**Bending at the base of a dragged-out viscous thread** MAURICE
BLOUNT, JOHN LISTER, ITG, DAMTP, University of Cambridge — We consider
steady flow of a slender viscous thread falling from a nozzle onto a moving horizontal
belt. We analyse the asymptotic limit of a very slender thread, and show that it
has a boundary-layer structure in which bending stresses only become important
near the belt, where they support a vertical stress and allow the velocity and rolling
conditions to be satisfied. The outer solution is analogous to a viscous catenary, with
velocity fixed at the belt and at the nozzle. There are three asymptotic regimes,
with distinct structures, corresponding to the cases that the belt speed is larger than,
smaller than, or close to the velocity of a freely falling thread. The implications for
the onset and amplitude of meanders in the 'fluid-mechanical sewing machine' are
explored.

Maurice Blount
ITG, DAMTP, University of Cambridge