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Process of formation of a vortex street in the wake behind a flat plate

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Abstract. The process of the formation of a vortex street in the wake behind a flat plate set parallel to a uniform flow was investigated in a low speed wind tunnel. The vorticity distributions in the wake were calculated from the measured velocities using Taylor's hypothesis.

Just behind the plate, the equi-vorticity lines were nearly parallel to the free stream. At locations somewhat downstream, sinusoidal contour lines appeared near the wake center. Further downstream, some closed contour lines appeared in the figures mapped. The arrangement of the closed lines suggests the existence of a vortex street. The maximum value for vorticity in a wave length of the fundamental velocity fluctuation decreased in the downstream direction; the concentration of vorticity, however, increased in a region the further downstream it was. Meanwhile, the value for circulation obtained by the surface integral of vorticity within the closed contours of a vortex increased until the vortex street was established.