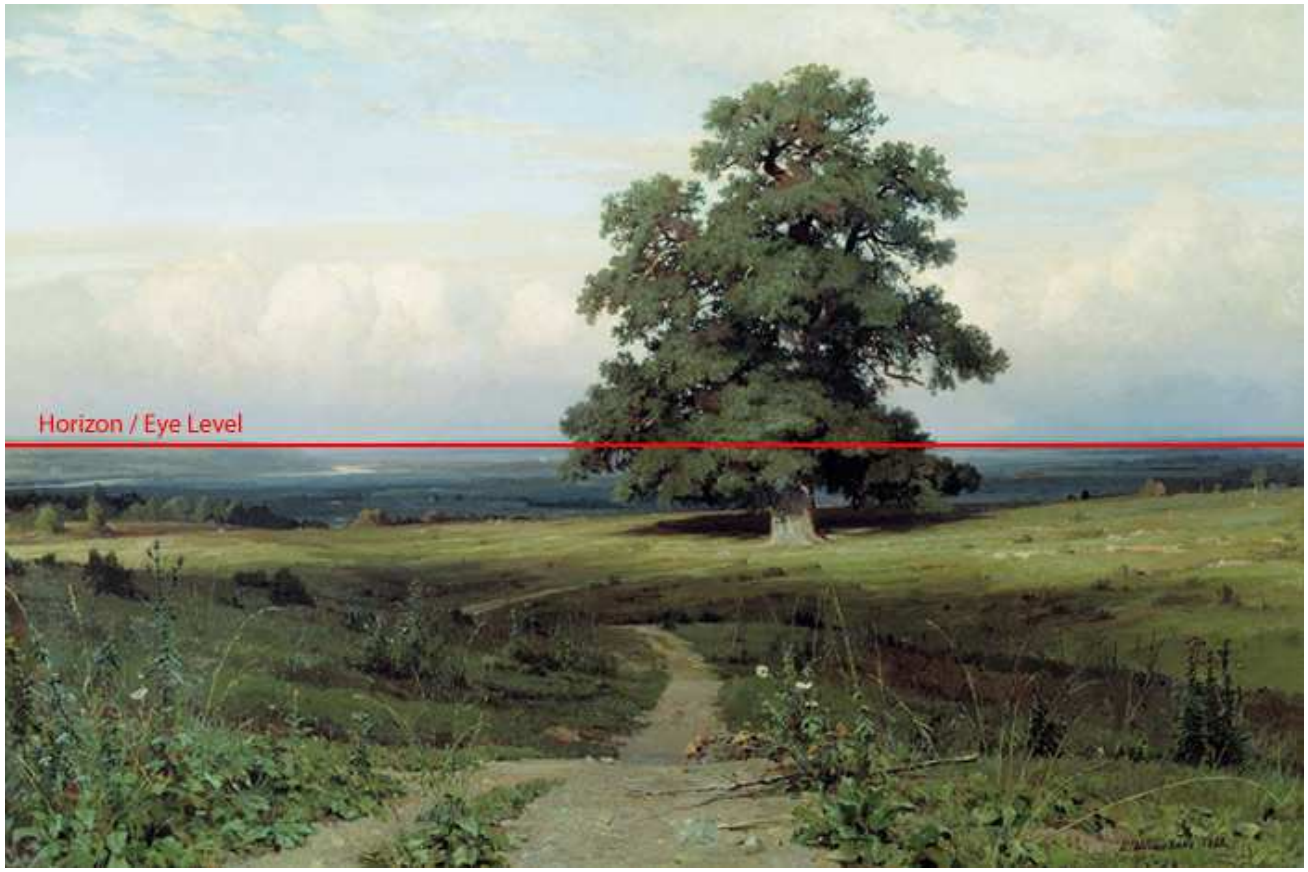
