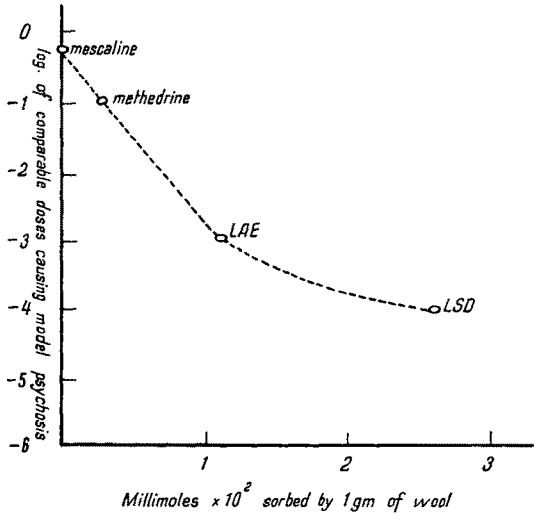
The results indicate that the higher the affinity of a drug for wool, the lower the amount of that drug required to cause a model psychosis.

We are inclined to attribute the increasing affinity of the drugs in question for wool to their different degrees of specificity thus simulating a reversible inhibition of an equilibrium involved in the production of model psychoses.




We included only these four drugs in our Table and Figure because it is not easy to find other drugs which precipitate a reversible model psychosis with hallucinatory experience of comparable duration and intensity after administration of a *single* dose. Atabrine e.g., which is known to produce hallucinations and catatonic excitement, requires prolonged daily administration[1]. Its affinity was found to be 0·9 millimoles $\times 10^{-2}$/g of wool. Another antimalarial of similar structure and action, Pentaquine, displays an affinity of 3·6 millimoles $\times 10^{-2}$/g of wool. If Pentaquine is administered daily at a dosage four times higher than usual (0·12–0·24 g/day), it acts as an adrenergic blocking agent[2]. This feature seems to be, among others, a common characteristic of drugs capable of precipitating a model psychosis.

LIDDELL and WEIL-MALHERBE[3] have shown that methedrine as well as LSD seem to block adrenergic activity by lowering the blood-epinephrine level after short initial increase during the model psychosis; so might LAE since it belongs to the family of ergot alkaloids, which are presumed to inhibit sympathetic vasomotor tone[4]; however, it should be noted that the peripheral adrenolytic effects of LAE and LSD are about 300–2000 times weaker than that of dihydroergotamine[5].

Surgical (sympathectomy)[6] or chemical (Dibenamine)[7] adrenergic blockage, also produce psychotic experiences in certain subjects, possessing high epinephrine and norepinephrine[1] levels[2] to which they apparently are not adapted.

Hence it appears (a) that sympathetic stimulation followed by (peripheral) adrenergic blockage are factors involved in the production of model psychoses and (b) that drugs which exhibit their adrenergic blocking activity in smaller doses than e.g. Dibenamine and simultaneously display a high affinity for (wool) protein, are able to cause model psychosis in very small doses. Further aspects of the problem are to be considered in a more detailed report[3].

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R. FISCHER

*Research Laboratory, Munroe Wing, General Hospital, Regina, Saskatchewan, Canada, April 24, 1954.*

*Zusammenfassung*

Mezkalin, Methedrine (Pervitin), Lysergsäuremonoäthylamid und Lysergsäurediäthylamid weisen eine steigende Affinität zu Wollprotein auf. – Es scheint, dass zwischen der Dosis, welche von diesen Substanzen benötigt wird, um beim gesunden Menschen nach einmaliger Verabreichung Modellpsychosen ungefähr vergleichbarer Intensität und Dauer hervorzurufen, einerseits und der Affinität derselben Substanzen zu Wollprotein andererseits eine umgekehrte Korrelation besteht.

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## The Differentiation of Optic Lobes Neurons in a Blind Cave Teleost

The structure of the most specialised neurons of the optic lobes of Ichthyopsida (except for Cyclostomata and Selachians) and Sauropsida is well known from the work of RAMON, CAJAL, VAN GEUCHTEN, and others. They are mono- or bipolar spindle cells with one (sometimes two) "recurrent" branch emerging from the prolongment of the cell directed to the external surface of the lobe. These recurrent branches, considered as axons, after a narrow curve, run almost parallel to the cell down to the deepest layers of the lobe wall.

