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**Reply to the Comment by A. P. Grammatin on the Paper
“Cat’s Pupil and Apodization” by A. V. Lensky
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The inferences of the paper refer to not only domestic cats (*Felis domesticus*), but the entire cat family (*Felidae*), as well as to many reptiles, amphibian, and other animals. For the most part, these animals are predators that chase prey in the sunny daytime and the absence of disturbing light flashes during their rapid chase is vital for them. For animals with round pupils, including humans, a comparatively large diffraction illumination of the retina from the sun is not as crucial in their living conditions; therefore, it has no disturbing effect on them.

The vertical and horizontal resolutions of a narrow cat’s pupil would significantly differ if the optical system of the eye were free of aberrations, i.e., were diffractionally limited in these two directions; however, this is not the case (see, e.g., A. B. Bonds *Optical Quality of the Living Cat Eye*, J. Physiol. **243**, 777–795 (1974) and references therein). In the vertical direction, for which the aperture is large, the resolution is determined by aberrations, whereas, for the horizontal direction (the aperture is small), it is mainly determined by diffraction; furthermore, both resolutions are comparable, with the second one being even higher. Therefore, it is highly questionable to consider

the resolution to be an influencing factor for explaining the shape and orientation of the cat’s pupil.

If it were not for the special shape of the pupil (a narrow slit that smoothly converges to two angular points), there would arise no question about its orientation. For example, a prolate elliptical or rectangular pupil would not suppress the diffraction solar illumination as the cat’s pupil with angular points does—these angular points make the difference. Therefore, in this case, the shape of the pupil and its orientation are inseparably connected by the function of the highly efficient suppression of disturbing illumination. The explanation of the vertical orientation by a predominantly overhead position of the sun immediately substantiates the specific shape of the pupil, at which the diffraction illumination of the retina proves to be very small compared to any other possible prolate shape (except for a shape with reversal instead of angular points).

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Translated by V. Rogovoi