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We present general results on (bi-infinite) arrays having all adjacent  $k \times k$  adjacent minors equal to one. In particular, we consider the situation when these arrays are of minimal rank, describing how to construct them all. Several intriguing new properties are made apparent, and ties with  $T$ -systems of statistical physics, cluster algebras, and frieze patterns of Conway-Coxeter will be outlined. (Received September 16, 2009)