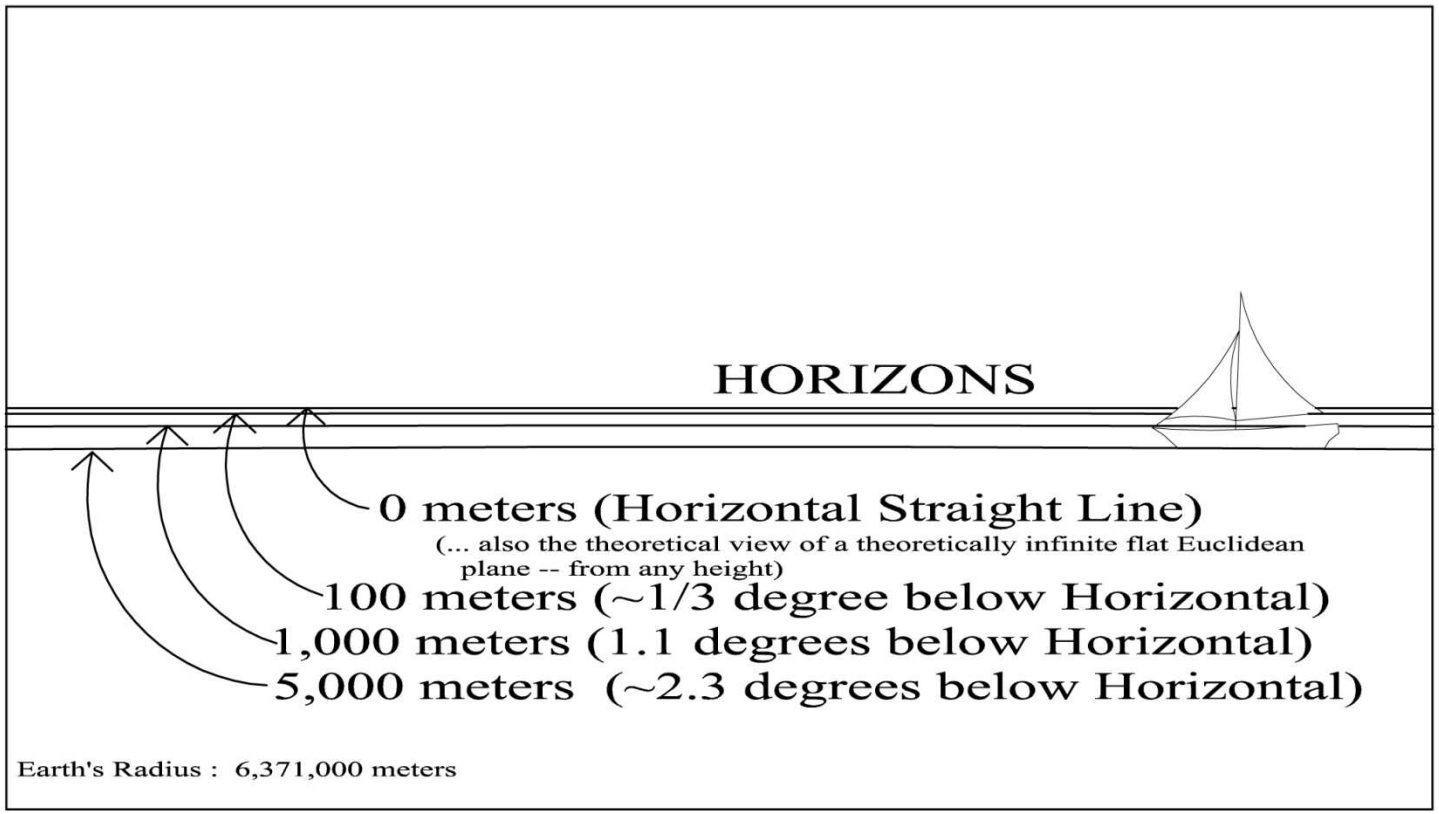
Lake Michigan

