Recovery of reserpine from urine

Dog number	Cumulative percentage of injected dose recovered as reserpine*			
	30 min	60 min	24 h	48 h
1 12·0 kg	0·18	0·25	1·4	1·6
2 13·5 kg	0·12	0·40	1·9	2·0
3 14·3 kg	0·24	0·39	1·6	1·7

* Figures represent averages of two experiments performed on each animal.

found urinary excretion to be of a similar magnitude, but the disappearance from plasma was somewhat more delayed. Observations of SHEPPARD *et al.*[1], HESS *et al.*[2], NUMEROF *et al.*[6], and GLAZKO *et al.*[7] indicate that the rapid disappearance of reserpine from arterial plasma reflects a quick degradation of the compound and not extensive binding in tissues. In addition, HESS *et al.*[2] claim that the same duration of sedation, or of change in brain 5-hydroxytryptamine, is induced whether a small or a large dose of reserpine is administered. Therefore, it is unlikely that reserpine is acting through a degradation product.

Since the sedative effect of reserpine was most marked at a time when most of the drug had disappeared from plasma, the results of this paper are in accord with the hypothesis[2] that the central effect of sedation is not mediated through reserpine *per se*, but conceivably through 5-hydroxytryptamine changes in brain.

The disappearance of reserpine from arterial plasma does not appear to explain the marked sensitivity of the dog to small doses of the drug, but there is other evidence that this animal metabolizes reserpine differently than other species[8].

The negligible urinary excretion of reserpine precludes further studies on the renal handling of the drug.

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Résumé

La réserpine administrée par voie intraveineuse chez le chien à dose de 1,5 mg/kg de poids du corps disparaît rapidement du sang artériel. Les quantités de réserpine retrouvées sont de 1,5 µg/ml au bout de 90 s. Il n'y a pas de corrélation entre les quantités de réserpine contenues dans le sang et le début ou la durée de la sédation produite. Au bout de 48 h, moins de 2% de la dose injectée est retrouvée dans l'urine. Etant donné la rapidité avec laquelle la drogue disparaît dans du sang, on ne s'explique pas l'hypersensibilité du chien à son égard. L'excrétion rénale négligeable de la drogue chez le chien ne permet pas d'espérer que des études de clairance rénale éclaircissent le mécanisme d'action de la réserpine chez cet animal.

[6] P. NUMEROF, M. GORDON, and J. M. KELLY, J. Pharmacol. *115*, 427 (1955).

[7] A. J. GLAZKO, W. A. DILL, L. M. WOLF, and A. KAZENKO, J. Pharmacol. *118*, 377 (1956).

[8] H. SHEPPARD and W. H. TSIEN, Proc. Soc. exp. Biol. Med. *90*, 437 (1955).

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Short-term Oscillations in Sign of Phototaxis in the Eyed Hawk Caterpillar (*Smerinthus ocellata* L.)

In a previous communication[1], we have discussed the cyclic changes in phototaxis occurring in the later instars of the Eyed Hawk's larval life. The data then presented always referred to the average behaviour of a group of larvae of the same age, but in our experiments we have recorded the movements of each larva individually. Further analysis of these records has revealed an interesting fact. At all ages during the 3rd to 5th instars, periods in which the larva crawls towards the light alternate with periods in which it moves in the opposite direction (Fig. 1). This suggests that the sign of the caterpillars' phototaxis is subject to somewhat irregular short-term oscillations between positive and negative.

However, before we can accept this conclusion, another possible explanation must be considered. The occurrence of bouts of crawling in the 'wrong' direction in larvae showing an over-all preference for a given orientation, might be regarded merely as a sign that the phototaxis of these larvae is rather weak, the wrong movements being chance deviations from the 'intended' course. The following argument can be advanced against this hypothesis as the sole explanation of our findings. Figure 2 illustrates our scoring method (for further details, see the earlier paper). It will be seen that the sum of the two angles comprising our 0 directions is $^2/_3$ of the angle comprising either the + or the – directions. Hence, if the bouts of wrong scores were due to errors made by the larvae, we should expect the number of 0 scores to be greater than (or at least equal to) $^2/_3$ of the number of wrong scores in each test, as large chance deviations, leading the larva into the wrong sector, will be less frequent than smaller ones which take it only into the 0 sectors.

