“VISIONARIUM”

DUODEVIGINTI

XVIII

at Tvärminne Zoological Station,
University of Helsinki,
September (14)16-18,2019

Tvärminne Zoological Station 1903

The purpose of the Visionarium meeting is to continue in the spirit of the former "Planeringsgruppen" (Swedish Medical Council 1968-2001) by bringing together scientists in vision research to informal meetings to present on-going and planned research and to discuss and establish future projects. Projects in the planning stage are as welcome as already finished projects. Convener and organizer has since the beginning 2002 been Dr Magnus Lindström (magnus.lindstrom@helsinki.fi).

About Tvärminne Zoological Station.

The station was founded as a private research base in 1902 by Professor Johan Axel Palmén, who bequeathed it to the University of Helsinki in 1919. Since then, the Station has gradually evolved into the modern research and education institute of today. A prerequisite for a modern field station is that it attracts high quality research. By this measure, Tvärminne is clearly successful. More than two hundred research scientists (non-graduate and graduate students included) work yearly at the Station. We are indebted to the late Professor Palmén for perhaps our greatest asset. He chose the best imaginable location for his field station, not only for marine studies but for many others. The University of Helsinki built new buildings for the station in 1970 and has kept them in good condition. A major repair is scheduled to begin 2020. We have managed to keep our instrumentation and field equipment up-to-date. Although priority has been given to marine research in developing our infrastructure, it is by no means the only subject at T.Z.S. We got a hovercraft in 2016, and the new research boat will be delivered end of 2019. For vision scientists there is the Electrophysiological laboratory, old but very flexible.

If you are planning an international field course or seminar, please, don't hesitate to contact the Station for more information. Please, check our home pages at: http://www.helsinki.fi/tvarminne .

A history book covering the Station's first little more than one hundred years has been published in Finnish and Swedish. The book is plentifully illustrated, interesting and even fun. The Swedish version is easier to understand for English speaking readers. Take a look at the book outside the Office, in which it can be bought for a reduced price of only 30 €. A good gift, especially for Swedish or Finnish speaking biologists celebrating their 50-year anniversaries!

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About Visionarium, and especially Visionarium XVIII

The eighteenth Visionarium has brought 37 scientists to Tvärminne. After this meeting Visionarium has been visited about 735 times by ca. 250 scientists, who have given > 600 presentations. This achievement was something I never could imagined when I back in 2002 invited colleagues, mainly from Helsinki, to take part in an unofficial meeting for vision scientists. The meeting was a success, and next year our colleagues from Sweden and Russia joined us. Since that time Visionarium has been international. For arranging this year's meeting I have received a grant from the Oscar Öflund Foundation, for which I express my gratitude. I also thank those who kindly have sent supporting letters along with my application. Thanks are due to the Zoological Station, which kindly has paid for printing of the Abstract Book and for the cultural entertaining by the JAMM Barbershop Quartet. I hope that the Visionarium will have a positive effect on the flow of ideas, and for creating contacts and collaborations. As important as the lectures is the social part of the program. I feel that even if we all were connected by Facebook or some other social medium it could not replace personal contacts. You are all very welcome.

Visionarium		Date	Participants	Presentation.
I	2002	27-29/9	23	17
II	2003	26-28/9	27	20
III	2004	24-26/9	33	27
IV	2005	23-25/9	37	37
V	2006	22-24/9	47	31
VI	2007	28-30/9	44	30
VII	2008	17-19/10	39	34
VII	2009	25-27/9	52	39
IX	2010	7-10/10	34	24
X	2011	23-25/9	43	37
XI	2012	28/9-30/10	37	31
XII	2013	4-6/10	42	35
XIII	2014	9-12/10	39	35
XIV	2015	24-27/9	51	41
XV	2016	20-23/10	58	52
XVI	2017	28/9-1/10	59	48
XVII	2018	13-16/9	46	36
XVII	2019	14-18/9	37	32

resonance imaging (fMRI) experiments on 13 dogs with equivalent stimulation of the rhinarium were conducted. There was a significant response in the left somatosensory cortex. Studies on erosion casts of the vascular system in dog heads have revealed a structure that appears to be a counter-current heat exchanger to cool arterial blood for supplying the rhinarium skin. There is another supply with warm arterial blood to the capillary network of the rhinarium skin, which is separate from the network of the hairy skin. The papillated skin of the rhinarium is richly innervated by thick, heavily myelinated nerve fibers of the maxillary portion of the trigeminus nerve. Close beneath the skin surface, we have found a previously undescribed skin organ that may be the site of sensory transduction. The molecular mechanism is still unknown. Newborn dog pups already show cold noses at the first day of life. Up to the age of about 10 days, a dog pup cannot smell, hear, or see, so that sensing body heat may guide the young animal to the mother and her teats. All terrestrial carnivorans have cold rhinaria. We have successfully trained a European red fox (*Vulpes vulpes)* with the same experimental design. The ability to sense body heat radiation may therefore be widespread in the mammalian order of Carnivora.

RECEPTIVE FIELD SIZES OF RETINAL GANGLION CELLS IN FISH: WHY DIFFERENT METHODS GIVE DIFFERENT RESULTS

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Introduction. The responses of ganglion cells were recorded from their axonal terminals in tectum opticum of immobilized living goldfish (Maximov et al., 2005). To measure the size of the excitatory part of the retinal ganglion cell receptive field the small single contrast spots flashing in the visual field can be used. When the center of the receptive field is found the structure of the receptive field can be investigated by various visual stimuli depending on the preference of the examined cell. One of the possible ways to examine the interaction between center and periphery is to present centered spots of different sizes and to observe the responses of the cell. We supposed that the response of the cell would be maximal when the size of the spot coincided with the size of the excitatory part of the receptive field. Surprisingly the size of the excitatory part of the receptive field of the sustained ganglion cell measured by this method is often two times larger than the size measured by the use of small flashing spots.

Possible explanations. One of the possible explanations of this phenomenon was suggested by Alexey Aliper. He supposed that receptive fields of sustained retinal units consist of the central excitatory zone, peripheral excitatory part and far peripheral inhibitory part. Another hypothesis suggested by Elena Maximova and Ilija Damjanovic is that these units have ordinarily structured receptive fields with excitatory central zone and inhibitory periphery, but the transition from excitation to inhibition is very smooth. In this work we tried to determine which of the hypotheses is correct based on our experimental data.

Conclusion. Despite the apparent difference in the proposed explanations, the only distinction between the suggested receptive field structures is the precise position of the border between central and peripheral zones. However this position can not be determined from existing data and the new stimuli, namely, concentric rings of different sizes flashing around the receptive field center, need to be developed for the further research.

1. Maximov V., Maximova E , Maximov P. Direction Selectivity in the Goldfish Tectum Revisited // Annals of the New York Academy of Sciences. 2005 V. 1048. P. 198-205. DOI: 10.1196/annals.1342.018