1021-05-138 **Alexander Postnikov*** (apost@math.mit.edu), Departement of Mathematics, M.I.T., Cambridge, MA 02139. *Combinatorics of Grassmann cells.*

We discuss the combinatorics that came from the totally positive Grassmannian. Simply put, we solve the following problem. Suppose we know that all maximal minors of a k x n - matrix are either strictly positive or equal to zero. What can we say about possible configurations of nonzero minors? These configurations are given by certain geometrical objects that we call nonnegative Grassmann cells. We show that these cells are in bijection with many interesting combinatorial objects: L-diagrams, decorated permutations, planar networks modulo some transformations, alternating chord diagrams, rook placements on a certain skew chessboard, regions of a certain hyperplane arrangement, matroids of special kind, elements in some intervals in the Bruhat order, degenerations of cyclic polytopes, and many others. We construct explicit bijections between these seemingly different objects. We also discuss the partial order on these cells, which extends the Bruhat order. (Received September 01, 2006)