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Introduction

It has been reported that Dénes König, the author of the classic *Theorie der endlichen und unendlichen Graphen* (Leipzig, 1936), expressed a special liking for infinite graphs, which certainly receive substantial attention in his book. Nevertheless, the majority of combinatorialists seem to have concentrated on finite combinatorics, to the extent that it has almost seemed an eccentricity to think that graphs and other combinatorial structures can be either finite or infinite.

However, there seems to be no logical reason why combinatorial structures should 'usually' be finite, and indeed this would preclude many fascinating avenues of exploration. To a considerable extent, finite and infinite combinatorics are parts of the same subject. Most of the concepts of finite combinatorics and many of its results carry over (sometimes in more than one way) to the infinite case. Results and problems in infinite combinatorics often arise from seeking analogues of corresponding finite results, and sometimes the attempt to do this also leads to new ideas in finite combinatorics.

Nevertheless, infinite combinatorics has its own distinctive features. Some of its problems, such as certain ones involving *ends* of graphs, have no meaningful finite analogue but are closely related to other parts of mathematics. Sometimes problems which are difficult for finite structures become trivial or easy in the infinite case because infinite structures allow so much more room for manoeuvre. On the other hand, the passage from finite to infinite structures often introduces new difficulties, commonly, but not always, of a set-theoretic character. Sometimes these two phenomena occur together, i.e. passing to the infinite case of a problem may reduce some difficulties while introducing others. Increasingly, interactions between infinite combinatorics and mathematical logic are coming to light.

So far as I know, the very interesting and successful Cambridge conference on *Directions in Infinite Graph Theory and Combinatorics* was the first conference devoted wholly to infinite combinatorics. Therefore this conference, and the appearance of this volume, may be hailed as something of a landmark, showing increasing recognition of the far-reaching possibilities of infinite combinatorics after a period of comparative neglect. It provides an excellent introduction to the field and pointers to other relevant literature. Several of its papers show the increasing interaction of infinite combinatorics with mathematical logic and set

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theory, as well as with aspects of topology and algebra. For all these reasons, the volume seems likely to play a major part in generating interest in infinite combinatorics, and deserves to be widely distributed and read.

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