The facts do not confirm this expectation. In only 43 out of 133 larvae tested at varying ages in the 3rd to 5th instars, the difference expected on the hypothesis under consideration was actually found. In all others, the number of 0 scores was smaller than $^2/_3$ of the number of wrong scores. Moreover, the expected difference occurred more frequently among larvae giving a relatively small proportion of wrong scores than among

[1] L. DE RUITER and I J. VAN DER HORN, Nature *179*, 1027 (1957).

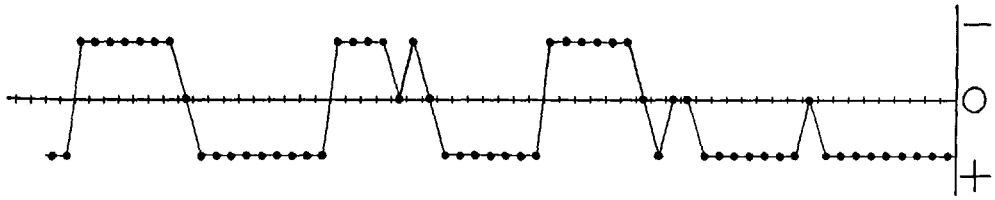

Fig. 1.—Third instar larva, observed at one-minute intervals. Alternation of movements towards and away from the light source (indicated by dots above and below the abscissa, respectively). Time scale: minutes.

those giving a large one. As a measure of this proportion in a given test (or, in other words, of the intensity of the larva's preference for one orientation) we may use the

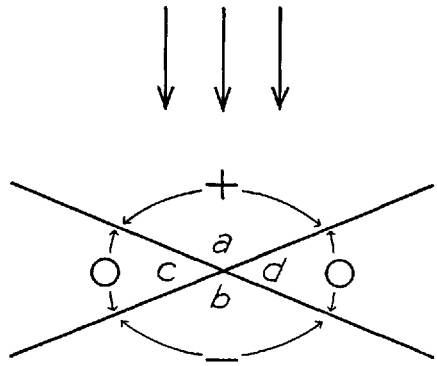

Fig. 2. – Scoring method. The arrows indicate the direction of the light. The signs +, −, and 0 indicate the scores given to larvae heading in directions within the respective sectors.
$\angle a = \angle b = 135°$; $\angle c = \angle d = 45°$.

absolute value of the difference D between the percentages of positive and negative scores obtained in that test.

In this way we find:

D	Number of larvae	Percentage of these showing expected difference
0– 20	21	9·5
21– 40	16	12·5
41– 60	15	20·0
61– 80	20	45·0
81–100	61	44·3

This correlation between the value of $|D|$ and the occurrence of the expected difference seems inexplicable on the 'error hypothesis'.

In our opinion, our data suggest that in larvae with a strong preference, bouts of wrong movements may indeed be due in many cases (but not in all) to errors in orientation. However, for caterpillars giving low values of $|D|$ this explanation appears to hold in a small minority of all cases. Here a change in sign of the direction taken by the larva must far more often be due to a real change in the sign of the phototaxis itself.

The duration both of the positive and of the negative phases in the behaviour of a larva varies considerably, even within a single test. Therefore, more extensive experiments will be necessary to decide whether increase in length of the negative phases, or in their frequency, or in both, is the cause of the shift towards photonegativity to be seen in each instar[1]. We are pursuing the work in this direction. In addition, we are attempting a further analysis of the oscillations in sign of phototaxis.

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Zoological Laboratory of the University, Groningen (Netherlands), April 24, 1957.

