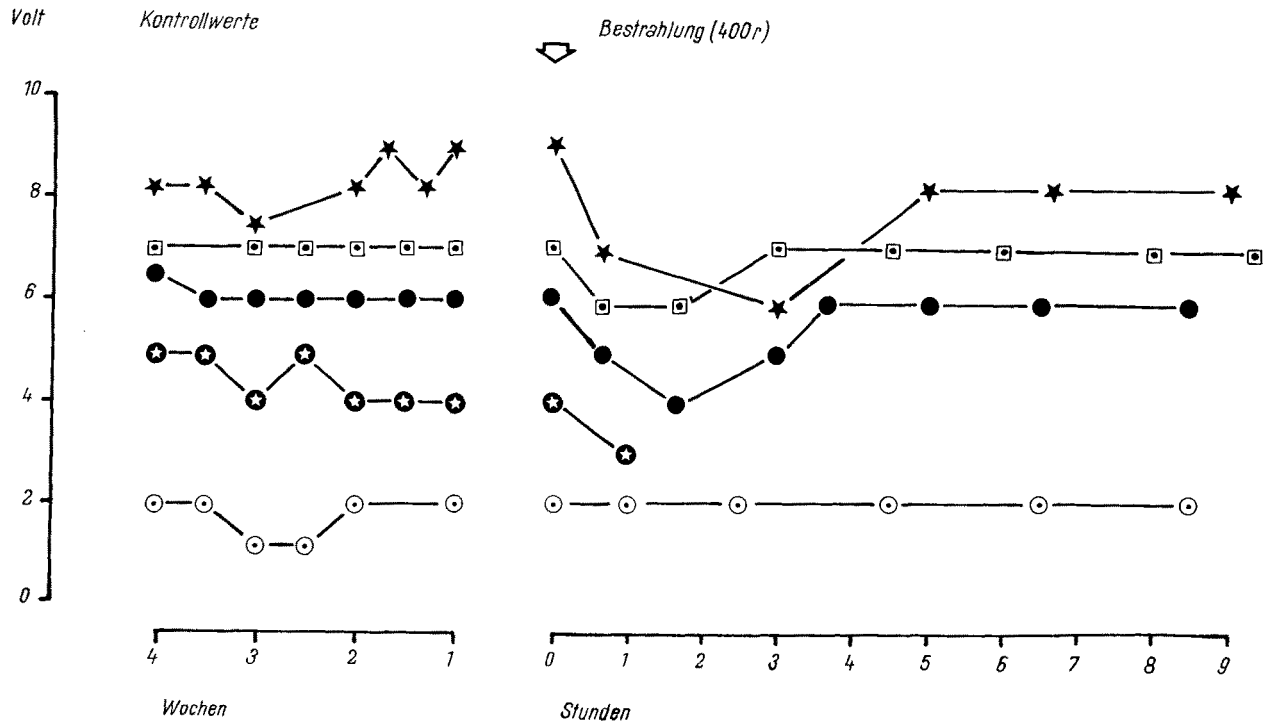

Abb. 2. Vorübergehendes Absinken der retikulären Weckschwellen unmittelbar nach 400 r Ganzkörperbestrahlung. Nur eine der 5 Katzen zeigt keinerlei Veränderung der Schwellenwerte. Man beachte jedoch die schon primär niedrigen Kontrollschwellenwerte (1 und 2 Volt) bei diesem Tier.

der Thalamusschwelle für Rekrutierung, gelegentlicher Anstieg der retikulären Weckschwelle), die zeitlich teilweise mit Störungen des Allgemeinbefindens, des Appetits, des Antriebs und der Koordination zusammenfallen und Folge einer organischen Gewebsschädigung sein könnten. Die diesbezüglichen, histologischen Ergebnisse sollen gesondert mitgeteilt werden. – Inwieweit die beschriebenen Veränderungen peripher ausgelöste oder direkt zentrale Vorgänge sind, werden weitere Untersuchungen klären. Zur Zeit sind Untersuchungen mit noch schwächeren Dosen im Gang.

