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A train of rising Bretherton bubbles[1] MICHAEL J. DAVIS, PETER S. STEWART, STEPHEN H. DAVIS, Northwestern University — Abstract: A closely fitting gas bubble in a vertically aligned capillary tube will rise due to buoyancy when the Bond number exceeds a critical value in the limit of low Capillary number, as shown by Bretherton [*J. Fluid Mech.* **10**, 1961]. We consider a steadily propagating train of such bubbles at various separation distances, and examine the additional influence of a temperature gradient along the walls of the tube. This problem is applicable to processes for manufacturing porous metal solids, where molten foams with low liquid fraction are solidified by an applied temperature drop. We seek to show that gravity can act as a means of control of the porosity of the foam as the liquid is cooled to its melting point.

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