Geometry of *Odontella aurita*

This article explores the geometry of the inside of a valve of the diatom *Odontella aurita* by measuring the depths of optical slices from the bottom of the cover slip.

This species is a polar centric diatom that lives abundantly in the oceans in the plankton or as an epiphyte. These specimens were collected in Hawaii in 2015, cleaned in hydrogen peroxide, and mounted in Zrax. Sims (ed.) (1996) pl 195 fig 1-2 and from Round et al. (1990) p230 provided identification.

It was tempting to figure out the real depth based on refractive index of Zrax (n=1.7) but I was not able to clearly measure the refractive index (n = real depth / apparent depth). Galbraith (1955) suggests using refractive index this way should be avoided if possible.

Still wanting to study the geometry, I compared the height of the hyaline groove in fig 1 to the height of the groove in fig 4. This convinced me to simply use the calibrations on the fine focus knob of the Nikon Labophot-2 used here.

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Fig 1-2 Girdle view.

Fig 1 High focus showing hyaline groove above edge of mantle. The groove measures 2.2 µm high. A valvocopula with straight rows of areolae lies below the valve (8206).

Fig 2 Low focus on outline with ocelli in cross section and two spines forming exit tubes of the rimoportulae (8207).

Fig 3-7 Valve view, internal view. Depths are from the high focus.

Fig 3 High focus on recurved edge of valve margin. (8208)

Fig 4 Focus on top of hyaline groove where the areolae begin. Depth 3.5 µm suggesting that the groove is 3.5 µm high. (8225)

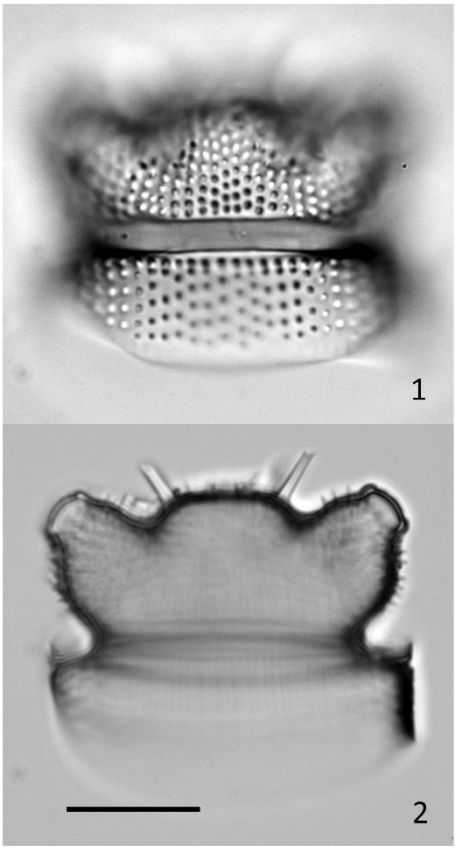
Fig 5 Focus on ocellus outline. Depth 6.5 µm. (8209)

Fig 6 Focus on inside lip of rimoportulae. Depth 9.5 µm. (8210)

Fig 7 Focus on inside of dome. Depth 11 µm. (8211)

Scale bars = 10 µm.

Numbers in parentheses are the image file numbers.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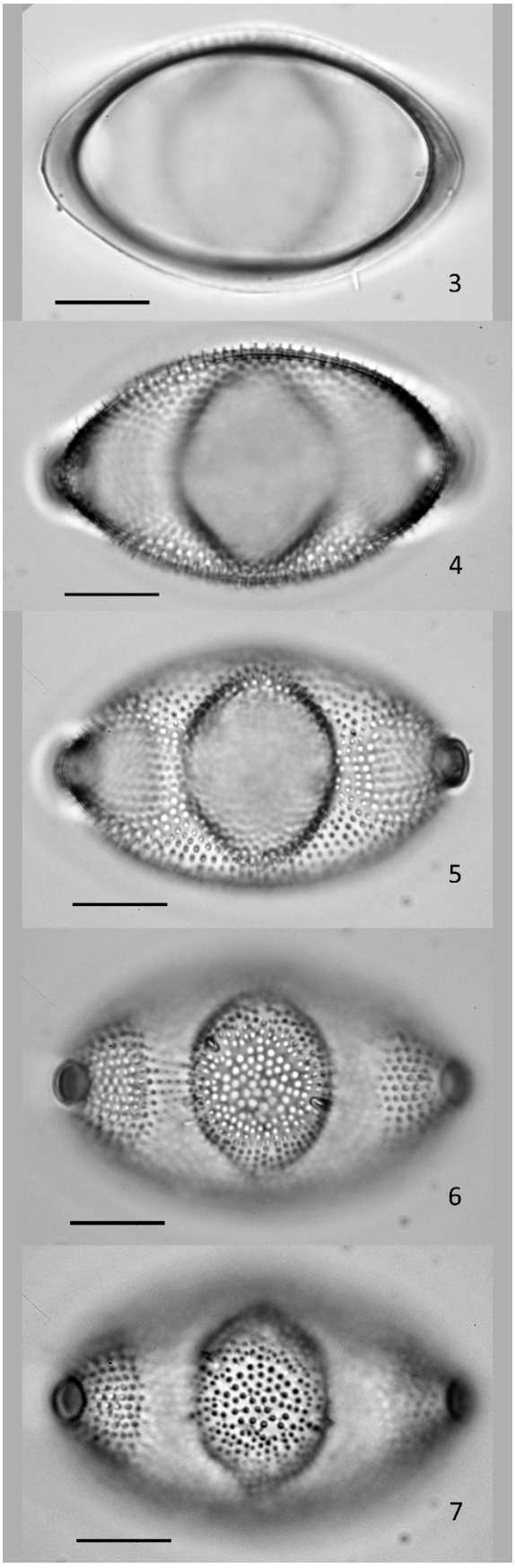
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Appendix 1 – Table of Depths

Fine focus knob readings which Nikon publishes as µm.

image	apparent depth (high focus minus object focus)	depth from high focus
8208	90 – 90	0
8225	22 – 18.5	3.5
8209	90 – 83.5	6.5
8210	90 - 80.5	9.5
8211	90 - 79	11

References

Galbraith, W. (1955) Optical measurement of depth

Round, F.E., Crawford, R.M. & Mann, D.G. (1990). The diatoms biology and morphology of the genera. pp. [i-ix], 1-747. Cambridge: Cambridge University Press.

Sims, P.A. (ed.) (1996). An atlas of British diatoms arranged by B. Hartley based on illustrations by H.G. Barber and J.R. Carter. pp. [2], 1-601, incl. 290 pls. Bristol: Biopress Ltd.

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