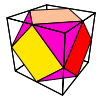
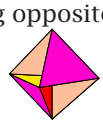
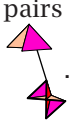
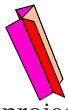
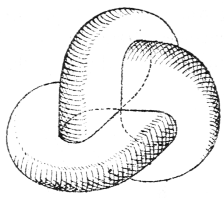
About the Cover

Collapsing Boy's Umbrellas

This month's cover accompanies Rob Kirby's *What is Boy's Surface?* A polyhedral model of the real projective plane is obtained by identifying opposite points on a truncated cube  to obtain a  heptahedron whose 1-skeleton is a well known figure  . It possesses at each vertex a copy of a singularity known as *Whitney's umbrella*. One can connect these in pairs along three transverse edges of the heptahedron  . As is often pointed out in the literature, there is no deformation of Whitney's umbrella into an immersion, since the boundary of a small neighborhood disk is a figure eight. But the neighborhood of an edge with two such singularities at opposite ends  may be deformed into an immersion  to obtain Boy's surface, an immersed copy of the real projective plane in three dimensions. The resulting tubes may be seen in the usual pictures of Boy's surface, for example this one taken from Boy's original paper:



A nice image of a smooth version of Whitney's umbrella can be found at `http://www.geom.uiuc.edu/zoo/features/whitney/`.

The smooth version of the heptahedron is called Roman's surace. It can be seen at `http://mathworld.wolfram.com/RomanSurface.html`.

—Bill Casselman, Graphics Editor

(`notices-covers@ams.org`)