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**THE RHYTHMIC SWIMMING ACTIVITY OF CARP,
CYPRINUS CARPIO L. AND ITS "ZEITGEBER"**
**I A DESIGN OF AN APPARATUS MEASURING THE ACTIVITY
OF FISH AND SOME DATA OBTAINED WITH IT**

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(Summary of Master's thesis written under direction of Dr. K. HONMA)

An apparatus was designed for measuring the activity of fish. This apparatus consists of a bottle, a light source, a photoconductive cell, an integrating wattmeter and an impulse counter. The flow of water produced by the movements of fish shakes the bottle. The shaking bottle moves the shutter between the light source and the photoconductive cell, changing the amount of light reaching the photoconductive cell. The photoconductive cell has the ability to change its electric resistance according to the amount of incident light it receives. As a result, the revolution speed of the disk in the integrating wattmeter changes according to the amount of incident light reaching the photoconductive cell when the photoconductive cell and the integrating wattmeter are set in series circuit at constant electric power voltage. The revolution speed is changed to a photoelectric pulse through a photoelectric relay and transferred to the impulse counter. Thus the apparatus can register the activity of fish automatically for long periods under any conditions.

Results obtained from one carp which was used to test this apparatus showed that it was active in the daytime under artificial light and quiet in the darkness with the water temperature ranging from 23° to 25°C. This rhythmic activity was disturbed when the water temperature was lowered from 23°~25°C to 20°, 18°, 17° and 16°C successively. The water temperature was kept constant at each level for 4~10 days. The rhythmicity and amount of activity were not recovered although the water temperature was raised from 16° to 23°C.