Projective (or more generally compact Kähler) manifolds with vanishing first Chern class form an important building block of algebraic varieties in general. I will recall the three basic types of examples (complex tori, holomorphic symplectic and Calabi-Yau manifolds) and their basic structure theorem, the Beauville-Bogomolov decomposition. In the second part, I will focus on the singular counterpart of the above theory and in particular on how to distinguish complex tori among K_X-trivial varieties by looking at certain intersection numbers. The last part is a joint work with B. Claudon (Rennes) and H. Guenancia (Toulouse).