seen. At higher intensities the relative decline of frequency is almost the same for all units investigated. No impulse activity has been found with light adaptation of more than 10 lm/m².

The range of illumination over which changes of impulse activity of the epiphyseal stalk occur seems to be confined to the scotopic level. However, the illumination given above refers to the surface of the exposed diencephalon after removal of the skin and the skull. After allowance is made for the loss of light absorbed by the tissues of the head, the above values should be shifted by about 3 log units towards higher intensities[5]. Thus complete inhibition of the nervous discharge of the pineal organ in situ does occur under natural lighting conditions above 1000 lm/m², the absolute threshold being of the order of 0.01 lm/m², i.e. quite common lighting conditions. Recently, similar values have been found for the darkening reaction of frog tadpoles deprived of their lateral eyes[8].

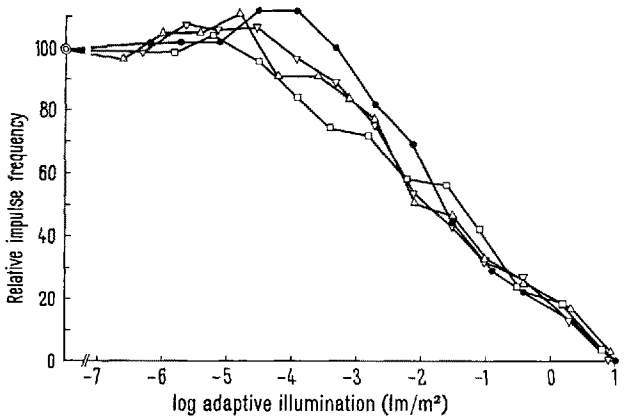

Fig. 2. Plot of the steady discharge (relative values) of single photosensitive elements of the frog's epiphysis cerebri at different levels of light adaptation. Measurements proceeding from dark to light adaptation in steps of 0.6 log units. Values after 2 h dark adaptation equal to 100%. Four different elements depicted by different symbols.

Zusammenfassung. Die proximale Anlage des lichtempfindlichen Pinealorgans adulter Anuren zeigt eine Daueraktivität, die durch Belichtung gehemmt wird. Die mit Hilfe von Stahlmikroelektroden bestimmte absolute Schwelle einzelner Neurone des Organs liegt zwischen 10^{-5} und 10^{-6} lm/m². Bei Belichtung vermindert sich die Impulsfrequenz der Daueraktivität linear mit dem Logarithmus der Beleuchtungsstärke. Der Halbwert der Entladungsfrequenz liegt bei 10^{-2} lm/m². Oberhalb 10 lm/m² ist keine Impulsaktivität zu beobachten.

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Acute Toxicity and Elimination of Phenol Injected into Fish (*Carassius auratus* L.)

According to MAICKEL et al.[1] the ability to conjugate phenols (phenolphthaleins, 8-hydroxyquinoline, α-naphthol or *p*-nitrophenol) with either glucuronic or sulphuric acid seems to be completely lacking in fish (goldfish, perch[2]). Doses of these phenols as low as 0.5 mg/kg are often fatal; fish placed in solutions of 10 ppm of phenols absorbed enough of the phenols through the gills to be toxic in 4–8 h, whereas frogs were found to excrete 90–95% of a 5 mg dose of phenols as conjugated compounds within 48 h after administration. KUHN and KOECKE[4], however, observed that concentrations of phenol (hydroxybenzene) up to 1:50000 were tolerated by goldfish without untoward effects: in the presence of higher concentrations the gills act mainly as point of entry of the poison, undergoing minor damage, and the true toxic effects are produced on other organs. In terrestrial vertebrates (frog, mouse, rat, guinea-pig, and rabbit) the MLD (minimal lethal dose) of phenol s.c. is reported to be 300–550 mg/kg[5].

For our experiments, healthy well-acclimatized goldfish (*Carassius auratus* L.), weighing 10 to 15 g, were kept in running fresh water, temperature 16–18°C. A 5% solution of phenol (hydroxybenzene) in water was used; the injections were administered in the muscular masses of the tail; a gentle pressure was held at the injection point for a short time.

To determine the acute toxicity, 50 animals in groups of five were injected i.m. with different doses of phenol and observed for 4 days. The MLD of phenol was found to be 230 mg/kg. The toxic effects noted were excitation, followed by depression, loss of locomotor coordination, and eventually convulsions and death.

Another 12 animals were injected i.m. with a standard dose of 200 mg/kg of phenol and immediately placed each into a separate jar containing a volume of fresh water 20 times the weight of the animal. Control fishes, also 12 in number, were administered saline for fish[6] and held in a similar manner. Every 30 min, for the first 4 h, a small sample of the water was taken from each jar. Free phenols were directly determined with GIBB's reagent[7] colorimetrically. Total (free + conjugated) phenols were deter-

[1] R. P. MAICKEL, W. R. JONDORF, and B. B. BRODIE, Fed. Proc. *17*, 390 (1958).