Zusammenfassung

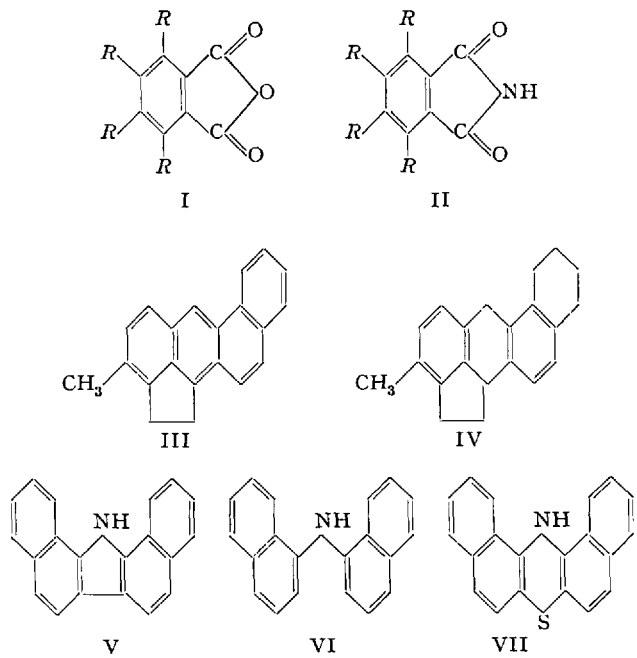
Raupen von *Smerinthus ocellata* L. im dritten bis fünften Larvenstadium zeigen im Phototaxisversuch unregelmässig periodische Umkehr der Kriechrichtung (Fig. 1). Aus der weiteren Analyse der experimentellen Daten ergibt sich, dass dieser Richtungswechsel in der Mehrzahl der Fälle durch einen tatsächlichen Umschlag des Richtungssinnes der Phototaxis verursacht wird.

PRO EXPERIMENTIS

Sur une nouvelle méthode chromatographique pour la séparation de composés polycycliques aromatiques ou hétérocycliques

On sait que les techniques habituelles de chromatographie utilisent les différences existant entre les composantes d'un mélange en ce qui concerne leur faculté de fixation physique sur un adsorbant approprié, constitué en général soit par des composés minéraux, soit par des substances organiques macromoléculaires.

Nous proposons aujourd'hui l'utilisation d'une nouvelle technique chromatographique, basée sur l'utilisation, comme adsorbant, de composés tels que l'anhydride tétrachlorophtalique (I; R = Cl) et la tétrachlorophtalimide (II; R = Cl). Ces composés présentent en effet, à l'état dissous, une affinité prononcée vis-à-vis de certains types de donneurs d'électrons, tels que les hydrocarbures aromatiques polycycliques, les indoles, les carbazoles, etc., avec lesquels ils fournissent des combinaisons moléculaires de type 1:1 plus ou moins fortement colorées et plus ou moins stables[1]. Cette affinité varie dans larges proportions avec la structure moléculaire des donneurs d'électrons, et existe également lorsque l'anhydride et l'imide tétrachlorophtaliques se trouvent à l'état solide. Dans ce dernier cas, on obtient des adsorbats tout comme dans le cas de la chromatographie ordinaire. Les anhydrides tétrabromo- (I; R = Br) et tétraiodophtalique (I; R = I), ainsi que les imides correspondantes (II; R = Br ou I) peuvent également se comporter comme de bons adsorbants, les imides étant d'une façon générale moins satisfaisantes que les anhydrides. Si le long d'une colonne constituée avec de l'anhydride tétrachlorophtalique en poudre fine, on fait passer une solution dans l'éther de pétrole ou dans le cyclohexane d'un mélange de plusieurs corps ayant des affinités



[1] P. PFEIFFER, *Organische Molekülverbindungen* (F. Encke, Stuttgart 1927). – N. P. BUU-HOI et P. JACQUIGNON, C. r. Acad. Sci. *234*, 1056 (1952); Bull. Soc. chim. France *1957*, 488.