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Summary

In cats with chronically implanted electrodes, hippocampus and amygdala consistently showed spike discharges immediately after relatively low doses of total body x-irradiation (400 r) and reticular arousal thresholds were transitorily decreased. Thalamic recruiting thresholds increased later, while hippocampal seizure thresholds remained practically unaltered. Experiments with lower doses are in progress.

Optically Aimed Ear Movements in the Rabbit

It is well known that rabbits have mobile auricles. Early investigators laid emphasis on the reflex-like character of the observed movements. Högyes[1] described the 'Preyer-reflex' for the rabbit, a stereotype ear movement caused by tones of high frequency. Horsley[2] described such a movement, evoked by mechanical stimulation (pressure on infra-orbital region). Several authors (Mangold[3]) pointed to another type of ear movement, a directioning of the auricle to the sound-source. Such directed ear movements are encountered frequently when observing rabbits. They may even appear when an object that probably has no acoustical value for the rabbit, is passing through its visual field.

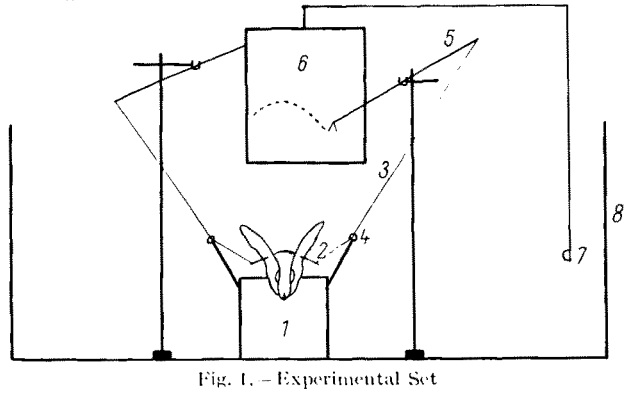


Fig. 1. – Experimental Set

1 fixed rabbit; *2* piece of straw attached to auricle; *3* thread that connects straw with recorder; *4* ring through which thread is conducted; *5* recorder; *6* kymograph-drum; *7* light-source; *8* enclosing black wall

This observation led to a series of experiments in which the possibility of an optical causation of the ear movements was examined. In a darkened room, a 2 V, 0·05 A light-source circled at constant speed around a fixed rabbit[4]. Ear movements were recorded on a kymograph

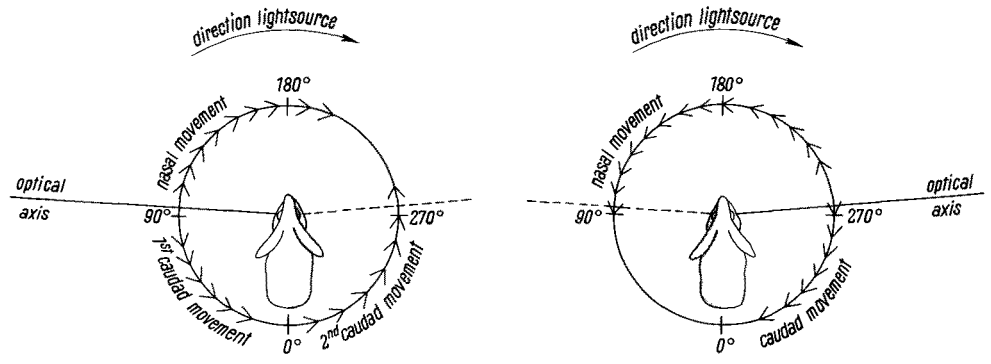
[1] A. Högyes, Zbl Nervenheilk. *9*, 268 (1886).

[2] V. Horsley, Brain *28*, 65 (1905).

[3] E. Mangold, *Winterstein's Handbuch der vergleichenden Physiologie* (Jena 1913).

[4] Three rabbits were each individually subjected to as many experiments.

