysis was widely opened so that a communication between the 3rd ventricle and the paraphyseal tubules was well warranted. In theory the possibility exists that during the injection the orificium was closed so that the stream of ink could not enter the paraphysis. This, however, is not very probable since we never saw a closed orificium in non-operated specimens of these stages. Thus we think that the conclusion is justified that the direction of flow of the fluid in the paraphysis is in the direction of the 3rd ventricle naturally preventing the particulated matter in the ventricle from entering the paraphyseal tubules.

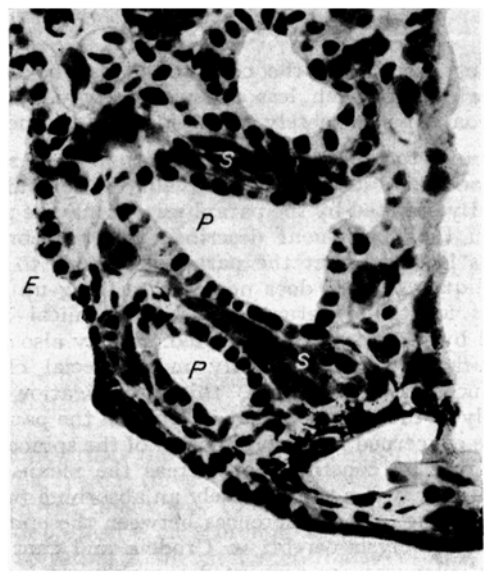

Fig. 1. – Sagittal section through part of *Amblystoma paraphysis.* *P* Tubules with epithelium in secreting phase, *S* Venous sinusoids partly filled by blood cells, *E* Ependymal cells at caudal border of paraphysis showing adhered black particulated matter.

Moreover the tubular epithelium was not of normal appearance. A number of epithelial cells showed vacuoles and had lost quite a quantity of cytoplasm and even parts of the nuclear substance or even the whole nucleus (Fig. 1). Some nuclei were in decay and here and there little nuclei or their parts were seen near the basement membrane. All evidence points in the direction of a very intense secreting activity of the paraphyseal epithelium. This is in part a merocrine secretion, in part, however, even a holocrine secretion after which a restoration may take place. Examining specimens sacrificed after longer intervals *post operationem* the black granules in the plexuses were more resorbed by the epithelium and could even be found in the mesenchymal cells below this.–After a thorough examination of the paraphyseal epithelium of non-operated animals

[1] E. SELENKA, Biol. Centralbl. *10*, 323–326 (1891).

[2] P. FRANCOTTE, Arch. Biol. *8*, 757–821 (1888); Bull. Acad. Roy. Belgique, 3e série *27*, 84–112 (1894); ib. 879–943 (1912).

[3] K. H. KRABBE, Danske Vidensk. Selskab. Biol. medd. *12*, 1–111 (1935).

[4] E. SCHARRER, Z. Zellf. mikr. Anat. *23*, 244–252 (1936).

Epithelial cells of the paraphysis	*Epithelial cells of the choroid plexuses*
1 Mostly cubic or low cylindric.	1 Mostly flat or low cubic.
2 Nuclei mostly ovoid to oval with long axis perpendicular to the free surface of the cell.	2 Nuclei mostly oval with their long axis parallel to the free surface of the cell.
3 Relatively much nuclear substance in cell.	3 Relatively much more cytoplasm in cell.
4 Continuous thin cuticula lining the free border. Broken up during secreting phase.	4 Relatively high striated cuticular membrane, never broken up.
5 No cilia.	5 Cilia in bundles from the parts of some cells.
6 Basement membrane in immediate contact with the endothelium of venous sinusoids.	6 Basement membrane especially in younger stages much less in contact with endothelium of choroidal vessels but more with underlying mesenchyme.
7 No attachement of particulated matter injected.	7 Strong attachment of particulated matter especially at the cilia.
8 Cells have secretory function.	8 Cells have certainly resorbing function. Secretory function could not be demonstrated in the experiment described.

secreting activity of the cells could also be detected although in a much less conspicious way. Here the secretion happens merely merocrine and eccrine.

