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George E. Andrews* (andrews@math.psu.edu), Dept. of Math., McAllister Bldg., Penn State University, University Park, PA 16802, and **Peter Paule**. *Further developments in MacMahon's partition analysis.*

P.A. MacMahon developed a calculus for producing generating functions of partitions constrained by linear inequalities relating the various parts of the partitions. Recently we have used MacMahon's method to find new classes of partitions whose generating functions are modular forms (Acta Arith., 126(2007), 281-294), and we have retrieved MacMahon's original project which was to prove his generating function formula for plane partitions. We shall report briefly on these topics and indicate new areas for exploration. In particular, we shall consider the modification of MacMahon's methods in which the inequalities relating the various parts of the partition take into account congruence constraints on the parts. (Received July 31, 2007)