

Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Progressive internal waves of permanent form JOHN MCHUGH,
University of New Hampshire — Progressive internal waves of permanent form in a semi-infinite layer of stratified fluid are considered. Such waves were previously considered in a layer of finite depth by Thorpe (1968) and Yih (1974). Both of these previous studies have difficulty with uniform validity, which becomes critically important in the unbounded layer. New results are obtained here using a different expansion, still assuming small wave amplitude. A model equation is useful in directing the choice of expansion. Long's equation is used for the governing equation. The upstream velocity is assumed constant and equal to the wave speed, making the problem steady. The upstream density profile is chosen to have constant Brunt-Vaisala frequency, however for nonlinear waves, the upstream density profile must be adjusted to avoid mass transport through a streamline, as demonstrated by Yih (1974). This adjustment involves non-Boussinesq effects. The results show that the wave amplitude can reach a maximum at a finite altitude, depending on the background state.

John McHugh
University of New Hampshire

Date submitted: 04 Aug 2005

Electronic form version 1.4