Fig. 2. – Direction Ear Movement in Relation to Angle passed through by Light-Source



	Auricle at the side of the rabbit that is first passed by the light-source						Auricle at the side of the rabbit that is next passed by the light-source					
	1st caudad movement		nasal movement		2nd caudad movement		1st temporal movement		nasal movement		2nd caudad movement	
Frequency	7/12		12/12		5/12		0		12/12		9/12	
	start	end	start	end	start	end	start	end	start	end	start	end
Mean Value	20°36′	74°	108°	204°12′	262°48′	345°36′			90°	240°	268°48′	340°48′
Standard Deviation	18°54′	38°	35°	40°36′	35°54′	18°18′			39°54′	27°12′	6°48′	20°18′

In half of the experiments, the direction of the circular movement of the light-source was clockwise, in the other half it was anti-clockwise. Each movement started, and came after one turn to an end, behind the rabbit. The results are converted in such a way that in the Figure they all correspond to one direction of the light-source. Arbitrarily, the clockwise direction is chosen. In each half of the Figure, movements of one ear are shown. The movements of the ear at the side first passed by the lamp (in the Figure the left side of the rabbit) are shown in the left half of the Figure. The movements of the ear at the side that is next passed by the lamp (in the Figure the right side of the rabbit) are shown in the right half of the Figure. The track of the light-source is indicated by the circular lines; the direction of the ear movement is indicated by the arrows drawn in these lines.

drum. For this purpose, a piece of straw was fixed at the base of each auricle. The straws were connected by thread with recorders (Fig. 1). If the circling lamp was not burning, no movements, or at most slight random movements were recorded. The same applies to the recordings made when the circling lamp was burning but the eyes of the rabbit were blindfolded. However, when the lamp was burning and when the eyes were uncovered, clear ear movements were recorded. These results justify the conclusion that optical stimuli can cause ear movements.

In a second series of experiments, the direction of the ear movement (nasal or caudal) was examined in relation to the angle passed through by the lamp. To this end 12 experiments were performed[4]. In all experiments the speed of the lamp was 7° 30′/s[5]. In half of the experiments the lamp moved in one direction, in the other half it moved in the opposite direction. As was expected, the recordings of the former group of experiments were approximately the image of those of the latter group. In Figure 2 the results are converted in such a way that they all correspond to one direction of the lamp. This Figure shows that if the lamp moved in the nasal part of the visual field of one of the eyes, the homo-lateral auricle moved in the nasal direction. It never moved in the opposite way. If the lamp moved in the caudal part of this visual field, the auricle, if reacting, moved in the caudal direction. Also in this case, it never moved in the opposite way. The conclusion seems justified that the direction of the ear movement is primarily determined by the area of the retina that is stimulated. The direction of the image movement on the retina seems to have no influence on the direction of the ear movement. As becomes evident from Figure 2, the movement of an auricle is for the greater part directed by the homo-lateral eye, although the contra-lateral eye also has an influence on its direction. These results justify the conclusion that the recorded ear movements are optically directed.

As is known, the rabbit's retina has no area centralis. Probably the most important function of the eye is detection of moving objects. The function of the described ear movement will be a rough aiming of the auricles at moving objects to get acoustic information, if any. Probably the finer adjustments will be acoustically directed.

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Laboratorium voor vergelijkende Physiologie der Rijks-Universiteit, Utrecht, June 4, 1959.

[5] In preliminary experiments the following speeds were used: 50′/s, 3° 45′/s, 7° 30′/s, 60°/s, and 120°/s. Of these speeds that of 7° 30′/s proved to give best results.

Zusammenfassung

Durch Bewegungssehen ausgelöste Ohrmuschelbewegungen beim Kaninchen werden registriert. Die Ohrmuscheln werden dem Objekt zugewendet. Umgekehrt wie beim Menschen, wo akustische Reize eine gerichtete Blickwendung auszulösen vermögen, erfolgt hier auf visuellen Reiz hin eine gerichtete Ohrmuschelwendung.