

**Meeting:** 998, Houston, Texas, SS 15A, Special Session on Geometric Variational Problems

998-49-388            **Henry C Wente\*** (hwente@math.utoledo.edu), Department of Mathematics, University of Toledo, Toledo, OH 43606. *Elastica, Sessile Drops, and Exotic Containers*. Preliminary report.

Consider a container filled with a given volume of fluid. In equilibrium the liquid-air interface will be surface whose mean curvature is a linear function of height and which, along with the walls of the container, enclose the prescribed volume. Furthermore, the free surface will meet the container wall at a prescribed contact angle. In gravity-free conditions, the free surface has constant mean curvature. An exotic container is one for which at certain volumes there exist a continuum of geometrically distinct equilibrium configurations. Examples of this phenomenon were first given by R. Gulliver and S. Hildebrandt (no gravity and contact angle of 90 degrees). The more general situation was solved by R. Finn and P. Concus-R Finn. The containers in these examples are rotationally symmetric and have been seen in drop tower experiments. The equilibria in these examples are always unstable. We construct a family of new examples of exotic containers. Our construction will include those described but also many new ones. For some of our examples the equilibria seem to be "stable". (Received March 02, 2004)