1032-76-163 **Peter Vorobieff*** (kalmoth@unm.edu), MSC01 1150, Department of Mechanical Engineering, The University of New Mexico, Albuquerque, NM 87131, and **Tanveer Shakeel** and **Aparna Korlimarla**. *Quasi-two-dimensional turbulent decay and fossil turbulence.*

We present an experimental study of decaying quasi-two-dimensional turbulence in a flowing, gravity-driven soap film. The soap film tunnel used in the experiments can produce the two-dimensional analogs of grid and shear-layer turbulence. The behavior of the experimental system deviates from the "ideal" behavior governed by two-dimensional Navier-Stokes equations due to the presence of extra dissipative forces in the system (*e.g.*, air drag between the moving soap film layer and the ambient air). The presence of these forces notwithstanding, the statistical properties of the system, at least within a certain range of scales, are consistent with the predictions of two-dimensional turbulence theory. The rate of turbulence decay we observe is somewhat higher than that predicted for ideal two-dimensional turbulence, likely due to the influence of the extra dissipative terms in the governing equations. There also exists a threshold scale beyond which the air drag becomes dominant, leading to rapid dissipation of the energy carried by the flow structures. Flow visualization with passive scalar tracer shows these large-scale structures advected by the mean flow without evolving, indicative of *fossil turbulence*. (Received August 20, 2007)