This very peculiar orientation of fibres was related by LEGHISSA (1946) to neurobiotactic antagonist effects created during development by the activation of two functional fields, a superficial one of optical nature and a deep one of general sensitivity (spino- and bulbotectal tracts).

It has also been demonstrated by many authors (KRAUSE, DÜRKEN, LARSELL, and others, and, more recently, FILOGAMO (1948), KOLLROS (1947, 1948), PFLUGFELDER (1952) that the enucleation of one or both eyes determines an hypoplasia of one or both optic lobes. This phenomenon has been related, in Amphibians, to

the degeneration of nervous cells (LARSELL) and also to a lower mytotic activity (KOLLROS) and, in the chicken, to fibre reduction and degeneration of cells (FILOGAMO). Hypoplasia was also observed in congenital anophtalmic animals.

The peculiarity of structure of these "recurrent neurons" brought me to a group of researches on the general problem of nervous differentiation. I refer the reader to some preliminary articles of mine and of my collaborators for some experimental results[1], while my purpose in this brief account is to describe the condition of these optic neurons in a blind Teleost from mexican caves, profiting by the experiment made by Nature itself by means of ecological adaptation.

The optic tectum of blind Teleosts was already taken into consideration by some authors [RAMSEY (1901), EIGENMANN (1909), FRANZ (1912), CHARLTON (1933)]: hypoplasia was observed with special reduction of the most superficial layers but was not considered from a cytological point of view.

I had the opportunity to dispose of numerous adult *Anophthyctys jordani* and of some embryos and larval stages of a spawn obtained in laboratory.

After the development of an optic cup almost of the size of zoologically related species living in the open air and with fully developed eyes, the organ enters into a rapid atrophy and reduces itself to a very small optic ball, with a very reduced cavity, formed by some retinic material, surrounded by a conspicuous pigmented tissue and a bone capsule, provided with a very reduced lens and an atrophyc optic nerve, very deeply located in the skull and completely covered by the integument (Fig. *B*).

Comparing the optic lobes of this blind fish with those of related species (*C*, *D*) with fully developed eyes (*A*) (*Astianax mexicanum*, *Pristella riddley*) of the same body size, hypoplasia is very evident; and the dorsal side and the *thorus semicircularis* are especially reduced; the optic superficial layer is absent and all the strata, but especially the second and third (following HUBER and CROSBY classification) are reduced in thickness. Spindle cells are decidedly reduced in number in agreement with the attribution of a specific optic function of these cells (CAJAL, KAPPERS, and others). But the most impressive fact is the morphological aspect of these spindle-shaped optic cells: the form is typical and the recurrent branch is also present with its peculiar orientation (*F*), although there are no optic fibres.

These observations give a clear demonstration that the "recurrent axons" are not determined by conflicting physiological fields, as those suggested for vision and general sensitivity, acting neurobiotactically. They support the idea of an intrinsic nature of the specific "particular" neuron differentiation. Infact, the surviving optic neurons of the tectum, deprived of their optic function, differentiate normally, as also do the retinic cells of the remnant of the eye, without any possibility of physiological action.

Current experiments in my laboratory on the differentiation of these specific cells of the tectum clearly demonstrate that "recurrent neurons" differentiate also in small fragments of optic lobe of chicken implanted in the chorion-allantoic membrane at a very early stage of optic vesicle, apart from any physiological activity.