[2] The capability of some marine fishes to conjugate aminobenzoic acid isomers with glucuronic acid has been observed by HUANG and COLLINS[3].

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[6] J. Z. YOUNG, Publ. Staz. Zool. Napoli *12*, 425 (1932).

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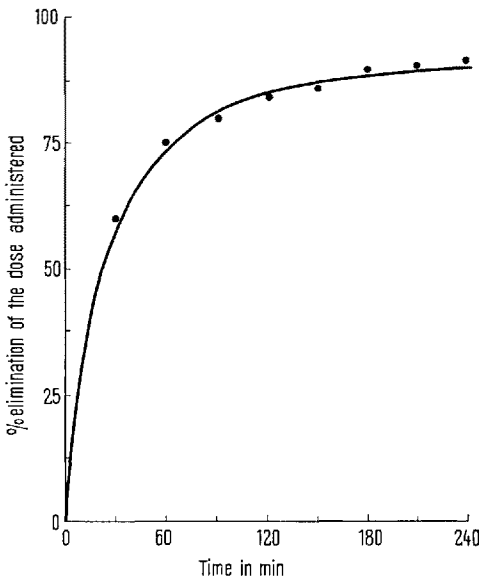
Group	No. of animals	mg of phenol administered mean (range)	mg of free[a] and total[b] phenols eliminated mean (range) First 30 min	First 60 min	First 120 min	First 180 min	First 240 min
Control	12	0	[a] 0.3 (0.0–0.6)	0.5 (0.1–0.9)	0.8 (0.4– 1.2)	1.0 (0.7– 1.5)	1.3 (0.8– 1.9)
			[b] 0.3 (0.0–0.6)	0.5 (0.2–0.9)	0.8 (0.4– 1.3)	1.1 (0.7– 1.6)	1.3 (0.8– 1.9)
Treated	12	12.8 (10.5–14.8)	[a] 6.8 (6.1–7.3)	9.6 (8.8–9.9)	11.1 (10.2–11.8)	11.8 (11.0–12.5)	12.7 (11.8–13.6)
			[b] 6.9 (6.2–7.3)	9.6 (8.9–9.9)	11.1 (10.2–11.8)	11.9 (11.0–12.6)	12.7 (11.8–13.7)

mined with the same reagent after hydrolysis with 0.5 N H_2SO_4 in sealed ampoules kept at 100°C for 1 h.

The Table shows that control animals normally eliminate, in discrete amounts, some compounds which react as free phenols; these basal values, like a blank, must be subtracted to obtain correct figures of the elimination rates of administered doses of phenols. It appears, then, that of the 200 mg/kg dose of phenol about 50% is eliminated within 30 min after the injection and almost 90% within the first 4 h. The excreted phenols have been found only in the free form, conjugated compounds appearing to be completely lacking. In the Figure is reported one individual excretion pattern of free phenols, corrected for basal elimination of phenols and expressed as % of the injected dose.



From these experiments it appears that goldfish are unable to conjugate phenol, while showing a high efficiency in excreting the drug unchanged. The latter peculiarity may help to explain the relatively moderate parenteral toxicity of phenol for fish, notwithstanding the fact that this animal species lacks the mechanism to detoxicate phenol by means of conjugation.

Riassunto. Nel ciprino la DLM del fenolo è di 230 mg/kg i.m. Il fenolo, iniettato i.m. a dose di 200 mg/kg, viene eliminato in media per quasi il 90% nelle prime 4 ore come fenoli liberi. Sotto il profilo della tossicità, la mancata capacità a detossicare mediante coniugazione sembra nel pesce compensata dalla elevata capacità escretiva degli organi emuntori.

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Stasis-Induced Changes in Platelet Adhesiveness

Previous studies suggest that abnormally low platelet adhesiveness is correlated more closely with increased bleeding tendency than mere reduction in the platelet count[1,2] and that abnormally high adhesiveness better reveals the predisposition to thrombosis than do coagulation tests or determinations of platelet count[2]. Circulatory stasis is a factor promoting thrombus formation, but, of the factors involved, increased platelet adhesiveness is regarded as being the most important. However, the effects of stasis on the platelet adhesiveness have not been studied, although the coagulation status seems to be affected thereby; besides fibrinolysis[3], stasis has been found to evoke hypercoagulability as reflected in a shortening of the plasma cephalin time and in a rise of the plasma AHG activity[4]. Because the formation of a platelet nidus must be regarded as the primary event of thrombosis, it was deemed useful to determine whether the platelet adhesiveness is altered by circulatory stasis, and whether the response, if demonstrable, is modified with increasing periods of stasis.

The tests were done on eight medical students. A control blood sample (9 ml in 1 ml of 3.13% citrate solution) was taken without stasis from an antecubital vein of one arm. Then a pressure cuff was placed above the elbow of the other arm and inflated to 100 mm Hg. Following stasis of 3 or 6 min, two successive samples of 9 ml were collected from an antecubital vein of the 'cuffed' arm. The first sample was considered to represent a large vein

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