From high ground, can a human eye see the curvature of the Earth?



Artists are typically taught to draw their picture's **Horizon** as a simple straight line,
located at the "eye level" of the picture's typical viewer.
This assumes that the ground is a flat plane extending endlessly to infinity.
It's actually a bit more complicated than that.

In 2017 I drew this picture, trying to illustrate how various Perspective views of the **Horizon** would appear to an observer stationed at various heights above a large body of water (assumed to be relatively calm and evenly spherical).



Introduction to the Perspective Illustration of Non-Euclidean Geometry, 2017, pp. 112-113

The **Horizon** appears as a circle, revolving around a central axis on which the observer is located.

When the observer's Eye is at zero height (or at a negligible height above the even surface of the water), then the encircling **Horizon** will appear straight – it will be precisely congruent with the edge of a straight ruler.

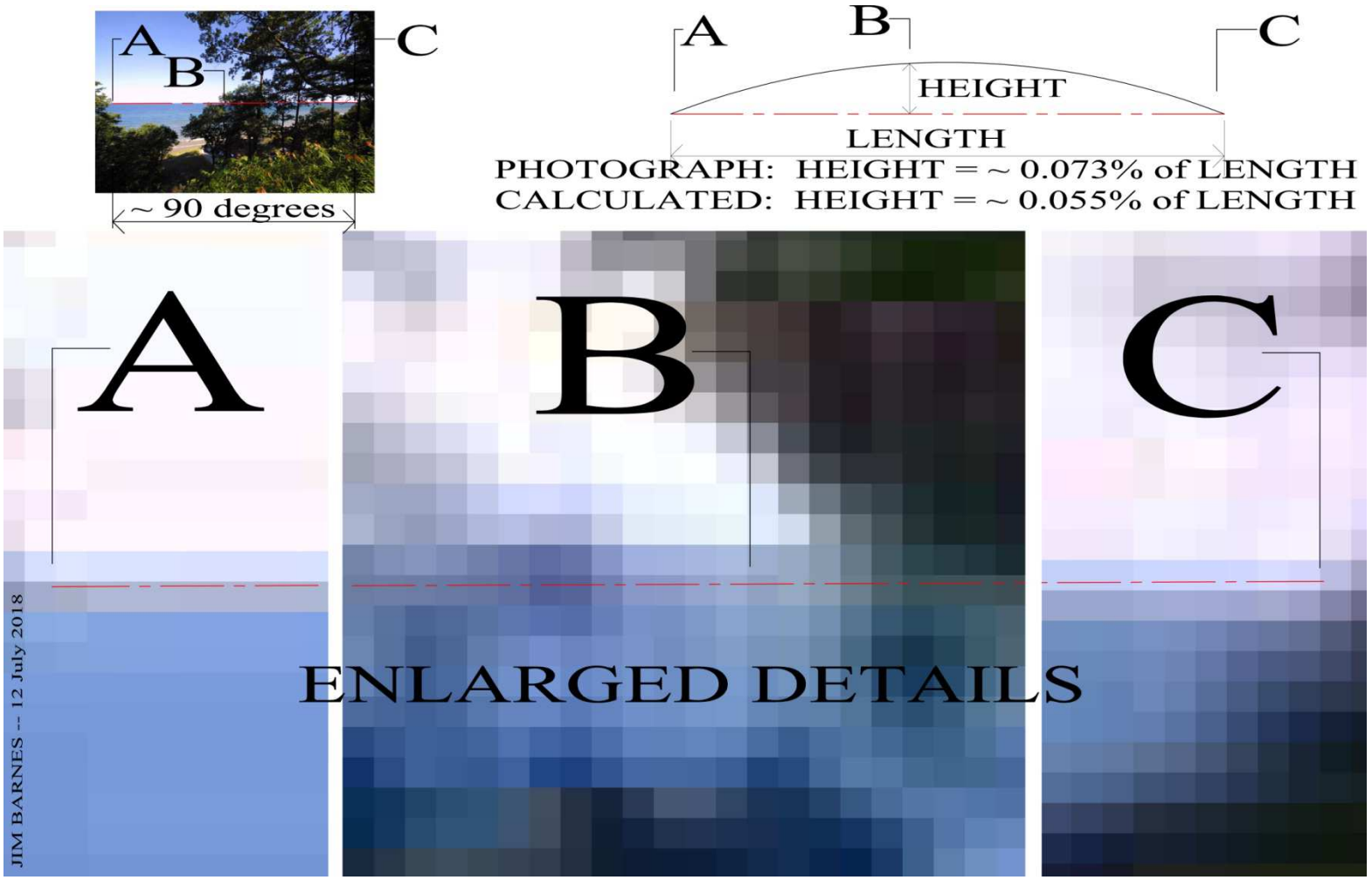
As the observer's Eye rises higher above the smooth surface of the water, then the **Horizon** appears as a circle -- below "eye level". Compared to a straight edge, the **Horizon** will appear to curve.

Does this curvature of the **Horizon** appear visible to a human eye?