A. STEFANELLI

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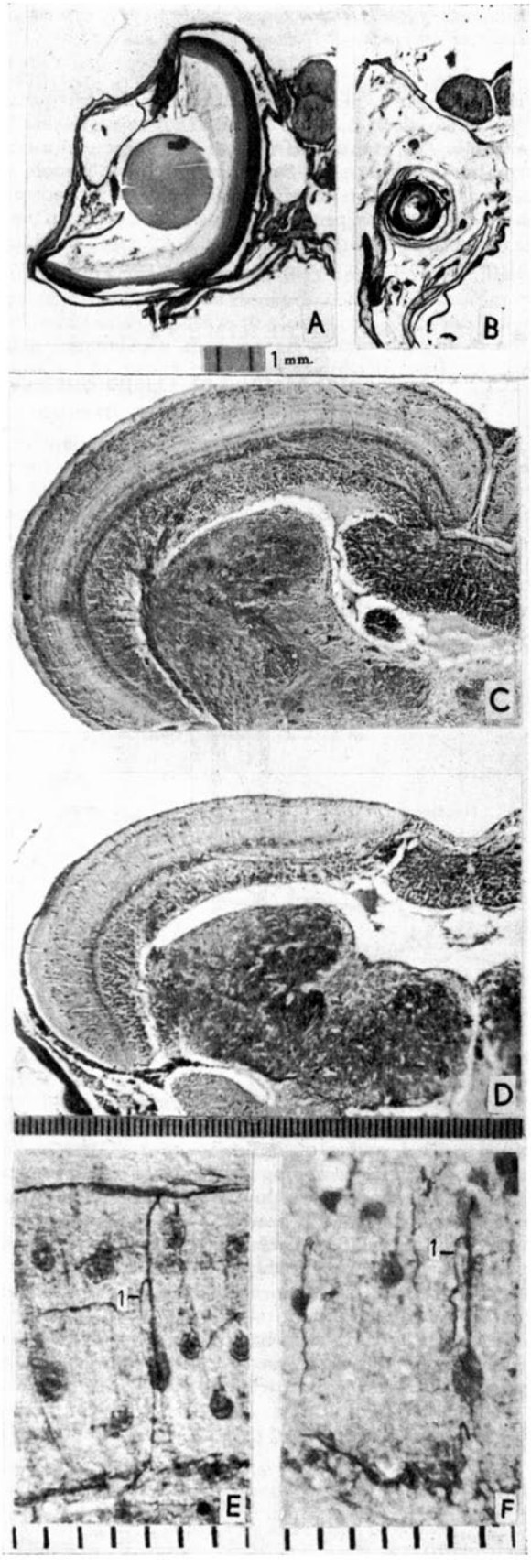


Fig. 1. – Right eye (*A*), optic lobe (*C*) and "recurrent neuron" (*E*) of *Astianax mexicanum* (open air living teleost); compared with those (*B*, *D*, *F*) of *Anophthyctys jordani* (cave fish zoologically related). Recurrent axon is indicated with 1 (*E*, *F*). Cajal-DeCastro method. Every space of the scale at the foot of pictures = 10 $\mu$.

*Laboratory of Histology and Embryology, Faculty of Science, University of Rome, June 8, 1954.*

*Sommario*

È comparato lo sviluppo degli occhi e del tetto ottico di un pesce cieco delle caverne (*Anophthyctys jordani*) con quello di forme affini viventi all'aperto e con occhi normalmente sviluppati. Pur essendovi una notevole ipoplasia del tetto i neuroni specifici a neurite ricorrente conservano le loro peculiari caratteristiche strutturali. Ciò dimostra che l'adattamento ecologico non ha ridotto i fattori intrinseci del differenziamento di questi neuroni.

## PRO EXPERIMENTIS

### An Experimental Method of Tissue Surface Measurements of Beta Activity *in vivo*

Several workers have considered the problem of *in vivo* external measurements of radioactivity in tissues. Studies have been carried out with $\beta$ emitters and particularly with radiophosphorus by LOW-BEER[1], FRIEDELL *et al.*[2], GEFFEN *et al.*[3] on human subjects and by SODARO and SHEPPARD[4], SCHÖNENBERG and MENZEL[5] on rabbits. The physical aspect of these measurements has been investigated by STRAJMAN[6] with theoretical and experimental analysis.

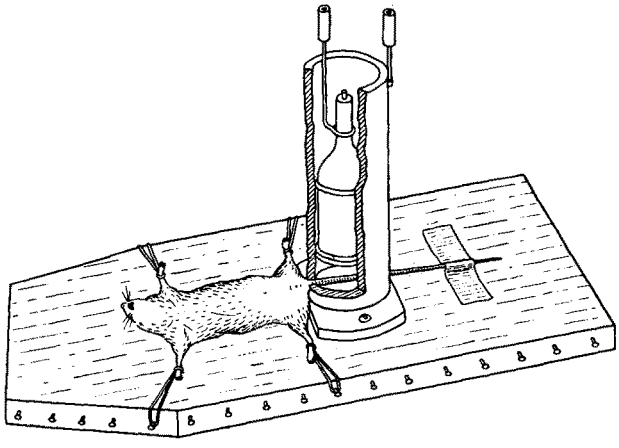

Fig. 1

As the interpretation of the results of external $\beta$ activity measurements was not thorough, it seemed useful to study the behaviour of radiophosphorus in a normal animal by means of varying the route of administration only. We have therefore developed a simple and convenient experimental procedure, which enables us to obtain reliable surface $\beta$ measurements in mice, over a lapse of some hours. Such procedure ensures strictly constant counting efficiency as well as rather comfortable conditions for the animal.