It stands to reason that these experiments do not give us a conclusive idea as to the quality of the substance evidently secreted by the paraphysis. It may be possible that in the experiment described some cerebrospinal fluid is lost and that the paraphysis tends to secrete more liquor than it does normally making up for the loss or for the eventual disturbed chemical balance caused by the suspension injected. It may also be that the paraphysis secretes only more special chemical substances. But, as it is, this investigation points strongly in the direction that in Urodela the paraphysis is more concerned in the production of the spinocerebral fluid or of its constituents whereas the plexuses may have primarily if not exclusively an absorbing function. Summarizing, some differences between the epithelium of the paraphysis cerebri in Urodela and that of the choroid plexuses are computed see above.

J. ARIËNS KAPPERS

Anatomisch-Embryologisch Laboratorium der Rijksuniversiteit te Groningen, November 24, 1948.

Zusammenfassung

Die Paraphysis cerebri ist ein zusammengesetztes tubulöses Organ, das sich in den Ventriculus impar telencephali, den vorderen Teil des 3. Ventrikels, eröffnet. Die Tubuli bestehen aus einem einschichtigen hauptsächlich kubischen bis zylindrischen Epithel auf einer Basalmembran, die mit wenigen Ausnahmen unmittelbar an die Wand von venösen Sinusoiden grenzt. Nach intrazerebralen Injektionen durch das Dach des 4. Ventrikels von *Amblystoma mexicanum* mit einer 5%-Suspension von Tusche in isotonischer Ringer-Lösung zeigen sich in den Schnitten gar keine Tuscheteilchen in den paraphysären Tubuli, während diese auf und in dem Ependym und vor allem dem Epithel aller Plexus chorioidei in großer Menge sichtbar sind. Die schwarzen Teilchen werden offenbar in den Plexus resorbiert. Weiter wird eine Sekretion in den paraphysären Tubuli in der Richtung des Lumens, also nach dem Ventrikel zu, beschrieben und abgebildet. Aus dieser vorläufigen Mitteilung geht also hervor, daß die Paraphysis von Urodelen eine zusammengesetzte tubulöse extern sezernierende Drüse ist, die einen oder mehrere, wenn nicht alle Bestandteile des Liquor cerebrospinalis produziert, und daß dem Epithel der Plexus jedenfalls eine resorbierende Funktion zukommt. Eine Tabelle zeigt einige Unterschiede zwischen dem Epithel der paraphysären Tubuli und demjenigen der Plexus chorioidei.

The Effect of Nitrogen-Mustard on Sea-Urchin Eggs

It is well known that nitrogen-mustard compounds cause a delay or inhibition of mitotic divisions in yeast[1], *Tradescantia*[2], and *Triton embryos*[3]; an effect on cleavage of sea-urchin eggs has also been reported[4]. The present work was carried on the fertilized and unfertilized eggs of two species of sea-urchin (*Arbacia lixula* and *Sphærechinus granularis*) at the Zoological Station Naples, in August and September, 1948, while the senior author was on a UNESCO fellowship.

Eggs were treated with hydrochloride salt of methyl (dichloroethyl)amine. No cleavage occured in the first hour after insemination, and from then observations were made at intervals of 10 minutes to 1 hour up to 8 to 10 hours.

The results are expressed graphically as number of divisions plotted against time after insemination. Divisions 1, 2, 3, 4, 5, and 6 represent the number of blastomeres 2, 4, 8, 16, 32, and 64 respectively. Each point in the graphs represents the average number of blastomere per sample at a given time.

Eggs treated with 0·001%—0·005% of the substance for 10 minutes developed normally up to the 4th day, forming normal plutei. There was only slight decrease in rate of cleavage as compared with the controls (Fig. 1). Longer treatment at these concentrations resulted in abnormal gastrulæ or failure of gastrulation. A concentration of 0·01% for 10-minutes treatment delayed cleavage more considerably, but the eggs reached the 6th division forming normal swimming blastulæ. They however, only reached the beginning of invagination and cytolysed in a further 20 hours. Longer

[1] V. E. KINSEY and W. M. GRANT, J. cell. and comp. Physiol. *29*, 51 (1947).

[2] P. C. KOLLER, M. Y. ANSARI, and J. M. ROBSON (1943), quoted in: J. Exp. Zool. *103*, 1 (1946).

[3] R. GILLETTE and D. BODENSTEIN, J. Exp. Zool. *103*, 1 (1946).

[4] R. K. CANON et al. (1943, 1944), quoted in: J. Exp. Zool. *103*, 1 (1946).