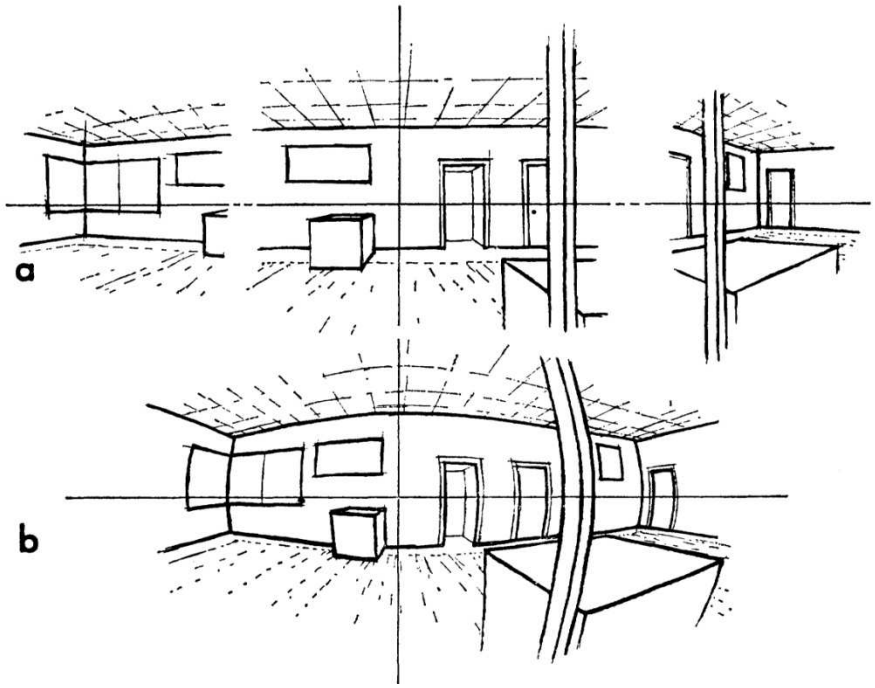
During my summer trip to the shore of Lake Michigan I decided to test this question.
From a sand dune ~ seventy-five feet (23 meters) above the surface of the lake, I looked at the distant **Horizon.**
The curvature was slight and rather subtle, but to my mind a bend to the **Horizon** appeared quite visible.
Surprisingly this curvature was more easily seen by my eye than in my wide-angle lens photographs.

Sighting the **Horizon** across a long straight edge, the curvature was certain.

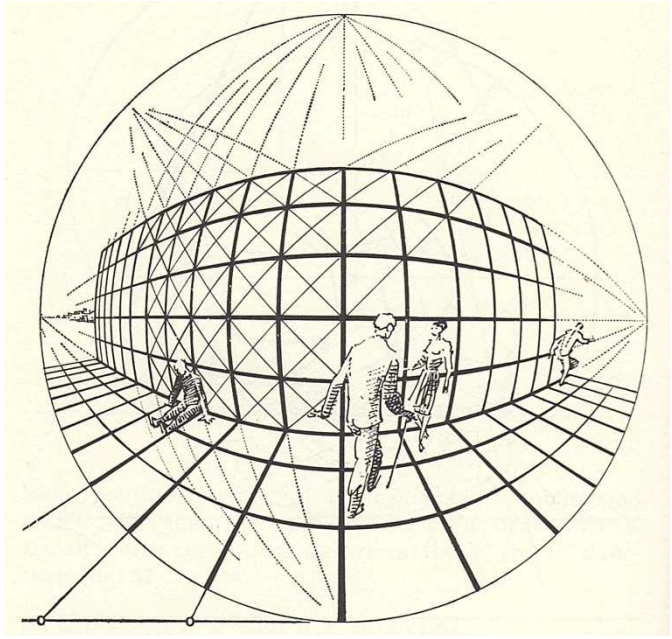
I positioned one open eye so that the outer parts on the visible Horizon were aligned with the edge of the straight rod – at the center point I could then see the Horizon's curve bulging up. To be sure that my rod was not slightly curved, I flipped it over to test it oriented in the opposite direction – still the Horizon's curve was greater than any curvature in my "straight edge" tool. Again, it is easier to see this with my bare eye than in my wide-angle photos.



My calculation gave an answer surprisingly similar to my measurement of the photograph. Despite my guesses about measurements and my crude instruments, the rate of curvature was found to be roughly the same as the calculated prediction.



I indulged in a long digression of thought where I wondered if the curvature created by my camera's lens, or the wide-angle curves of human eyesight predicted by Robert Hansen and *Curvilinear Perspective* might account for the curving appearance of the **Horizon**.



But in the end I was satisfied that if I judged the **Horizon** passing through the center of my eyesight's field of view, or passing through the center of my camera lens' field of view, that a straight line ought to still always appear straight. And the comparison to the straight edge ruler would necessarily always confirm straightness.

The End *– 15th September 2019*