The mouse is laid on its back upon a small table with the four limbs held by means of rubber elastics. The tail is passed through two diametrically opposite small holes at the base of an aluminium cylinder firmly fixed on the table: the free extremity of the tail is then kept in place by adhesive tape (Fig. 1). Cotton wool, properly placed, prevents any spreading of radioactive excreta. The aluminium cylinder houses a $\beta$ G.M. tube of the bell jar type with thin mica window. The thickness of the cylinder wall is sufficient to stop all $\beta$ particles except those emitted from the counting area.

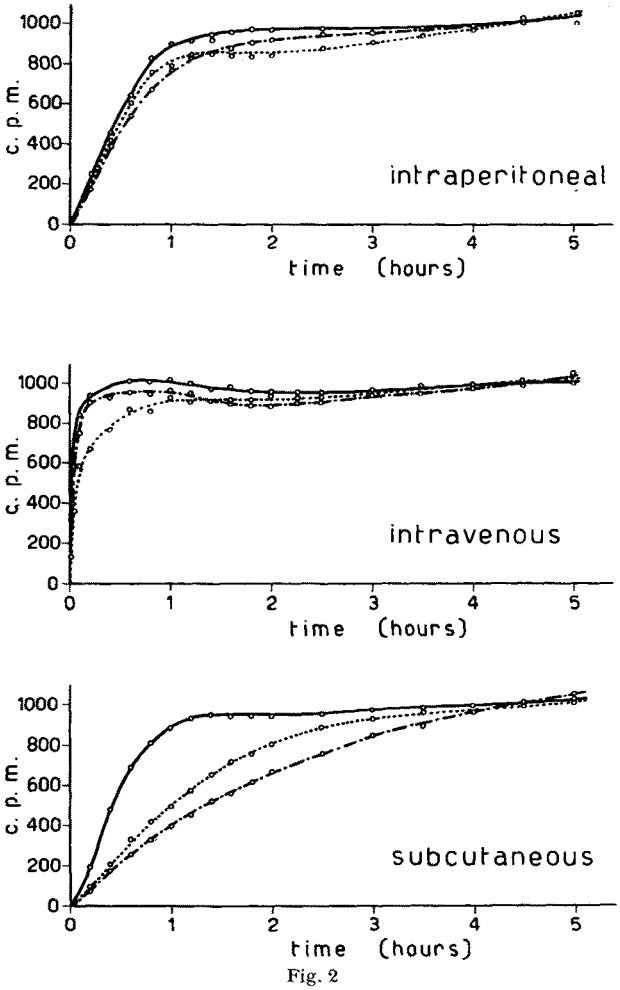


Fig. 2

We have employed white male mice of a body weight ranging from 23 to 27 g. The room temperature was constant (about 20°C). A solution of $P^{32}$ in the form of $Na_2HPO_4$ with $\sim 85\ \gamma$ of stable phosphorus per ml of isotonic NaCl solution at pH = 7·2 was injected intraperitoneally (0·5 ml of solution), intravenously (0·1 ml into the vena jugularis) and subcutaneously (0·5 ml) respectively. We have made a series of brief integral preset-time countings for each animal starting before the injection and extended over 4 to 6 h.

Under these conditions of experiment, the counting rate depends on the following variables: (1) geometrical conditions of the counting (e.g. size of tail, portion of the tail in counting area, etc.); (2) route of administration; (3) quantity of injected $P^{32}$; (4) individual biological variability.

The counts-per-minute (corrected for dead time, background and radioactive decay) make "build up" curves when drawn in cartesian co-ordinates. A comparison between the "intravenous", "intraperitoneal" and "subcutaneous" curves indicates that their trend, different in the initial portions, tends gradually to become similar at the beginning of the third hour; thereafter the curves show a very slow and continuous slope of a few units per cent per hour. Furthermore the counting rate at the

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